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The Role of Land Management Projects



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ABSTRACT: The following negative factors have had a significant impact on the withdrawal of irrigated arable land from agricultural turnover in the Kashkadarya region of the Republic of Uzbekistan. 44,818 ha (64.5%) out of 69,469 ha of arable land in the region fell into disrepair due to lack of water supply, and 8,124 ha (11.7%) fell into disrepair due to unsuitable irrigation systems (canals, flumes and ditches) into disrepair, 1069 ha (1.5%) due to non-working artesian wells and failed pumps, 13359 ha (19.2%) due to the deterioration of the ameliorative state (1779.0 ha groundwater rose and swamped, in 11580 ha increased mineralization), 2126 ha (3.1%) have a layer of gypsum and all these reasons led to the fact that arable land was dropped from agricultural circulation and perennial crops turned into shrubs as a result of non-cultivation.

This article describes the results of scientific and practical research conducted by the State Research and Design Institute "Uzdaverloyiha" in 2018-2021 in order to increase the efficiency of land use in Kashkadarya region, where the situation has deteriorated and lost its agricultural turnover.

KEYWORDS: Kashkadarya region of the Republic of Uzbekistan, degraded and out of agricultural use lands, land management projects, efficiency.

INTRODUCTION

Fallow land is land that was previously arable and not used for sowing crops for more than a year from next autumn and not left for pure plowing. [3; 280-b.].

In 2018-2021, the State Research and Design Institute "Uzdaverloikha" conducted scientific and practical research on lands in a degraded state and out of agricultural circulation.

Object and methods of research. The object of the study is deposits in the Kashkadarya region of the Republic of Uzbekistan, where the situation has worsened and dropped out of agricultural circulation. The study is a generally accepted method in practice [4; 462-s., 2; 120-s., 3; 280-s.].

RESULTS OF THE STUDY AND THEIR DISCUSSION

As of January 1, 2021 [1; 35], the total land fund of the Kashkadarya region is 2856.8 thousand hectares, of which 21.9 thousand hectares (0.8%) are deposits.

According to the analysis of the dynamics of changes in irrigated arable land in the region in 2021, compared to 2004, the area of irrigated arable land decreased from 374,626 ha to 347,359 (-27,267 ha), and, conversely, there is a steady increase in population from 2,378, 5 thousand to 3,335.4 thousand (+956.9 thousand). As a result, the level of land provision in relation to the population decreased from 0.16 ha to 0.10 ha (-0.06 ha). These cases show that the increase in the fallow area occurs, on the one hand, due to population growth, and on the other hand, due to a sharp reduction in irrigated arable land.

The following negative factors had a significant impact on the exit of irrigated arable land from agricultural circulation in the Kashkadarya region of the Republic of Uzbekistan. At the same time, 44,818 ha (64.5%) out of 69,469 ha of arable land in the region fell into disrepair due to lack of water supply, and 8,124 ha (11.7%) fell into disrepair due to unsuitable irrigation systems (canals, flumes and ditches). into disrepair, 1069 ha (1.5%) due to non-working artesian wells and failed pumps, 13359 ha (19.2%) due to the deterioration of the ameliorative state (1779.0 ha groundwater rose and swamped, in 11580 ha increased mineralization), 2126 ha (3.1%) have a layer of gypsum and all these reasons led to the fact that arable land was dropped from agricultural circulation and perennial crops turned into shrubs as a result of non-cultivation.

The Role of Land Management Projects

In studies [5; 179-182-p.] developed land management projects in order to improve the efficiency of melioration and use of agricultural land.

Project 1: In order to reuse 1085.0 hectares of irrigated arable land in the A.Navoi massif of the Guzar district of the Kashkadarya region, 3.18 km of the Turtsari canal and 4165 km of the Turtsari-2 canal were cleared. According to the analysis, the total cost of the project is 259,441.1 thousand soums in national currency, and the cost of reusing one hectare of land will decrease to 239.1 thousand soums.

According to the analysis of efficiency and payback period, the net profit from one hectare of soybeans can be more than 2,861.9 thousand soums in national currency, and the total profit from 1,085 hectares of land under the project can be more than 3,105,177.7 thousand soums. This will create jobs for unemployed citizens living in more than 350 villages. In this project, the coefficient of efficiency of capital costs is determined to be 1.7, and the payback period is 0.6 years.

Project 2: The cost of reconstruction of the Khanabad canal in the territory of A. Navoi Guzar district of Kashkadarya region and the construction of water supply systems, the installation of 2 pumping units and the layout of 1085 hectares of arable land will amount to 6246634.5 thousand soums in national currency. This means that the cost of converting one hectare of arable land into irrigated arable land is 5757.3 thousand soums in national currency.

A comparative comparison of the above projects 1 and 2 reveals the possibility of redevelopment of 24.1 hectares of irrigated land at the expense of the cost of converting one hectare of arable land into irrigated arable land.

Project-3. A project has been developed to re-enter 197.81 hectares of agricultural land in the Turkmaniston massif in the Nishan district of the Kashkadarya region into agricultural circulation using a laser installation. According to the results of the analysis, the payback period of the project is 0.6 years. The main thing is to expand the irrigated area by 28.9 hectares and create 40 new jobs.

CONCLUSIONS

Suggestions and recommendations. The role of land management projects in practice is great. According to the analysis of socio-economic, organizational, economic, technical, technological and environmental indicators, the efficiency of re-development of 24.1 hectares of irrigated land will be achieved by transferring one hectare of arable land to newly irrigated arable land. This situation indicates that the cost of land turnover will decrease by almost 24 times. The introduction of water-saving technologies has led to the expansion of irrigated land by 28.9 hectares and the creation of 40 new jobs.

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Physical and Mechanical Properties of Roll Materials Made of Local Raw Materials



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ABSTRACT: The article presents the results of experiments on the development of coiled insulating material based on gossypol resin bitumen and provides indicators of physical, mechanical and technological research.

KEYWORDS: gossypol resin, basalt fabric, secondary polyethylene, conditional strength, porosity, moisture absorption, elasticity, thermal analysis.

INTRODUCTION

The production of rolled roofing material is a costly process, the cost of cardboard, bitumen and fillers are 80-85% of the total production costs. Improving the exploitation properties and reducing the cost of this type of material can be achieved by modifying the bitumen binder or using non-conventional bitumen and choosing the right fillers.

To this day, despite the diversity of the names of companies that produce roll materials, the structure of the products they produce, the bases used in the composition and the binding materials are almost the same. They use petroleum bitumen as binders in the amount of 70-80% of the total mass. When choosing a technical solution for roofing and repair work should take into account not only the initial cost of the work and roofing materials, but also its physical and mechanical properties, and most importantly long-term durability, ie they require at least 20 years of service [1].

PROBLEM STATEMENT

The creation of a new generation of roll materials, which is free from the existing shortcomings in the roll materials used to this day, is a pressing issue. In this article, the competitiveness of this type of products high-efficiency, low-cost, easily accessible raw materials, based on the waste of fat-oil combinant was proved by a comparative study of physical and mechanical properties.

RESEARCH METHODS

The research used chemistry, analytical chemistry and modern physicochemical methods.

THE PURPOSE OF THE RESEARCH

The purpose of this scientific work is to test the physical and mechanical properties of roll materials based on industrial waste and local raw materials in modern methods.

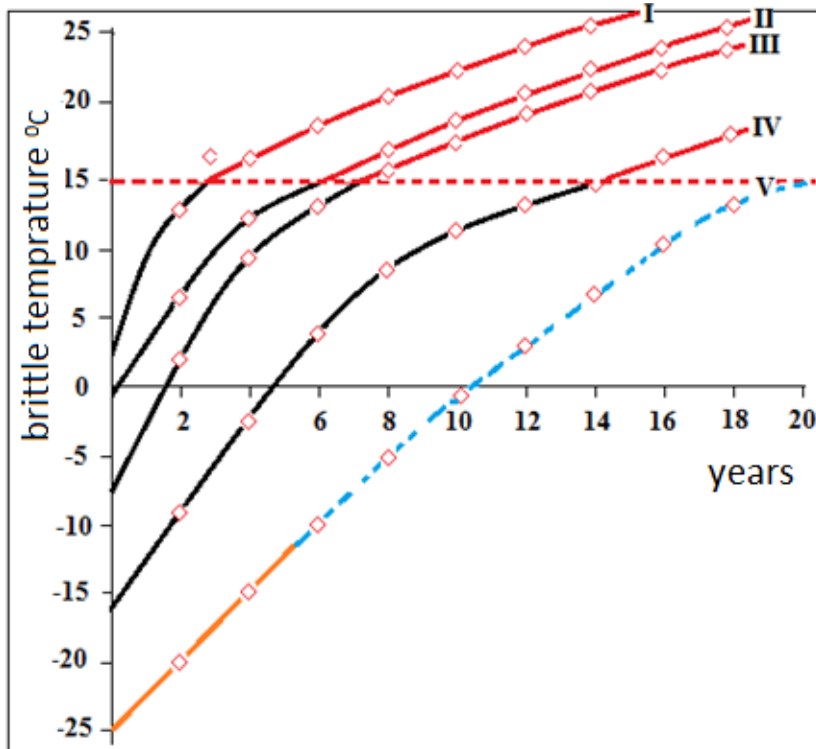
PART OF RESEARCH

In the production of a new generation of roll materials used non-traditional materials gossypol resin-based bitumens, basalt fibers, secondary polyethylene and other resources. The main object in determining the physical and mechanical properties of the new generation of roll material is the following of the composition in percentage - bitumen based on gossypol - 80.0; rubber resin (0.1mm) - 5.0; basalt fiber- 3.0; secondary polyethylene - 7.0; talc-5.0, was tested.

The brittleness temperature is one of the most important factors in any roll materials. It is known that the material is considered unusable when this value exceeds 15 °C. We began the first series of our research with a comparative study of the change in brittleness index of the composition created over the years. This is because the wear of the resulting composition under the

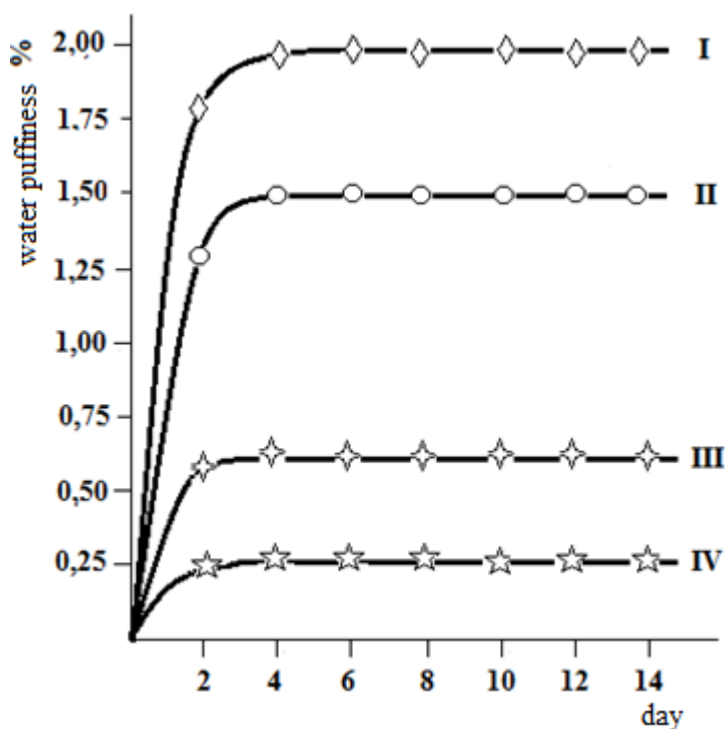
Physical and Mechanical Properties of Roll Materials Made of Local Raw Materials

influence of heat is directly related to the service life. In a comparative study of these indexes, 1-ruberoid, 2-synthetic fiber roll material, 3-glass fiber composition, 4-asbestos fiber and 5-basalt fiber roll materials were tested. The results are shown in Picture 1. According to the results of the comparative study, the superiority of the brittle properties of the new composition over other analogues and its compliance with all standards was scientifically and practically justified.



Picture 1

In the later stages of the study, we tested the water puffiness of the above materials relative to the above analogues. The results are shown in Picture 2.



Picture 2

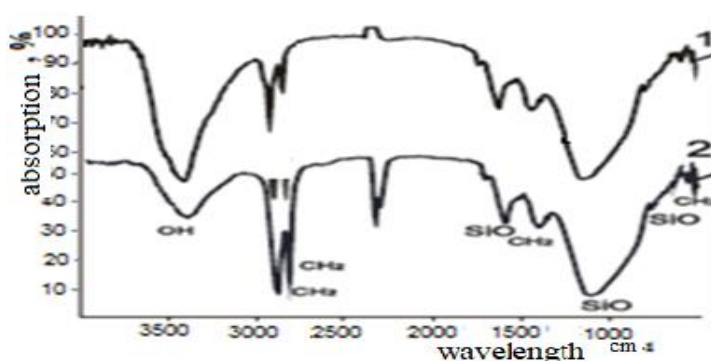
The main parameters of the created compositions were determined in subsequent resars in given in the requirements of GOST 2678 comparison with ruberoid. The results of the study are presented in Table 1.

Physical and Mechanical Properties of Roll Materials Made of Local Raw Materials

Table 1. Comparative physical and mechanical properties of bituminous roll materials based on ruberoid and gossypol resin

Material	Conditional strength	In stretching delay power H	Flexibility R=20 mm °C	Strength in bonding with concrete MPa, not less	Bending in the temperature range	water puffiness in 24 hours, %	Water conductivity during 72 hours 0,001MPa	Service life, year
Ruberoid	5,6	220 - 340	5	0,45	15,0	5,0	2,0	5
Gosizol	7,8	600-650	0	0,61	-55 +100	2,0	not swallowed	30

The presence of bitumen matrix and basalt fibers (length 15-20 mm) in the roll materials provides a certain degree of elasticity. The irregular arrangement of these fibers ensures smooth physicochemical performance throughout the material. IR spectra of the constituents of the obtained composition were studied in the range of 400-4000 cm^{-1} . The samples being tested were crushed on an agate stupa and placed between NaCl and KBr plates. Hexachlorobutadiene was used as an immersion fluid in the recording of high-quality spectra in the 4000-2000 and 1500-1300 cm^{-1} regions, and Vaseline oil was used in the 2000-1500 and 1300-400 cm^{-1} regions.



Picture 3. IR spectra:

1- basalt fiber; 2 - polyethylene + basalt fiber.

As can be seen in the figure, the valence oscillations of the silicon-oxygen chain Si-O in a wide-density feldspar of length 1145 cm^{-1} are repeated in the anorite $\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$, albite $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$ and the solid solution $[\text{SiO}_3]^{2-} [\text{SiO}_4]^{4-}$ one, two, three, four, five, seven tetrahedral chains are distinguished. The main active groups are Si-O, Al-O bonds and Si-O-Si and O-Si-O silicon-oxygen bridges. Basalt contains a nonsymmetric compound $2\text{MgO} \cdot \text{SiO}_2 - 2\text{FeO} \cdot \text{SiO}_2$, the component of which is an isolated $[\text{SiO}_4]^{4-}$ tetrahedron. The heterogeneity of the distribution of the Si-O bond and other bonds in the basalt composition is very weak at a distance of 800 cm^{-1} . The oscillations of the Si - O bond are characteristic of the hydroxyl oscillations of the lowest maximum N30⁺ ions at a maximum of 1750 cm^{-1} .

For basalt fiber-polyethylene samples, the maximum intensity of the assimilation range of vibrations of CH₂ groups is 2 times more than 2922 cm^{-1} and 2852 cm^{-1} . This is also explained by the presence of secondary polyethylene in the samples. However, no shift in these maxima was observed in the IR spectra of all samples. This means that the interaction of polyethylene films with the active centers of the basalt fiber surface does not affect the strength of -C - C - C - and - C - H - compounds. But there is a deformation of these relations. All levels 1466 cm^{-1} and 1469 cm^{-1} , which is caused by vibrations, showed the presence of polyethylene in the IR spectra of the samples. At a maximum height of 1375 cm^{-1} vibration of CH₂ groups occur.

The thermal stability of the obtained materials was also assessed by the thermogravimetric analysis method. Samples of composite material obtained under laboratory conditions are characterized by low mass losses up to 300 °C (Table 2).

Table 2. Differential thermal analysis of roll material based on basal fibers and secondary polymers

Composition	The main stages of destruction		Weight loss at a temperature of °C., %						E _{akt} , KJ/mol
	T _n -T _k , °C	M _n -M _k , % M _{max}	100	200	300	400	500	600	
	T _{max}								
Polyethylene + Basalt layer	160-240	0-4							
	200	2	0	2	7	20	37	37	32,95
	330-540	10-37							
	390;470	18;35							

Physical and Mechanical Properties of Roll Materials Made of Local Raw Materials

Thermo gravimetric analysis showed that the mass loss for basalt fiber modified materials was 24% less. When secondary polyethylene was used to obtain the roll material, the mass loss was reduced according to the TGA compared to the primary polyethylene-based sample and was 30-37%, respectively. This indicates the emergence of structural processes in the processing of polyethylene and leads to a high level of heat resistance, however, it reaffirms the effectiveness and expediency of using secondary polyethylene to obtain layered materials.

Basalt fibers, unlike common glass fibers, have high crystallization ability and high heat and chemical resistance. High-pressure polyethylene consists of polymers containing crystals (40-60%) and amorphous regions.

The created compositions were tested in HCl and H₂SO₄ solutions in aggressive environments. The acid resistance of this composition is based.

CONCLUSION

- For the first time, a new type of bitumen-based roll technology has been developed for gossypol resin. For the first time, a new type of roll material (based on bitumen from gossypol resin) technology has been developed. In order to solve the problems of quality and prolongation of service life of the tested materials in the developed technology, petroleum bitumen was replaced by bitumen obtained from gossypol resin with the addition of various local components. The use of basalt fibers and secondary polyethylene in the formation of roll materials was demonstrated for the first time.

- The presence of bitumen matrix and basalt fibers (length 15-20 mm) in the packaging materials provides a certain degree of elasticity. The irregular arrangement of these fibers ensures smooth physicochemical performance throughout the material.

- Bitumen based on gossypol resin, secondary polyethylene (industrial waste) has been proven to be effective and expedient when using basalt fiber for the formation of roll materials superior to its bitumen and fiberglass-based analogues in terms of physical-mechanical and chemical properties.

Thus, the combination of basalt fiber with polyethylene allows the wrapping material to have high mechanical properties, as well as the efficient use of secondary polymers and low basalt fibers as a polymer matrix.

THE RESULTS OBTAINED AND THEIR DISCUSSION

Based on the above, it can be concluded that the technology of roll materials based on oil-free bitumen, basalt fiber and secondary polyethylene was developed for the first time, it has many advantages compared to industrially produced petroleum bitumen roofing materials and is inexpensive.

Using modern methods, it was found to be distinguished by its physicochemical and mechanical properties, heat resistance, chemical resistance, water resistance and cold resistance. The created compositions have high strength, heat and sound resistance, sufficient flexibility and cold resistance, high resistance to moisture, chemical environment analogues, simple production technology, high efficiency of the obtained products, low cost.

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Genetic Diversity for Zinc, Iron and Yield Contributing Characters in Pearl Millet [*Pennisetum glaucum* (L.) R.Br.] Genotypes



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ABSTRACT: The most widely grown drought-tolerant warm-season coarse grain cereal, Pearl Millet [*Pennisetum glaucum* (L.) R.Br.] is grown on almost 26 million ha. Pearl Millet is India's fourth most extensively and widely produced food crop. This study aims for estimation of genetic variability among fifty-two genotypes of Pearl Millet were grown at Bajra Research Scheme, College of Agriculture, Dhule, (MS) during *Kharif*, 2020, in a Randomized Block Design with three replications. The maximum inter-cluster distance (D^2) were observed between clusters VI and VII (23.06) and cluster minimum between II and III (8.23). The significant differences due to genotypes with high range (D^2) value clearly indicated the presence of adequate diversity among genotypes studied. Among the genotypes divergence contributed maximum (41.63%) to iron content, followed by plant height (19.23%), panicle girth (15.16%), test weight (6.86%), days to flowering (5.13%), yield per plant (4.15%), panicle length (4.00%), and zinc content (3.39%) etc. Hence, this traits suggested important indices for selection of superior genotypes of pearl millet in breeding programs.

KEYWORDS: Genetic diversity, Pearl millet.

INTRODUCTION

The pearl millet is most important cereal crop which feeds major group of country. After maize, rice, wheat, barley, and sorghum, Pearl Millet is the world's sixth most significant cereal crop. After rice, wheat, and maize, Pearl Millet is India's fourth most extensively and widely produced food crop. During the 2018-2019 season, it covered an area of around 6.93 million tones and produced 1234 kg/ha. It outperforms all other cereals due to its unique characteristics: a C_4 plant with high photosynthetic efficiency, high dry matter production capacity, and the ability to grow in the harshest agro-climatic conditions, where other crops such as sorghum as well as maize fail to produce economically viable yields. The nutritional values of 100 seeds of pearl are energy 360 calories, moisture 12%, protein 12 %, fat 5 g, mineral 2 g, fiber 1 g, carbohydrates 67 g, calcium 42 mg, phosphorous 242 mg, iron 8 mg, and zinc 3.1 mg respectively. To begin with any crop improvement programme, the information of genetic variability in genetic system of particular crop is sought as pre-requisite. Although increased seed yield is the ultimate aim of the plant breeders, seed yield is a product of interaction of many component traits, which influence it directly or indirectly. Therefore, variability and diversity existing within each component traits must be exploited by selection to realize seed yield. Assessment of genetic diversity is a basic step in any crop improvement programme.

MATERIAL AND METHOD

The 52 genotypes of pearl millet were evaluated in a Randomized Block Design (RBD) with two replications during kharif-2020, at a distance of 50 x 15 cm with two replications. The divergence analysis was carried out by D^2 statistic of Mahalanobis (1936) as described by Rao (1952). Analysis of variance for the individual characters was worked out as per Randomized Block Design to test the significances among the genotypes. The characters exhibited significant differences were only used for further analysis of D^2 statistic. The analysis of covariance for pairs of characters, based on plot averages was carried out.

$$D^2 = \sum_{i,j} \lambda_{ij} \delta_i \delta_j$$

Where,

λ_{ij} = The reciprocal matrix to common dispersion matrix

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δ_i = Difference between the mean values of the two Populations for the *i*th character. ($\mu_{i1} - \mu_{i2}$)

δ_j = Difference between the mean values of the two populations for the *j*th character. ($\mu_{j1} - \mu_{j2}$)

μ = Vector of mean value

RESULTS AND DISCUSSION

The present investigation undertaken with view to genetic diversity and correlation coefficient of fifty-two diverse genotypes in pearl millet. The genetically diverse parents are known to produce high heterotic effects and consequently give desirable recombinants in the breeding material or wide spectrum of transgressive segregants in segregating generations. Multivariate analysis (D2 statistic) measures the genetic variability quantitatively among a set of genotypes. The fifty-two genotypes under study were therefore, assessed for genetic diversity for a set of twelve characters. The fifty-two genotypes were grouped into seven clusters presented in Table No.2. Cluster I had maximum genotypes (28 genotypes) followed by cluster II (12 genotypes), cluster III (8 genotypes) and remaining all other clusters viz., IV, V, VI, and VII containing single genotypes (monogenic).

The pattern of group constellation proved that significant amount of variability existed among the studied genotypes. Mahajan and Wadikar (2012) also observed the wide diversity in the experimental material. The intra and inter-cluster D^2 values among seven clusters are given in Table No. 3. Intra-cluster distance ranged from 6.67 to 7.63. Cluster III had the greatest intra-cluster distance (7.63), followed by Cluster I (7.34), while Cluster II had the smallest intra-cluster distance (6.67). While the clusters IV, V, VI and VII recorded zero values as they include single genotypes in each group of them. Maximum inter-cluster distance were observed between clusters VI and VII (23.06) followed by clusters V and VII (20.81), cluster IV and VII (17.20), cluster I and VII (17.08), cluster III and VI (16.93), cluster III and V (15.79), cluster IV and V (15.63), cluster II and VI (15.25), cluster II and V (13.01), cluster V and VI (12.41), cluster III and IV (11.92), cluster I and III (11.29), cluster II and IV (11.17), cluster I and IV (10.79), cluster I and VI (10.32), cluster III and VII (10.12), cluster I and V (9.72), cluster I and II (9.44), cluster IV and VI (9.44), cluster II and VII (9.41) and cluster II and III (8.23).

The inter-cluster distances were higher than intra-clusters which indicated the existence of substantial diversity among the genotypes. The genotypes in this clusters can be utilized as potential parents and crossing between these genotypes results in high heterotic expression for yield and its components. Among all the characters studied, iron content contributed maximum (41.63%), to diversity by taking first rank in 552 times out of 1326 combinations, followed by plant height (19.23% with 255 ranked first), panicle girth (15.16% with 201 times ranked first), test weight (6.86% with 91 times ranked first), days to flowering (5.13% with 68 times ranked first), yield per plant (4.15% with 55 times ranked first), panicle length (4.00% with 53 times ranked first) and zinc content (3.39% with 45 times ranked first). Higher contribution towards genetic divergence was also observed by Govindraj *et.al.* (2013) for zinc content; Athoni *et.al.* (2016) for seed yield and panicle girth; Basavaraj *et.al.* (2017) for panicle girth and Ramya *et.al.* (2017) for plant height, test weight and productive tillers per plant.

In decreasing order, the characteristics of number of productive tillers per plant and days to maturity contributed 0.30 % and 0.15 % to genetic divergence, respectively.

Table No.1: Analysis of variance for ten characters in Pearl Millet:

Sr.No.	Characters	Mean sum of square		
		Replication	Genotypes	Error
1	Day to flowering	0.8141	21.5633**	0.8663
2	Days to maturity	0.7500	27.25527**	1.37745
3	Plant height	24.6602	992.4032**	24.4903
4	No. of productive tillers per plant	0.2925	0.37494**	0.0726
5	Panicle length	0.8296	12.5462**	0.6105
6	Panicle girth	0.0405	0.359461**	0.0201
7	Test weight	0.2805	6.86185**	0.1827
8	Yield per plant	34.8560	138.7306**	9.3943
9	Iron content	15.9307	815.0834**	7.4122
10	Zinc content	2.0967	150.7717**	6.2947

* and ** indicated significance at 5% and 1% levels, respectively.

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Table No.2: Grouping of fifty-two genotypes of Pearl Millet into different clusters:

Sr. No.	Cluster	No. of genotypes	Name of genotypes
1	Cluster I	28	DHLBI-544, S-73, S-69, DHLBI-549, S-84, DHLBI-1609, DHLBI-535, S-65, S-83, S-82, S-81, DHLBI-534, DHLBI-1035, S-71, DHLBI-543, DHLBI-1013, DHLBI-1103, S-59, S-80, S-68, DHLBI-1708, S-72, S-78, S-66, DHLBI-537, DHLBI-967, S-63, DHLBI-539
2	Cluster II	12	DHLBI-541, S-79, S-56, DHLBI-1822, S-58, DHLBI-502, DHLBI-1603, DHLBI-1201, S-62, DHLBI-103, Dhanshakti, DHLBI-1074
3	Cluster III	8	S-75, S-76, S-61, S-67, DHLBI-104, DHLBI-101, S-70, DHLBI-1806
4	Cluster IV	1	DHLBI-907
5	Cluster V	1	S-77
6	Cluster VI	1	DHLBI- 908
7	Cluster VII	1	S-74

Table No.3: Average intra and inter-cluster distance (D^2) value for ten characters in Pearl Millet:

Sr. No.	Cluster I	Cluster II	Cluster III	Cluster IV	Cluster V	Cluster VI	Cluster VII
Cluster I	7.34	9.44	11.29	10.79	9.72	10.32	17.08
Cluster II	9.44	6.67	8.23	11.17	13.01	15.25	9.41
Cluster III	11.29	8.23	7.63	11.92	15.79	16.93	10.12
Cluster IV	10.79	11.17	11.92	0.00	15.63	9.44	17.20
Cluster V	9.72	13.01	15.79	15.63	0.00	12.41	20.81
Cluster VI	10.32	15.25	16.93	9.44	12.41	0.00	23.06
Cluster VII	17.08	9.41	10.12	17.20	20.81	23.06	0.00

➤ Bold values indicates the intra-cluster distance

Table No. 4.: Relative per cent contribution of different characters towards total genetic divergence in Pearl Millet.

Sr. No.	Characters	No. of times ranked first	Per cent contribution
1	Days to flowering	68	5.13
2	Days to maturity	2	0.15
3	Plant height	255	19.23
4	Number of productive tillers/plant	4	0.30
5	Test weight	91	6.86
6	Panicle length	53	4.00
7	Panicle girth	201	15.16
8	Yield per plant	55	4.15
9	Iron content	552	41.63
10	Zinc content	45	3.39

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The success of any crop improvement program involves selection of best parent having high potential for the economically important characters. Among different approaches for selection of parents, selection based on diversity has its own significance, as diversity is a basic need of crop improvement. Therefore, in the present investigation diversity among different genotypes was studied, which yielded valuable information that could be useful in selection of potent parent for hybridization.

In the present study, an attempt was made to classify the cluster combination into four divergence classes by following the above procedure suggested by Arunachalam and Bandyopadhyay (1984). The statistical distance (D^2) given in Table No. 3, represents the index of genetic diversity among the clusters. The mean of seven cluster and three intra clusters (as monogenotypic clusters IV, V, VI and VII had no intra-cluster distance) was 12.44 and standard deviation 3.17. The minimum (X) and maximum (Y) values among these distances were 6.67 and 23.06 respectively.

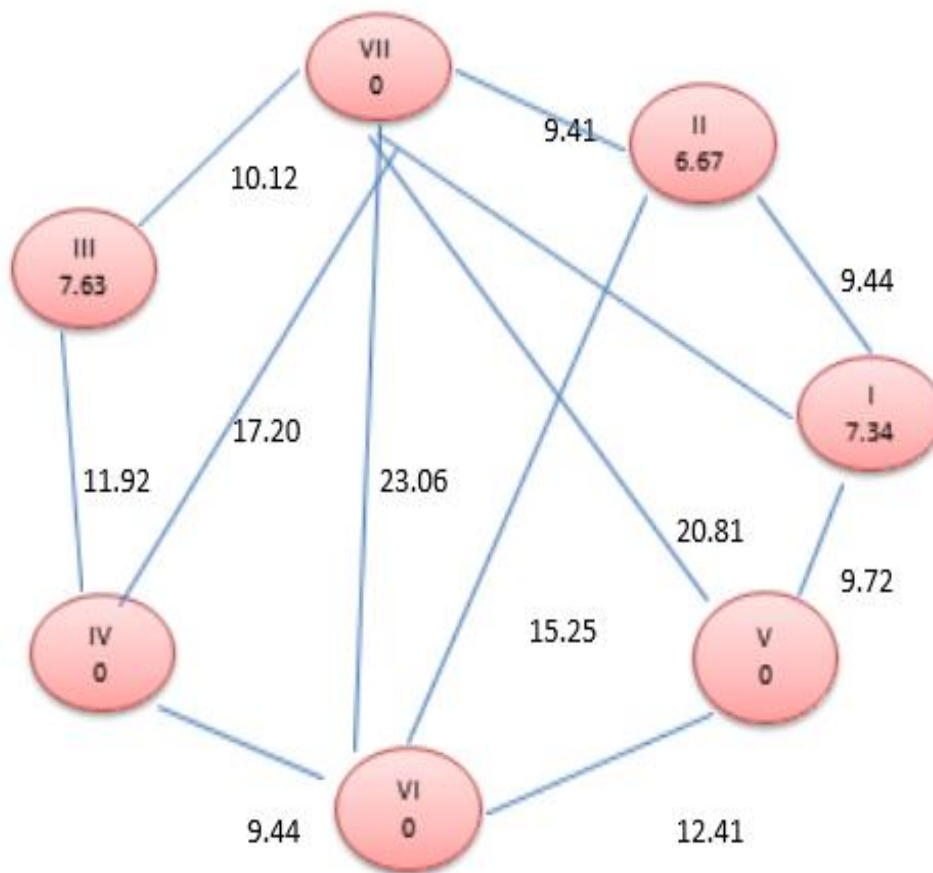
	DC4	DC3	DC2	DC1
	↓	↓	↓	↓
X	m-s	M	m+s	Y
(6.67)	(9.27)	(12.44)	(15.61)	(23.06)

Grouping of cluster pairs into the divergence class (DC) are presented in Table No. 5. Following the debate, the initial selection of parents should be selected from cluster combinations in the DC2 and DC3 divergence classes. When crossing genotypes within a cluster, the genotypes' individual performance for characters such as earliness (days to flowering and maturity), plant height, number of productive tillers per plant, panicle length, panicle girth, test weight, grain yield per plant, iron and zinc content, and so on should be considered. So, the desirable transgressive segregants would be obtained after hybridization.

Table No.5: Distribution of different clusters combination into four divergence classes based on D^2 values between them. (Cluster combination)

DC1	Y (23.06) (VI, VII), (I, VII), (III, V), (III, VI), (IV, V), (IV, VII), (V, VII) (7)
DC2	(m+s) (15.61) (II, V), (II, VI) (2)
DC3	M (12.44) (I, II), (I, III), (I, IV), (I,V), (I, VI), (II, IV), (II, VII), (III, IV), (III,VII) (IV, VI), (V, VI) (11)
DC4	(m-s) (9.27) (I, I), (II, III) (2) X (6.67) (II, II) (1)

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lists the various clusters that can provide desirable parents for hybridization programmes to improve the characters shown against them, based on the cluster mean presented in Table No.6

Table no: 6: Character improvement on the basis of source clusters:

Sr. No.	Characters	Source clusters
1	Days after flowering (Early)	VII, III, II, V, I
2	Days to maturity (Early)	II, III, V, VII, I
3	Plant height (cm) (Tall)	VI, IV, VII, V
4	No. of productive tillers per plant (Maximum)	V, VII, VI
5	Test weight (Maximum)	IV, V, VI, III
6	Panicle length(cm) (Maximum)	IV, III, VI
7	Panicle girth(Maximum)	III, VI, I
8	Yield per plant (Maximum)	III, VI, IV, I
9	Iron content (Maximum)	VII, III, II, IV
10	Zinc content (Maximum)	III, VII, IV, II

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Keeping in view all the above aspects the following genotypes in the present studies, deserve to be considered as potent parents for future crossing programme for improvement of seed yield and yield contributing traits in Pearl Millet.

- | | |
|---------------|---------------|
| 1. DHLBI- 907 | 5. DHLBI-1201 |
| 2. DHLBI- 908 | 6. Dhanshakti |
| 3. S-74 | 7. DHLBI-1806 |
| 4. S-75 | 8. S-77 |

Taking into account the inter-cluster distance, cluster means, genotype per se performance, and divergence class, the above genotypes may be used in future breeding programmes to create a broad spectrum of variability for different yield contributing characters, allowing for the development of superior genotypes for multiple characters and the improvement of multiple characters simultaneously.

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Language Use in the Propaganda-Driven Boko Haram War in Nigeria



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ABSTRACT: For about two decades now, Boko Haram, whose real name is “Jama`at ahl al-sunna li-da`wa wa-l-qital”, has been waging war against the Nigerian nation in a bid to carve an Islamic state (a caliphate) out of Nigeria. The group is opposed to any form of Western education as its name; Boko Haram, means “(Western) education is forbidden.” Pursuant to this, the deadly group has attacked schools where hundreds of students were kidnapped. Hundreds of people have also been killed by the group. However, the Nigerian government, through its well-oiled propaganda machine, is wont to make Nigerians believe that it is winning the war against Boko Haram. For example, the Nigerian government has, at one time or the other, said that Boko Haram had been “technically decimated” or “defeated several times.” The reality, however, is that the insurgents are the ones having the upper hand as they resurfaced (even with more viciousness and brutality) each time government claimed the group had been defeated. Therefore, this paper looks at how both the Nigerian government and the leadership of Boko Haram deploy language in the propaganda-driven Boko Haram war with the aim of exposing how effectively or otherwise the government of Nigeria and Boko Haram have employed language in dishing out propaganda to the public. It concludes that for the fight against the insurgents to be effective, the Nigerian government must show its readiness to fight crimes and criminality instead of relying on propaganda. Among others, the paper recommends that the Nigerian government should not take Boko Haram messages as “mere propaganda” because the insurgent group has on many occasions lived up to its threat.

KEY WORDS: Boko Haram, General Insecurity, Language, Nigeria, Propaganda

INTRODUCTION

Security is very key to a peaceful and prosperous nation. Its importance to the survival of the Nigerian nation is underscored by the constitutional provision that the security of the lives and property of her citizens shall be the major responsibility of her government. Although absolute peace is not obtainable virtually anywhere in the world, the level of insecurity in Nigeria since the return to democratic rule in 1999 has, however, gone beyond what is condonable. Though there are other forms of security challenges facing the Nigerian nation, the Boko Haram insurgency has been the longest, the deadliest, and the most difficult to overcome. Beginning from July 2005, the Boko Haram insurgents have stepped up their campaign of violence against the Nigerian nation and her citizens, especially in the north-eastern part of the country.

The insurgents appear to be undefeatable as they continue to wreak serious havoc on the people of the North-East where the group has awesome presence. Some factors can be blamed for the seeming invincibility of Boko Haram. A cursory look is taken at these factors. The first factor is the failure of the government to address the root causes of the insurgency which include poor governance, corruption, official neglect, poverty, illiteracy and unemployment among others. All these have left many Nigerians, especially the youths, frustrated and desperate. Adamu, cited in Khalid (2021), is of the opinion that the military approach alone cannot effectively tackle the Boko Haram insurgency.

Another factor is the ability of the group to continue to recruit new members. Unemployment, endemic corruption and indoctrination have made it possible for Boko Haram to continue to recruit new fighters. A security expert, Abdullahi Yalwa; cited in Khalid (2021), says “People are readily available for recruitment just to survive.” The need for survival pushes many youths in the north into joining the group not minding the dangers involved. This explains why the group could still boast of sizeable number of fighters in spite of the high number of casualties suffered regularly by the insurgents in the hands of the military.

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Corruption is another factor that is aiding the resistance of Boko Haram. Monies meant for the procurement of arms have been alleged to have been misappropriated by government officials. The arms fund scandal involving top officials of President Goodluck Jonathan's government is a good example in this case. There is lack of sincerity and transparency in the counter-insurgency war. In some cases, correct allowances of the fighting soldiers are not paid them leading to poor motivation. In the words of Yalwa; cited in Khalid (2021); "... some people have turned it into merchandise and are into self-enrichment."

Following as a concomitance of the above factor is the issue of ill-equipment of the personnel of the military. It is being said that the Boko Haram fighters are better-equipped than men of the Nigerian army and this puts the military at a disadvantage in the theatre of war. The United States' government anxiety over human rights abuse led to the placement of embargo on arms sale to Nigeria. This embargo was, however, lifted by the United States in 2018 and Nigeria has been able to buy some Super Tucano aircraft since then. However, the fighter jets are yet to be put into active use against the insurgents.

Wrong tactics or approaches to the fight are also helping Boko Haram to continue to stage attacks on vulnerable targets. For instance, the army used to have its men stationed in small numbers in rural communities and this used to help stave off attacks or provide prompt responses to attacks by the insurgents. In early 2020, this strategy was changed and the army began to have super camps where large number of soldiers are camped. The conviction that this approach would stem the tide of increasing attacks on soldiers stationed in communities and subsequent loss of weapons to the insurgents. The withdrawal of soldiers from those rural communities has, however, made these communities to be more vulnerable to attacks rather than helping to curtail the insurgents (Adamu; cited in Khalid, 2021).

Closely related to the above is the of infiltration of the military by criminals who divulge critical military intelligence to Boko Haram. The way and manner Boko Haram allegedly lay ambush for the military can only go to confirm that the insurgents do have intelligence on the planned movements of troops. This divulgence has led to the military suffering huge losses in the hands of the insurgents. The rumoured recruitment of "repentant" and "deradicalized" Boko Haram insurgents into the military might be responsible for this.

There is also the factor of widening scope of influence of Boko Haram. Until recently, the activities of Boko Haram insurgents were confined to the north-eastern part of the country. Sometimes in 2020, Boko Haram released a video which claimed its presence in Niger State; hundreds of kilometres away from its usual area of operation. The state issued a statement after this in which it says that Boko Haram fighters had infiltrated the state and were already occupying some forests in the state (Khalid, 2021).

Lastly is the apparent non-comital of the government to the prosecution of Boko Haram sponsors. The Nigerian government has stated that it has been able to identify some Nigerians who have been alleged of being sponsors or financiers of the deadly terror group. Some of these alleged sponsors have been tried and jailed in the United Arab Emirates. Till now, the Nigerian government is still foot-dragging and has not been able to find the courage to prosecute any of them ostensibly because they are people close to Nigerians in the corridors of power.

THEORETICAL FRAMEWORK

The social identity theory (SIT) provides this work with the required theoretical underpinning. Before we discuss social identity theory, it is apt we first understand what identity is, especially as it concerns this study. Alubo (2009: 9) sees identity as "a combination of socio-cultural characteristics which individuals share, or are presumed to share, with others on the basis of which one group may be distinguished from others." Ikelegbe (2005: 73) views identity as that subsisting sense of belonging and attachment to a group or institution, or other social, cultural and political entities.

Korostelina (2007) explains SIT as that feeling (by us) of belonging to a social group, or of having a strong connection with a social category and which has become an important part of our minds and which affects our social perceptions and behaviour. At its core, social identity theory suggests that people tend to see themselves and others in terms of groups. The main thrust of SIT could be summed up thus: (i.) Social identification is a perception of oneness with a group of persons; (ii.) social identification involves the forming of in-groups and out-groups; and (iii.) social identification leads to activities that are congruent with the identity, support for institutions that embody the identity, stereotypical perceptions of self and others, and outcomes that traditionally are associated with group formation, and it reinforces the antecedents of identification (See Agbibo, 2015: 4).

In the words of Agbibo (ibid.), terrorist organisations typically see themselves as being bastions of the values and interests of the ethnic or religious communities to which they belong, and their self-identification as members of a much larger community will help them to fulfil their avowed goals. The social identity theory is applicable to Boko Haram and its

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operations in Nigeria. The Boko Haram insurgents in Nigeria see themselves as belonging to an Islamic group that is more pious than other Muslims in their practice of Islam, and that is desirous of breaking away from Nigeria and establishing a caliphate run purely on Islamic principles and devoid of any form of Western civilisation.

SITUATING/CONTEXTUALIZING BOKO HARAM IN NIGERIA

The Islamic history of northern Nigeria provided Boko Haram with the enabling environment to thrive. For about 800 years, powerful sultanates were established around Hausa land and Borno up to parts of modern-day Chad. These sultanates constituted high Muslim civilizations (Cook, 2011). Between 1802 and 1812, Sheik Usman Dan Fodio challenged these sultanates by way of jihads and he was able to create a unified caliphate which stretched across northern Nigeria and into neighbouring countries (Hiskett, 1994). In 1905, Dan Fodio's caliphate was conquered by the British and brought under the Northern Protectorate. At independence of Nigeria in 1960, the largely Muslim populated Northern Protectorate was amalgamated with the largely Christian populated Southern Protectorate.

The British colonialists helped tremendously in strengthening the hegemony of Islam in the north. For a very long time, the colonialists did not allow Christian missionaries into the core northern parts of Nigeria in apparent concession to the request of Muslim leaders in the areas. Islam was thus more or less being taken as the state religion in the north. When Christian missionaries eventually began to penetrate the north and spread the Gospel of Christ, the stage was being set for conflicts between the majority Muslims and the minority Christians. So, the Muslims who had never for once wanted Christianity to get to most parts of the north began to get into conflicts with Christians.

The colonialists also helped in building particularistic forms of identity and consciousness which emphasize ethnicity and religion among the Nigerian people. Unfortunately, this phenomenon has continued to be further entrenched by post-independence Nigerian leaders. Without any form of prejudice, this phenomenon is more pronounced in the northern part of the country than in the other parts "where disgruntled politicians and other sinister actors, far from building a coherent nation, adroitly cash in on religious or ethnic identity to incite wars" (Agbiboa and Maiangwa, 2013).

In the late 1970s and early 1980s, a major Islamic uprising erupted in several parts of northern Nigeria. This uprising was led by Muhammad Marwa, popularly known as "Maitatsine." The uprising was named "Maitatsine" apparently after the man that led it. Muhammed, Ayinla and Adeoye (2006) state that between 1980 and 2005, well over twenty-eight religious crises had occurred in Nigeria. One noticeable thing about the crises is that virtually all of them had happened in the northern part of the country.

Religious intolerance among the majority northern Muslims is usually blamed for the high rate of religious conflicts in northern Nigeria. Ekanem and Ekefre (2013) are of the opinion that religious intolerance is deeply rooted in northern Nigeria because the region has the highest level of illiteracy in the country. In their explanation of the deep-rootedness of religious intolerance in the North, they posit that northern Moslems see everything from the angle of religion to the extent that their culture is tied to Islamic religion. Because of this, an average northern Muslim cannot separate culture from politics and religion.

All the religious conflicts that have broken out in the northern part of Nigeria (starting from the Maitatsine religious crisis in Kano and other parts of the north) have been caused remotely by the desire of conservative northern Muslims to institutionalize Sharia codes throughout the country despite the nation's constitutional provision that the country shall not adopt any religion as a state religion as contained in Section 10 of the 1999 Constitution of the Federal Republic of Nigeria (as amended). The actions of some northern state governments at the return of democracy to the country in May 1999 lend credence to the argument above that the north (especially the core north) has for long been planning to adopt Islam as the state religion in spite of the nation's avowed secularity.

Shortly after being inaugurated as the first executive governor of Zamfara State, Governor Ahmed Sanni Yerima introduced Sharia law into the state. In spite of opposition to this based on its unconstitutionality, the governor went ahead with its implementation thus becoming the first northern state to take Sharia beyond mainly personal status issues and into the criminal justice system. In introducing the Sharia code, Governor Yerima was quoted by Agbiboa (2013a) to have said: 'Whoever administers or governs any society not based on Sharia is an unbeliever.' Other states in the north soon followed the path of Zamfara State. There was desperation on the part of northern political elites in the core northern states to introduce Sharia and it was the vogue between 1999 and 2002. The polity was heated up and it was the grace of God and the rare statesmanship displayed by the then sitting president, Chief Olusegun Obasanjo, that doused the tension and helped in averting crisis. As of today, twelve states; Zamfara, Kano, Katsina, Kaduna, Sokoto, Niger, Borno, Yobe, Kebbi, Jigawa, Bauchi and Gombe are Sharia states.

Language Use in the Propaganda-Driven Boko Haram War in Nigeria

In the opinion of Cook (2011:6), the move to introduce Sharia was triggered by a 'messianic fervor and belief in the efficaciousness of Sharia as a panacea for Nigeria's problems, and most especially for the country's growing corruption and lawlessness.' The pertinent question here is: "Are these Sharia states faring better than the non-Sharia states?"

Another explanation given for the desperation of the state governors to introduce Sharia in their states was offered by Adesoji (2010: 103) when he submits thus:

... the adoption of the Sharia appeared to be an effort to pacify a section of Muslims (the 'conservatives') who had consistently agitated against the secular nature of the country and who perhaps were seen either as a threat to the tenure of the political office-holders or as a support base that could not be neglected on the basis of political calculation.

As it is evident from the foregoing, the ground had already been prepared for the emergence of Boko Haram by the actions of some northern Muslim leaders. Boko Haram began in Borno State as a religious movement around 2002. The group was then being led by one Muhammed Yusuf. The group was not violent at inception. However, the group gained international notoriety in July 2009 when this group of Islamic fundamentalists pronounced a *fatwah* (a religious decree) on Western education (Okedigba, Shittu, and Tiamiyu, 2018). That year, the group was able to hold the state hostage for about five days before the Nigerian military dislodged it from the state. Muhammed Yusuf was eventually arrested and taken into custody where he eventually died. The death of Yusuf led to the emergence of splinter groups with the group becoming very violent. This was the beginning of Boko Haram insurgency.

There are two main factions of the Boko Haram insurgents that are still active and that continue to wage a campaign of insurgency against the government and the people of Nigeria. There is the Abubakar Shekau-led faction of Boko Haram which operates mainly in southern Borno while the faction of Abu Musab al-Barnawi (ISWAP) is mostly found around Lake Chad. From 2009 when the group turned violent, Boko Haram has staged numerous deadly attacks on communities, schools, police and military formations, the United Nations' building in Abuja among others. Because of space constraint, a mention of a few of such high-profile attacks will suffice here.

On 16 June, 2011, the group bombed the Headquarters of the Nigerian Police in Abuja. The group followed this up two months later with the bombing of the United Nations building in Abuja. That was the first time that the group would attack an international institution. On 4 November, 2011, the motorcade of then Borno State governor, Kashim Shettima, came under Boko Haram's bomb attack in Maiduguri on its way from the airport to the Government House as the governor was returning from Abuja. On that same day, around 150 people were killed in coordinated Boko Haram's bombing and shooting attacks on police facilities in Damaturu and Potiskum in Yobe State. On 25 December, 2011; a Christmas day, Boko Haram's bomb attack on Saint Theresa Catholic Church in Madalla town, near Abuja, killed 42 worshippers.

On 15 April, 2014, Boko Haram terrorists abducted about 276 girls from Government Girls' Secondary School, Chibok, Borno State (Maclean, 2014). This abduction drew international condemnation and protests with protesters carrying placards with the "#BringBackOurGirls" inscription. Similarly, on 20 May, 2014, two bombs which killed at least 118 people and injured more than 56 others were detonated by some agents of Boko Haram in the city of Jos, Plateau State. The bombs exploded 30 minutes apart; one at a local market place at approximately 3:00 pm and the second in a parking lot next to a hospital at approximately 3:30 pm, where rescuers responding to the first accident were killed (Fox News, 20 May, 2014).

The town of Baga in Borno State, Nigeria was attacked by Boko Haram between 3 and 7 January, 2015 where the deadly group killed around 2,000 people (Belfast Telegraph, 2015). This is perhaps the largest massacre by Boko Haram in a single onslaught on a town so far (Amnesty International, 2015). In 2018, specifically on 19 February, Boko Haram again kidnapped 110 schoolgirls from Government Girls' Science College, Dapchi, Yobe State. However, many of the girls were later released after negotiation with the insurgents. On 29 July, 2020, the convoy of the Borno State's governor, Babagana Zulum, was attacked by Boko Haram. Though the governor was not hurt, five people, including three policemen, were killed in the attack (Sahara Reporters, 2021).

On 11 December, 2020, more than 330 students were abducted from a secondary school in Kankara, Katsina State by Boko Haram. A midnight attack on a secondary school in Zamfara on 26 February, 2021 also resulted in at least 279 schoolgirls being kidnapped by Boko Haram insurgents. In fact, the list of Boko Haram's deadly attacks is too lengthy to be exhausted in this paper.

PROPAGANDIC LANGUAGE USE IN THE BOKO HARAM WAR

There have been claims and counter claims of victories by both the Nigerian government and Boko Haram insurgents. Despite the increasing number of attacks being launched by Boko Haram fighters on military formations and the Nigerian nation in general, both the Nigerian government and the Nigerian military are wont to make the world believe that the war

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against the Boko Haram terror group is being won by the military. Leaders of Boko Haram also do come out to claim victories over the military, oftentimes via short viral videos. All these reinforce our own opinion that the war is propagandic. A critical look at the claims of victory over the insurgents by the government and the military, and vice versa, shall help prove this. But first, let us very briefly look at what propaganda is.

In this work, propaganda is explained as an act whereby individuals or groups of people express opinions or carry out actions with the deliberate aim of influencing the opinions or actions of other individuals or groups to achieve predetermined goals or objectives usually through psychological manipulations. It is a form of communication (usually subjective or half-true) with the sole aim of influencing an audience and promote an agenda. It is found in journalism, advertising, government, politics, war, etc. With this understanding of what propaganda is, we can now go ahead to analyse the propagandic use of language by the government and Boko Haram. Selected speeches of President Buhari, military chiefs and Shekau (Boko Haram leader) are sampled.

President Buhari, being the Commander-in-Chief of the Armed Forces, does speak, albeit seldom, on the progress being made by the military in the war against Boko Haram. Some of his statements considered propagandic are looked at below.

... So, I think technically we have won the war because people are going back into their neighbourhoods. Boko Haram as an organised fighting force, I assure you, that we have dealt with them.

President Buhari made this statement in an interview with the British Broadcasting Corporation in December 2015 (BBC, 2015). With what the President said, the question to be asked here then is: How come that the war which the president said had been won continues to rage, and the insurgents continue to grow bolder and more daring? The number of attacks staged by Boko Haram between 2015 and now, and the fatality of such attacks have confirmed that the Nigerian military has never for once defeated Boko Haram, be it technically or otherwise, let alone win the war.

In the same interview with the BBC, the president had also said that Boko Haram could no longer stage "conventional attacks" against security forces and population centres. But today, can we count the number of times that military formations and civilian populations have been attacked from 2015 till now? The propagandist intent of the President's statements had thus fell through as many Nigerians were not fooled by the President's claim of victory over Boko Haram. This is because the President had not effectively used language to achieve his set propagandic goal.

Ndahi, in *Vanguard Newspaper* of 30 April, 2021, reported the late Chief of Army Staff, Lt-General Ibrahim Attahiru, to have said this about the Boko Haram war:

Even though some of our troop locations in Mainok and other formations were attacked by members of Boko Haram sect, we will not accept defeat. In war, there is no way troops would always claim victory over its enemies. The Nigerian Army under the support of President Muhammadu Buhari will take on Boko Haram decisively as troops have defeated Boko Haram severally.

Lt-General Attahiru seemed to be speaking from both sides of his mouth in the statement above. In one breath, he had conceded that the military had been attacked by Boko Haram at different locations while in another, he said that the military would not accept defeat. It is not difficult to read into the statement that Boko Haram had at different times been victorious over the military. He unwittingly admitted this fact in the second sentence when he said that there was no way the military would always claim victory over the enemies.

On the other side of the war, propaganda video messages are also being released by Boko Haram leadership. Let it be said here that in spite of their opposition to Western civilisation, leaders of Boko Haram make use of smart phones and video recorders (which are products of Western technology) to send out their propaganda. It is, however, worthy of note that these messages are produced with the objectives of showing that: (i). Boko Haram is strong and powerful while the Nigerian government is weak and feeble; (ii). Boko Haram is a professional army while the Nigerian soldiers are cowardly and incompetent; (iii). Boko Haram fighters live in luxury; (iv). Boko Haram leaders are truthful and honest while Nigerian leaders are untruthful and dishonest; (v). Boko Haram is contemptuous of Nigeria as a nation; and (vi). Boko Haram leader, Abubakar Shekau, is invincible and unpredictable (Mutsvairo, Ogbondah and Agbese, 2017). Some of the (video) messages are sampled below to illustrate some of the sect's objectives:

We are safe. We have not been flushed out of anywhere. And tactics and strategies cannot reveal our location except if Allah wills by his decree... You should not be telling lies to the people. If you indeed crushed us, how can you see me like this? How many times have you killed us in your bogus death?" (Shekau, as reported by *Firstpost*, 2016).

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The statement above was allegedly made by Abubakar Shekau via a viral video to debunk the claims of President Buhari that the group had been defeated and routed out of Sambisa forest. When compared with President Buhari's own statement, it could be seen that Shekau's own propaganda was more effective as it was laden with words which reinforced the group's propagandic claim of invincibility: "... tactics and strategies cannot reveal our location except if Allah wills by his decree." The two rhetorical questions in the statement; "If you indeed crushed us, how can you see me like this? How many times have you killed us in your bogus death?" were so powerful that they could easily puncture the President Buhari's claim of victory over the insurgents. Shekau, assuming the role of a moralist, even admonished President Buhari to stop lying to Nigerians and the world at large; a reinforcement of the untruthfulness of the Nigerian leadership.

In another thirty-six-minute YouTube video message released by Boko Haram in 2015, Shekau boasted that the quantity and quality of the weapons seized by Boko Haram fighters from the vanquished Nigerian soldiers during the invasion of Baga town in Borno State were enough for the insurgents to successfully prosecute its war against the Nigerian nation. The video was out to reinforce the claim that Boko Haram fighters are more professional than the Nigerian soldiers who are cowardly and incompetent. The video can be viewed from: <https://www.youtube.com/watch?v=MgdKblgzggQ>

Shortly after the abduction of the Chibok girls in 2014, Boko Haram released another video. In the video, the abducted girls were seen squatting on the floor. The video was meant to puncture the argument of the Nigerian government that no students were abducted from any school in Borno State. In the video, Shekau reiterated Boko Haram's disdain for Western education while at the same time painting the insurgents as being strong, and the Nigerian government as being a liar. He said; "... Western education should end. I abducted your girls. I will sell them in the market by Allah. I will marry off a woman at the age of twelve. I will marry off a girl at the age of nine." The video can be viewed from: <http://www.theguardian.com/world/video/2014/may/06/boko-haram-sell-girls-market-video>

CONCLUSION

Our examination of samples of propaganda messages from both the Nigerian government and Boko Haram has shown that Boko Haram has been more professional in its use of propaganda in its war against the Nigerian nation than the Nigerian government has been. This has largely made Boko Haram's propaganda to be more effective. This work thus concludes that for the fight against the insurgents to be effective, the Nigerian government must show its readiness to fight crimes and criminality instead of relying on ineffective propaganda.

RECOMMENDATIONS

The following are offered as recommendations to the Nigerian government and the military in their bid to win the Boko Haram war: First, messages that are being released by Boko Haram should not be viewed as "mere propaganda" by government because the insurgent group has on many occasions lived up to its threat.

Secondly, the military should be more discrete in the management of its intelligence so that such intelligence will not get leaked to the enemy. Moreover, there is need for the military to do some sort of self-cleansing where-in saboteurs will be fished out and punished accordingly.

Lastly, official propaganda (messages) should be well-crafted by professionals who know the art of propaganda (writing) so that the messages will look credible and convincing. Where possible, pictorial evidences should be provided like Boko Haram does.

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An Evaluation of the Quality of Premier Universities' Services and Facilities in Malaysia



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ABSTRACT: Education has a critical role in realizing Malaysia's aspirations to be a developed country in the world. Empirical research was completed to evaluate and assess the fundamental aspects of the quality of services and facilities of premier universities (world-ranked) in the Klang Valley, Malaysia, particularly in terms of non-academic aspects, academic aspects, reliability/access, empathy/understanding, reputation, and program issues. This research employed Firdaus Abdullah (2006) Higher Education Performance (HedPerf) instrument because service quality has a substantial influence on student satisfaction. The survey involved 1440 respondents, consisting of university students who were approached randomly at various faculties at two world-ranked public universities and two world-ranked private universities. This research found that university students were extremely satisfied with academic concerns and a university's strong reputation. Students were pleased with the quality of academic courses and programs, as well as the academic staff's positive attitude and work habits. This is the main deciding factor for both domestic and foreign students when selecting a renowned university. Academic supporting services, career counseling services, dean of student services, testing grading system, course content, instruction, university attitudes toward students, offering a diverse range of courses, and class size were the areas of students' needs and satisfaction. Quality of services and facilities is a extremely important factor for internationalization, global competition, and the future sustainability of a university.

KEYWORDS: Higher education, Quality of services and facilities, HedPerf, Open system theory, Socio-technical theory, TQM theory

INTRODUCTION

In today's globalized world, quality and perfection are keywords. The growth of higher education institutions (HEI) has created new concerns in the methods and means of ensuring the quality of the educational process. It became vital for HEI to focus more on the quality of services and facilities, which would reflect on the success of its graduates in the job market and influence the institution's reputation (Akleh & Wahab, 2020). Increasing the quality and effectiveness of higher education (HE) is critical to a country's success on the world stage. In Malaysia, one area that has received special attention is the emphasis on quality.

All aspects of HE places a high value on quality in the National Higher Education Strategic Plan and Action Plan, which complement the Education Ministry's National Education Blueprint. They have a system in place for accrediting and regulating educational establishments. Malaysia developed a unified Quality Assurance (QA) system referred to Malaysia Quality Assurance (MQA), which has the mission to ensure the QA of institutions. The MQA Act empowered universities that have created internal quality assurance procedures and have effectively completed an institutional audit to be granted self-accrediting status. Additionally, Malaysia QA focuses on the premise of collaborating with institutions for accountability, transparency, and continuously assessing and updating key operations to achieve continuous progress. As a result, the QA ideas modified the QA frameworks to adapt to society's increasing societal expectations (Hanh, Loan, & Viet, 2020). Of late, the Minister of HE emphasized the importance of the private part's involvement in supporting the government in developing the HE in Malaysia entrepreneurship (Times, 2010). To accomplish this, the curriculum must be relevant to the demands of the world's marketplace to guarantee the graduates' quality in finding suitable employment in Malaysia.

HE quality is directly correlated with problems of Quality for Accountability and QA (Newson & Polster, 2001). According to Goedegebuure and Hayden (2007, p. 9) Quality for Accountability means "the requirement to demonstrate responsible actions" whereas QA is the "mechanisms, procedures and processes in place to ensure that the desired quality, however, defined and measured, is delivered". The government's current initiative to assure quality control in universities are "supervisory" and

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"market coordinating" parts. In terms of their expectations, the Malaysian government promoted HEI. Internal QA was developed to enhance the quality of institutions via self-assessment, self-accreditation, academic evaluation, and educator and staff feedback. The suggested internal QA method is intended to supplement the existing internal and external QA mechanisms in HEI (Endut, Abd Majid, Ibrahim, & Ashari, 2013).

The government establishes general guidelines, although the details and efforts are entrusted to the respective institutions. Marketplace factors such as institutional rivalry and bidding for funding, as implemented in certain countries, are used to urge HEI to enhance the efficiency and relevance of delivered courses (Kenway, Bigum, & Fitzclarence, 1993; Roberts & Peters, 1999). Quality frequently links with "customer satisfaction" in the most literature available about management, however, Vroeijenstijn (2003) states that in HE, there is no well-defined statement whether the "customer" is the organization, the learner, the prospective employer, or the community. Generally, several "players" are involved, including learners, instructors, admins, the authorities, professional groups, employers, and society have their own, sometimes competing, and different interpretations of quality. As a result, QA procedures tend more sophisticated, and quality evaluation becomes more complex. The shifting description of "quality" in universities has prompted a great deal of research and writing. The most widely recognized definition, according to Harvey and Green (1993), is "fitness for purpose." Fitness for the purpose may be converted to real policies and procedures in education which will enhance the being of developing countries (Idrus, 2003). Institutions are allowed the flexibility for establishing their mission and goals, and quality is supposed to occur while both the mission and the goals are accomplished. It would be accurate from the theoretical perspective however in authenticity if it is accomplished or if the mission and goals are related is a distinct concern.

Within the context of this research, universities are described as HEI that deliver specialized or professional education and training to youth in different disciplines and areas of study which prepare them for employment in the job market, career, or vocation (Hussin & Wong, 2011). Simultaneously, universities are also corporate organizations because of the fact that they function as a business entity that employs different categories and levels of employees to perform different kinds of jobs and duties based on a certain set of goals, structure, and work process (S. Asimiran & Hussin, 2012; Ismail, 2008; Sporn, 1999). In this regard, universities are complex corporate organizations that have their own peculiar culture, priorities, roles, expectations, and rules (Tama, 2019). In this research, the conceptual model and Higher Education Performance-only (HEdPERF) survey instrument created by Abdullah (2006) was used as it is the most relevant and appropriate. It is a complete and accurate performance-based measuring scale which aims to grasp the full dimensions of service quality in the HE sectors. This model has a sound theoretical construct, and it has been used before in many empirical studies on the quality of services and facilities in HE.

PROBLEM STATEMENT

The most important motivators in the realm of international competitiveness of HE is the quality of services and facilities. A university's administration is fully accountable to its students for upholding the highest quality standards, which includes quality assurance for all sorts of services accessible at the institution. It may be claimed that a university that ignores the quality of particular services puts itself in peril and jeopardizes its long-term viability and sustainability. Despite all development efforts for quality services, the primary focus should be on the quality of academic programs, which is the primary predictor of a university's quality and reputation for employers and the general public. Additionally, students are the primary stakeholders in HEI. Hence, when students accumulate the experience of provided services and facilities by university and its staff, it would gradually compound and result in service and facility excellence. This is critical for Malaysian universities to operate continually to guarantee that the delivered facilities and services meet or exceed the expectations of students. Moreover, the quality of services and facilities is highly valued by academics and students when selecting a university that will assist them in improving their careers or educating them. The quality of facilities and services does have a substantial impact on their satisfaction and motivation (Jimenez & Tan, 1987; Patrinos, 1990)

LITERATURE REVIEW

There is a worldwide challenge to enhance the quality of universities in every nation in the globe owing to the essential part that universities play in the enhancement of global society's social, cultural, political, economic, and environmental elements (Ludeman, 2002). A university that ignores the quality of services and facilities places the situation at risk and jeopardizes long-term viability and sustainability. To guarantee the long-term viability and sustainability of HE, institutions must strive to meet and exceed students' demands (Anderson, Fornell, & Lehmann, 1994). Responsibility, autonomy, certification, globalization, popularity, and ranking of educational programs, certificates, graduates, and campus life are the major core issues of service quality. According to Gallifa and Batallé (2010), one of the most significant research topics in recent decades has been service

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quality. Consumers place a high value on the type of service, as well as the quality of received output. When the quality of services and facilities given, surpasses the consumers' expectations, a positive perception of the services and facilities are formed.

University services and facilities, according to Ghanad, Hussin, and DeWitt (2020), comprise educational services, administration and maintenance facilities, facility services, co-curricular and sporting facilities, and basic amenities (like hostels, health, security, loan, and transport). Regardless of satisfaction, the quality of such services and facilities may influence the quality of lifetime and mental health of students and staff, along with the university's general culture, and reputation. Despite all attempts to improve quality services, the primary focus must be on educational programs and degrees, which are the primary predictors of a university's quality and reputation for employers and the public. Woo (2006) viewed the quality of HE in a unique yet intriguing way. He referenced Arora (1986), who identified the primary quality factors as physical facilities, lecturers' credentials and competency, curricula, educational resources, tools, teaching methodologies, assessment, and administration. However, Woo later claimed that families may evaluate quality by the reputation of the institutes and the quantity of students enrolled. Academics, on the contrary, may believe that large research funding and strong educational admittance criteria are determining considerations. He concluded that consumer satisfaction is a reflection of 'perceived quality.' The prime concern of university administration in terms of service quality is not only the availability of necessary facilities and technology to staff and students, but also the efficient delivery of a variety of facilities and services such as classroom instruction, hostel, career and academic guidance and counseling, and co-curricular training programs. A university administration is responsible for its employees, learners, and the overall population for attaining the greatest level of quality which relates to quality assurance including a wide range of university services. Universities also must address students' fundamental personal needs, allowing and empowering them to focus more completely on their academics as well as their self-development and maturity, both emotionally and intellectually.

Another major justification for quality services and facilities is financial, since investment in learners, learner affairs, and facilities may bring a significant return to economic systems while also creating the human resources required for a country's socio-economic progress. Finances are an important component of the progress of universities, and the government is the principal provider or subsidizer of funds for public universities to support their growth, operation, and research projects. The other key fact in quality services and facilities is students' employability. HE is now widely regarded as a business, with fierce rivalry for status, fees, finances, and students. As a result, universities compete for students. In these days of global crisis, where fewer pupils will be hired in the labor market, the circumstances are getting critical. In these conditions, both society and business demand universities to be economical and affordable while simultaneously taking them accountable for generating graduate students who are turned into social capital at the societal level and intellectual capital at the industrial scale.

The demand for institutions for generating high-quality alumni is rising all the time. Furthermore, universities are determined to continue their consumers, aware that their long-term viability is dependent on the service quality they deliver to their key clients, students (Arif, Ilyas, & Hameed, 2013). The quality of services and facilities has now moved from business to academia. Service quality has inspired and impacted many HEI, both for educational and administrative support objectives. Focusing on the client is an essential tenet of service quality, and the clients for HE services fall into five categories: learners, staff, government, the general public, and also industry and the greater community (Martensen, Grønholdt, Eskildsen, & Kristensen, 2000). According to Tang and Hussin (2011), it appears that universities are competing on the base of students' employability after graduation, which is primarily decided by the substance of academic and training programs that straightforwardly include industry and business stakeholders. This technique encourages students from both local and international sectors to schools and universities that ensure graduates' employment, but at the expense of increased student costs. Herein lies the issue of accessibility against high-cost service quality and even the issue of students' scholarship and intellectualism against vocationalism.

In the private universities in the Gwalior region, Rajput, Sengar, and Gupta (2019) investigated the link between student satisfaction and service quality. This study resulted in a strong outcome of all the elements of service quality except assurance on student satisfaction. The results stated that a large number of learners were satisfied with educational institutions' services and facilities, and there were meaningful associations between the postulated aspects of service quality and student satisfaction. The degree of satisfaction with existing facilities and services provided by a Malaysian university among students was investigated by Arokiasamy and Abdullah (2012). They observed 245 students from 12 diverse disciplines. They were generally satisfied with numerous essential services and facilities at their universities, such as instruction, administration assistance, library, laboratories, dormitory, healthcare, and sports, while discontent was stated in three augmented parts, such as transportation, classroom, and prayer amenities. Surprisingly, no important variations in viewpoint were identified between men

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and women. The question at the core of these studies is: What are the theoretical implications of the outcomes? The studies on students' services and facilities did not clarify the theoretical underpinnings of their conclusions and outcomes and results have been published as basic statistical data, with no justifications on theory to describe why and how they link to specific theories or principles. The response might be the motivation of the university for sustainability within the context of open system theory, i.e., providing high-quality facilities to learners and academic staff to guarantee sustainability at universities in the face of the contest with other campuses for student and staff satisfaction with the physical and technological setting on campus, along with administrative and academic processes.

According to socio-technical system theory, a complex organization including academic institutions is both a social and a rational technological system, with human resources constituting the social side and operating on the technical system achieve the organization's goals. Sociotechnical system theory states an organization's improvement and optimum efficiency may be accomplished via the methodical and successful integration of the organization's social and technological aspects. Individual dynamics in workplace relations are as significant as organizational processes and systems. The discovery of components and aspects which impede quality and productivity is considered to be essential for remedial action to occur for organizational growth; otherwise, the organization's sustainability, effectiveness, and productivity deteriorate (Owens & Valesky, 2007). According to socio-technical system theory, managing human resources along with infrastructure and technology is critical for achieving high productivity, quality, profitability, and effectiveness, therefore managers must continually update or develop their management tactics. According to Appelbaum (1997), the management process of a socio-technical system is complicated since it deals with an organization's socio-cultural system as well as technological advances (tools, processes, concepts, and plans) and the infrastructure that people utilize to operate the company.

Open system theory states that an organization, as well as its culture, is influenced by the external environment, which is always changing in terms of international and national economical, societal, cultural, and political aspects (Khalid, Yacob, & Alhabshi, 2009). A university's organizational characteristics at the faculty and department divisions, with diverse study programs, functions, and student groups that create sub-cultures have an impact on the university's organizational culture. In order to achieve sustainability and homeostasis, the organization will attempt to make critical modifications in reaction to the change. The open system theory is supplemented by the concepts of learning organizations and system thinking.

Total quality management (TQM) theory asserts that for achieving a competitive advantage over its competitors and hence becoming sustainable, an organization must improve its quality in terms of work procedure, facilities, and production. Deming (1991) proposed TQM, which states that significant efforts at the organizational level are essential to create a constant environment in which an organization constantly upgrades its management and productivity processes for producing high-quality products and facilities that satisfy customers. Numerous studies on students' satisfaction with universities' quality of services and facilities have been conducted, but the majority of them are completed in small-scale survey research using instruments with uncertain reliability and normally intended for clients associated with commercial and industrial enterprises.

RESEARCH METHODOLOGY

The objectives of our research were to examine the outstanding domains in the quality of services and facilities of premier universities and consecutively to determine the main distinctions among premier public and private institutions in Malaysia. "Premier" here means among the top-500 in the QS Global Ranking of Universities in 2017.

The research questions of the study were as follows:

Objectives of the Research	Research Question	Methods of Data Collection	Methods of Data Analysis
1. To compare the quality of services and facilities in selected world-ranked public and private universities, as assessed by students who comprise the internal customers and consumers.	1. What are the outstanding features of services and facilities at some of Malaysia's world-ranked universities from the perspective of students?	HEDPERF service quality questionnaire	Descriptive statistics using frequency,

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2. To identify the aspects of a university services and facilities that need to be improved in selected world-ranked public and private universities.	2. What aspects of university quality of services and facilities need to be improved at some of Malaysia's worldranked universities from the perspective of students?	percentage, mean, and standard deviation
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For answering those questions, we collected quantitative data using the HedPerf survey instrument. Abdullah (2006) identified six categories of service quality in HE includes nonacademic aspects, academic aspects, reliability, empathy, reputation, and program issues. Each domain consisted of five survey items, each with an ordinal scale corresponding with responses of 1 to 5 (response 1 for “totally disagree” to response 5 for “totally agree”). For the actual study, only the top four premier or world-ranked universities in Malaysia were purposively selected from the list in the QS Global Ranking of Universities, 2017. Only the top-two public universities and top-two private universities were purposively selected for this study.

As for the sample, the required number of respondents for the study was determined by using Krejcie and Morgan (1970) table of a random sample, which indicated that the suitable number is in the range of 330 to 360 respondents per university. The four premier universities had different number of faculties and student populations. Subsequently, the HedPerf survey questionnaire was distributed randomly to 1520 university students, undergraduates, and graduates, from numerous faculties that were also chosen at random. Data collection was slow, but after three months a total of 1440 fully answered survey questionnaires were successfully collected. Data were then entered into and quantitatively analyzed by the computer program Statistical Package for the Social Sciences (George & Mallery, 2016).

RESULTS AND FINDINGS

Data from the 1440 survey questionnaires were computed and statistically analyzed. As for research question 1, regarding the outstanding aspects of facilities and services of premier universities, the outcomes of analyzing data are as presented in Table 1.

Table 1. Comparing Students' responses to the Quality of Services and Facilities at Public and Private Universities in Terms of Mean Values and Standard Deviation

No	Quality of services and facilities in Institution	Public Institution		Private Institution	
		Mean	SD	Mean	SD
1	Lecturers are knowledgeable enough to address students' course-related questions.	4.19	.76	3.98	.89
2	Lecturers treat me with respect and courtesy.	4.04	.78	3.93	.90
3	Lecturers are never too occupied to reply to students' assistance requests.	3.80	.90	3.89	.90
4	When students have an issue, fellow students are genuinely willing to assist to solve it.	3.81	.96	3.72	1.16
5	Students show a positive attitude towards academic staff.	3.94	.81	3.87	.82
6	In the classroom, students discuss and communicate well.	4.19	3.89	3.78	.98
7	Students share feedback on the performance of their lecturers.	3.91	.84	3.74	1.09
8	Students schedule adequate and convenient consultation/supervision time with lecturers.	3.81	.88	3.90	.84
9	University presents a professional image.	3.92	.85	3.84	.89
10	The amenities and facilities at the hostel are sufficient and appropriate.	3.72	.97	3.42	1.19
11	Academic facilities are appropriate and sufficient.	3.78	.88	3.65	.98
12	University offers high-quality programmes.	3.92	.86	3.61	.99
13	Recreational amenities and services are sufficient and appropriate.	3.85	.87	3.63	1.01
14	The size of the classes is maintained to a minimum for providing individual attention.	3.89	.91	3.83	.91
15	University provides a variety of programs with a range of specialties.	3.93	.82	3.71	.94
16	University provides programs with a customizable syllabus and framework.	3.85	.83	3.59	.99

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17	University is at an outstanding location, with an appealing layout and design of the campus.	3.93	.81	3.82	.93
18	Reputable programs are provided by university.	3.98	.78	4.03	.83
19	Lecturers are trained professionally in their areas.	4.11	.82	4.04	.99
20	The alumni of the university are in high demand for employment.	3.73	.91	3.67	1.10
21	The lecturers are genuinely concerned with resolving students' problems and issues.	3.97	.87	4.03	1.04
22	Administrators give compassionate and personalized service.	3.51	.92	3.60	1.03
23	Faculty/Institutional management responds to requests and complaints in a timely and effective manner.	3.60	.85	3.52	.99
24	Administrators are not too occupied to reply to a demand for help.	3.55	.92	3.51	1.03
25	Administration departments maintain precise and comprehensive retrievable archives.	3.61	.80	3.71	.94
26	Once students agree to accomplish a project by a given time, they follow through.	3.67	.81	3.96	.92
27	Administrative offices provide suitable hours of operation for students.	3.66	.87	3.86	.98
28	Administrators have a pleasant and positive work attitude toward students.	3.66	.94	3.83	.98
29	Administrators and lecturers engage and communicate well with students.	3.81	.84	3.97	.92
30	Administrators are well-versed in the structures and procedures.	3.70	.86	3.88	.90
31	When students encounter university, they feel comfortable and confident.	3.77	.90	3.87	.89
32	University delivers services within a reasonable/anticipated time limit.	3.80	.87	3.78	.95
33	Students are treated equally and with respect by each other and staff.	3.72	.91	3.79	1.03
34	Students have the freedom to express their thought, beliefs, and ideas.	3.77	.90	3.76	1.06
35	When the university-provided information regarding its organization, the students maintained confidentiality.	3.77	.84	3.77	.93
36	Students guarantee that their lecturers and administrators can easily reach them via phone.	3.83	.83	3.83	.88
37	Professional counseling services are provided by the university.	3.73	.94	3.69	1.06
38	The health-care system is adequate and suitable.	3.83	.92	3.73	1.10
39	The establishment university fosters and encourages the formation of a Student Union.	3.78	.85	3.76	.97
40	University values student opinions and reviews in order to enhance service performance.	3.85	.86	3.72	.87
41	University's service delivery processes are standard, uniform, and straightforward.	3.78	.93	3.69	.91

Table 1 shows that the mean values in public institutions were higher (4.19 to 3.51) compared to those in private institutions (4.04 to 3.42). Though, it varies from moderate to a high agreement regarding the service and facility quality. Students responded that their institution's lecturers were qualified and committed. Aside from that, students strongly agreed that they involve in the university's activities and demonstrate the proper attitude as a student mentality. On the contrary, students generally believed that the facilities and services were appropriate and essential. Administrative employees were considered to be cooperative and helpful with students and academic employees. It was discovered that university management respected student comments and feedback in order to improve service quality. According to the findings, on average, students believed that their university delivered services within an acceptable/reasonable timespan. On average, students indicated that the university had standard and simple service delivery processes. According to Abdullah (2006), service quality in HE is categorized into six determinants.

1) Non-Academic Aspect

According to the results, 71.4 % of students at private universities reported that administrative staff had a great understanding and awareness of the procedures and systems, compared to 69.4 % of students at public universities. On the contrary, 72.4% of students at public universities stated that they had an outstanding location with great campus architecture and design in comparison to students at private universities (68.9%). Nevertheless, students at both universities were generally dissatisfied with aspects including the right to have freedom of thought, beliefs, and ideas, respect for confidentiality, and hostel amenities.

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The management of the universities should focus on these areas to improve the services, culture, and campus environment along with student progress and well-being.

2) Academic Aspect

Based on the findings, 86.3% of students at public universities and 77.1 % of students at private universities reported that academic staff were knowledgeable about the course content. On the other side, 71% of students at private universities students and 69.7 % of students at public universities indicated that academic staff provides adequate and appropriate consultation time. Overall, it is concluded that high levels of academic quality satisfaction among students were related to the quality of services and the expertise of the academic staff. It appears to be an accurate theoretical and practical notion, as evidenced by its presence in many prestigious and prominent universities throughout the world.

3) Reliability

According to the findings, 80.8 % of students at public universities and 68.6 % of students at private universities student stated that academic staff treats students with care and courtesy. While 70.3 % of students at private universities students and 59 % of students at public universities indicated that their university employees promised to solve a problem by a particular time, they do. According to the findings, a larger percentage of private university students were pleased with the reliability of services and facilities than public university students. Nevertheless, regarding service efficiency and the usage of standard delivery processes, public university students were more satisfied than private university students.

4) Empathy

Based on the findings of this study, 75.8 % of students at public universities and 76.1 % of students at private universities believed that whenever they had an issue, administrative staff expressed a genuine interest in addressing it. 70.6 % of students at public universities and 67.6 % of students at private universities indicated that the staff makes it easy to contact them via phone. Based on the results, it is reasonable to state that both public and private universities place equal emphasis on student welfare concerns.

5) Reputation

Based on the finding of this research, 72.2% of students at public universities and 59.3% of students at private universities reported that their universities offer high-quality programs. Remarkably, 79.2 % of students at private universities and 76.9 % of students at public universities indicated their university-provided highly reputable programs. According to the outcomes, a higher percentage of students at public universities were pleased with the reputation of their university in delivering quality programs in comparison to students at private universities. Students at private universities, on the other hand, place a higher priority on alumni employability than on quality academic programs.

6) Program Issues

According to 76.4% of public university students and 62.1% of private university students, the university provides a broad variety of programs with a diversity of specialties. Furthermore, the flexibility of the curriculum was 73.5 % at the public university and 58.3 % at the private university. The comprehensiveness and adaptability of academic programs are crucial in attracting students to educate at world-ranked universities. According to findings, a larger number of students at private colleges were pleased with the program adaptability, delivering a broad variety of programs and specializations, and program quality compared to students at public institutions.

In conclusion, the mean value for all areas of quality of services and facilities is higher than 3.50, inferring that the quality of services and facilities at Malaysia's world-ranked universities were highly satisfactory—however, additional enhancements need to be done because rationally, a mean value of 4.5 to 5.0 would represent an outstanding level of satisfaction with the quality of services and facilities.

This section's goal is to provide answers to research question 2. i.e. what are the aspects of services and facilities that need to be improved by selected public and private universities? This question requires averaging the mean values of variables in all dimensions of the quality of service and facility. Table 2 shows the rank of domains in the quality of services and facilities.

Table 2. Average Mean Value and Rank of Domains in Quality of Services and Facilities in Universities

Quality of Services and Facilities in University	Public Total mean	Rank	Private Total mean	Rank
Non-academic Aspect	3.78	4	3.74	5
Academic Aspect	4.11	1	3.88	1
Reliability of Services	3.72	6	3.77	4
Empathy	3.77	5	3.78	3
Reputation	3.89	3	3.79	2

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Program Issues	3.90	2	3.65	6
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Table 3 shows the top three areas in public and private universities.

Table 3. The 3 Areas with the Highest Quality of Services and Facilities

Public Universities	Private Universities
Academic aspect	Academic aspect
Program issues	University Reputation
University Reputation	Empathy or student welfare

This is concluded that students seemed extremely pleased with education programs and activities which ranked as the greatest significant domain at premier public and private universities, i.e. the quality of academic services to students was of the greatest priority, determining graduates' great reputation, whether for employment prospects or high accreditation. The three categories with the lowest rating are those that require improvement are shown in Table 4.

Table 4. The 3 Areas with the Lowest Quality of Services and Facilities

Public Universities	Private Universities
Reliability of services	Program issues
Empathy of student welfare especially residential	Non-academic services
Non-academic services	Reliability of services

DISCUSSION

Malaysia has become a popular location for international students wanting to pursue their education, and more prominent and reputable universities from across the world are establishing branch campuses in collaboration with Malaysian universities. Human capital development is emphasized as an economic necessity in the 10th Malaysian Plan (2011-2015) as a basis for transitioning Malaysia from an intermediate to a high-income nation. This transformation necessitates significant endeavors to improve the university's overall efficacy. One approach to accomplish this is to develop the quality of HE services from the perspective of students. Furthermore, in the 10th Malaysian Plan, the concept of establishing a rating system for Malaysian Higher Education Institutions (SETARA) was raised. This assessment method is meant to establish a standard and objective evaluation in order to provide more clarity and transparency and increased performance weight to improve the whole educational system's quality. Since 2010, all Malaysian HEI has been required to participate in this ranking system (Latif, Bahroom, & Khalil, 2016). In Malaysia, public universities are regarded as both social and political institutions (S. B. Asimiran, 2009). As a result, as a social organization, public universities engaged in Malaysia's social development, notably through research and development missions, and as political organizations, the academics may serve as a vital resource of information for the Malaysian government in formation and concentrated efforts. The government of Malaysia is dedicated to providing its students with the highest level and quality of HE.

Based on the findings of this research, students as consumers were highly pleased with academic topics, the university's high reputation, the quality of academic courses and programs, as well as the academic staff's positive attitude and work ethic. This should be the scenario since the major aim of a reputable university is to offer high-quality academic and training courses in diverse departments in order to generate graduates who can meet the human resource requirements of government agencies and corporate enterprises. This is the primary motivator for both international and local students when considering a reputed university.

According to Uka (2014), students' needs and satisfaction rate is classified in the key areas: educational advising assistance, career counseling facilities, dean of students services, assessing grading scale, study course material, study instruction, faculty perception toward students, a wide range of programs offer, size of the class, and accessibility of the academic advisor. Relating to Uka (2014), this study discovered that some students' associated demands included nonacademic requirements including economic support services, canteen services, sociocultural activities, university orientation program, access to financial support before registration, reliability of information systems before registration, consideration for students as individuals, the approach of university non-teaching employees to students, racial rhythms at university, and the possibilities of student employment, student participation in campus and religious events, campus media, student journal and the university in particular.

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Several studies have been carried out and published about students' satisfaction with the quality of university services. However, the majority of the research was on a microscale. The outcomes were similar to Uka (2014), as a case in point, Yeo (2008) RM Hanaysha, Hilman Abdullah, and Warokka (2011) discovered that students were mostly pleased with several fundamental services and facilities in the university, such as instruction, administrative support, library, laboratories, hostels, healthcare, and sports, whereas discontent has been only observed within three major categories, that are transportation, classes, and prayer facilities. Service quality at university is a critical indicator of educational success and a key strategic factor in establishing a powerful perception in the minds of consumers (Ahmed et al., 2010). Mohamad Tahar (2008) observed that students identify quality based on the university's capacity to reputation, advanced employment prospects, capabilities in resolving concerns of study programs, cost/time, physical components, location, and other aspects. Likewise, Hasan, Ilias, Rahman, and Razak (2008) discovered that the primary characteristics that might influence students' satisfaction were: students' perceptions of the teaching and learning process, educational support facilities including libraries, computer and lab services, the education system (academic rooms, labs, social setting, and academic campuses), students' facilities (medical centers, canteens, hostels), and the external factors (finance, and transport). This is the point of view of socio-technical theory and TQM theory. Furthermore, Cameron and Kirkman (2010) believe that institutions should be committed to offering assistance and supervision to students to allow them to gain the required academic, social, and cultural competencies that are required to deal with the problem of culture shock. In this respect, the socio-technical system theory, and TQM theory are important in bringing the required innovations and changes to universities to maximize customer and stakeholder satisfaction.

IMPLICATIONS

The outcomes of this research have few implications.

Firstly, regarding the quality of university services and facilities, this research discovered that students as consumers put a high value on academic quality and institutional reputation. The cause might be related to status and employability; for example, alumni from a reputable university have a greater possibility of landing a job than those from a less-reputable university. Another aspect with a high degree of satisfaction between students was the quality of services and facilities related to their well-being and satisfaction on campus. Among the quality factors, the reliability of services and program issues received the lowest ranking, implying that universities, particularly public universities, should enhance the efficiency of administrative staff and work process in order to raise student satisfaction. Staff and students would be frustrated by bureaucratic procedures and inaccurate information. Approximately 65-75 % of students believed that the quality of services and facilities were highly satisfactory. The outcomes were consistent with the socio-technical system theory and TQM theory in terms of theoretical implications. Based on the socio-technical system theory, the human and social dimensions of the technical system in a university must function properly to reach the intended outcomes, benchmarks, and goals of TQM in facilities and services. In reality, the human and social dimensions have to be prioritized above the technical aspects as the latter requires developing skills and upgrading the knowledge, capabilities, and mindsets through training workshops. TQM audits concentrated on standard processes and accurate record filing of diverse positions at various levels and divisions.

Secondly, the findings highlight the significance of socio-technical system theory and TQM theory in the university context. According to the results, the human and social factors were more significant than the technological factors in obtaining high quality and satisfying consumer satisfaction. As a case in point, strategies of initiating change and then managing and integrating the various processes of change and innovation among faculties and departments in universities appear to be significant parts of quality culture and procedure.

CONCLUSION

The satisfaction of university students is critical in assessing service quality. Evaluating and measuring satisfaction with students' academic experiences is challenging, although it may be highly beneficial for universities in developing strong relationships with both present and future students (Hanaysha, Abdullah, & Warokka, 2011). According to Ghanad et al. (2020) in Malaysia, students at public universities were more satisfied with the culture of the campus in compare to private university students. Patrinos (1990); and Balán (1990) in their discussions rationale that the main benefit of private HEIs has been their ability to respond to market needs more quickly and effectively. They are able to offer the most in-demand form of education, thereby meeting the current economy's and society's demands. Public HEIs, on the flip side, are significantly slower to respond to market demands since such demands would likely necessitate a significant rearrangement of national resources (Wilkinson & Yussof, 2005). According to two papers, it is particularly accurate at public universities, which have historically been regarded as a bureaucracy with an insufficient attitude to adhocracy and industry philosophies and values because they function in

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complicated political structures with varying stakeholder interests in continuous evolution (Zammuto & Krakower, 1991). It is also argued that graduate students at private universities have lower unemployment percentages and obtain higher-paying jobs (Patrinos, 1990). However, issues of quality and value of programs provided by different universities, particularly private universities, have been a major responsibility for the country (Muhamad, Chan, Suhaimi, & Suzyrman, 2006). This is accompanied by a drop in ranking at several of Malaysia's top universities (Ranking, 2010). Both challenges raise concerns about the reputation of Malaysian universities for quality education. According to Yaumiddin (2011), private universities must continually assess the level of service quality to preserve competitiveness in the face of emerging challenges in the HE market. It is recommended that similar studies involving more universities and a bigger sample should be conducted to affirm or repudiate the findings of this study and the theories used.

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Awareness, Attitude, and Compliance with Ra11313 – Safe Spaces Act among College Students in a Higher Educational Institution in Laguna



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ABSTRACT: This study investigated the 374 respondents of Pamantasan ng Cabuyao on their level of awareness, attitude and level of compliance with RA11313 Safe Spaces Act thru the use of descriptive-correlational method based on the results of the three-part researcher-made questionnaire. The findings showed the respondents' high level of awareness, the very positive attitude, and the very high level of compliance to RA11313 Safe Spaces Act. As to the relationship between variables, the findings showed significant relationships between the level of awareness and attitude; level of awareness and level of compliance; and attitude and level of compliance of the respondents with RA11313 Safe Spaces Act. In conclusion, the students are aware of RA11313 Safe Space Act knowing that their university is a safe space; they have positive attitude towards RA11313 Safe Spaces Act which signifies their belief that the university will use the survey's feedback to make improvements; and they comply to RA11313 Safe Spaces Act as they have not committed any violations in the Implementing Rules and Regulation of the act. Similarly, the higher their level of awareness, the more positive their attitude; the higher their level of awareness, the higher their level of compliance; and the more positive their attitude, the higher their level of compliance to RA11313 Safe Spaces Act. Therefore, there is a need to implement the proposed action plan to enhance or sustain the awareness, attitude, and compliance of the college students towards RA11313 Safe Spaces Act.

KEYWORDS: Descriptive correlational study, United States, safe space, gender-based sexual harassment.

INTRODUCTION

Republic Act (RA) 11313, or the Safe Space Act, is "an act defining gender-based sexual harassment in streets, public spaces, online, workplaces, and educational or training institutions, providing protective measures and prescribing penalties therefor" (Philippine Commission on Women, 2019). Principally authored by Sen. Risa Hontiveros (Senate of the Philippines, 2019), RA11313 was signed by President Duterte in April 17, 2019 and took effect on August 3, 2019 after the drafting of the Implementing Rules and Regulations (IRR) of the law.

In the United States, Title VII of the Civil Rights Act of 1964 is highlighted prohibiting sexual harassment on the basis of race, color, religion, sex or national origin and forbids discrimination on the basis of sex, as well as, race in hiring, promoting, and firing (US Department of Labor, 2022).

Despite the presence of this law, it did not stop a renowned nuclear physicist at Cornell University from harassing his administrative assistant in 1974 (Adeleke, 2022). Similarly, despite RA7877, or the Anti-Sexual Harassment Act of 1995 signed by then President Fidel V. Ramos (Philippine Commission on Women, 2020), cases of sexual harassment increased and is still increasing, according to the Commission on Population and Development (2020).

It is also worthy to mention that in the study of Klein and Martin (2019) genderbased harassment and unwanted sexual attention rather than sexual coercion were more commonly experienced in campuses. This is supported by a comparative analysis on Sexual Victimization and Sexual Harassment among College Students by Magnuson, Augustyn and Rennison (2019) of which 24 colleges were subjected to the study. Those who were victims of sexual harassment reported to feeling uncomfortable in their college environment implying a campus that is not a safe space. More specifically, a study on Sexual Harassment at Institutions of Higher Education: Prevalence, Risk, and Extent by Wood, Hoefler and Kammer-Kerwick (2018) focused on sexual harassment victimization by a faculty/staff member or by a peer since enrollment at their Institution of Higher Education (IHE). Race and

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gender are common in sexual harassment. Results of this study became part of a discussion for institutional program planning and policy creation.

Locally, and specifically in Laguna, there are few studies conducted related to sexual harassment. The study by Algaba, Peji, Sta. Maria and Bawica from the Laguna

State Polytechnic University, titled “Laguna Patroller: Mobile Application for Public Awareness about Violence with Global Positioning System and Image Processing” (2018) created a mobile app by providing the user with a channel for reporting cases of violence to local law enforcement agencies. On a similar note, iJuanaHelpMo: Web and Mobile Application for Reporting Violence: A Framework for Developing Violence Against Women Application was created in 2020 by Francis F. Balahadia and Zerah-Jane M. Mortel College of Computer Studies, Laguna State Polytechnic University Siniloan Campus created a framework for the development of Web and Mobile Application for Reporting Violence Against Women (VAW) capable of using the undetectable mobile application in reporting Violence against Women, a customizable e-reporting mechanism for pre-selected people to contact in times of emergency and provide essential help.

Although there is a study on RA11313 Safe Spaces Act conducted by Remoto and Villalobos (2021) for the province of Negros Occidental as a Local Government Unit with results focusing on the promotion of RA11313 for their province to be a safe space for all; however, there were no studies conducted regarding awareness, attitude, and compliance to RA11313 Safe Spaces Act among college students in higher institutions in Laguna, particularly Cabuyao.

Thus, this study investigated on the awareness, attitude, and compliance to RA11313 Safe Spaces Act specifically in higher institutions in Laguna, particularly Cabuyao. This can be benchmarked by other higher educational institutions on safe spaces in Laguna; it can also improve the current situation of safe spaces among institutions; and the results of this study can be used as guide in creating programs for the improvement of the Gender and Development department of the institution.

METHODS

The researcher utilized the descriptive-correlational research design, which is the most effective research model to use for this study. The research design determined the level of awareness, attitude, and compliance to RA11313 – Safe Spaces Act among college students in Laguna. This research model was specifically conceived to describe systematically, factually, accurately, and objectively a problem or phenomenon. It sought to describe “what is”. From this research design, the researcher sought to probe for the significance of relationship between two or more factors or characteristics (Stangor and Walinga, 2019). The primary sources of data were the college students from Laguna.

The population of the study was from the 5,904 college students of Pamantasan ng Cabuyao enrolled for SY 2021-2022. Using Slovin’s formula, the number of respondents was 374. The actual sample was chosen through the random sampling technique. The respondents were given questionnaires as to their awareness, attitude, and compliance to RA11313 – Safe Spaces Act.

The researcher developed a self-made questionnaire for obtaining the primary data for the study. It was categorized into three (3) parts. Part I focused on the respondents’ level awareness on RA11313 – Safe Spaces Act. Part II focused on the respondents’ attitude. Part III focused on the respondents’ level of compliance to RA11313 – Safe Spaces Act. The statistical scale of measurement utilized was the 4-point Likert scale. Since the questionnaire was self-made, it was tested for face and content validity by a panel of experts of communication, research, and statistics. It was presented to the experts of communication, research, and statistics. After making some adjustments and adding some content, it was submitted to the adviser for final consent and was disseminated to the targeted respondents. The study conducted reliability using Cronbach Alpha.

The results of the study were collected from a survey questionnaire. The survey was devised by recreating a standard questionnaire to measure and ensure that the respondents would answer accordingly, based on the variables presented to them. It was made up of a total of 30 questions designed to evaluate the respondents’ level of awareness (10 questions), level of attitude (10 questions), and level of compliance (10 questions). The researcher assured the confidentiality of the respondents’ identities. The questionnaires were allocated after the respondents answered them for the results to be tallied, tabulated, analyzed, and interpreted.

The respondents from the selected educational institution were given letters to ask for and receive their permission to participate in the study, which guaranteed their anonymity and confidentiality of their answers. The respondents were asked to

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answer a self-made questionnaire by the researcher by checking the appropriate answer beside the following statement that best represents their level of awareness, attitude, and compliance to RA11313 Safe Spaces Act.

RESULTS AND DISCUSSIONS

Discussion of the awareness, attitude, and compliances of the colleges students are discussed in the succeeding tables and textual presentations.

Table 1. The Respondents' Level of Awareness on RA11313 Safe Spaces Act

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Familiar with the Safe Spaces Act.	2.67	High Awareness (Agree)	10
2. The Safe Spaces Act was signed during the Duterte Administration.	2.84	High Awareness (Agree)	9
3. The Safe Spaces Act supports the AntiSexual Harassment Act.	3.16	High Awareness (Agree)	3.5
4. The Safe Spaces Act protects men and women against harassment.	3.21	High Awareness (Agree)	1
5. There are penalties included in the Safe Spaces Act.	3.16	High Awareness (Agree)	3.5
6. An LGU or HEI will be penalized if the Safe Spaces Act is not implemented.	2.95	High (Agree)	8
7. My university implements the Safe Spaces Act.	3.07	High Awareness (Agree)	5
8. My university has a policy on Gender Based Sexual Harassment based on the IRR of the Safe Spaces Act.	3.06	High Awareness (Agree)	6.5
9. My university has promoted the Safe Spaces Act with informative webinars.	3.06	High Awareness (Agree)	6.5
10. My university is a safe space.	3.20	High Awareness (Agree)	2
		(Agree)	
Average	3.04	High Awareness (Agree)	

Table 1 presents the respondents' level of awareness on RA11313 Safe Spaces Act, where Indicator 4, "The Safe Spaces Act protects men and women against harassment" got a weighted mean of 3.21 which ranked 1; followed by Indicator 10, "My university is a safe space" with weighted mean of 3.20 and ranked 2; followed by Indicator 3, "The Safe Spaces Act supports the Anti-Sexual Harassment Act" with weighted mean of 3.16 and Indicator 5 "There are penalties included in the Safe Spaces Act" with weighted mean of 3.16 which shared rank 3.5.

On the other hand, Indicator 1 "Familiar with the Safe Spaces Act" with weighted mean of 2.67 and ranked 10; Indicator 2 "The Safe Spaces Act was signed during the Duterte Administration" with weighted mean of 2.84 ranked 9 and Indicator 6 "An LGU or HEI will be penalized if the Safe Spaces Act is not implemented" with weighted mean 2.95 ranked 8. All ten indicators had verbal interpretations of High.

To sum up, the college students have High Awareness to RA11313 Safe Spaces Act as an average weighted mean of 3.04 was revealed. This means that the respondents know that RA11313 Safe Spaces Act protects both men and women and that their university is a safe space.

The findings support the study made by Salmon, Stanton, Walker and Jenkins (2017) when people within a circle are engaged with each other can maintain enough understanding of 'what is going on' within that circle and they can successfully perform the task at hand, at which case, to comply with what RA11313 requires. The findings also support the study of Nguyen,

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Lim, Nguyen, Brown and Nahavandi (2019), which explains that awareness is necessary in processing human information and essential in decision making, in which case is compliance with RA11313 Safe Spaces Act.

Table 2. The Respondents' Attitude towards RA11313 Safe Spaces Act

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Pamantasan ng Cabuyao does a good job of communicating about this new law, RA11313 or the Safe Spaces Act.	3.09	Positive (Agree)	10
2. The Gender and Development Office communicates a clear sense of direction for the students of Pamantasan ng Cabuyao.	3.26	Very Positive (Strongly Agree)	7
3. Satisfied with the information I received from my university.	3.25	Very Positive (Strongly Agree)	8
4. Have enough information to follow rules and regulations of my university.	3.21	Positive (Agree)	9
5. Feel the university is serious when it comes to making it a safe space for students.	3.30	Very Positive (Strongly Agree)	4.5
6. Know what is expected of me as a student of this university.	3.27	Very Positive (Strongly Agree)	6
7. Support the values taught by my university.	3.40	Very Positive (Strongly Agree)	2
8. Made to feel that I am an important part of the university.	3.30	Very Positive (Strongly Agree)	4.5
9. Believe the university will use this survey's feedback to make improvements.	3.43	Very Positive (Strongly Agree)	1
10. Believe following what is stipulated in the law will help me as a student.	3.36	Very Positive (Strongly Agree)	3
Average	3.29	Very Positive (Strongly Agree)	

Table 2 presents the respondents' attitude towards RA11313 Safe Spaces Act. Indicator 9, "Believe the university will use this survey's feedback to make improvements" garnered a weighted mean of 3.43, verbally interpreted as Very Positive and ranked 1 among all indicators. Indicator 7, "Support the values taught by my university ranked 2 with a weighted mean of 3.40, verbally interpreted as Very Positive; and Indicator 10, "Believe following what is stipulated in the law will help me as a student" ranked 3 with a weighted mean of 3.36 verbally interpreted as Very Positive.

On the other hand, Indicator 1, "Pamantasan ng Cabuyao does a good job of communicating about this new law, RA11313 or the Safe Spaces Act" ranked 10 with a weighted mean of 3.09 verbally interpreted as Positive. Rank 9 is Indicator 4, "Have enough information to follow rules and regulations of my university" with weighted mean of 3.21 verbally interpreted as Positive. Finally, Indicator 3, "Satisfied with the information I received from my university" ranked 8, with weighted mean of 3.25 verbally interpreted as Positive.

To sum up, an average weighted mean of 3.29 revealed the respondents' attitude towards RA11313 Safe Spaces Act as Very Positive. This mean that this is the respondents' attitude towards the university using the survey's feedback to make improvements and having enough information to follow rules and regulations of the university.

The findings support the theory by Cherry (2021) which refers to attitude as a "set of emotions, beliefs, and behaviors toward a particular object, person, thing, or event; as well as the study of Olufemi which theorizes that a person's attitude are actual evaluations 31 the they make about objects, ideas, events or other people and can either be positive or negative; in which case the respondents' attitude towards RA11313 Safe Spaces Act.

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Table 3. The Respondents' Level of Compliance with RA11313 Safe Spaces Act

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Don't do catcalling.	3.60	Very High (Strongly Agree)	3
2. Don't do wolf-whistling.	3.58	Very High (Strongly Agree)	4
3. Don't make unwanted invitations.	3.56	Very High (Strongly Agree)	6.5
4. Don't use misogynistic, transphobic, homophobic and sexist slurs.	3.57	Very High (Strongly Agree)	5
5. Don't make using persistent uninvited comments or gestures on a person's appearance.	3.54	Very High (Strongly Agree)	8.5
6. Don't make relentless requests for personal details.	3.56	Very High (Strongly Agree)	6.5
7. Don't make statements of sexual comments and suggestions	3.52	Very High (Strongly Agree)	10
8. Don't do public masturbation or flash private parts.	3.67	Very High (Strongly Agree)	1
9. Don't grope, or make any advances, whether verbal or physical, that is unwanted and has threatened personal space and physical safety	3.61	Very High (Strongly Agree)	2
10. Don't make sexual jokes or remarks.	3.54	Very High (Strongly Agree)	8.5
Average	3.57	Very High (Strongly Agree)	

Table 3 presents the respondents level of compliance with RA11313 Safe Spaces Act. Indicator 8, "Don't do public masturbation or flash private parts" ranked first and garnered a weighted mean of 3.67 verbally interpreted as Very High; followed by Indicator

9, "Don't grope, or make any advances, whether verbal or physical, that is unwanted and has threatened personal space and physical safety" which ranked second and had a weighted mean of 3.61 verbally interpreted as Very High; and finally, Indicator 1 "Don't do catcalling" ranked third and got a weighted mean of 3.60 verbally interpreted as Very High.

However, that which ranked 10 is Indicator 7 "Don't make statements of sexual comments and suggestions" with weighted mean of 3.52; rank 8.5 are Indicators 5 "Don't make using persistent uninvited comments or gestures on a person's appearance." and 10 "Don't make sexual jokes or remarks" both with Very High verbal interpretation of their 3.54 weighted mean each. This is followed by Indicator 3 "Don't make unwanted invitations" and Indicator 6 ". Don't make relentless requests for personal details" both ranked 6.5 and share 3.56 weighted mean verbally interpreted as Very High.

To sum up, an average weighted mean of 3.57 revealed the respondents' level of compliance with RA11313 Safe Spaces Act as Very High. This means that the respondents follow rules and regulations that are required of them.

The findings support the studies of Mortensen and Cialdini (2020); Sutinen and Kuperan (1999); and Cherry (2021) which both theorized that a person's compliance is a behavior, whether with social or psychological underpinnings. Therefore, the respondents' compliance to RA11313 Safe Spaces Act, is not because of an authority asking them to do it but because their attitude towards the law made them decide to follow it.

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Table 4. Relationship between the Respondents' Level of Awareness and Attitude towards Ra11313 Safe Spaces Act

Indicator	Pearson r	p-value	Interpretation
Respondents' Level of Awareness and Attitude towards Ra11313 Safe Spaces Act	0.668** Moderate correlation	0.000	Significant
**Significant @ 0.01			

As shown in the table, there is a significant relationship between the respondents' level of awareness and attitude towards RA11313-Safe Spaces Act. A Pearson r value of 0.668 indicates a moderate correlation with a probability value of 0.000 which is less than the 0.01 significance level. This implies that the higher the respondents' level of awareness the more positive is their attitude towards RA11313-Safe Spaces Act.

This supports the study conducted in 2020 at the onset of the pandemic. The authors, Ikhlq, Bint-E-Riaz, Bashir, and Ijaz showed a satisfactory level of awareness and a positive attitude towards understanding the coronavirus (2020).

Likewise, a study by Moghadam, Azad, Sahebalzamani, Farahani and Jamaran (2017) stated that having a high level of awareness toward one's major led students studying in medicine, dentistry, and pharmacy to experience a more positive attitude and a higher level of interest. This means that if one is aware of something, then their attitude towards this something may either be positive or negative.

Table 5. Relationship between the Respondents' Level of Awareness and Level of Compliance with Ra11313 Safe Spaces Act

Indicator	Pearson r	p-value	Interpretation
Respondents' Level of Awareness and Level of Compliance with Ra11313 Safe Spaces Act	0.403** Moderate correlation	0.000	Significant
**Significant @ 0.01			

As shown in the table, there is a significant relationship between the respondents' level of awareness and level of compliance with RA11313-Safe Spaces Act. A Pearson r value of 0.403 indicates a moderate correlation with a probability value of 0.000 which is less than the 0.01 significance level. This implies that the higher the respondents' level of awareness the higher their level of compliance is with RA11313-Safe Spaces Act.

This supports the study of De Luca (2019) which discussed how to get employees to follow certain rules. He stated that once employees know that the rules are necessary to their responsibilities, then it is easy for them to comply. Similarly, if school rules are explained to students at the start of the school year, or if new rules are carefully and properly explained to them, they will follow it, especially if sanctions are clearly defined.

Table 6. Relationship between the Respondents' Attitude and Level of Compliance with RA11313 Safe Spaces Act

Indicator	Pearson r	p-value	Interpretation
Respondents' Attitude and Level of Compliance with RA11313 Safe Spaces Act	0.511** Moderate correlation	0.000	Significant
**Significant @ 0.01			

As shown in the table, there is a significant relationship between the respondents' attitude and level of compliance with RA11313 Safe Spaces Act. A Pearson r value of 0.511 indicates a moderate correlation with a probability value of 0.000 which is less than the 0.01 significance level. This implies that the more positive the respondents' attitude is the higher their level of compliance is with RA11313-Safe Spaces Act.

This supports the study of Alharbi, Shono, Alballee & Aloufi (2019) which looked into the knowledge, attitude and compliance of faculty members and students to guidelines. The results of attitude and compliance are of equal measure signifying that respondents' compliance is based on how much they know about a subject, event, or activity.

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CONCLUSION

The college students are aware that RA11313 Safe Space Act protects both men and women and that their university is a safe space. The college students' attitude towards RA11313 Safe Spaces Act signifies their belief that the university will use the survey's feedback to make improvements and that they support the values taught by their university. The college students comply to RA11313 Safe Spaces Act as they have not committed any violations stipulated in the Implementing Rules and Regulation of the act.

Further, the higher the level of awareness of the respondents, the more positive their attitude is towards RA11313 Safe Spaces Act. The higher the level of awareness of the respondents, the higher is their level of compliance to RA11313 Safe Spaces Act. The more positive respondents' attitude, the higher is their level of compliance to RA11313 Safe Spaces Act. There is a need to continuously implement the proposed action plan to enhance or sustain the awareness, attitude, and compliance of the college students towards RA11313 Safe Spaces Act.

FUTURE DIRECTIONS

The Gender and Development Office of the Pamantasan ng Cabuyao should have a calendar of activities designed to make its students aware of RA11313 Safe Spaces Act, not just on the surface but the substance of the law itself. This is possible thru the implementation of the action plan of this study.

The university, thru the Gender and Development Office should make a follow through of this study by actually implementing the recommendations and proposed action plan, not just for compliance purposes of the researcher, but a basis for improvement for the current situation in the university. The values of the university must always be aligned with the protection of all of its stakeholders, most especially the students.

The university, thru the Gender and Development Office, should regularly hold a Gender Sensitivity Training, not just for its students, but for its teaching and non-teaching personnel. After which, another round of survey or Training Needs Assessment should be given to evaluate and further improve the plans and programs of the university.

The students, after having taken the general education subject, Gender and Development (GAD101), should still be required to regularly attend advance topics like, Gender Fair Language, Budget Planning for Gender and Development, that will further enhance or improve their knowledge about Safe Spaces.

The Gender and Development Office should include in their webinar the sanctions that an offender or an LGU/HEI which does not comply with RA11313 Safe Spaces Act.

The Gender and Development Office should design webinars that students will appreciate and bring about positive attitude towards RA11313 Safe Spaces Act.

Future researchers should be encouraged to continue or improve this study as the fight against violence against women is a never-ending battle.

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Knowledge and Implementation of Total Quality Management of Selected Grocery Stores in Cabuyao City, Laguna



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ABSTRACT: The study's objective was to determine the level of knowledge and implementation of the Total Quality Management (TQM) of the grocery stores in the City of Cabuyao, in the Province of Laguna, Philippines, and the relationship that exists between the variables. In the study, modified questionnaires were utilized as a part of the descriptive correlational methodology. The study showed that the majority of the grocery stores have been in the business for less than ten years, are classified as a partnership, and have approximately less than 50 employees. The grocery stores had average knowledge of total quality management, and so with its implementation. A significant difference was noted in the level of knowledge and implementation when their responses were grouped according to their profile. The correlation result suggested that the increase in the TQM knowledge will also increase the likelihood of its implementation. The study results impacted the TQM implementation to help the small and medium enterprises (SMEs) improve the quality of their business towards increased business engagement and realizing their full potential, particularly during these trying times amidst the pandemic.

KEYWORDS: descriptive correlational study, TQM, SMEs, grocery stores, knowledge and implementation

INTRODUCTION

Small and medium enterprises (SMEs) play a vital role in generating sufficient cash flows and foreign exchange earnings and providing significant employment opportunities. The critical issue now is starting a business and keeping it going and profitable in the short and long term.

Total Quality Management (TQM) is a primary factor for an organization's continuous improvement and improved performance. TQM tools are critical in assisting with improvement efforts. However, SMEs have limited resources and awareness when implementing TQM tools in their businesses (Ahmad et al., 2018). A successful TQM implementation can create long-term quality and productivity by fostering continuous improvement. Furthermore, TQM tools and techniques are critical for SMEs to maintain their quality and productivity performance (Ahmad et al., 2016).

Adeyamo (2019) observed that Total Quality Management (TQM) had received much attention in the Philippines over the last few decades. However, it has also been criticized for failing to address critical issues related to its success and implementation. However, it is still too early to assume that TQM is obsolete or dead. Total Quality Management is a holistic approach to quality improvement that focuses on achieving customer satisfaction, increased productivity, and increased profitability (Dipasupil, 2018). This can only be accomplished by allowing SMEs to understand better how to implement Total Quality Management to improve the enterprise's quality.

Total Quality Management (TQM) is a quality management method frequently employed in large-scale organizations. Many years ago, it was widely believed that the quality of physical goods was critical. Nowadays, many people are concerned with the quality of the product and services since this is a highly relevant issue. Every firm works hard to achieve excellence in everything it does. TQM is being used as a tool to meet this goal. However, it is not used in small and medium-sized businesses.

One of the benefits of TQM as a tool for performance improvement is that it can be applied to businesses of all sizes (Assarilind & Gremyr, 2016). Quality has become an essential component of business improvement plans due to increased consumer awareness

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and global competition. Although quality management programs have proven successful in some businesses, others have not seen their hoped results. This discrepancy in achievement is primarily because the success of the programs is determined by how well they are adapted to the organizational context (Escrig & De Menezes, 2016).

The primary objective of TQM is to provide customers with high-quality products or services, which will increase productivity and lower costs. On the other hand, SMEs require a significant investment in the workforce, skills, and financial resources to implement TQM tools and techniques. In this situation, SMEs' poor quality and productivity performance resulted from their limited use of TQM tools and techniques (Ahmad et al., 2018).

Hence, this study aimed to determine the relationship between the level of knowledge and implementation of total quality management of selected grocery stores in Cabuyao City to recommend an action plan that will improve the quality of their business. This issue should be addressed because improving the quality of firms enables business owners to develop more effective strategies for achieving business excellence. Failure to formulate an action plan for improving the quality of businesses might hurt the business performance, and the company's full potential will never be attained.

METHODS

This study used a descriptive correlational method of research to achieve the purpose of the study. Descriptive research aims to describe a population, situation, or phenomenon systematically and accurately (McCombes, 2019). It mainly focuses on describing and determining the relationship between knowledge and implementation of TQM in selected grocery stores in Cabuyao City.

This study was conducted in Cabuyao City, a first-class component city in the province of Laguna, Philippines. The City of Cabuyao has 18 barangays with a total area of 43.40 km² (16.76 sq. m.): three are Poblacion barangays, six are located along the national highway, six along Laguna de Bay, and the remaining three are located on the western side near the Cabuyao-Cavite boundary (<https://www.cabuyao.gov.ph/>).

This study aimed to determine the level of knowledge in TQM and the level of implementation of TQM in selected grocery stores in Cabuyao City. The study respondents were the thirty-five (35) selected grocery store managers in Cabuyao City who were chosen through purposive sampling. A business manager's job is to oversee and manage the business operations and workers. They implement business strategies, evaluate business performance, and supervise staff, among other things, to ensure firm productivity and efficiency. Therefore, they are the primary source of the data since this study explored the level of knowledge in TQM and the level of implementation of TQM based on what they had experienced.

The researchers were permitted by Professor Sha'ri Yusof, a professor from Japan, to use his survey questionnaire named "Survey on the Implementation of TQM in Malaysian Automotive Suppliers" to guide the researcher's survey questionnaire. The survey questionnaire consists of three (3) parts: the business profile of the respondents, the level of knowledge in TQM of businesses, and the level of implementation of TQM of businesses. The first part of the questionnaire comprises the business profile of the respondents, such as years of operation, the status of ownership, and the number of employees. The second part consists of twenty (20) statements regarding the respondents' level of knowledge in TQM regarding its components and its importance and benefits. Finally, the third part consists of sixty (60) statements regarding the respondents' level of TQM implementation regarding customer focus organization, involvement of people, process approach, system approach to management, continual improvement, and factual approach to decision making. These statements helped the researchers to determine the respondents' level of knowledge of TQM and the respondents' level of implementation of TQM. The researchers modified the constructed survey questionnaire and underwent a validation process.

The data gathered and collected in this study was organized and classified based on the research design and problems formulated. Finally, the data are tallied and tabulated for the presentation, and the researchers used the following statistical tools to interpret the data: the weighted mean to determine the level of knowledge and level of implementation of the TQM; the ANOVA for the significant difference in the responses when grouped to profile; and the Pearson r Moment Correlation Coefficient for the significant relationship between the level of knowledge and level of implementation of the TQM.

RESULTS AND DISCUSSIONS

A survey of 35 grocery stores in Cabuyao City was conducted to assess their TQM knowledge and implementation level. The results are shown in the tables and textual discussions below. This section also discusses the correlation between the factors among the respondents:

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Table 1. Respondents' Business Profile

Years of Operation	Percentage	Type of Ownership	Percentage	Number of employees	Percentage
Less than 10 years	72%	Sole Proprietorship	34%	<50	69%
10-20 years	17%	Partnership	37%	50-100	29%
More than 20 years	11%	Corporation	29%	>100	2%
Total	100%		100%		100%

Table 1 shows the business profile of the respondents. It can be observed that the majority of the businesses had been operating their business for less than ten years. This could be due to the recent increase in registered businesses dealing with the pandemic. Despite economic uncertainty and a volatile market, the coronavirus pandemic has increased the number of startups. More businesses are being launched than at any other time in the last decade with the hope of generating enough income to survive the pandemic. It supports the Department of Trade and Industry (DTI) data, which showed that from January to March 2021, the number of business name registrations reached 432,962, as many Filipinos turned to entrepreneurship to help them cope with the pandemic. (<https://www.dti.gov.ph/>). It can also be seen that in terms of ownership, the majority of the respondents are classified as a partnership. This means that large numbers of partnerships are operating in the City of Cabuyao. Many businesses operate as partnerships, possibly because it is difficult for small businesses to survive independently, and they believe that having a partner is a wise choice. It affirms the study of Tsutsumi et al. (2019). They asserted that strategic business partnerships are important for various reasons, including the possibility of gaining a competitive advantage for the business. A win-win partnership could give a business the edge to outperform its competitors. However, a poorly planned partnership can cause more harm than good, making this procedure difficult.

The majority of the businesses have less than 50 employees. Small businesses generate more jobs than medium-sized businesses. The findings above support the data from 2020 shown by the Philippine Statistics Authority (PSA), which stated that a total of 957,620 business enterprises were operating in the country. Of these, 952,969 (99.51%) were MSMEs and 4,651 (0.49%) were large enterprises. Micro enterprises constitute 88.77% (850,127) of total MSME establishments, followed by small enterprises at 10.25% (98,126) and medium enterprises at 0.49% (4,716) (<https://psa.gov.ph/>). It also supports the data from 2020 shown by the Department of Trade and Industry (DTI), which stated that MSMEs generated a total of 5,380,815 jobs, or 62.66% of the country's overall employment. The micro-enterprises produced the biggest share (29.38%), closely followed by small enterprises (25.78%), while medium enterprises were far behind at 7.50%. (<https://www.dti.gov.ph/>).

Table 2. Level of Knowledge in TQM of the Respondents in Terms of Components of TQM

Indicator	Weighted Mean	Verbal Interpretation
1. When it comes to any business decision, the primary focus should be on the customer.	3.74	Very High
2. Being able to see things from your customer's point of view allows you to provide an outstanding customer experience.	2.80	High
3. Involvement of people helps to create value for the organization and helps achieve its business objectives.	2.74	Average
4. Total employee commitment is only possible when fear is eliminated from the workplace, people are empowered, and management creates an acceptable atmosphere.	2.71	Average
5. The application of a process approach increases an organization's effectiveness and efficiency in meeting its objectives.	2.11	Low

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6. The process approach enables issues to be resolved and to influence the result more quickly.	2.46	Average
7. Quality management entails a methodical and strategic approach to attaining an organization's vision, purpose, and objectives.	2.54	Average
8. An organization's ability to remain competitive and fulfill stakeholder expectations requires both analytical and creative thinking.	2.66	Average
9. There is a need for performance data in order to assess the effectiveness of an organization.	2.66	Average
10. TQM needs an organization to gather and evaluate data on a regular basis in order to increase the accuracy of decision-making, establish consensus, and create forecasts based on prior performance.	2.54	Average
Average Weighted Mean	2.70	Average

Table 2 presents the respondents' level of knowledge in terms of components of TQM. The overall mean response of small grocery stores for this aspect is 2.70, which is interpreted as Average. It can be observed that small-medium groceries are aware that the primary focus of their business should be on the customers, but knowing that processes can directly impact the ability to serve their customers is something that they are lacking. In any business, not understanding the process approach is a disadvantage because it is an efficient way to plan the development and improvement of service quality. It affirms the study of Doblas et al. (2019) that knowledge transfer and learning are crucial to process improvement. To achieve process improvement, procedures should be in place to ensure top management's quality management policies are transferred to the employees who will directly impact customers.

Table 3. Level of Knowledge in TQM of the Respondents in Terms of Importance and Benefits of TQM

Indicator	Weighted Mean	Verbal Interpretation
1. Quality plays an essential role in every business.	3.20	High
2. Quality is an attribute that differentiates a product or service from its competitors.	3.00	High
3. TQM ensures superior quality products and services.	2.54	Average
4. TQM is a continuous effort by an organization's management as well as its employees.	2.37	Average
5. TQM ensures long-term customer satisfaction and loyalty.	2.66	Average
6. TQM is a management theory and practice that ensures that all available resources are used efficiently and effectively.	2.51	Average
7. TQM benefits the business in terms of decision making.	2.43	Average
8. TQM improves the business process that helps in the ability to serve customers.	2.60	Average

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9. TQM efforts have been beneficial in strengthening the competitive position in the industry.	2.74	Average
10. TQM leads to higher productivity.	2.54	Average
Average Weighted Mean	2.66	Average

Table 3 shows the respondents' knowledge of TQM in terms of its importance and benefits of TQM. The overall mean response of small grocery stores for this aspect is 2.66, which is interpreted as Average. This means that small-medium grocery stores know that quality is a crucial aspect of the business. However, they are not fully aware of TQM, including its importance and benefits, vital to achieving quality. Considering that small-medium-sized groceries are not fully aware of TQM in terms of its importance and benefits, it can be observed that TQM implementation may be hindered by the lack of information about TQM, including its importance and benefits. It supports the study of Imran et al. (2018). They stated that knowing TQM is essential to performing tasks and achieving the organization's business goals. Because managers and entrepreneurs are unaware of the benefits of TQM, they are less likely to invest in it.

Table 4. Summary Table for the Level of Knowledge in TQM

Level of Knowledge in TQM	Weighted Mean	Interpretation
Components of TQM	2.70	Average
Importance and Benefits of TQM	2.66	Average
Average Weighted Mean	2.68	Average

Table 4 shows the composite summary of the respondent's level of knowledge in TQM in terms of components and its importance and benefits. The overall mean response of Components of TQM is 2.70, and the overall mean response of importance and benefits of TQM is 2.66. Both are interpreted as Average.

The average mean response for the level of knowledge in TQM is 2.68, which is interpreted as Average. Overall, the results state that the level of knowledge in TQM of selected grocery stores is still lacking. This means that there are areas in TQM they still need to understand to fully implement TQM correctly and receive its benefits. It supports the study of Niazi et al. (2019). They stated that inadequate knowledge of TQM practices leads to poor planning, management confusion, insufficient management support, and a lack of full implementation.

On the other hand, knowledge is one of the most valuable resources in our modern world and is viewed as one of the critical success factors in any organization. The problem today is not how to find the information but how to manage it; the most difficult challenge for organizations is determining how to process knowledge and turn it into profit. Therefore, being knowledgeable about TQM tends to improve the performance of many organizations. It affirms the study of Long et al. (2016), who stated that in today's global trends, knowledge has already been recognized as a competitive advantage and has become a critical component of businesses. Effective knowledge management aids the successful implementation of quality improvement. Knowledge ensures continuous improvement in total quality management.

Table 5. Level of TQM Implementation of the Respondents in terms of Customer Focus Organization

Indicator	Weighted Mean	Verbal Interpretation
1. The store provides the item that the customer needs.	2.94	High
2. The store offered a broad variety of brands.	2.83	High
3. The products are organized.	3.09	High
4. The stocks are monitored on a First In, First Out (FIFO) basis to prevent spoilage and expiration of products.	2.83	High

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5. There are price labels in each category of the products that are being updated regularly.	2.91	High
6. The price of the products is visible.	2.80	High
7. There are working price checker machine for price inquiry of the products.	2.37	Average
8. The price written on the label is consistent with the cashier's payment.	2.80	High
9. Cashiers in the store always act quickly when there is a long queue.	2.77	Average
10. There is a specific lane for PWDs, senior citizens, and pregnant women in the cashier.	2.86	High
11. The grocery store offers contactless payments.	2.49	Average
12. The customer service personnel are well-trained to respond customer inquiry.	2.86	High
13. The store responds immediately to customer complaints.	2.77	Average
14. All the complaints of customers are being documented.	2.49	Average
15. The store has reasonable return and exchange policy.	2.89	High
16. The store provides high cleanliness and tidiness.	2.94	High
17. Staffs regularly sanitize the store.	2.91	High
18. Safety protocols are being implemented.	2.97	High
19. The business regularly surveys the customers to determine their satisfaction level.	2.26	Average
Average Weighted Mean	2.78	Average

Based on Table 5, the overall mean response for the level of implementation of TQM in terms of customer focus organization is 2.78, which is interpreted as Average. Even though the grocery stores are consistently organizing their products, some areas are considered lacking. Most of them failed to carry out regular surveys to the customers to assess how satisfied they were with different aspects of the business. The fact that most small-medium groceries failed to conduct regular surveys of their customers implies that there is still a need for improvement. An organization must consider service quality as a source of added customer value and listen to consumers' voices to meet their needs and increase demand for their products. To fully implement TQM, businesses must focus on their customers (customer focus), as it is one of the most common TQM practices that assist businesses in achieving service quality.

According to Goetsch and Davis (2016), the customer is the driver in a total quality setting. The above findings support the study of Pambreni et al. (2019), who claimed that SMEs in the service sector need to improve the implementation of total quality management (TQM) by focusing on customer focus. It also affirms the study of Emamian and Sheikholeslam (2016), who stated that customer focus is one of the foundations of good customer-related performance and one of the keys to fully achieving TQM implementation.

Table 6. Level of Implementation of TQM of the Respondents in terms of Involvement of People

Indicator	Weighted Mean	Verbal Interpretation
1. The store valued all the employees.	2.83	High
2. The store treats the employees fairly.	3.00	High
3. The store has regular meetings or orientation to the employees to understand their part on the organization.	2.34	Average
4. The organization encourages their employees to do their best.	2.77	Average
5. The store provides feedback for every employee so they can immediately improve their performance.	2.69	Average
6. The organization rewarded employees for their dedication and commitment towards work.	2.66	Average
7. The organization offers benefits for the employees, excluding their salary.	2.83	High
8. The organization has a fair policy for promotion for all the employees.	2.63	Average
9. The store let their employees express their opinions and valued it.	2.60	Average
10. The company involves the employees in the decision making that affects their work.	2.60	Average
Average Weighted Mean	2.70	Average

Table 6 presents the respondents' level of implementation of TQM in terms of the involvement of people. The mean response for this aspect is 2.70, which is interpreted as Average. This implies that small-medium-sized groceries claim that they value their employees, but some do not have regular meetings, which contradicts their claims. Having regular meetings allows employees to be involved in the decision-making and voice their opinions for the improvement of the organization. It can be observed that small-medium grocery stores are not fully implementing the TQM component involvement of people.

The above findings follow the statement of Bakotić and Rogošić (2017) that the implementation of involvement of people has a vital role in implementing other TQM principles such as process approach, system approach to management, and others. It also supports the study of Boikanyo and Heyns (2019), who concluded that employee involvement has a positive relationship with the components of TQM, which was utilized as a measure of quality and is a non-financial measure of performance. To establish a sustainable competitive edge, managers must enable an organization to attract, develop, and retain highly engaged workers.

Table 7. Level of Implementation of TQM of the Respondents in terms of Process Approach

Indicator	Weighted Mean	Verbal Interpretation
1. The store utilized a process flowchart to clearly define roles and responsibilities so that everyone understands who is accountable for what and when.	2.43	Average
2. The store sort products based on its similarity.	2.86	High

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3. The store uses signage to highlight products or features, guide customers to specific items, or share information with them.	2.91	High
4. The store offers grouping or bundling products with the goal of driving customers to purchase multiple items.	2.74	Average
5. The store connects with customers using seasonal displays.	2.54	Average
6. The store refines grocery replenishment for improved availability, waste, and efficiency.	2.57	Average
7. Grocery store employees count the products on the shelves and in the warehouse and compare the number to the quantity recorded in the store's records.	2.66	Average
8. The store provides a safety program that covers hazard identification and elimination, incident reporting, and safety meetings.	2.66	Average
9. The store provides customer service training.	2.57	Average
10. The store follows cash handling procedures that include clear store opening, closing and bank deposit instructions to prevent loss.	2.71	Average
Average Weighted Mean	2.67	Average

As reflected in Table 7, the overall mean response for the level of implementation of TQM in terms of the process approach is 2.67 and which is interpreted as Average. This means that most of them utilize a process that directly impacts their ability to serve their customers by using signage. On the other hand, most failed to utilize a process flowchart. Things can get complicated when it comes to keeping track of all the information within an organization. To help visualize and organize business processes, the business can utilize a process flowchart which can be used to identify critical steps while also providing a larger picture of the process. It can be observed that small-medium groceries are not fully implementing the component process approach, and there is a need for improvement.

The findings affirm the study of Guo et al. (2018), who concluded that the quality of the final product or service through the process approach is determined by quality management and vice versa. It also supports the statement of Nallusamy (2016) that if the resources and activities are managed as a process, the desired result will be attained.

Table 8. Level of Implementation of TQM of the Respondents in terms of System Approach to Management

Indicator	Weighted Mean	Verbal Interpretation
1. The store is constantly able to meet the demands and expectations of customers.	2.89	High
2. Attracting customers with promotions.	2.83	High
3. The store used software or spreadsheets to organize information and identify trends.	2.66	Average
4. The store conducts inspections for the products regularly.	2.66	Average
5. Store management keeps track of stock to ensure that all merchandise is accounted for, whether damaged, sold at a discount or stolen.	2.74	Average

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6. Customer support is available 24/7 via the web, phone, and email.	2.26	Average
7. The store provides cross-training for their employees.	2.54	Average
8. The organization considers uniforms or matching outfits so customers can easily identify employees.	2.77	Average
Average Weighted Mean	2.67	Average

Table 8 shows the respondents' Level of Implementation of TQM in terms of System Approach to Management. The overall mean response for this aspect is 2.67 and is interpreted as Average. As a result, small-medium grocery stores are not fully implementing the TQM component system approach to management. They might need an improvement as they have a minor setback like failure to provide customer support 24/7. Having your business available to your customers 24/7 shows that you are attentive to their needs and are always willing to assist them, which leads to increased customer satisfaction.

It strongly supports the statement of Castro (2018) that TQM (Total Quality Management) is a management strategy that aims for excellence by coordinating the entire system. To meet the needs of all clients, a business should optimize all processes by utilizing resources and quality methods. It also supports the statement of Terzić (2017) that the system approach is based on the engagement of all employees to meet the needs of clients and, as a result, accomplish the organization's long-term success.

Table 9. Level of Implementation of TQM of the Respondents in terms of Continual Improvement

Indicator	Weighted Mean	Verbal Interpretation
1. The grocery store has modern technology and equipment.	2.49	Average
2. The grocery store has security cameras in stockrooms, break rooms or storage area.	2.71	Average
3. The grocery store has security cameras for customers.	2.86	High
4. The grocery store installed inventory controls.	2.54	Average
5. The grocery store conducts scheduled audits.	2.63	Average
6. The company has checks and balances to keep employees accountable and reduce the chance of fraud.	2.69	Average
7. The company always demonstrates commitment to quality.	2.66	Average
8. The employees have self-evaluation to enhance the performance management process.	2.14	Low
Average Weighted Mean	2.59	Average

It is shown in Table 9 the respondents' level of implementation of TQM in terms of continual improvement. The overall mean response for this aspect is 2.59, interpreted as Average. The fact that most small-medium groceries have security cameras to monitor their customers, but most fail to conduct self-evaluation for their employees indicates a need for improvement. Having self-evaluation for their employees lets them know their workers' strengths and weaknesses and what areas to improve on. To achieve continual improvement, businesses must constantly focus on their employees' performance as they play an essential role in the company's success.

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Similarly, Anil and Satish (2016) assert that in TQM practices, the best way to improve organizational performance is to continuously improve performance activities, as continuous improvement helps convert inputs into valuable outputs. It also affirms the study of Terzić (2017), who stated that the use of TQM for the system's continual improvement and upgrade leads to the organization's excellence.

Table 10. Level of Implementation of TQM of the Respondents in terms of Factual Approach to Decision Making

Indicator	Weighted Mean	Verbal Interpretation
1. The manager makes decisions and requires others to make the decisions based on the data effectively.	2.80	High
2. The store has a backup for all the important documents.	2.63	Average
3. The manager listens to the voice of the employees for decision making.	2.71	Average
4. The management is responsible for the measurement and monitoring of stores' operations.	2.80	High
Average Weighted Mean	2.74	Average

Table 10 manifests the respondents' level of implementation of TQM in terms of factual approach to decision making with an overall mean response of 2.74, which is interpreted as Average. It can be observed that most of the respondents are responsible and making decisions based on data which is very vital when it comes to a factual approach to decision making as it enables them to make more informed decisions. However, it can also be observed that most of them do not practice backing up their documents. Database backups are critical for any business because they prevent data loss, which can ultimately disrupt business operations. As a result, small-medium grocery stores are not fully implementing the TQM component factual approach to decision making and may or may not need improvement.

The findings above indicate strong support for the study by Sinha et al. (2016), who concluded that the managers must recognize that effective quality management decisions must be founded on examining sufficient facts and information, as defined by the 'Factual Approach to Decision-Making. This means that managers must ensure data accuracy and reliability while making quality decisions and always make decisions based on logical analysis combined with experience and intuition.

Table 11. Summary Table for the Level of Implementation of TQM

Level of Implementation of TQM	Weighted Mean	Interpretation
Customer Focus Organization	2.78	Average
Involvement of People	2.70	Average
Process Approach	2.67	Average
System Approach to Management	2.67	Average
Continual Improvement	2.59	Average
Factual Approach to Decision Making	2.74	Average
Average Weighted Mean	2.69	Average

As a whole, the respondents' level of implementation of TQM in terms of Customer Focus Organization, Involvement of People, Process Approach, System Approach to Management, Continual Improvement, and Factual Approach to Decision Making is Average, as shown in the average weighted mean of 2.69. Overall, the results state that the level of implementation of TQM in those grocery stores is not that high. It can be observed that some areas have received insufficient attention, affecting the quality of service provided by the grocery store to its customers and these areas need to be improved.

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It affirms the study of Ahmad et al. (2018) that when used in conjunction with an integrated business management framework, TQM tools add to an organization's overall quality by helping the firm or organizations understand and acquire these tools. However, several small and medium-sized enterprises (SMEs) fail to properly use excellent TQM techniques, resulting in a moderate and low level of organizational performance. As a result, SMEs must give careful consideration to TQM tool management.

Moreover, it is more important to stand out than to blend in. TQM, a tool to achieve competitiveness and improve service quality, is an excellent way to attract more customers, increase customer satisfaction, and gain a competitive advantage.

It supports the study of Magd and Karyamsetty (2021), who concluded that the application of TQM in small and medium-sized businesses is an additional tool for assisting businesses in improving and speeding up their general practices that contribute to sustainability. It also affirms the study of Bharaddwaj and Guledgudda (2020), who stated that it is impossible to achieve perfection because perfection is a never-ending process. As a result, small businesses should exceed their customers' expectations by incorporating TQM into their goods and services. These results could only be obtained by employing the tried-and-true TQM principle.

Additionally, it strongly supports the study of Aziz (2019), who stated that by using Total Quality Management (TQM), small and medium-sized businesses (SMEs) can grow more quickly, improve, provide superior services and products, and gain a competitive advantage. TQM assists organizations in meeting consumer needs by providing superior products and services to improve the world-class service that their customers will receive. Making a business more efficient and productive can improve its quality and service.

Table 12. Test of Significant Difference in the Level of Knowledge in TQM of Grocery Stores in Cabuyao City When Grouped According to the Business Profile

	F-test Computed Value	Degree of Freedom		F-Critical Value $\alpha = 0.05$	Interpretation	Decision
		Between the Group	Within the Group			
Years of Operation	3.41	2	57	3.16	With Significant Difference	Reject Ho
Type of Ownership	6.60	2	57	3.16	With Significant Difference	Reject Ho
Number of Employees	7.06	2	56	3.16	With Significant Difference	Reject Ho

Decision rule: If the computed value is less than the critical value at df and significance level, accept the null hypothesis. Otherwise, reject the null hypothesis.

Table 12 shows the result in the test of difference in the level of knowledge in TQM of grocery stores in Cabuyao City when grouped according to their business profile. It was found that there is a significant difference in the level of knowledge in TQM of grocery stores when grouped according to years of operation, type of ownership, and the number of employees. This means that the level of knowledge in TQM of grocery stores varies depending on how long the business has been in operation, the type of ownership, and the approximate number of employees.

The findings above support the study of Wang and Yang (2016), who concluded that small businesses do not always share the same characteristics and ideals as large corporations. Before implementing Knowledge Management (KM) in their environment, specific characteristics of SMEs must be understood.

It also affirms the study of Calvo-Mora et al. (2016), who is one of the few to provide empirical evidence on the aspects that are crucial to the success of KM and TQM projects in businesses of all sizes. Although KM is beneficial in large and small businesses, the results reveal distinctions exist, indicating the importance of orienting corporate management based on size.

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Table 13. Test of Significant Difference in the Level of TQM Implementation of Grocery Stores in Cabuyao City When Grouped According to Their Business Profile

	F-test Computed Value	Degree of Freedom		F-Critical Value $\alpha = 0.05$	Interpretation	Decision
		Between the Group	Within the Group			
Years of Operation	45.37	2	174	3.05	With Significant Difference	Reject Ho
Type of Ownership	66.51	2	174	3.05	With Significant Difference	Reject Ho
Number of Employees	26.16	2	174	3.05	With Significant Difference	Reject Ho

Decision rule: If the computed value is less than the critical value at *df* and significance level, accept the null hypothesis. Otherwise, reject the null hypothesis.

It is shown in Table 13 that there was a significant difference in the level of TQM implementation of grocery stores when grouped according to years of operation, type of ownership, and the number of employees. It demonstrates that the degree of implementation of comprehensive quality management in grocery stores differs depending on the number of years the store has been in business, the type of ownership, and the number of workers. As a result, their approaches to managing their businesses vary.

The findings above follow the study of Nguyen et al. (2018), who concluded that while there are considerable disparities in the levels of Quality Management practice implementation among groups of varying company sizes, only a small difference can be seen among groups classified according to Quality Management experience, time and industry. There are also significant differences in Quality Management practices on Sustainability Performance across groups with varying QM experience times, industry types, and firm sizes.

Table 14. Test of Relationship Between the Level of Knowledge and Implementation of TQM of Grocery Stores in Cabuyao City

Variables	Pearson r Value	Critical Value	Interpretation	Decision
Level of Knowledge Level of Implementation	0.833	0.325	Very Strong Positive Correlation	Reject Ho

Decision Rule: If the computed *p*-value is less than the critical value at 0.05 level of significance, accept the null hypothesis. Otherwise, reject the null hypothesis.

Table 14 shows the relationship between the level of knowledge and implementation of TQM in grocery stores in Cabuyao City. The calculated *r*-value at 0.833 indicates a very strong positive correlation. Therefore, there is a significant relationship between the level of knowledge and implementation of TQM in grocery stores in Cabuyao City.

It can be observed that there is a significant relationship between the level of knowledge and the implementation of TQM. It implies that knowledge is the crucial parameter in implementing TQM. Effective use of knowledge in quality management increases the success of quality improvement efforts. If knowledge is effectively integrated into the process, the effectiveness of the quality management to achieve quality improvement will be increased. Hence, knowledge and TQM complement each other.

It indicates strong support for the study of Rajeshwaran and Aktharsha (2017), who asserted that Knowledge Management had an impact on Total Quality Management. It denotes that knowledge management techniques in the company

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impact all aspects of total quality management. It also supports the study of Mokhtar (2017), who stated that there is a positive role between TQM practices and enhancing knowledge management processes. It implies that to improve knowledge management processes effectively, TQM practices must be viewed as a single set of practices that can complement one another, beginning with top management commitment and progressing to detailed processes for reporting necessary data among divisions.

Finally, the findings also affirm the study of Honarpour et al. (2017), who concluded that TQM and Knowledge Management have a positive relationship. Furthermore, using TQM and Knowledge Management as predictors reveals that the joint variances of TQM and Knowledge Management can account for a significant amount of variance (approximately half) of the criterion. As a result, the reciprocal causation between TQM and KM has synergistic effects and can play a critical role in implementing TQM practices.

CONCLUSION

Most grocery stores in City of Cabuyao have been in operation for less than ten years, are registered as corporations, and have fewer than 50 employees. The businesses' degree of TQM understanding was "Average," emphasizing consumers and the quality of products and services offered. However, they must focus more on TQM as a strategy and a tool. The businesses had an average level of TQM implementation, emphasizing continuous improvement to sustain the TQM benefits. The amount of understanding and level of application of TQM differed significantly based on the company profile of the respondents, which included the length of operation, type of ownership, and the number of employees, all of which influenced their perception of the TQM components. Moreover, the greater a company's familiarity with TQM, the greater its level of implementation.

FUTURE DIRECTIONS

There are limits to the current research, notably regarding the types of people being investigated. Additionally, focusing on SMEs in the future research will assist enhance the local economy by increasing the quantity and quality of general community services while also creating jobs for the town's residents. In order to better comprehend the interplay of the variables, it is also possible to seek the perspectives of the rank-and-file personnel. Understanding TQM in its entirety as both a tool and a process for improving the products and services offered by small businesses will dispel the myth that it is only suitable for large corporations due to its extensive and expensive process requirements.

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Assessing the inefficiencies in the execution of GET Fund construction Projects in the Upper West Region, Ghana



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ABSTRACT: The fundamental objective of GETFund is to provide money to augment government budgetary allocations in the development of educational infrastructure at all stages of education, from pre-tertiary to tertiary level, as defined in the GETFund Act, 2000 Act 581. The purpose of the research is to investigate the inefficiencies in the execution of GETFund construction projects, identify variables impacting GETFund projects, and propose effective ways to increase successful GETFund project execution in the Upper West Region. The descriptive survey research method was adopted for the study. Sixty-five clients, twenty-one consultancies, and sixty-two construction firms totalling one hundred and forty-eight were sampled for the study. Questionnaires were the major approach utilised for data gathering. Descriptive statistics were employed to examine the data. Findings from the study indicated that the most important difficulties that hinder efficient implementation of GETFund building projects are political and financial in nature. Furthermore, the most significant problems confronting effective GETFund construction project execution in the region are cost considerations and schedule aspects. It is recommended that a new approach to contract award procedures be instituted by giving less weight to prices and more weight to the capacity, past performance, and adherence to performance measurement of contractors bidding for the projects, irrespective of their political, cultural, and religious persuasions.

KEYWORDS: GETFund, Inefficiencies, Construction Projects, Educational infrastructure, Execution.

INTRODUCTION

The success of a construction project is judged by meeting the criteria of cost, time, safety, resource allocation, and quality as determined by the client (Muir, 2005). Thus, the purpose of construction project management and assessment is to achieve goals and objectives through planned expenditure of resources.

Construction project management involves numerous parties, various processes, different phases and stages of work and a great deal of inputs from both the public and private sectors with the major aim of bringing the project to a successful conclusion (Takim & Akintoye, 2002). The assessment of construction projects in Ghana brings to the level of success, in carrying out construction projects depends on the quality of proper management techniques, financial, technical and the organizational performance of the respective parties. The assessment of the execution of various construction projects brings to fore the delay in project execution as major problem facing the Ghanaian construction industry. It is endemic and its economic and social impacts are huge and devastating.

Frimpong & Oluwoye, (2003), reported that, to a large extent, consultants, client, and contractors agreed that project financing, economic and natural conditions and material supply were some of the major categories of causes of delay and cost overrun factors.

The construction industry is an important sector of the Ghanaian economy. It contributes an average of 8.5% of the Gross Domestic Product GDP (Ghana Statistical Service, 2013). It employed 2.3% of the economically active population in 2002 (Amankwa, 2003). The industry provides many products for other industries or commodities to be consumed. As Ghana aspires to become a middle-income nation by 2020, and with the recent discovery of oil in commercial quantities, the role of the construction industry is absolutely important.

Turner (1993), defines project as an endeavor in which human, material and financial resources are organized in a novel, to undertake a unique scope of work, of given specification, within constraints of cost and time, so as to achieve beneficial change

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by quantitative and qualitative objectives. His definition of project emphasizes on organization of resources and uniqueness of the scope of work. Hence, it is evident that, assessing and evaluating the management and planning are essential elements that deals with construction risks and devise safe working methods throughout all stages of the construction process from inception through the design, tendering, construction and commissioning stages of the project. This research is limited to the assessment of GETFund sponsored public sector construction projects in the Upper West Region. The study is further aimed at identifying and analyzing factors and challenges affecting efficient execution of construction projects by contractors within the Region. The analysis will reflect the strength of each factor and rate at which it influences failure and abandonment of construction projects in the Upper West Region.

LITERATURE REVIEW

Inefficiency in project execution occurs in every construction project and the magnitude of these varies considerably from project to project of which GETFund construction projects are of no exception, so it is important to define the actual causes in order to minimize and avoid inefficiency in any construction project. Thus, exploring the reasons for delays is one of the prerequisites of keeping the cost within budget and of good construction time performance (Alaghbari et al., 2007).

The failure of any construction project is mainly related to the problems and failure in performance. Moreover, there are many reasons and factors which attribute to such problem. Long et al. (2004), remarked that performance problems arise in large construction projects due to many reasons such as; incompetent designers/contractors, poor estimation and change management, social and technological issues, site related issues and improper techniques and tools. Navon (2005), stated that the main performance problem can be divided into two groups: (a) unrealistic target setting (i.e., planning) or (b) causes originating from the actual construction (in many cases the causes for deviation originate from both sources).

Chan and Kumaraswamy (2002), conducted a survey in Hong Kong and Jordan respectively to evaluate the relative importance of delay factors in construction projects. Their findings indicate that, poor risk management and supervision, unforeseen site conditions, slow decision making involving all project teams, client-initiated variations, necessary variations of work, the owner interference, inadequate contractor experience, financing and payments, labour productivity, slow decision making, improper planning, and subcontractors are among the top most important factors contributing to inefficiency in project execution.

Projects customarily measure results by periodically accounting for planned progress and cost. Measuring results is important in that they give the management team confidence that achievements are made, but they do not identify the factors that cause poor performance. While it is generally recognized that "what gets measured improves", when it comes to actual efficiency or productivity, most projects end up having difficulty collecting useful metrics that could help project owner and contractor determine how well the execution process is meeting requirements at any time (Kim et al., 2009). The execution process is made up of steps and work activities that take input resources, add value and produce the completed project-value being based on customer willingness to pay for the process step or activity. The execution process provides an excellent base for measurement: an execution process that is in control delivers good performance, and can be improved. Ling et al (2007), remarked that architectural, engineering and construction (AEC) firms may face difficulties managing construction project execution in China because they are unfamiliar with this new operating environment. Kim et al (2008), stated that international construction projects performance is affected by more complex and dynamic factors than domestic projects; frequently being exposed to serious external uncertainties such as political, economic, social, and cultural risks, as well as internal risks from within the project. According to Jim et al (2004), Labor is the major cost- and time-variable in project execution. Great value is therefore placed on workforce productivity, on 'doing more with less', to stay within budget and schedule, or do better. Efficiency of labor utilization is a key measure of construction productivity.

DATA BASE AND METHODOLOGY

The research design used for the study is descriptive survey. Data for the study was collected from a total of 69 public clientele, and 66 contractors with 22 Consultants from the four major firms in the region working on GETFund projects using a questionnaire. Data was analysed using SPSS version 25.

RESULTS AND DISCUSSION

Factors confronting efficient GETFund construction projects execution in the Upper West Region

In trying to find out the major factors confronting efficient GETFund construction projects execution in the Region, seven imaginable questions were raised by the researcher for the consultants, clients and contractors to rate their level of disagreement and agreement on all the seven major confronting factors in a Likert scale, where; SD&D: strongly disagree and disagree and A&SA: Strongly Agree and Agree. The results were displayed in table 2.1 below

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Table 2.1: Factors Affecting Performance of GETFund Contractors / Consultants /Clients

GROUPS/FACTORS	SD/D		N		SA/A		Mean	Std Dev	Rank	
	Freq	%	Freq	%	Freq	%				
COST FACTORS										
Project labor cost	31	25.20%	6	4.90%	86	69.90%	2.45	0.87	6	
Cash flow of the project	21	17.10%	4	3.30%	98	79.70%	2.63	0.76	4	
Escalation of materials cost	6	4.90%	0	0.00%	117	95.10%	2.9	0.43	1	
Liquidity of the organization	18	14.60%	2	1.60%	103	83.70%	2.69	0.71	3	
Overhead cost	25	20.30%	1	0.80%	97	78.90%	2.59	0.81	5	
Cost of variation orders	12	9.80%	0	0.00%	111	90.20%	2.8	0.6	2	
Materials and equipment cost	31	25.20%	10	8.10%	82	66.70%	2.41	0.87	7	
Project overtime cost	31	25.20%	10	8.10%	82	66.70%	2.41	0.87	7	
Waste rate of materials	37	30.10%	12	9.80%	74	60.20%	2.3	0.9	10	
Motivation cost	30	24.40%	20	16.30%	73	59.30%	2.35	0.85	9	
AVERAGE	24.2		0.20		6.5		0.05		92.3	0.75
2.6		0.8								
TIME FACTORS										
Availability of resources	18	14.60%	6	4.90%	99	80.50%	2.66	0.72	2	
Planned time for project cost	25	20.30%	6	4.90%	92	74.80%	2.54	0.81	3	
Time needed to defects	31	25.20%	6	4.90%	86	69.90%	2.45	0.87	4	
Average delay in payment	12	9.80%	2	1.60%	109	88.60%	2.79	0.6	1	
Site preparation time	37	30.10%	0	0.00%	86	69.90%	2.4	0.92	5	
AVERAGE	24.6	0.2	4	0.03	94.4	0.8	2.6	0.8		
QUALITY FACTORS										
Conformance to specification	25	20.30%	6	4.90%	92	74.80%	2.54	0.81	4	
Quality of equipment and raw materials	12	9.80%	0	0.00%	111	90.20%	2.8	0.6	1	
Availability of personnel	12	9.80%	0	0.00%	111	90.20%	2.8	0.6	1	
Quality training/meeting	23	18.70%	3	2.40%	97	78.90%	2.6	0.79	3	
AVERAGE	18	0.1	2.3	0.02	103	0.84	2.7	0.7		
PRODUCTIVITY FACTORS										
Management labor relationship	12	9.80%	1	0.80%	110	89.40%	2.8	0.6	2	
Sequencing of work according to Schedule	0	0.00%	6	4.90%	117	95.10%	2.95	0.22	1	
Absenteeism rate through projects	31	25.20%	12	9.80%	80	65.00%	2.4	0.87	3	
Project complexity	43	35.00%	0	0.00%	80	65.00%	2.3	0.96	4	
Number of new project/years	49	39.80%	4	3.30%	70	56.90%	2.17	0.97	5	
AVERAGE	27	0.22	4.6	0.04	91.4	0.74	2.5	0.72		
CLIENT SATISFACTION FACTORS										
Information coordination between Owner	6	4.90%	0	0.00%	117	95.10%	2.9	0.43	1	
Leadership skills for project	18	14.60%	6	4.90%	99	80.50%	2.66	0.72	2	
Number of disputes between owner	25	20.30%	10	8.10%	88	71.50%	2.51	0.81	3	
AVERAGE	16.3	0.13	5.3	0.04	101.3	0.82	2.4	0.65		
INNOVATION AND LEARNING FACTORS										
Number of reworks	37	30.10%	12	9.80%	74	60.20%	2.3	0.9	5	
Learning from best practices	12	9.80%	0	0.00%	111	90.20%	2.8	0.6	4	
Training the human resources	18	14.60%	2	1.60%	103	83.70%	2.69	0.71	2	
Learning from own experiences	31	25.20%	6	4.90%	86	69.90%	2.45	0.87	3	
Review of failures	18	14.60%	0	0.00%	105	85.40%	2.71	0.71	1	
AVERAGE	23.2	0.19	4	0.03	95.8	0.78	2.5	0.75		

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ENVIRONMENTAL FACTORS									
<i>Climate condition on site</i>	25	20.30%	12	9.80%	86	69.90%	2.5	0.81	1
<i>Waste around the site</i>	62	50.40%	61	49.60%	0	0.00%	1.5	0.5	3
<i>Noise level and air quality</i>	37	30.10%	6	4.90%	80	65.00%	2.35	0.91	2
AVERAGE	41	0.3	26	0.2	55	0.4	2.1	0.7	
OVERALL AVERAGE	25	0.2	7.6	0.1	91	0.7	2.5	0.7	

Source: Field Survey, 2019

Cost Factors

The cost factors affecting performance of GETFund results as shown on table 4.4 indicate that: project labor cost 25.20% (n = 31) were strongly disagree/disagree, 4.90% (n = 6) respondents were neutral to the statement while 69.90% (n=86) were strongly agree/agree of the statement. On cash flow of the project: 17.10% (n = 21) were strongly disagree/disagree, 3.30% (n = 4) respondents were neutral to the statement and majority of the respondents 79.70% (n = 98) were strongly agree/agree to the issue at hand. On escalation of materials cost: 4.90% (n = 6) were strongly disagree/disagree, 0.0% (n = 0) respondents were neutral to the statement while, 95.0% (n = 117) were strongly agree/agree. On liquidity of the organization: 14.60% (n = 18) were strongly disagree/disagree, 1.60% (n = 2) respondents were neutral to the statement while 83.70% (n = 103) were strongly agree/agree level representing the majority group of the respondents. On overhead cost: 20.30% (n = 25) were strongly disagree/disagree to the statement, 0.80% (n = 1) respondents were neutral to the statement while 78.91% (n = 97) were strongly agree/agree level representing the majority group of the respondents. On cost of variation orders: 9.80% (n = 12) were strongly disagree/disagree and neutral to the statement, 0.0% (n = 0) respondents were neutral to the statement while 90.20% (n = 111) were strongly agree/agree level representing the majority of the respondents. On materials and equipment cost: 25.20% (n = 31) were strongly disagree/disagree, 8.10% (n = 10) respondents were neutral to the statement while 66.70% (n = 82) were strongly agree/agree level representing the majority of the respondents. On project overtime cost: 25.20% (n = 31) were strongly disagree/disagree 8.10% (n = 10) respondents were neutral to the statement while 66.70% (n = 82) were strongly agree/agree level representing the majority of the respondents. On waste rate of materials: 30.0% (n = 6) were strongly disagree/disagree, 4.90% (n = 6) respondents were neutral to the statement while 70.0% (n = 14) were strongly agree/agree level representing the majority of the respondents. To end with cost factors, on motivation cost: 24.40% (n = 30) were strongly disagree/disagree, 16.30% (n = 20) respondents were neutral to the statement while 59.30% (n = 73) were strongly agree/agree level representing the majority of the respondents.

Time Factors

The time factors affecting performance of GETFund results as shown on table 4.6 indicate that: availability of resources 14.60% (n = 18) were strongly disagree/disagree, 4.90% (n = 6) respondents were neutral to the statement while 80.50% (n = 99) were strongly agree/agree to the statement of availability of resources. On planned time for project cost: 20.30% (n = 25) were strongly disagree/disagree, 4.90% (n = 6) respondents were uncertain to the statement and majority of the respondents 74.80% (n = 92) were strongly agree/agree to the issue at hand. On time needed to defects: 25.20% (n = 31) were strongly disagree/disagree, 4.90% (n = 6) respondents were neutral to the statement while, 69.90% (n = 86) were strongly agree/agree. On average delay in payment: 9.80% (n = 12) were strongly disagree/disagree, 1.60% (n = 2) respondents were neutral to the statement while 88.60% (n = 109) were strongly agree/agree level representing the majority group of the respondents. To terminate with time factors, site preparation time: 30.10% (n = 37) were strongly disagree/disagree, 00% (n = 0) respondents were neutral to the statement while 69.90% (n = 86) were strongly agree/agree level representing the majority of the respondents.

Quality Factors

The quality factors affecting performance of GETFund results as shown on table 4.6 indicate that: conformance to specification 20.30% (n = 25) were strongly disagree/disagree, 4.9% (n = 6) respondents were undecided to the statement while 74.80% (n=92) were strongly agree/agree of the statement of conformance to specification. On quality of equipment and raw materials: 9.80% (n = 12) were strongly disagree/disagree, 0.0% (n = 0) respondents were neutral to the statement and majority of the respondents 90.20% (n = 111) were strongly agree/agree to the issue at hand. On availability of personnel: 9.80% (n = 12) were strongly disagree/disagree, 0.0% (n = 0) respondents were uncertain to the statement while, 90.20% (n = 111) were strongly agree/agree to the statement. To conclude with quality factors, quality training/meeting: 18.70% (n = 23) were strongly disagree/disagree, 2.40% (n = 3) respondents were neutral to the statement while 78.90% (n = 97) were strongly agree/agree level representing the majority of the respondents.

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Productivity Factors

The productivity factors affecting performance of GETFund results as shown on table 4.6 indicate that: management labor relationship 9.80% (n = 12) were strongly disagree/disagree, 0.80% (n = 1) respondents were neutral to the statement while 89.40% (n=110) were strongly agree/agree of the statement. On sequencing of work according to Schedule: 0.0% (n = 0) were strongly disagree/disagree, 4.90% (n = 6) respondents were uncertain to the statement and majority of the respondents 95.10% (n = 117) were strongly agree/agree to the issue at hand. On absenteeism rate through projects: 25.20% (n = 31) were strongly disagree/disagree, 9.80% (n = 12) respondents were undecided to the statement while, 65.0% (n = 80) were strongly agree/agree to the statement. On project complexity: 35.00% (n = 43) were strongly disagree/disagree, 0.0% (n = 0) respondents were neutral to the statement while 65.0% (n = 80) were strongly agree/agree level representing the majority group of the respondents. To end with productivity factors, on number of new project/year: 39.80% (n = 49) were strongly disagree/disagree to the statement, 3.30% (n = 4) respondents were undecided to the statement while 56.90% (n = 70) of the respondents strongly agree/agree.

Client Satisfaction Factors

The client satisfaction factors affecting performance of GETFund construction projects results as shown on table 4.6 indicate that: information coordination between Owner 4.90% (n = 6) were strongly disagree/disagree, 0.0% (n = 0) respondents were undecided to the statement while 95.10% (n=117) were strongly agree/agree of the statement. On number of dispute between owner: 14.60% (n = 18) were strongly disagree/disagree which represents minority of the respondents, 4.90% (n = 6) respondents were undecided to the statement while 80.50% (n = 99) were strongly agree/agree to the issue at hand. To end with client satisfaction factors, on number of dispute between owner: 20.30% (n = 25) were strongly disagree/disagree to the statement, 8.10% (n = 10) respondents were undecided to the statement while 71.50% (n = 88) were strongly agree/agree level representing the majority group of the respondents.

Innovation and Learning Factors

The innovation and learning factors affecting performance of GETFund results as shown on table 4.6 indicate that: learning from best practices 9.80% (n = 12) were strongly disagree/disagree, 0.0% (n = 0) respondents were undecided to the statement while 90.20% (n=111) were strongly agree/agree of the statement of learning from best practices. On training the human resources: 14.60% (n = 18) were strongly disagree/disagree, 1.60% (n = 2) respondents were undecided to the statement and majority of the respondents 83.70% (n = 103) were strongly agree/agree to the issue at hand. On learning from own experiences: 25.20% (n = 31) were strongly disagree/disagree, 4.90% (n = 6) respondents were undecided to the statement while, 69.90% (n = 86) were strongly agree/agree to the issue of learning from own experiences. On review of failures: 14.60% (n = 18) were strongly disagree/disagree, 0.0% (n = 0) respondents were undecided to the statement while 85.40% (n = 105) were strongly agree/agree level representing the majority group of the respondents.

Environmental Factors

The environmental factors affecting performance of GETFund results as shown on table 4.6 indicate that: on Climate condition on site: 20.30% (n = 25) were strongly disagree/disagree to the statement, 9.80% (n = 12) respondents were neutral to the statement while 69.90% (n = 18) were strongly agree/agree level representing the majority group of the respondents. On waste around the site: 50.40% (n = 62) were strongly disagree/disagree, 49.60% (n = 61) respondents were uncertain to the statement while 0.0% (n = 0) were strongly agree/agree level representing the majority of the respondents. To end with environmental factors, on noise level and air quality: 30.10% (n = 37) were strongly disagree/disagree, 4.90% (n = 6) respondents were undecided to the statement while 65.00% (n = 80) were strongly agree/agree level representing the majority of the respondents.

Overall, we appreciated that majority of the respondents 73.98% (n = 91) were in agreement that the factors confronting efficient GETFund construction projects execution in the region and minority of them 20.33% (n = 25) were in disagreement with the affecting factors. Again, the mean scores in the table 4.6 suggest that the most leading factors confronting efficient GETFund construction projects execution in the region are quality factors, cost factors and time factors with the highest mean score of (mean=2.7, 2.6, 2.6) with standard deviation of (0.7, 0.8, 0.8) respectively.

CONCLUSION AND RECOMMENDATIONS

- From the findings of the study, it can be concluded that, major challenges affecting the efficient execution of GETFund construction projects in Ghana is financial inadequacies, political interferences in the award of contract to deserving contractors, high interest rate, price fluctuations lack of qualified personnel's, inadequate equipment's, poor payments as important challenges affecting the execution of GETFund construction projects in the Upper West Region. It is recommended that; clients should ensure that there are available funds for a project before it is awarded in order to avoid prolonged delay in payment of certified certificates for work done by contractors and the accumulation of interest. The study recommends

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that, a new approach to contract award procedure be instituted by giving less weight to prices and more weight to the capacity, past performance and adherence of performance measurement of contractors bidding for the projects irrespective of their politically, culturally and religious persuasions. The study also recommends that, contractors making requisition of materials to project site should put into consideration the availability of storage facilities that will receive such materials before requisition, this will help to minimize deterioration of materials on site and pilfering.

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The Effect of Replacement of River Sharp Sand with Quarry Fines on the Split Tensile Strength of Concrete



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ABSTRACT: Sharp sand, the normal fine aggregate in concrete is getting scarce daily because of the increase in construction activities in the country. Moreover, the cost of sand is so enormous to be afforded by the common citizens. The need to find readily available and good substitutes for sand becomes imminent. Quarry fines, a waste product generated in the stone quarrying industries has been found to serve as a good substitute for sand in concrete. The proper utilization of this waste material in concrete will seriously reduce the problem of managing this waste while at the same time helping in the reduction of the cost of concrete produced. This study investigated the effects of replacement of river sharp sand with quarry fines on the split tensile strength of concrete. It was observed that the split tensile strength kept increasing as the curing days increased and attained a maximum value of 2.66N/mm² at 75% sand replacement with quarry dust at 28 days age. At 100% quarry dust content, the 28th day split tensile strength reduced to 1.97N/mm² indicating a 26% reduction in strength.

KEYWORDS: Curing, Quarry fines, Utilization, Waste material, Split tensile strength,

1. INTRODUCTION

Concrete is regarded as the most widely used man-made material in the world, seconded only to water, a natural material (Nwofor, 2016). It is one of the most important construction materials, comparatively economical, easy to make, offering continuity and solidity and fast to bind with other materials. It is made up of cement, fine aggregate (sharp sand, quarry fines), coarse aggregate (crushed or uncrushed stones) and water in the proper proportions. The key to good quality concrete are the raw materials required to make the concrete. It has been shown that the strength of concrete depends mainly on the water-cement ratio, the slump, cement-aggregate ratio, the quality of cement, gradation of the aggregates and the efficiency of the curing technique (Nwofor, 2016). Also the specific gravity, particle size distribution, shape and surface texture of aggregates also have significant impact on the properties of wet and hardened concrete, while the mineralogical composition, toughness, elastic modulus generally account for significant impact on the hardened state of concrete. Concrete is basically of three types: light weight with density less than 19,200.00 kg/m³, normal weight which is most common with density of about 24,000.00 kg/m³ and heavy weight with density above 28,000.00 kg/m³. There is high demand for concrete materials with the need for research into locally available substitutes for conventional concrete materials like river sand. Quarry fines have of recent been used to replace sand as fine aggregate in concrete.

1.1 Back Ground of Study

Another material used to replace sand as fine aggregate in concrete is quarry dust. Quarry dust is a fine material obtained from the crushing process during quarrying activity at the quarry site. In this study, quarry dust will be used to replace river-sand as a fine aggregate in concrete. Quarry dust has been in used for various activities in the construction industry such as road construction and manufacture of building materials such as bricks, tiles and autoclave blocks. Recent developments in the building construction industry in Calabar, Southern Nigeria have witnessed an increasing use of mixtures of lateritic sand and quarry dust to replace river sand in concrete productions without any reliable data on the appropriate use of these materials in structural elements of buildings. This is worrisome, given the history of building collapses in major cities of Nigeria and elsewhere. Information about strength properties of a material from which a load-bearing component is made is required by an engineer to complete the theoretical stress analysis of the component; tensile strengths are among some of the important properties to be considered. Quarry dust (QD) exist in abundance in most parts of Nigeria, and its incorporation in structural concrete will likely reduce the cost of building construction significantly. On the other hand, the use of this material would

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reduce environmental waste. These include: the environmental problems posed by the excessive mining of river sand, the conventional fine aggregate for concrete works in Nigeria and most parts of the world; and the environmental problems in quarry sites due to large heaps of quarry dust - the waste product of aggregate crushing process (Joseph *et al*, 2012).

River sand, which is one of concrete constituents has become very expensive and is also becoming scarce due to the depletion of river beds. Because of the scarcity, the cost of sand becomes enormous. This makes it necessary to source for alternative materials that are readily available and cheap to replace sand. Quarry Dust is a fine waste material and its utilization as sand replacement could perhaps have beneficial effects on the properties concrete.

1.2 Objectives of the Study

This study will evaluate the effects of replacement of river sharp sand with quarry dust on the split tensile strength of concrete. The workability, density, and water absorption capacity of concrete containing quarry dust as fine aggregate will also be ascertained.

The findings of this study will be of immense help to engineers and construction firms wishing to utilize quarry dust in concrete production. It will also help in reducing the demand for sharp sand for concreting purposes. The study will also help in alleviating the problem of waste disposal encountered by the producers of quarry dust.

Split tensile strength is significantly used for plain concrete structures such as dam under earthquake excitations. Other structures which are designed based on bending strength e.g pavement slabs and airfield runways are subjected to tensile stresses.

2. LITERATURE REVIEW

2.1 Concrete with Quarry Dust as Fine Aggregate

Many attempts have been made to investigate the suitability of quarry dust as a replacement for sand in concrete. Gowrisanker (2016) carried out an experimental study on the variation in strength of concrete when replacing sand with quarry dust and cement with lime powder with replacement from 0% - 30%. From the test results, it was found that the maximum compressive strength and tensile strength was obtained at 30% replacement of quarry fines with sharp sand. They reported that quarry dust can be utilized as a good substitute for sharp sand. Mohankumar and Sudharsan (2017) studied the replacement of sand fine aggregate with quarry dust. The sharp sand was totally replaced with quarry dust. Krishnamoorthi and Mohankumar (2012) made preliminary studies on the strength properties of quarry dust based concrete. A trial mix design for M30 grade concrete and sand replaced at different percentages with quarry dust. They recommended a total replacement of sand with quarry dust. Allam (2016) studied the behaviour of M35 grade concrete having partial replacement of cement or sand with quarry waste. It concluded that the optimum percentage of concrete with granite fine powder was 60%. Anzar (2015) made a study on the suitability of quarry dust as sand replacing material and discovered that it improves the mechanical properties of concrete as well as its elastic modulus. The optimum compressive strength was achieved at a proportion of fine to coarse aggregates of 60:40. Agrawal (2017) made a study focusing on determining the suitability of using quarry dust as fine aggregate in traditional concrete. The compressive strength of concrete was determined after replacing sand with quarry dust at several ratios. The results of the study showed encouraging results for replacement of 50% of sand with quarry dust. Ukpata (2012) studied the compressive strength of concrete using lateritic sand and quarry dust at various combinations as fine aggregates. The results compared favourably with those of conventional concrete. The concrete was found to be suitable for use as structural members where lateritic sand did not exceed 50%. Ilangovana (2008), studied the strength and durability properties of concrete containing quarry dust as fine aggregate and found that the compressive, flexural strength and durability studies of concrete made with quarry dust were nearly 10% more than the conventional concrete. Their workability results showed slump values ranging between 60-90mm and compacting factor 0.87 - 0.90 for grade 20 concrete. The range of 28 days compressive and flexural strengths for grade 20 concrete were found to be 23.7 - 34.50N/mm² and 3.45 - 6.40 N/mm² respectively.

Naushad (2014) observed that the escalating consumption of concrete as indicated by the steady rise of cement consumption has led to an increase in the world wide use of sand as fine aggregates. As a result of this, several developing countries like ours, have encountered some strain in the supply of natural sand to meet the increasing needs of infrastructural development in recent years. This situation has led to the increase in the price of sand and this translates directly to an increase in the cost of concrete. Large scale exploitation of river sand creates adverse environmental effects while the large scale exploitation of quarry dust will lead to the removal of environmental load and help reduce the effects posed by accumulation of this dust. Nowadays the natural river sand has become scarce and very costly. Quarry dust may be used in the place of river sand fully or partly if adequate data is available on its utilization.

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2.2 Negative Effects of River Sand Mining

For thousands of years, sand has been used in the construction of roads and buildings. Today, demand for sand continues to increase. Excessive sand mining causes the degradation of rivers. Sand mining lowers the stream bottom, which may lead to bank erosion. Depletion of sand in the streambed and along coastal areas causes the deepening of rivers and estuaries, and the enlargement of river mouths and coastal inlets. It may also lead to saline-water intrusion from the nearby sea. The effect of mining is compounded by the effect of sea level rise. Any volume of sand exported from streambeds and coastal areas is a loss to the system.

Excessive stream sand mining is a threat to bridges, river banks and nearby structures. Sand mining also affects the adjoining groundwater system and the uses that local people make of the river. Sand mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology. Impacts include bed degradation, bed coarsening, lowered water tables near the streambed, and channel instability. These physical impacts cause degradation of riparian and aquatic biota and may lead to the undermining of bridges and other structures. Continued extraction may also cause the entire stream bed to degrade to the depth of excavation. Sand mining generates extra vehicle traffic, which negatively impairs the environment. Where access roads cross riparian areas, the local environment may be impacted. Sand mining can have other costly effects beyond the immediate mine sites. Many hectares of fertile streamside land are lost annually, as well as valuable timber resources and wildlife habitats in the riparian areas. Degraded stream habitats result in lots of fisheries productivity, biodiversity, and recreational potential. Severely degraded channels may lower land and aesthetic values (Sennag 2018)

2.3 Tensile Strength of Concrete

The tensile strength of concrete is one of the basic and important properties which greatly affect the extent and size of cracking in structures. Moreover, the concrete is very weak in tension due to its brittle nature hence, it is not expected to resist the direct tension; this cause the concrete to develop cracks when tensile force exceeds its tensile strength. Therefore it is necessary to determine the tensile strength of concrete, to determine the load at which the concrete member may crack. The cracking is a form of tension failure .Furthermore, splitting tensile strength test on concrete is a method to determine the tensile strength of concrete (Katz, 2003).

3. RESEARCH MATERIALS AND METHODS

3.1 Research Materials

Materials used in this study include the following;

3.1.1 Cement: Dangote Portland cement was used for this research process. The Portland cement conformed to BS12:Part3: 1978 requirements. The cement was well protected from dampness to avoid lumps. Cement was purchased and taken to the laboratory in sealed 50kg bags.

3.1.2 River Sharp Sand: Sufficient quantity of sharp sand was obtained and spread out for a few days in the laboratory before use to dry, removing dampness in order to maintain consistent weights when batching. Sieving analysis was conducted on the sharp sand to determine the particle size distribution of aggregates according to BS 882: Part 103.

3.1.3 Quarry Fine: Quarry fine was also used as fine aggregate to replace sand. It was obtained from a dealers dump site at Udo Udoma Avenue, Uyo, Akwa Ibom state in bags and transported to the laboratory.

3.1.4 Coarse Aggregate:

Coarse aggregate of 20mm maximum size was used for this research work. It was purchased from a dealer along Udo Udoma Avenue, Uyo. It was sieved and the particles size distribution computed.

3.1.5 Water:

Portable tap water suitable for domestic consumption was be used throughout the research experiments. Water is important in starting the reaction between cement and other constituent materials. The binding property of cement cannot take effect without water. The water will conform to BS31480.

3.2 Research Methods

The following tests were performed in the course of this study:

3.2.1 Sieve Analysis:

Sieve analysis was done by passing the dried aggregate through a series of standard test sieves beginning with the one sufficiently coarse to pass all the material. The test conformed to the requirements of BS 410: 1976. Having completed the sieving, the weights of aggregate retained in each sieve in turn were recorded. The weights and percentages of aggregate passing each test sieve were then computed. The results of sieve analysis were represented graphically in charts known as grading curves/charts.

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3.2.2 Specific Gravity Test: This test was carried out to determine the specific gravities of all the soil samples.

3.2.3 Slump Test: The concrete slump test is an empirical test that measures the workability of fresh concrete. . The slump of each batch of concrete was tested using a 300mm high slump cone. The mixed concrete was put into the slump cone in 3 layers with each layer stroked 25 times. When the strokes were completed a trowel was used to level the top of the cone. The cone was lifted upwards and the difference between the height of the slump cone and top of the subsided concrete gave the slump of the mixture.

3.2.4 Compacting factor test: The compacting factor was obtained by passing the mix through an arranged system where the mix falls through the apparatus and is compacted by gravity as it falls from one level to another, the surface is leveled and the weights taken. Then the mix was further compacted in a vibrating table, the vibrated mix was filled in the cylinder and leveled, the new weight taken and the compaction factor obtained as the ratio of the weight of the non-compacted mix to the compacted weight of the same sample.

3.2.5 Casting of cylinder: The specimens were cast in an iron moulds, 150mm x 300mm in shape. This conforms to the specifications of ASTM C496 - Standard Test Method of Cylinder Concrete Specimen. The moulds surfaces was cleaned and oiled the moulds were then assembled. After assembling the mould was filled with concrete in three approximately equal layers. Each layer was stroked with a 16mm tamping rod for 25 times. This was done to ensure a symmetrical concrete distribution within the mould. Finally the excess concrete was scrapped off the top surface. The concrete was kept in a moist condition for 24 hours before demoulding.

3.2.6 Curing: after 24 hours the cylinder was removed and the resulting concrete was cured in a water bath till the age of testing.

3.2.7 Split tensile strength test: After curing the cubes for the specified period, the cylinder was removed and wiped to remove surface moisture in readiness for split tensile test. The cylinder was tested according to ASTM C496 requirements.

The splitting tensile strength was calculated using eqn 1:

$$T = 2P/\pi LD \dots\dots\dots[1]$$

Where:

T= Splitting tensile strength, MPa

P= Maximum applied load indicated by the testing machine, N

D= Diameter of the specimen, mm

L= Length of the specimen, mm

4. RESULTS AND DISCUSSION

4.1 Properties of Materials Used: The physical properties of the materials used in this research work are summarized in Table 4.1.

Table 4.1: Properties of Materials used.

Materials	Properties	Values
Sharp sand	Specific gravity	2.61
	Coefficient of curvature(Cc)	1.05
	Uniformity Coefficient (Cu)	2.81
Quarry dust	Specific gravity	2.86
	Coefficient of curvature(Cc)	0.71
	Uniformity Coefficient (Cu)	3.60
Coarse aggregate	Specific gravity	2.56
	Coefficient of curvature(Cc)	1.03
	Uniformity Coefficient (Cu)	1.80

Table 4.2: Slump, Compacting factor and Water absorption values for every mix

Percentage replacement		Slump (mm)	Compacting factor	Water absorption (%)	28 th day Density (kg/m ³)
Sharp Sand	Quarry Dust				
100%	0%	48	1.88	0.74	2546
75%	25%	36	2.18	0.76	2561
50%	50%	21	2.60	0.76	2570
25%	75%	10	2.92	0.83	2593
0%	100%	0	3.75	0.94	2296

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4.1.1 Specific Gravity of Samples

The quarry dust used had a specific gravity of 2.86 while the sharp sand had a specific gravity of 2.61. Moreover, the coarse aggregate had a specific gravity of 2.56.

4.1.2 Particle Distribution of the Aggregates

The results of the grain size analysis for sand, quarry dust and coarse granite are presented in Figures 4.1, 4.2, and 4.4 respectively. Figure 4.3 presents a plot of both fine aggregates to show their variability. From the results obtained, the sharp sand had a particle size ranging between 4.75mm and 0.075mm with 3.85% of the aggregate being retained in the 4.75mm sieve and 0.38% retained in the 0.075mm sieve, a Uniform Coefficient (Cu) of 2.66 and a Coefficient of curvature (Cc) of 1.32, thus the sand is well graded. The quarry dust had a particle size ranging between 4.75mm and 0.075mm, a Uniform Coefficient (Cu) of 3.71 and a Coefficient of Curvature (Cc) of 0.71. The coarse aggregate contained particle sizes ranging from 19.00mm to 4.75mm, and has a Uniform Coefficient (Cu) of 1.8 and a Coefficient of Curvature (Cc) of 1.058. Sieve analysis for fine and coarse aggregates was conducted in conformity to BS 882:1992.

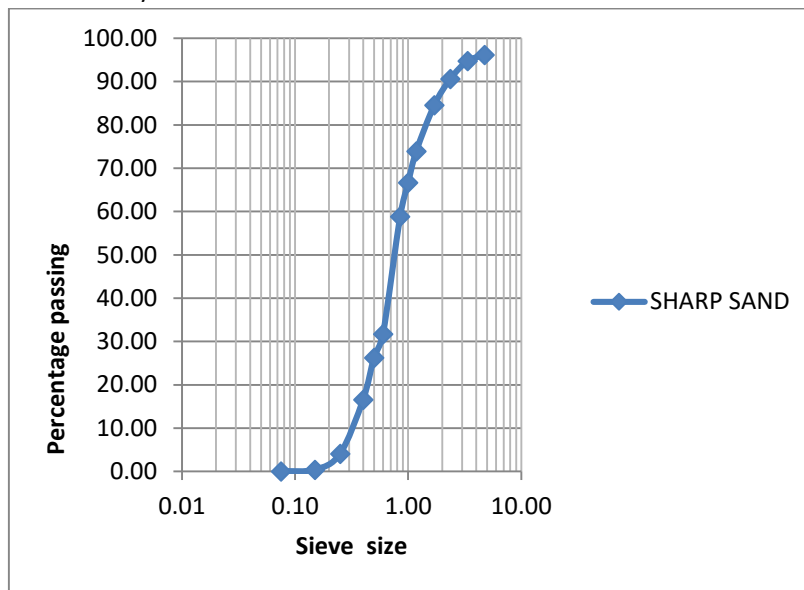


Figure 4.1: Graph Showing Sieve Analysis of Sharp Sand

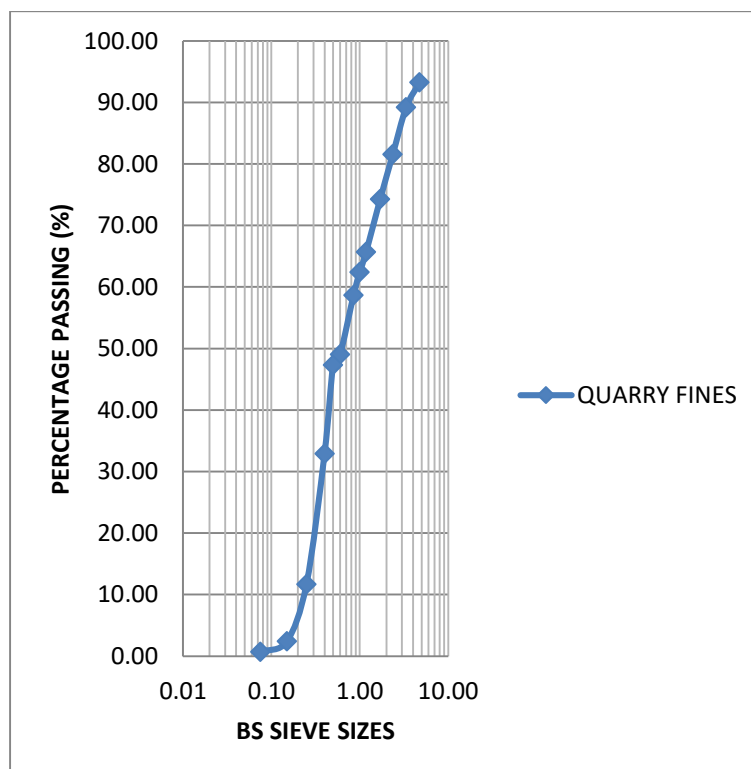


Figure 4.2: Graph Showing Sieve Analysis of Quarry Fines

The Effect of Replacement of River Sharp Sand with Quarry Fines on the Split Tensile Strength of Concrete

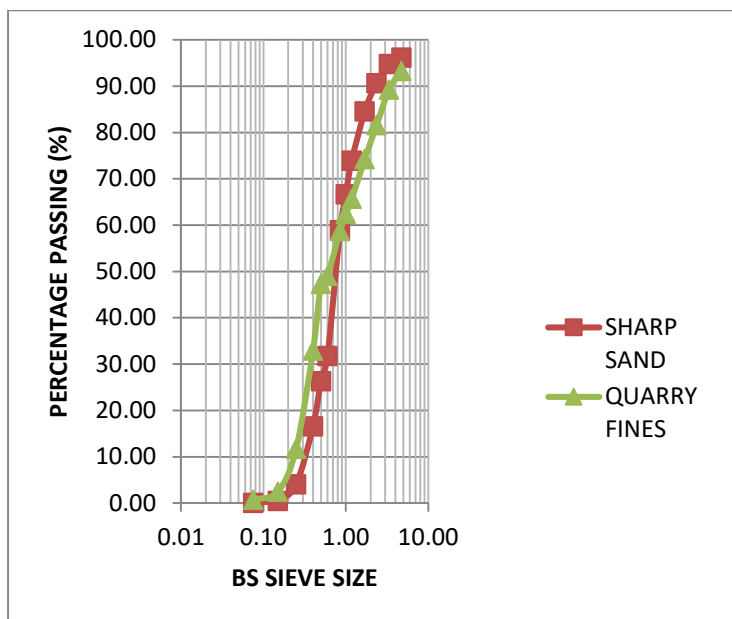


Figure 4.3: Combined Graph Showing Sieve Analysis of All Fines Aggregate

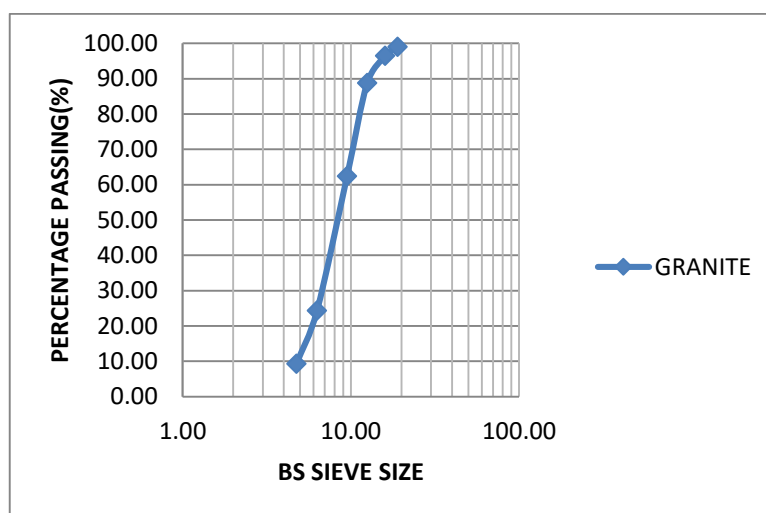


Figure 4.4 Graph of Coarse Aggregate.

4.3 Workability of the Concrete

The slump test and the compacting factor test were used to ascertain the workability of each of the mix.

4.3.1 Slump Test Results

The slump tests result are presented in Table 2 and Figure 4.5. The results showed that quarry dust concrete required a considerable higher amount of water as compared with the river sharp sand concrete. The mix containing quarry fines alone had a generally low workability as compared to the sample with sharp sand alone. The mix with 100% quarry dust had a zero slump compared to a slump of 48mm for the 100% sand mix. This can be seen from the graphs of variations of slump values. The slump values decrease with increase in the quarry dust content. This shows that the high proportion of fine particles in concrete made with quarry dust reduces the water effect; so much of the water is first used to wet the fine aggregates before bonding them together. This leaves the amount of water available for bonding inadequate to create a workable mix.

4.3.2 Compacting Factor Test Result

The compacting factor test results ranges from 0.78 - 0.95 which is close to the range of 0.7 – 0.95 specified in BS 1881; Part 103 of 1993. The results of compacting factor tests are presented in Table 4.2 and Figure 4.6. From the graph it is obvious that the compacting factor is high with increase in quarry dust replacement.

4.4 Properties of Hardened Concrete

4.4.1 Density

The density of the tested concrete is presented in Table 2. The 28th day density of the Quarry dust concrete ranged from 2296 to 2546 kg/m³. This lies within the range of 2100 to 2300 kg/m³ specified for normal weight concrete (Neville 2000). Quarry dust

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concrete could be confirmed to be normal weight concrete.

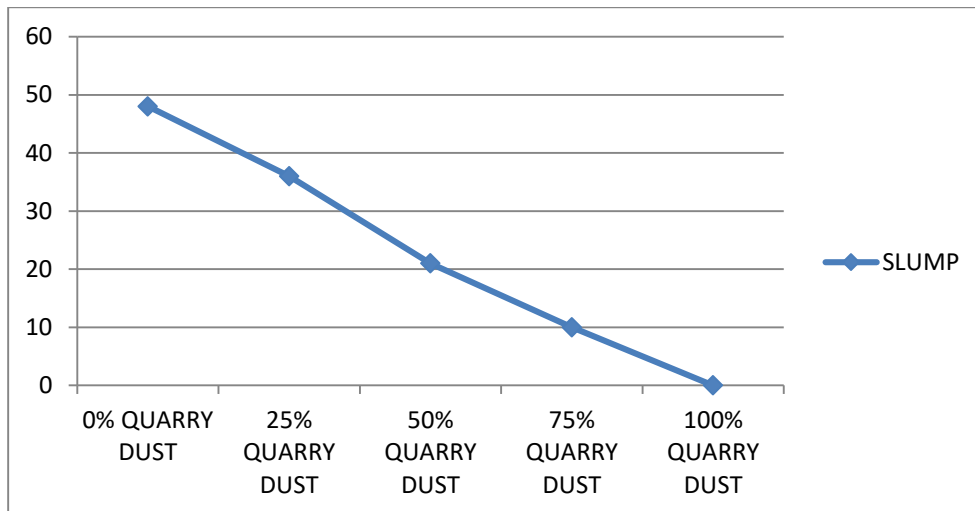


Figure 4.5 Graph of slump values against the percentage of quarry dust used (mm).

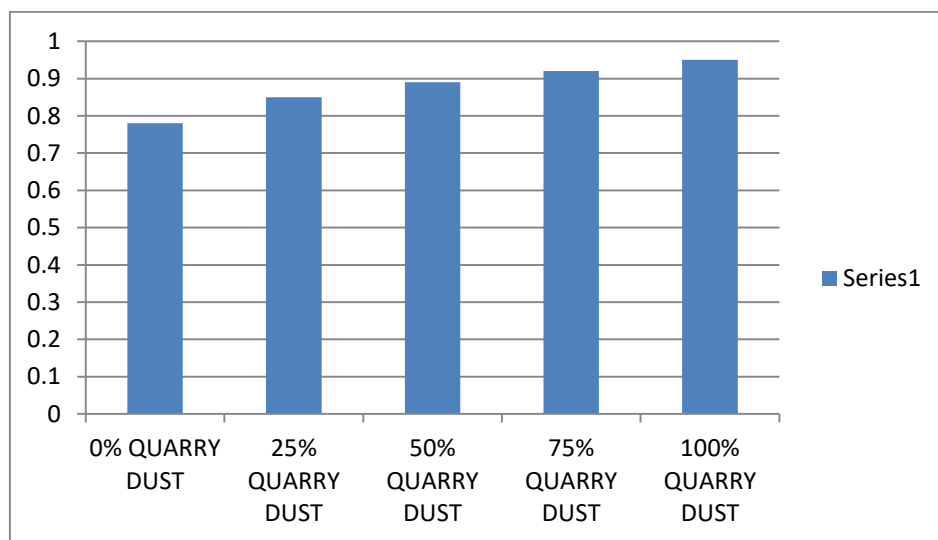


Figure 4.6 Graph Of Compacting Factor Values For Different Mix.

4.4.2 Water Absorption Test Result: The results of the water absorption test are presented in Table 2 and Figure 8. The graph shows a unique and clear understanding that as the percentage replacement of quarry dust increased, more water is absorbed (at 100% quarry dust, percentage of water absorbed is 3.75) than in concrete made with only river sharp sand as the only fine aggregate (100% sharp sand, percentage of water absorbed is 1.88).

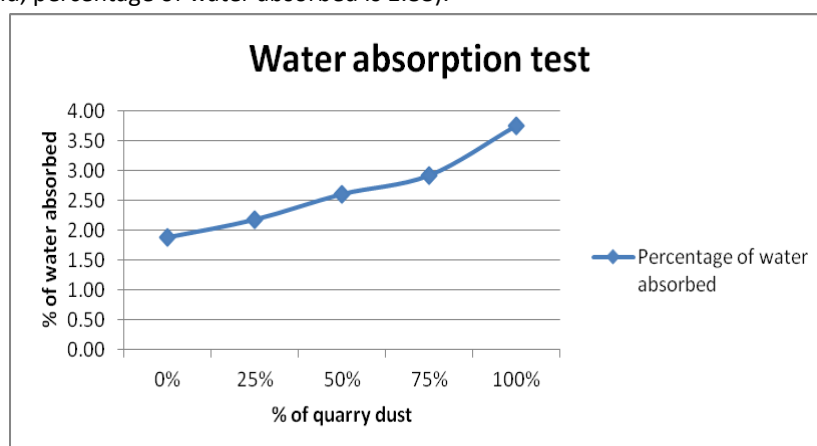


Figure 4.8: Water absorption capacity of the concrete

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4.5.3 Split Tensile Strength

Table 4.3 and Figure 4.7 shows the split tensile strengths of concrete for the different curing ages.

Table 4.3: Split Tensile Strengths of Quarry dust Concrete

% replacement		Tensile strength				
Sharp Sand	Quarry Dust	3 days	7 days	14 days	21 days	28 days
100%	0%	1.19±0.11	1.20±0.05	1.42±0.02	1.45±0.03	1.53±0.04
75%	25%	1.32±0.05	1.52±0.08	1.53±0.05	1.71±0.05	1.81±0.05
50%	50%	1.79±0.21	1.83±0.02	2.04±0.07	2.11±0.02	2.19±0.11
25%	75%	1.86±0.17	2.22±0.27	2.43±0.08	2.54±0.36	2.66±0.12
0%	100%	1.55±0.12	1.67±0.04	1.74±0.03	1.87±0.59	1.97±0.10

The 28th day split tensile strength of quarry dust concrete ranged from 1.53 N/mm² to 2.66 N/mm² at 25% sharp sand to 75% quarry dust mix. The strength however reduced to 1.97N/mm² at 100% sand concrete mix. This shows that the incorporation of quarry dust into the mix increases the split tensile strength of the concrete. The same trend is also observed at other curing ages. There was also a gradual increase of split tensile strengths from the 3rd day of curing till the 28th day. The 28th day split tensile strength increased within the range of 22.3% to 43.0% above the 3rd day strength. At 75% replacement of sand with quarry dust, the strength was found to be 1.86, 2.22, 2.43, 2.54 and 2.66 respectively for 3, 7, 14, 21 and 28th day's curing. However, the 28th day strength reduced to 1.97N/mm² at 100% replacement of sand with quarry dust but is still higher than the strength gotten from 100% sharp sand which stood at 1.53. The maximum split tensile strength recorded was 2.66N/mm² at 25% sand and 75% quarry dust mix, while the minimum strength recorded was 1.53N/mm² at 100% sharp sand, 0% quarry dust mix.

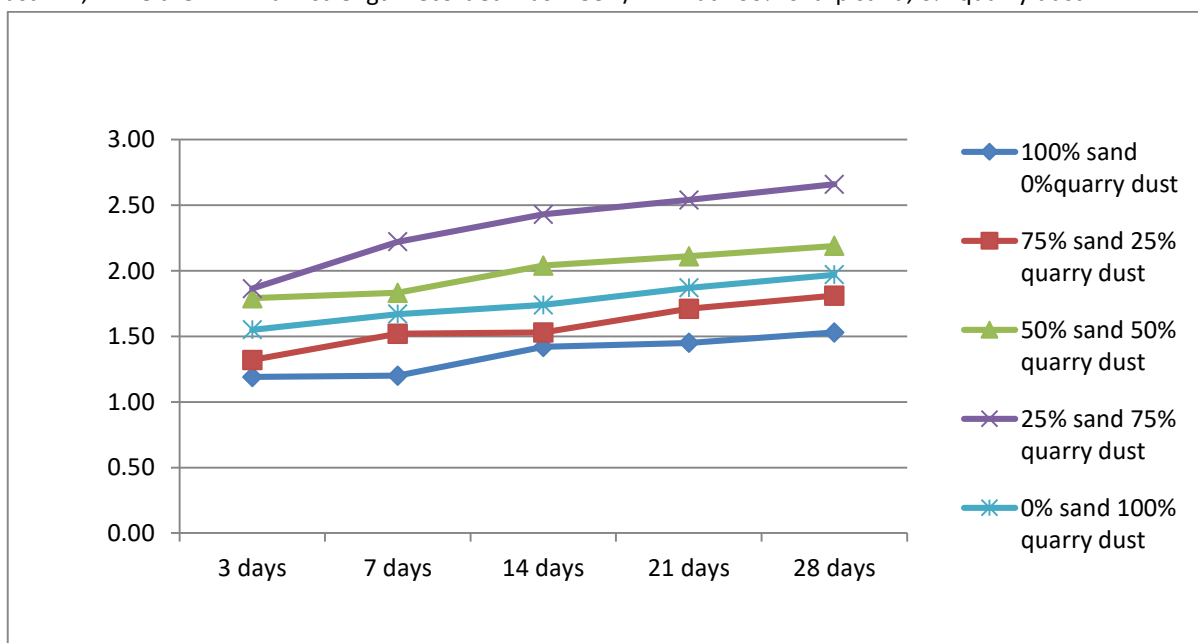


Figure 4.7 Graph of Split Tensile Strength.

5. CONCLUSION

Based on the results obtained from the experiment conducted, it can be concluded that the workability decreases while percentage of water absorption increases with increase in replacement level of sand with quarry dust. The strength of the concrete increased with age of curing. It also increased with increase in the replacement of sand with quarry dust.

This experimental data shows that the addition of quarry dust improved the concrete properties. Since its properties are as good as those of sand, the quarry dust can be used as fine aggregate to replace sand in the concrete.

Usage of quarry dust in concrete reduces the workability of concrete hence a greater amount of water is needed in quarry dust concrete to make it more workable.

There is increment in strength of the concrete when quarry dust replaces sand up to 75%.

Utilization of quarry fines in concrete will reduce overdependence on natural sources of aggregates i.e. river sand and also promote environmental sustainability.

Quarry dust concrete can be classified as normal weight concrete because of its high density.

The Effect of Replacement of River Sharp Sand with Quarry Fines on the Split Tensile Strength of Concrete

6. RECOMMENDATIONS

Quarry dust is recommended as a suitable replacement for sand in concrete especially at a replacement level of 50% and 75%.

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Improving Poetry Reading Skills by Applying the Observation, Imitation, and Modification Learning Model Using Video Media for Students of Class 10 IPA Sman 8 Sarolangun



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ABSTRACT: The purpose of this study was to improve the poetry reading skills of 10th grade science students at SMA Negeri 8 Sarolangun in the even semester of the 2022-2023 academic year through the Observe, Imitate, and Modify learning model using video media. This study was designed with a classroom action research design. This Classroom Action Research (CAR) was carried out in two cycles. Each cycle has four stages, namely 1) implementation planning, 2) action implementation, 3) observation, 4) reflection. The subjects of this study were 10th grade science students at SMA Negeri 8 Sarolangun. The research focused on problems related to the low poetry reading skills of students. The data in this study were obtained through observation, interviews, tests of students' poetry reading skills, and documentation. The data were analyzed by data reduction techniques, data presentation, and drawing conclusions. The results obtained are the percentage of achievement indicators of poetry reading skills which have increased in each cycle. The average ability of students in discussing before implementing the action is categorized as less. After implementing the action for two cycles, the average ability of students in reading poetry is categorized as very good. The results showed that there was an increase in skills in reading poetry. It was proven during the first cycle of action with an average score of 6.72, and at the end of the implementation of the action, namely the second cycle, the average score was 8.48. Thus, the skills of students in reading poetry have increased by 1.76.

KEYWORDS: poetry, watch, copy, modification.

I. INTRODUCTION

The Minister of National Education Regulation Number 22 of 2006 concerning content standards (BNSP 2006: 329) states that one of the objectives of learning Indonesian is to increase students' ability to enjoy and utilize literary works to broaden horizons, refine character and improve knowledge and language skills. To be able to realize basic language skills at school, learning Indonesian aims to improve language skills and work skills which consist of four aspects, namely the ability to listen, speak, read, and write (Mashita, 2018).

Indonesian Language and Literature subjects cover aspects of listening, speaking, reading, and writing. Literature learning is part of the Indonesian Language and Literature subject which functions to refine character, increase sensitivity to humanity and social care, foster cultural appreciation and channel ideas of imagination and creative expression in oral and written form. Mashita (Ismawati, 2018) revealed that broadly speaking, the purpose of teaching literature is divided into two parts, namely short-term goals and long-term goals. The short-term goal is for students to be familiar with literary creations and be able to answer questions related to it. In addition, the long-term goal of teaching literature is the formation of a positive attitude towards literature with the characteristics of students having a high appreciation of literary works and being able to make it beautiful in every phase of their life as the saying goes with art (literature) life becomes more beautiful.

To improve language and literature skills in learning Indonesian at school, especially in grade 10 science, the researchers chose one of the language components, namely reading skills. Reading is one of the language skills in learning Indonesian in high school that must be trained by teachers to students. According to Dalman (2020: 5) reading is an activity or cognitive process that seeks to find various information contained in writing. This means that reading is a thought process to understand the content of the

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text read. According to Aminuddin (2002: 15) reading is referred to as an activity to give a reaction because in reading someone first makes observations of letters as a representation of speech sounds and other signs of writing.

The same opinion was also expressed by Harjasujana & Melati (Dalman, 2020: 6) reading is a skill development that starts from words and continues to critical reading. Then Damaianti (Dalman, 2020: 6) suggests that reading is the result of the interaction between perceptions of the symbols that embody language through the language skills the reader has and his knowledge of the natural surroundings. Meanwhile, according to Rusyana (Dalman, 2020: 6) interprets reading as an activity to understand language patterns in written appearance to obtain information from them. Meanwhile, according to Tarigan (Dalman, 2020: 7) reading is a process carried out and used by readers to get the message to be conveyed by the author through the medium of words or written language. In this case, reading is an attempt to explore the meaning in writing.

According to Mashita (Prasiti, 2018) reading skills are basic skills for students that they must master in order to participate in all activities in the education and learning process. The same opinion was conveyed by Syafi'ie (1993: 41-42) that reading is very important for students, both during their education at various levels and types of school, as well as after they finish school and work in the community.

According to Klein (Dalman, 2020: 6-7) suggests that reading includes : first , reading is a process. The point is that information from the text or knowledge possessed by the reader has a major role in forming meaning. Second , reading is strategic. Effective readers use a variety of reading strategies that are appropriate to the text and context in order to construct meaning when reading. Third , interactive reading. The reader's engagement with the text depends on the context. People who like to read a useful text, will find several goals to be achieved, the text that someone reads must be easy to understand. So that there is an interaction between the reader and the text.

Based on several definitions of reading that have been conveyed above, it can be concluded that reading is a process of changing the shape of a symbol or sign or writing into a meaningful form of sound. Therefore, this reading activity is largely determined by physical and mental activities that require a person to interpret written symbols actively and critically as a pattern of communication with oneself, so that readers can find the meaning of writing and obtain the information needed.

According to Mashita (Santoso, 2018) improving reading skills is one of them by learning literary appreciation. Learning appreciation of literature, especially poetry, can motivate students to work, imagine, fantasize, not just following the teacher but creating their own literary works. There are three things that need to be considered in learning literary appreciation, especially poetry, namely teachers, students and poetry. Students' interest in reading poetry is largely determined by the knowledge and skills of the teacher in presenting it at school (Waluyo, 2001: 44).

Siswantoro (2011: 23) reveals that poetry is the most dense and concentrated form of literature. The density of the composition is indicated by the use of fewer words, but reveals more things. Therefore, poetry can be defined as a type of language that says more and more intensively than what daily language says. Therefore, the message conveyed is clear and does not contain ambiguous dimensions.

The research was carried out at SMA Negeri 8 Sarolangun in grade 10 Science Even Semester for the 2020-2021 Academic Year. Based on the results of observations, literary learning skills still need to be improved, especially learning to read poetry. The learning model used by the teacher is ordinary or less varied and the teacher does not use the learning media in schools. The learning model used in learning to read poetry in grade 10 in science is actually good, namely the teacher gives direct examples of poetry reading. However, students still find it difficult to imitate the reading of the poem. This is because the teacher only once gave an example of reading poetry. That way, if students' listening power is lacking, it will result in students not being able to imitate properly.

Based on the results of observations and interviews, students' tests in poetry reading skills did not achieve the expected goals. From both cognitive tests and reading skills tests, many students' scores are below the Minimum Completeness Criteria (KKM). It is evident from the number of 31 students, only 8 students who achieved the KKM score in the cognitive test. While the other 23 students did not meet the KKM scores or had not completed. For the results of the poetry reading skill test, only 5 students achieved the KKM score. Meanwhile, 26 other students have not achieved the KKM score. Most students are shy in making facial expressions that match the content of the poem. The problem above is caused by several things. Based on interviews conducted with the Guardian of class 10 Science, namely Mr. Junaidi, he explained that the cause of students being unskilled in reading poetry is the lack of self-confidence of students and also the interference factor from their friends. In more detail, the researcher conducted interviews with several students whose final cognitive evaluation reached the KKM, but their reading skills were still less than the KKM. Interviews were also conducted on students whose final evaluation scores for cognitive and reading skills did not reach the KKM score.

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The problems that arise based on the results of the observations and interviews above, a lesson plan is designed to fix these problems, namely by applying the ATM learning model (Observe, Imitate, and Modify) assisted by audiovisual media to improve students' reading skills in reading poetry. This ATM learning model can provide a fun learning atmosphere and does not make students bored quickly. Such a learning atmosphere can help students determine the right pronunciation, intonation, and expression for a poem. In this learning model there are basic training techniques in reading poetry. Meanwhile, audiovisual media in the form of videos can help students read poetry correctly. This ATM learning model and audiovisual media can also develop students' imagination skills in determining expressions according to the content of the poems that they will read.

The purpose of using the Observe, Imitate, and Modify learning model is to make it easier for students to improve their poetry reading skills. Students will play an active role during the learning takes place. By showing examples of poetry reading videos, whether they realize it or not, students will have an idea to read poetry well. Bringing up the characteristics of students in reading poetry is also the goal of this learning model. While poetry reading media is a supporting medium for the Observe, Imitate, and Modify learning model (Herlina, et al 2016)

The purpose of this study is to improve the poetry reading skills of 10th grade science students at SMA Negeri 8 Sarolangun in the even semester of the 2022-2023 academic year through the Observe, Imitate, and Modify learning model using poetry reading video media.

II. RESEARCH METHODS

This research is located in SMA Negeri 8 Sarolangun. Pelawan District, Sarolangun Regency. The time of this research was carried out on January 27 - February 15 or when this research took place. This research takes place in the even semester of the 2022-2023 academic year. The research subjects in this study were students of class 10 science at SMA Negeri 8 Sarolangun in the even semester of the 2022-2023 academic year, totaling 31 students. Each consisted of 11 male students and 20 female students. This type of research data is in the form of qualitative and quantitative. This research uses classroom action research (classroom action research). The action taken is the application of the Observe, Imitate, and Modify learning model According to Sani (2016: 5) Classroom action research is a practical research conducted by examining the problems faced by teachers in the classroom and taking action to solve these problems. The data collection techniques used by researchers in order to obtain as much data as possible in order to achieve completeness are Tests, Nontests, Observations (Observations), Interviews, Journals, and Documentation.

The action research design used is the Kurt Lewin model design which consists of four steps, namely: planning, action, observation and reflection (Sani, 2018: 289) . Kurt Lewin's model was chosen because in teaching students to read poetry using the Observe, Imitate, and Modify method, it begins with planning, then carrying out the plan, observing the implementation of the action, and reflecting on the actions taken to see the advantages and disadvantages of the actions taken. This research will be carried out in two cycles, namely, cycle I and cycle II. Cycle I consisted of (1) action planning, (2) action implementation, (3) observation, and (4) reflection. In the process of cycle I, if problem solving has not been resolved, it can be continued in cycle II which consists of (1) action plan, (2) action implementation, (3) observation, and (4) reflection.

III. RESULTS AND DISCUSSION

Improving Poetry Reading Skills After Applying Observe, Imitate, Modify (ATM) Learning Models for Class 10 Science Students at SMA N 8 Sarolangun, can be seen in the following table:

Table 1. Average Value of Pre-cycle Test, Cycle I and Cycle II

No	Assessment Aspect	Indicator	Score		
			Precycle	Cycle I	Cycle II
1	appreciation	a. Intention (understanding)	6.64	10.54	12.81
		b. Mimics (facial movements)	3.34	6.25	8.51
		c. Atmosphere	4.34	7.32	7.91
2	Vocal Technique	a. Rhythm	6.62	9.08	10.60
		b. Volume	3.99	5.86	7.81
		c. Pause	4.00	6.11	7.78
3	Appearance	a. Blocking	3.98	5.35	7.46

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b. Kinesic	3.35	4.78	6.04
c. Conversation (eyesight)	3.45	5.21	7.40
Amount	40.97	60.5	76.32
Average value	4.55	6.72	8.48

From the table presented above, it can be concluded that students' skills in reading poetry using the observation, imitation, and modification learning model from pre-cycle to cycle II have increased in every aspect, namely:

1. Appreciation

Aspects of this assessment include matters relating to intentions (understanding), expressions or (facial movements), as well as the atmosphere created in the reading of a poem. The average score on pre-cycle activities for the indicator of intention (understanding) reached an average value of 6.64, and the indicator of facial expressions (facial movements) obtained an average value of 3.34. While the atmosphere indicator obtained an average value of 4.34. These results are categorized as not good enough, because students have not been able to read poetry according to their understanding, facial expressions that are not in accordance with the content of the poem and the atmosphere when reading poetry does not feel like someone who is reading poetry.

The average score in the first cycle in the intention indicator (understanding) reached an average value of 10.54, and the expression indicator (facial motion) obtained an average value of 6.25. Meanwhile, the atmosphere indicator obtained an average value of 7.32. This shows an increase in students' poetry reading skills in the appreciation aspect of the initial test (pre-cycle). Furthermore, the average value of the second cycle in the intention indicator (understanding) reached an average value of 12.81, and the expression indicator (facial motion) obtained an average value of 8.51, while the atmosphere indicator obtained an average value. of 7.91. These results indicate an increase in the average score from pre-cycle to cycle II by 6.17 points for the intention indicator (understanding) and 5.17 points for the expression indicator (facial movements), and 3.57 points for the mood indicator. The results of the average value of this aspect can be said to be higher, this indicates that the average student is able to read poetry with proper understanding, facial movements that are in accordance with the content of the poem and can appreciate the poetry he reads.

2. Vocal Technique

This aspect includes several indicators, namely rhythm, volume, and pause. The average score of students in the pre-cycle in the rhythm indicator reached a value of 6.62, the sound volume indicator reached a value of 3.99, while in the pause indicator the average value was 4.00. This value is categorized as not good enough. This is because, when reading poetry in the pre-cycle students are still unable to use the appropriate rhythm, volume, and pauses in accordance with the poem and are just reading.

The poetry reading skills of the first cycle students in this aspect of vocal technique, with the rhythm indicator reaching a value of 9.08, in the voice volume indicator reaching a value of 5.86, while in the pause indicator an average value of 6.11. These results indicate that students have started to be able to read poetry by paying attention to rhythm, volume, and good pauses and not just reading. Then, for the average score of students reading poetry in cycle II in the aspect of vocal technique, the rhythm indicator reached a value of 10.60, the voice volume indicator reached a value of 7.81, while in the pause indicator the average value was equal to 7.78. These results indicate an increase in the average score on the vocal technique aspect, from pre-cycle to cycle II by 3.98 points for the rhythm indicator, 3.82 points for the voice volume indicator, and 3.78 points for the pause indicator. This data indicates that on average students are able to read poetry with a good rhythm, proper vocal technique and appropriate pauses in accordance with the content of poetry reading.

3. Appearance

Indicators in this aspect are blocking, kinesics, and conversations. The average score of students on the blocking indicator reached a value of 3.98, on the kinesic indicator it reached a value of 3.35, while in the conversation indicator (eyesight) it reached an average value of 3.45. This value is categorized as not good enough. This is because on average students still feel less confident so they often lower their heads, cover their faces with poetry texts so that they lack communication with listeners when in front of the class and seem unable to understand the contents of poetry well.

Then, the students' skills in reading poetry in the aspect of appearance in the first cycle for the blocking indicator reached a value of 5.35, the kinesics indicator reached a value of 4.78, while in the conversation indicator (eyesight) the average value was

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5.21. This result is still categorized as sufficient because on average there are still many students who feel less confident so that they have difficulty expressing the contents of the poem in front of the class.

Then, for the average score of students reading poetry in cycle II in the aspect of appearance on the blocking indicator it reached a value of 7.46, on the kinesic indicator it reached a value of 6.04, while in the conversation indicator (eyesight) it reached an average value of 7.40. These results indicate an increase in students' poetry reading skills in the aspect of appearance from pre-cycle to cycle II by 3.48 points for the blocking indicator, 2.69 points for the kinesic indicator, and 3.95 points for the conversation indicator (eyesight). From these data, it can be categorized as very good, because on average students have the confidence to express the contents of the poem in front of the class, so that there is communication between the reader and the listener who is impressed that the poetry reader has lived the content of the poem well.

From these scores, it can be seen that up to the second cycle, the scores obtained by the majority of students have reached the minimum completeness criteria (KKM) in Indonesian language and literature subjects, namely 75 and there are only a few students who have not achieved the minimum completeness scores. However, students can already be categorized as being able to read poetry well.

Based on the results of the assessment of poetry reading skills above, it can be seen that the skills of 10th grade science students at SMA Negeri 8 Sarolangun in reading poetry have increased by 3.93 from the average value of students' poetry reading skills before being subjected to action until the end of the second cycle of action.

IV. CONCLUSION

From the results of the research that has been carried out, it can be concluded that the implementation of learning to read poetry with the learning model of observing, imitating, and modifying was applied to cycle I and cycle II, with the ongoing learning process including, (a) delivering material regarding the criteria for good poetry reading, (b) showing a video of poetry reading to provide examples of criteria for good poetry reading, and (c) students reading poetry individually.

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Gender Differences in Mental Health of International Graduate Students



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ABSTRACT: The study investigated the mental health concerns, mental health states, and help-seeking behaviors of international graduate students by gender. Ninety-two respondents accomplished an online survey. The males' main concerns were academics and finances while it was academics and other relationships for females. There is no significant gender difference in mental health states although, there are more males with 3-5 depression symptoms and moderate-severe anxiety. Both males and females were willing to seek help for their mental health concerns. Both males and females suggested the provision of university mental health services. Further, males added the need for better teacher/adviser-student relations while females added having social events. The depression and anxiety symptoms were higher for male master's students and for female students who resided off-campus and have a family member/friend diagnosed with a mental health problem. Provision of appropriate university services to attend to the mental health needs of international students is necessary.

KEYWORDS: international graduate students, mental health, depression, anxiety, help seeking, gender differences

INTRODUCTION

Mental health is "a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society" (Galderisi et al., 2015, p.408). Further, Galderisi et al. (2015) pointed to components which may influence this internal equilibrium such as one's cognitive skills, social skills, emotional regulation ability, empathy levels, and resilience against challenging situations. This internal equilibrium is dynamic in the sense that different life stages and experiences may lead to changes such as marriage, parenthood, career changes, and even, post-graduate studies in their own country or in another country.

International students are a special population in a particular educational institution due to their coming from various cultures and having particular social expectations. Mewett and Sawyer (2016) stated that international students experience many challenges such as being in a new environment, experiencing another culture for the first time, distance from their family support system, and financial concerns. These challenges to their psychological, social, and economic resources have the potential to negatively affect their mental health states.

Evans et al. (2018, as cited in Pain, 2018) reported that there is a mental health crisis in graduate education and measures must be done by higher education institutions around the globe to establish needed interventions and changes. More than a third of the doctoral students in their study coming from various countries experienced anxiety and depression. Factors such as academic pressure, peer and societal pressure, workload for the semester, financial concerns, work-life imbalance, negative relationship with their principal investigator/thesis adviser, and unclear career prospects inside or outside the academe may lead to negative effects on their mental health (Evans et al., 2018; Levecque et al., 2017; Han et al., 2012). Haber & Griffiths (2017) also pointed to acculturative stress or the stress of adapting to a new cultural environment and language barrier as stressors to international students.

Graduate students may experience mental health concerns as influenced by their gender. "Gender is a critical determinant of mental health and mental illness" (Malhotra and Shah, 2015). This arises because gender influences the disparity among men and

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women in terms of the power they have over socioeconomic determinants of their mental health such as social position and status, societal treatment, exposure to mental health risks, and their ensuing vulnerability. Prominent gender differences are found in the patterns of male and female mental illness, onset of the symptoms, frequency of symptoms, social adjustments, and long-term outcomes (WHO, 2019). More women are afflicted with depression and anxiety while more men manifest antisocial personality disorder. Evans et al. (2018) also found that about 40% of their female respondents and 33% of their male respondents experienced anxiety and depression.

According to Levecque et al. (2017), mental health problems can develop into serious long-term consequences which may be unfavorable to one's well-being and career, thus, addressing this is imperative. Levecque et al. (2017) cited the importance of mental health awareness, prevention, and monitoring practices in the academe. Mental health peer support networks and satellite counseling services need to be provided. Mental health professionals such as psychiatrists, psychologists, and counselors are being employed by higher education institutions to properly address the concerns. Thus, mental health services in universities are present, though at varying degrees.

Another matter is the help-seeking behaviors of the international students. Haber & Griffiths (2017) found that international students refrain from seeking help for their mental health concerns due to a fear of stigmatization especially from their home countries. Further, Hyun et al. (2007) stated that the fear of seeking help is related to having a note on their transcript of records or even, the cancelation of their student visa. Han et al. (2012) reported that barriers to seeking help centered on the belief that depression and anxiety are signs of weakness, a low awareness of available services, and language or communication barriers. Recently, Girmay et al. (2019) emphasized that the stigma remains a barrier in mental health help-seeking.

Patterns in seeking help for psychological disorders differ among men and women (WHO, 2019). Women are more likely to disclose mental health problems to their primary health care physician while men are more likely to seek mental health care from specialists and avail of in-patient care. Gender stereotypes reinforce social stigma and constrain help seeking behaviors, accurate identification, and treatment due to the stereotypical expectations.

In the university of the research locale, there is no specific program for the mental health concerns of international graduate students except for the provision of one psychiatrist who attends to the whole university and one designated Guidance Services Specialist who attends to local and international graduate students along with undergraduate students at a certain college. During the data gathering period, there were 174 (66 females and 108 males) international graduate students. Current programs and services of the office for international student matters are the following: issuance of study permit; issuance of certification related to visa renewal; tutorials; assistance to the activities of the international students' association; orientation of new international students; conduct of a two-day training program which aims to help in their adjustment to the university and learn the culture of the of the country and university; cultural exchange activities where international students share their culture to the staff and students; and an ambassadorship program which strengthens the role of selected graduating students as ambassadors of goodwill of the university when they return to their countries of origin. This research will help in the development of programs and activities sensitive to the needs of international graduate students, specifically, their needs that relate to mental health concerns.

Rosler (2018) highlighted that it is high time for a change in practice and research in the field. Sex and gender aspects must be addressed more rigorously in research, psychiatric training, and clinical practice. It should include more research on gender differences in illness behaviors, coping mechanisms, help-seeking behaviors, compliance to therapy as well as psychopharmacology, hormonal therapies, or gender-sensitive psychotherapy. Also, there remains a dearth of studies in understanding concerns regarding the mental health of international graduate students. Mewett (2020) emphasized that attention to this is critical to the achievement of the students' academic goals. Thus, this study aims to determine the gender differences in the mental health concerns of international graduate students and in their help-seeking behaviors as related to the available mental health services of the university. Using a gender approach to mental health studies means determining the biological and social attributes while exploring their interactions and being sensitive to how gender influences health outcomes. Thus, a gender approach helps determine the appropriate responses from the mental health care system of an education institution. Results of this study will help develop strategies and programs for handling mental health issues and concerns of the international graduate students who have greater risks of experiencing psychological distress.

METHODOLOGY

Sample

The participants were the international graduate students who applied for their study permit during the first semester, AY 2019-2020. Students experiencing physical trauma were not allowed to participate to avoid responses resulting from physical pains. During the time of the study, there were 71 international master's students (29 females and 42 males) and 103 international PhD

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students (37 females and 66 males) for a total of 174 international graduate students (66 females and 108 males). Stratified random sampling by gender was done and sample allocation was made proportional. There were 76 males and 48 females who accomplished the informed consent form. From this, 56 males and 36 females were randomly sampled for a total sample size of 92. More than half of the respondents are males (60.87%). More than a quarter (29.35%) are aged 31-35. Majority (79.35%) is heterosexual. There are more respondents from Myanmar (16.30%) though the respondents came from 20 countries. Nearly two-thirds (63.04%) are doctoral students. More than two-thirds (69.57%) reside in dorms inside the campus. More than half (57.61%) are single and without children. Nearly half (45.65%) have household sizes from 3-4 members. Half of the respondents have a monthly income considered as low income (Albert et al., 2018) although the average monthly income is P101, 635. More than three-fourths (81.52%) do not have a family member or friend who does not have a mental health concern.

INSTRUMENTS

A five-part questionnaire in English was developed to gather the information. The first part gathered the sociodemographic characteristics of the respondents. The second part is the Centre for Epidemiological Studies Depression Scale-Revised or CESD-R (Radloff, 1997; Eaton et al., 2004). It is a 20-item scale to assess depression symptoms using response options which range from 0 (Rarely or None of the time) to 4 (Nearly every day for two weeks). The scores range from 0-60 with higher scores indicating higher depressive symptoms. The Cronbach alpha of this scale is 0=.85-0.92. The third part is the Generalized Anxiety Symptoms or GAD-7 which measures severity of anxiety (Spitzer et al., 2006). It is composed of 7 items with response options from 0 (Not at all) to 3 (Nearly every day). Scores range from 0 to 21 with higher scores indicating more severe anxiety. The Cronbach alpha of this scale is 0=.92. The fourth part is on the mental health issues/concerns of the respondents while the last part is on their help-seeking behaviors.

The interview guide for the ten participants with the highest levels of poor mental health dealt with their main psychosocial concerns as graduate students, help-seeking behaviors, and suggestions for programs and activities which can help them have better mental health in the university.

DESIGN

The study utilized the sequential explanatory mixed method to determine the mental health aspects of the international graduate students and to delve into their help-seeking behaviors. Primary quantitative data was collected through an online survey. To gather qualitative data, in-depth interviews were done with ten of the respondents, five men and five women, with the highest levels of poor mental health to better explore the survey findings and possible explanations for the results.

An invitation to be part of the study was sent out to international graduate students through the university's office for international students. Those who agreed to be part of the study were given an informed consent form and the link to the Google form of the questionnaire. The ten respondents who showed the highest scores on the mental health scales were contacted for their participation in the in-depth interview.

Descriptive statistics were computed to present the sociodemographic data, mental health concerns, mental health states, and help-seeking behaviors of the respondents. Chi-square based measures of association were computed to determine the degree of association between gender and mental health measures. Correlations among scales and sociodemographic characteristics were determined through Spearman correlation and Point biserial correlation coefficients. Qualitative data were analyzed based on the emerging themes of their responses.

ETHICAL CONSIDERATION

Each participant was given an informed consent form and consent was ascertained before participation. The participants were oriented about the purpose of the study, their rights and responsibilities as respondents, confidentiality issues, security of their online data, and risks involved. The respondents were told that if they will feel any form of psychological distress due to the items in the questionnaire or the interview, they will be immediately referred to a mental health professional of the university. Those who showed high scores in the mental health scales were contacted and if they needed help, they were advised to immediately proceed to the Counseling and Guidance office or the university clinic.

Approval for the study was given by the National Ethics Committee of the Philippine Research Council for Health and Development, Department of Science and Technology (December 4, 2019).

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RESULTS AND DISCUSSION

Gender Differences in Mental Health Concerns

Both the male and female international graduate students pointed to academic concerns as the issue which contributes the most to their mental health concerns (Table 1). Academic pressure and heavy coursework for the semester may give rise to mental health concerns (Evans et al., 2018; Levecque et al., 2017; Han et al., 2012).

For the males, their main academic concerns were focused on the difficulty of the exams and the course, getting good grades, completing their degree on time, heaviness of academic load, funding support for the thesis, and failure in courses.

For the females, their academic concerns were focused on difficulty of subject matter and heavy coursework. Specifically, they also included different standards of different professors and difficulty in understanding and speaking the English language. Mewett and Sawyer (2016) found that if students struggle with English, the academic performance of students usually suffer.

The second top concern of males is finances. Financial concerns can impact mental health (Mewett and Sawyer, 2016; Hyun et al., 2007). The respondents described this concern as finances being unavailable or inadequate and as affected by the length of time they need to complete their studies. If they cannot complete their studies on time, this will require additional finances to support their extended stay. Around 26% of the male students have a monthly income of less than P21,000, which is considered low in the country, thus, financial inadequacy is a major concern.

The second top concern of females is other relationships. Mewett and Sawyer (2016) pointed out that being in a new, unfamiliar environment without their family and other social support systems can affect mental health. Their concerns regarding other relationships were on the loss of a loved one, a sick parent, problems with romantic partner, parents divorcing, and family violence.

The third top concern for males is related to marital and family issues such as the wife being alone with the children in their country, selecting the right partner, and a mother alone in their home country. Xiong (2018) pointed that marital status is a significant predictor of mental health. Hyun et al. (2007) also pointed to contact with family as a predictor of a mental health need.

The third top concern for females is related to the self. Personal psychological issues are another challenge that international students must face (Hyun et al., 2007). Adjusting to a new environment, people, culture and academic system bring about a new set of stressors to them (Haber & Griffiths, 2017). The concerns of females regarding the self were in relation to burn-out, a childhood trauma, homesickness, physical ill-health, premenstrual syndrome, psychological disorder, and concerns about what she will be in the future.

It is noteworthy to investigate the relationship with the adviser. This is an important factor in the emotional well-being of the international graduate student (Evans et al., 2018; Hyun et al., 2007). The adviser has the role of ensuring the quality of training by helping advance the student through the program, guiding the student in the thesis, and even, funding support (Galderisi, 2015; Hyun et al., 2007). Some descriptions of the respondents in relation to the adviser were having problems with their thesis adviser and/or panel members and conflict between their adviser and panel members which may impede their study.

A chi-square test of independence was performed to determine the relation between gender and mental health concerns of the international graduate students. The relationship between these variables was significant, $\chi^2(6, N=92) = 13.7, p=.0322$. There is sufficient evidence that there is a difference in the mental health concerns of male and female international students. Post hoc comparisons using Bonferroni analysis indicated that the "Others" category contributed to the significant difference between males and females ($p=0.0602$ at 90% confidence level) with females being more concerned with these problems (i.e. state of the world, compassion fatigue, breakdown of water and electricity supply at the dorm, roommate's noise during study time, and scholarship requirement).

When they were asked about how these concerns have made it difficult for them to do their tasks as international students, nearly half of the males (48.21%) and females (44.44%) stated that their concerns have made studying somewhat difficult for them. Further, these concerns have not made it difficult for them to take care of things at home nor get along with other people. This may be due to the saliency of their role as graduate students far from their own family and country.

GENDER DIFFERENCES IN MENTAL HEALTH STATES

The CESD-R scores of the male students averaged 13.87 ($s=17.30$) while the females averaged 11.08 ($s= 13.22$). More females showed no depression symptoms than males (Table 2). There were more females with possible major depressive episodes but 19% of the males have probable and major depressive episodes which require further assessment. The GAD-7 scores of the males averaged 4.03 ($s=5.29$) while the females averaged 3.08 ($s= 4.32$). There were more females with little or no anxiety (Table 2). However, around 12% of the males have moderate and severe anxiety.

According to Sheik et al. (2017, p. 1297), "mental health and other biological and environmental factors are predictors of psychological distress among foreign students." Both depression and anxiety are forms of psychological distress and are the most

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common comorbid disorders, meaning they usually occur together (Afifi, 2007). As international graduate students adjust to their new environment and go about their tasks as students, depression and anxiety may be experienced (Sheik et al., 2017). In their study, 47% do not have normal mental well-being. Han et al. (2013) found that 45% of the international students reported depression symptoms while 29% reported anxiety symptoms. In this study, only around 14% show depression or anxiety symptoms which may require further assessment and treatment.

Further, the results are contradictory to presented rates where females tend to be more afflicted with depression and anxiety symptoms (WHO, 2019; Evans et al., 2018) although there was one single female master's student who was the only one with a diagnosis of bipolar disorder. The higher mean CESD-R and GAD scores of the males may be due to the males coming from cultures where the traditional masculine and patriarchal gender roles are highly observed (Lynch et al., 2016; Lee et al., 2009) such as being the provider, decision-maker, or protector even if they are living apart from their family and home. They may have been socialized to carry the burden by themselves as a show of strength and independence (Vaswani, 2011).

Despite the differences in means in both the CESD-R and GAD-7 scales, there is no significant gender difference in mental health states of the international graduate students. A chi-square test of independence was performed to look at the relation between gender and mental health states of the international graduate students based on the CESD-R. The relationship between these variables was not significant, $\chi^2(4, N=92) = 3.931, p=.4154$. There is no sufficient evidence that there is a difference in the depression symptoms of male and female international students. A chi-square test of independence was performed to look at the relation between gender and the mental health states of the international graduate students based on the GAD-7. The relationship between these variables was not significant, $\chi^2(3, N=92) = 1.396, p=.7064$. There is no sufficient evidence that there is a difference in the anxiety symptoms of male and female international students.

Martin et al. (2013) found that males and female adults in their sample met depression criteria in equal proportions and manifested similar depression symptoms such as depressed mood, irritability, aggression, and anxiety. In this study, the top two depression symptoms for males and females, based on their level of agreement with the CESD-R items, were the same. These were for the statements "I felt sad" and "My sleep was restless."

McLean et al. (2011) found no gender differences in age of onset and persistence of generalized anxiety. In this study, the top anxiety symptom for males and females was the same based on their level of agreement on the GAD-7 scale. This was for the statement "Worrying too much about different things."

GENDER DIFFERENCES IN MENTAL HEALTH HELP-SEEKING BEHAVIORS

Willingness to seek help

Majority of both males (80.36%) and females (80.56%) said they would seek for help or advice in case they realize they have a mental health concern. For those who answered "no", some stated that it was not applicable to them. A chi-square test of independence was performed to look at the relation between gender and willingness to seek help of the international graduate students. The relationship between these variables was not significant, $\chi^2(1, N=92) = 3.841, p=.9813$. There is no sufficient evidence that there is a difference in the willingness to seek help of male and female international students. This contradicts usual findings that men are less likely to seek for help for psychological concerns (Liddon et al., 2017; Oliver et al., 2005). Still, it is a positive finding which warrants further study in the context of these respondents.

Sources of help-seeking

There are two categories of help-seeking: formal source of help-seeking from mental health institutions and professionals, and informal source of help-seeking from family members, friends, romantic partner, and significant others (D'Avanzo et al., 2012). Table 3 shows that a higher percentage of females will seek help from both formal and informal sources: mental health professionals, family members, and friends although a third of the males are also willing to seek help from mental health professionals and their family members. This contradicts past findings (Xiong, 2018; Haber and Griffiths, 2017; Hyun et al., 2007) where the international students were less likely to seek professional help and mental health services in the campus due to the stigmatization of such behaviors in their countries of origin. Still, it is fortunate that the respondents of the study show willingness to ask for help since this will aid in having better mental health states.

A chi-square test of independence was performed to look at the relation between gender and source of help of the international graduate students. The relationship between these variables was not significant, $\chi^2(1, N=280) = 9.488, p=.6626$. There is no sufficient evidence that there is a difference in the source of help of male and female international students. The Mental Health Foundation (2016) reported that seeking help from medical or psychological services, family and friends was equal for male and female adults. This positive change in terms of willingness to seek for help from various sources of help can be attributed to an observed paradigm shift in mental health and its care. Gulliver et al. (2010) have noted that mental health

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disorders have been normalized; that it can happen due to a host of physical, emotional, or psychological factors. This has lessened the stigma and discrimination associated with mental ill-health, increased support and understanding for those who experience it, and enables more help-seeking behavior. Mental health care laws have arisen around the world and the Philippines passed its Mental Health Act in June 2018 to protect the rights of patients (Lally et al., 2019).

Further, Table 3 shows that there were six males who reported that they would not seek help from anyone. Liddon et al. (2017) observed this in their study and attributed it to the males wanting to fix problems by themselves and not admitting it to anyone. It is significant to note that two of the six males in this study who would not seek for help were in the category of probable major depressive episode (4 symptoms) and with mild/moderate anxiety scores. When they were interviewed about this, one said that he does not want to be referred further to a mental health professional and the other one said that he does not want to be taken into a “mental home”. Camara et al. (2017) found that seeking help from mental health professionals and confinement in a mental institution connote serious psychiatric disorders or being “crazy” which the males may find unfavorable.

Important qualities of the help sources

When asked about the qualities they would seek for in their cited help sources, trustworthiness of the help source is the most important quality for both the male and female international graduate students. Gulliver et al. (2010) pointed out that a higher willingness to seek help is facilitated by having trusted and familiar sources of help. Similarly, Camara et al. (2017) stated that disclosing one’s issues and emotions requires that the source of help can be trusted as a help provider. One big fear of help-seekers is a breach of confidentiality leading to other people finding out about their issues and that they sought help for this (Gulliver et al., 2010). The males ranked accessibility of the source of help as the second quality. Vaswani (2011) pointed to accessibility of services as a facilitating factor for men to seek help. The males ranked as third the “others” category. In this category, the most cited quality they gave was the capability of the help source to assist during stressful moments. For females, they ranked approachability and credibility as second and third, respectively. Marlow et al. (2014) saw that approachability was important for females in the context of a trusting relationship. Topkaya (2015) found that, for females, being an expert able to give appropriate advice, facilitates help-seeking because it builds trust. Camara et al. (2017) also highlighted the importance of credibility of the help provider.

Visit to a mental health professional

When they were asked if they have visited a mental health professional for a mental health concern, only five respondents (5.43%), three males and two females, said that they have done so. The males sought help for divorce counseling, insomnia/vomiting, and weak health while the females went due to the need for a medication prescription and counseling and as requirement for a scholarship.

Suggestions for university services related to mental health needs

When they were asked about their suggestions for university services related to mental health, majority of male (55.81%) and female (41.94%) students reported the availability of professional mental health services as the priority to help ease stressors during the semester (Table 4). Hyun et al. (2007) stated that it is important to provide institutional support in the form of mental health outreach activities for the well-being of the international graduate students. Currently, there is only one psychiatrist in the university clinic and one guidance counselor assigned to the international graduate students who is also assigned to one college to serve undergraduate students.

Specifically, the males suggested the availability of mental health professionals such as a counselor, psychologist and psychiatrist, provision for a counseling center or private consultation rooms, individual counseling, group counseling, and monthly counseling sessions. Liddon et al. (2017) found that males preferred support groups more than women because such emphasize the sharing of information more than emotions.

The suggestions of the female students for mental health services focused more on individual counseling/consultation while a few also suggested group discussions or forums where they can learn relaxation techniques, how to avoid anxiety, and share concerns. Liddon et al. (2017) saw the importance of sharing emotions to a person or to a group to alleviate women’s mental health concerns.

The second top suggestion for males was fostering better teacher/adviser-student relations. Han et al. (2012) pointed out in their study that efforts at building better teacher/adviser-student relations can help improve the mental health of international students.

The males reported that their mentors (i.e. teachers, advisers) should be friendly, encouraging, understanding, and approachable so they can accomplish their requirements. Galderisi et al. (2015) pointed out the importance of a supportive and positive relationship with the mentor since this affects both the quality of the graduate education/training and the emotional well-being of the student.

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The females' second top suggestion was having social events. The emphasis on social events is for the purpose of battling loneliness, as sources of entertainment, and promoting a sense of belongingness with the host country (Mewett and Sawyer, 2016). Verma et al. (2011) reiterated that in females, during stressful moments, their stress response is activated by the limbic system and leads them to attachment and care-giving responses or the so-called tend-and-befriend model.

Relationships between the Mental Health States and Sociodemographic Characteristics

Table 5 presents the correlation results. Academic degree and mental health states were found to be weakly negatively correlated for both the CESDR scale, $r(54) = -.27, p = .039$ and GAD7 scale, $r(54) = -.30, p = .022$ of the male students. The depression and anxiety symptoms were higher for the male master's students. Sheik et al. (2017) noted that depression and anxiety usually arise with adjustments to being in a new environment far from home. It is possible that male master's students are experiencing socio-economic challenges as they adjust to a new environment without their usual support system (Mewett and Sawyer, 2016). Other challenges could be in relation to their financial state, cultural adjustment, and academic adaptation (Sheik et al., 2017; GulRaihan, 2017).

For the female students, campus residence and mental health states were found to be moderately positively correlated for both the CESDR scale, $r(34) = .43, p = .008$ and GAD7 scale, $r(34) = .49, p = .002$. The depression and anxiety symptoms were higher for the female students residing off-campus. This could be due to factors such as their sense of safety, expenses for rent and utilities, and being farther from university services and from friends residing on-campus. The university has limited rooms or bed space for graduate students, thus, majority have to live off-campus in more expensive dorms or apartments. Mewett and Sawyer (2016) found that international students living off-campus had to adjust to everyday chores aside from their academic tasks while at the same time adjusting to the freedom that off-campus living offers, which may distract from their studies. Further, they had to deal with financial concerns because living off-campus means higher rental and transportation costs. Much as the study of Beiter et al. (2015) were done on college students, they found that off-campus residents had higher stress, anxiety, and depression levels partly due to higher expenses for housing, food, and transportation. Further studies can investigate gender and mental health as influenced by campus residence and available services.

Further, having a family member or friend diagnosed with a mental health concern was found to be moderately positively correlated with mental health states for both the CESDR scale, $r(34) = .51, p = .001$ and GAD7 scale, $r(34) = .36, p = .028$ for female students. The depression and anxiety symptoms were higher for female students who had a family member or friend diagnosed with a mental health concern. Wittenberg et al. (2013) reported that having a family member with depression gives rise to non-health effects such as caretaking and changes in daily activities but more than these are the psychological effects such as stress, anxiety, worry, fear, and sadness. The worry may not only be directed to the effects on the life of the loved one with a mental health concern but also on whether she may also develop the same disorder due to being genetically related or emotionally invested.

CONCLUSIONS AND RECOMMENDATIONS

The study investigated the mental health concerns, mental health states, and help-seeking behaviors of the international graduate students by gender. The males' top concerns were academics and finances while for the females, these were academics and other relationships. There is no significant gender difference in mental health states of the international graduate students although, there is a higher percentage of males with 3-5 depression symptoms and moderate to severe anxiety. Both males and females were willing to seek help for their mental health concerns if the source of help is trustworthy. Both males and females suggested the availability of mental health professionals and services in the university although males also emphasized the need for better teacher/adviser-student relations while females also added having social events. The depression and anxiety symptoms were higher for the male master's students while females who resided off-campus and have a family member/friend diagnosed with a mental health problem had higher depression and anxiety symptoms.

This study contributes knowledge on mental health concerns by gender of international students in a Philippine university. Similar studies are qualitative in nature while this provides a quantitative analysis of the international students' situation in this country.

For future research, it is recommended that measures of masculinity and femininity be included to see how these influence mental health states and help-seeking behaviors. Also, further studies can investigate how academic degree, campus residence, and having a family member/friend diagnosed with a mental health problem affect mental health states.

It is also recommended that the university attend to the suggestions put forth by the international graduate students in terms of university services related to mental health. Further, counselors may be of greater assistance if they are trained towards

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multicultural counseling given the diversity of nationalities and cultures of the international students. These may greatly assist the students to better adjust to their new cultural and academic environment.

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Table 1. Distribution of the mental health concerns of the respondents by gender

Mental health concerns	Frequency (f)		Percentage (%)	
	Male (n=56)	Female (n=36)	Male	Female
Problems related to:				
Academics/difficulty of subject matter	43	28	76.79	77.78
Financial resources	32	16	57.14	44.44
Other relationships (i.e. friends, workmates)	24	20	42.86	55.56
Self	24	19	42.86	52.78
Marriage and family	27	8	48.21	22.22
Adviser or panel member	18	10	32.14	27.78
Others	1	7	1.79	19.44

*Multiple responses

Table 2. Distribution of the CESD-R and GAD-7 scores of the respondents by gender

Scale and Categories	Frequency (f)		Percentage (%)	
	Male (n=56)	Female (n=36)	Male	Female
CESD-R Scale				
No clinical significance (0-15)	39	27	69.64	75.00
Subthreshold depression symptoms (with a score of 16 and 1-2 symptoms)	6	3	10.71	8.33
Possible major depressive episode (3 symptoms)	4	5	7.14	13.89
Probable major depressive episode (4 symptoms)	4	1	7.14	2.78
Major depressive episode (5 symptoms)	3	-	5.36	-
GAD-7 Scale				
No or little anxiety (0-4)	37	27	66.07	75.00
Mild anxiety disorder (5-9)	12	7	21.43	19.44
Moderate anxiety disorder (10-14)	3	1	5.36	2.78
Severe anxiety disorder (15-21)	4	1	7.14	2.78

Table 3. Distribution of the responses for sources of help by gender

Categories	Frequency (f) & Males (n=56)	Percentage (%) Females (n=36)	Total	
			Male	Female
Mental health professional:			62 (36.26)	46 (42.20)
Psychologist	18 (10.53)	16 (14.68)		
Psychiatrist	20 (11.70)	13 (11.93)		
Guidance Counselor	19 (11.11)	12 (11.01)		
Social worker	5 (2.92)	5 (4.59)		
Family member:			55 (31.25)	36 (33.03)
Mother	22 (12.87)	12 (11.01)		
Father	17 (9.94)	8 (7.34)		
Sibling	16 (9.36)	12 (11.01)		
Friend	22 (12.87)	16 (14.68)		

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Romantic partner	12 (7.02)	4 (3.67)	
Teacher	8 (4.68)	6 (5.50)	
Extended relative	6 (3.51)	4 (3.67)	
Traditional faith healer	5 (2.92)	1 (0.92)	
Doctor	1 (0.58)	0 -	
I would not seek help from anyone	6 (3.51)	0 -	

*Multiple responses

Table 4. Distribution of the suggestions for university services related to mental health by gender

Categories	Frequency (f) and Male	Percentage (%) Female
Professional mental health services	24 (55.81)	13 (41.94)
More social events	4 (9.30)	7 (22.58)
Better teacher/adviser-student relations	7 (16.28)	-
Physical wellness	1 (2.32)	4 (12.90)
Financial help	3 (6.98)	1 (3.22)
Academic assistance	1 (2.32)	4 (12.90)
Others	3 (6.98)	2 (6.45)

Table 5. Correlations for variables by gender

Variable	Male CESDR	Male GAD7	Female CESDR	Female GAD7
Age	-0.08	-0.12	-0.16	-0.05
Sexual orientation	0.22	0.20	-0.17	-0.20
Civil status	-0.08	-0.19	0.00	0.02
With child	0.10	0.15	-0.14	-0.04
Degree	-0.27*	-0.30*	-0.16	0.01
Campus residence	0.02	-0.01	0.43*	0.49*
Household size	-0.09	-0.06	-0.13	-0.11
Average monthly income	0.03	-0.05	-0.01	-0.07
Has family/friend with mental health concern	0.04	-0.01	0.51*	0.36*
Will seek help	-0.00	0.06	0.25	0.24
Has visited a mental health professional	0.08	0.22	-0.05	-0.11

* p < .05



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Connectedness to Nature, Grit and Depression Among Selected Filipino Adolescents



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ABSTRACT: The study determined the relationship between connectedness to nature, grit, and depression level among selected Filipino adolescents. There were 116 respondents, with an average age of 19.6 years, who accomplished a self-administered questionnaire. The findings show that the average level of connectedness to nature was 50.99 with majority of the scores in the average range. Around two-thirds had an average grit level. Less than three-fourths of the respondents had an average depression level. Connectedness to nature had a weak positive relationship with grit levels and a weak negative relationship with depression levels. Grit levels had a weak negative relationship with depression levels. These relationships were significant. Adolescent connectedness to nature and grit should be enhanced in various settings as they are related to positive individual states. Further studies can consider larger samples of adolescents from various contexts and how the mentioned variables may facilitate better well-being in the youth.

KEYWORDS: connectedness to nature, grit, depression, adolescence

INTRODUCTION

Valuing nature and one's relationship with nature are imperative due to a host of existing environmental challenges being experienced around the globe (Kelly, 2014). A focus on connectedness to nature emerged and how to establish and enhance it in individuals. Capaldi et al. (2014) referred to connectedness to nature as an individual's personal sense of his/her relationship to the natural world. This includes one's sense of being part of nature and nature as part of the self. Pritchard et al. (2019) pointed to connectedness to nature as a stable individual characteristic with cognitive, affective, and experiential dimensions. Cervinka et al. (2012) emphasized that this connectedness to nature is significant for both human and environmental states of well-being.

Connectedness to nature is related to pro-environmental behaviors and pro-nature behaviors (Pereira and Forster, 2015; Richardson et al., 2016) Further, connectedness to nature is associated with a multitude of benefits to human development such as increased attentional capacity (Mayer et al., 2009), reflection and meaningfulness of life (Cervinka et al., 2012; Slezackova and Doubkova, 2013), happiness and positive affect (White et al., 2017; Nisbet and Zelenski, 2014; Capaldi et al., 2014; Kumar et al., 2014), life satisfaction (Capaldi et al., 2014), prosocial orientation (Passmore and Holder, 2017), and psychological well-being (Howell et al., 2013; Windhorst and Williams, 2015; Pritchard et al., 2019).

Grit is a non-cognitive skill and a personality trait which manifests consistency in interest and long-term persistence in pursuing a goal despite failures and challenges (Duckworth and Winkler, 2013). It has emerged as an area of research since the study of Duckworth et al. (2007) was published. In that study, Duckworth et al. found that much as intelligence is highly associated with achievement, grit also predicts success in terms of grade point average, educational attainment, and completion of the rigorous West Point cadet summer training. Grit was also highly correlated with the Big Five personality trait of conscientiousness which can be described as thoroughness, being organized, goal-directed, reliable, industrious, and self-controlled. Its main difference with conscientiousness focuses on grit's long-term persistence in relation to consistent goals or interests even without feedback. Other studies on grit have focused on its relationship with academic success, athletic success, metacognition, leadership behavior, retention (in work, school and marriage), happiness, life satisfaction, negative life events, and suicidality (Crede, Tynan, and Harms, 2017).

There are no studies yet on connectedness to nature and grit. The most related are studies done in relation to conscientiousness. Previous studies have shown that connectedness to nature is positively correlated with conscientiousness (Tam, 2013; Zhang et al., 2014; Di Fabio and Bucci, 2016). Recently, Di Fabio and Rosen (2019) confirmed this association among

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university students. They explained that characteristics of conscientiousness such as being organized, careful, self-disciplined, achievement-oriented, and diligent are involved in expressing attention and care toward nature.

Among the Filipino youth, it has been observed that mental illnesses, particularly depression, has increased in the recent years (Tomacruz, 2018). The increase has been attributed to social media and technology usage (Tomacruz, 2018; Maglunog and Dy, 2019), unhealthy lifestyles such as frequent smoking and drinking, dissatisfaction with financial status, disconnectedness from parents and peers (Lee et al., 2013), and detachment from the natural world (Windhorst and Williams, 2015). In their study, Zelenski and Nisbet (2014), found that nature relatedness or connectedness brought about “happiness benefits” and was associated to other measures of well-being related to interpersonal qualities. Berman et al. (2012) stated that for individuals with Major Depressive Disorder (MDD), walking for 50 minutes in a natural setting increased their positive affect. More recently, Bierski (2016) found that people with mental health problems are helped to recover by visiting outdoor places to become attuned to the environment and one’s relationship to it. This intervention is known as “Green therapy” or “Ecotherapy” (Bushak, 2013). Being in nature has a role in establishing and maintaining positive mental health.

Some studies have been done regarding grit and positive and negative emotional states. Singh and Jha (2008) found that, among university students, grit, positive affect, happiness, and life satisfaction were positively correlated. Grit accounted for 7% of the total variance for happiness. Life satisfaction and happiness levels may change over time and grit could help in increasing this through goal setting and achievement, close relationships, pleasurable physical activities, and flow activities. Pennings et al. (2015) found that, at higher grit levels, the relationship between hopelessness and suicidal thoughts decreased in strength. Also, the relationship between hopelessness and plans for suicide became negative. Similarly, Blalock et al. (2015) found with that high grit levels, the relationship between negative life events and suicidal ideation was weak. These results point to grit as a possible protective and resilience factor against suicidal ideation and attempts.

Thus, the present study focuses on determining the relationships among levels of connectedness to nature, grit, and depression among Filipino adolescents studying in the university. Scopelleti et al. (2016) pointed out that studies on connectedness to nature has been confined to Europe, North America, and Australia and that investigations in other countries need to be done. Further, only one study on grit as related to academic performance in Filipino university students was found (Garcia et al., 2015). This study extends the literature by looking into connectedness to nature and grit, which are considered as psychological strengths, their relationship to each other, and their relationship with depression. The study aimed to specifically answer the following questions:

1. To determine connectedness to nature levels of the respondents
2. To determine the grit levels of the respondents
3. To determine the depression level of the respondents
4. To determine the relationships among these variables

METHODOLOGY

This is a quantitative study using the cross-sectional research design to gather data through a survey questionnaire at one time period from the university students. The study locale was an autonomous unit of the national university in Los Banos, Laguna, a town located south of the national capital region.

The respondents were university students in their freshmen to senior year levels from three sections of a large General Education class. A complete enumeration of the respondents was done. There were 122 respondents who accomplished the questionnaire out of a total of 194 enrolled students for a 62.9% response rate. However, due to non-accomplishment of some items or scales in the questionnaire, 6 students were not included, for a total of 116 respondents.

The research instrument was a questionnaire with four parts. The first part focused on the socio-demographic characteristics of the respondents followed by the Connectedness to Nature Scale of Mayer and Frantz (2004). The Connectedness to Nature Scale measures how emotionally connected a person is to the natural world. It is composed of 14 items rated on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). The highest possible score is 70 and higher scores mean a higher connection to nature. The scale’s reliability is high at 0.82. The third part is the Center for Epidemiological Studies-Depression (CES-D) Scale (Radloff, 1977) to determine the depression level. It is a 20-item self-administered questionnaire where respondents were asked to rate how often they experienced symptoms associated with depression over the past week. Response options range from 0 to 3 for each item (0= Rarely/None of the time, 1= Some/little of the time, 2= Occasionally/Moderate amount of time, 3= All the time). The highest possible score is 60 and high scores indicated greater depressive symptoms. The CES-D’s reliability ranges from 0.85-0.90. The last part is the Grit Scale of Duckworth et al. (2007), a 12-item self-administered questionnaire rated on a 5-point Likert scale to measure perseverance and consistency of interest in goals. The highest possible score, after averaging the item scores, is 5 (extremely gritty). The reliability of the scale ranges from 0.79-0.85.

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The permission of the professors to conduct the study in the large classes were asked for and when they approved, the informed consent forms were sent to the respondents. The questionnaires were, thereafter, administered to the willing respondents immediately after the class lecture. The questionnaire took approximately 15-20 minutes to finish. The accomplished questionnaires were given to the professor or to the researchers directly.

The data were encoded in Microsoft Excel to readily get the descriptive statistics (means, frequencies, and percentages) of the variables. The Spearman Correlation Coefficient was used to determine the relationships among the levels of connectedness to nature, depression, and grit.

RESULTS AND DISCUSSION

Socio-demographic Characteristics of the Respondents

There was a total of 116 respondents, 60.34% were females while 39.66% were males (Table 1). The average age of the respondents was 19.6 years with nearly half in their junior year. More than three-fourths were living with their parents while studying. Majority reported that their parents' marriage was intact.

Table 1. Sociodemographic characteristics of the respondents

Characteristics Sex	f	% (N=116)
Male	46	39.66
Female	70	60.34
Age		
18	8	6.89
19	50	43.10
20	40	34.48
21	13	11.21
22 up	5	4.31
Academic level		
1st	3	2.59
2nd	20	17.24
3rd	52	44.83
4th	41	35.34
Living with parents		
Yes	90	77.59
No (dorm/apartment)	26	22.41
Parent's marriage intact		
Yes	101	87.07
No	15	12.93

Level of Connectedness to Nature of the Respondents

The average level of the connectedness to nature of the respondents is 50.99 (s.d.=5.97). Majority of the respondents' scores were in the average range (Table 2). The statements with the average highest levels of agreement were the following: Statement 3- I recognize and appreciate the intelligence of other living organisms (4.38); Statement 8 - I have a deep understanding of how my actions affect the natural world (4.07); and Statement 2- I think of the natural world as a community to which I belong (3.87). The agreement levels suggest that the adolescents respect other living things, are aware of the consequences of their behaviors, and have a sense of belongingness to the natural world. Their lowest level of agreement was with Statement 12-When I think of my place on Earth, I consider myself to be a top member of a hierarchy that exists in nature (2.99). This validates the above-mentioned results in that the respondents generally, know their sense of place within the natural world.

Table 2. Distribution of scores for level of connectedness to nature of the respondents

Scores	f	% (N=116)
Low (0-44)	18	15.52
Average (45-57)	83	71.55
High (58-70)	15	12.93

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Grit Levels of the Respondents

The average of the grit level of the respondents is 3.06 (s.d.=0.52). Nearly two-thirds of the respondents' scores were in the average range or "somewhat gritty" level, meaning that they have an average passion and perseverance for long term goals but can be discouraged by setbacks (Table 3). The items which showed the average highest agreement that these described the respondents as such were Statement 6 - I am a hard worker (3.59); Statement 1- I have overcome setbacks to conquer an important challenge (3.55); and Statements 9- I finish whatever I begin and 12- I am diligent (3.41). All these statements are in the perseverance of effort subscale which reflects the respondents' ability to sustain their efforts in the face of difficulties and challenges in order to achieve their goal.

Table 3. Distribution of scores for grit level of the respondents

Scores	f	% (N=116)
Low (1-2.51)	19	16.38
Average (2.52-3.55)	75	64.66
High (3.56-5.0)	22	18.97

Depression Levels of the Respondents

The average of the depression level of the respondents is 23.45 (s.d.=10.67). Majority of the respondents' scores were in the average range (Table 4). The items with the highest frequency of experiencing the symptoms were for Statement 4- I felt I was just as good as other people (1.78); Statement 7 - I felt that everything I did was an effort (1.66); and Statement 5- I had trouble keeping my mind on what I was doing (1.49). The first statement shows positive affect some of the time or occasionally. The last two items manifest somatic or retarded activity some of the time or occasionally. Generally, the average of the scores per item shows that the respondents felt these symptoms some or a little of the time only (one-two days) in the past week.

Table 4. Distribution of scores for depression level of the respondents

Scores	f	% (N=116)
Low (0-11)	13	11.21
Average (12-35)	84	72.41
High (36-60)	19	16.38

The Relationships among the Levels of Connectedness to Nature, Grit and Depression of the Respondents

Connectedness to Nature and Grit

The connectedness to nature and grit levels have a weak and positive relationship (Table 5). The correlation produced a p-value of 0.006 ($p < 0.05$) which is significant. Thus, as connectedness to nature increases, grit levels also increase.

There were no studies found relating connectedness to nature and grit per se but there have been studies on connectedness to nature and conscientiousness, which is part of the Big Five personality traits. Both conscientiousness and grit are in the domain of self-regulation and grit has been pointed out as a lower-level trait that is in the domain of conscientiousness (Duckworth et al., 2007). Persistence is a major component of grit and it has been identified as an important element of conscientiousness (Duckworth et al., 2007). The difference between conscientiousness and grit lie in two areas: grit focuses more on long-term persistence in achieving consistent goals even without feedback (Duckworth et al., 2007) and grit is more significant for goals where there are considerable options for the individual (Ivcevic and Brackett, 2014).

Connectedness to nature, like conscientiousness and grit, is an individual characteristic or trait (Cervinka et al. 2012). Some studies have looked into the relationship of the Big Five personality traits with connectedness to nature and similar constructs like nature relatedness and environmental engagement. Nisbet et al. (2009) found that nature relatedness was significantly related to conscientiousness. Milfont and Sibley (2012) found that environmental engagement such as protection of the environment, conservation of resources, and value for the environment was also related to conscientiousness. Further, Tam (2013), Di Fabio and Bucci (2016), Zhang et al. (2014), and Di Fabio and Rosen (2019) found that connectedness to nature was positively related to conscientiousness. These studies show that specific personality traits can predict connectedness to nature.

An individual who is emotionally connected to nature has been described as likely to be adventurous, outgoing, sociable, laid back, relaxed, and more environment-friendly (Nisbet et al., 2009). A conscientious individual is careful, organized, responsible, and future-oriented (Milfont and Sibley, 2012); adheres to norms and rules, goal-directed, and takes their obligations seriously (Leary, 2018). Conscientious individuals may be expected to follow social norms and rules related to pro-environmental actions, be more concerned about the future consequences of their actions on the environment, and plan activities which may

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benefit both humans and the natural environment (Milfont and Sibley, 2012). The statements of the CNS scale with the highest levels of agreement, in fact, centered on appreciation of other living organisms and understanding the effects of one's actions on the natural world. Di Fabio and Rosen (2019) emphasized that carefulness, diligence, being organized, being self-disciplined, planned behaviors, and aiming to achieve one's goals are related to expressions of concern for nature. Valuing the natural world and one's connections to it are related to responsible planning and diligent work, which may explain the link between these two constructs.

Table 5. Associations among levels of connectedness to nature, depression and grit of the respondents

Variables	Depression	Grit
Connectedness to nature	$r = -0.2090^*$	$r = 0.2319^*$
Depression		$r = -0.2439^*$

* Significant at $p < 0.5$

Connectedness to Nature and Depression

For connectedness to nature and depression levels, there is a weak and negative correlation between them (Table 5). Their correlation is deemed significant with a p-value of 0.0119 ($p < 0.05$); meaning, as connectedness to nature increases, depression levels decrease.

Pass more and Howell (2014) discussed the perspective called Eco-Existential Positive Psychology which posits that strengthening our innate tendencies to affiliate with nature can heighten our sense of well-being by looking into "existential anxieties" which they specified as identity, happiness, isolation, freedom, meaning in life, and death. In their literature review, they pointed out that there is substantive evidence for the restorative potential of connecting to nature and in addressing existential anxieties concerning various forms of happiness and well-being. Elements such as the natural patterns of ocean flow, night and day, and the seasons show humans that nature persists as it is.

Studies have shown the importance of exposure to nature on mental health and well-being. Walsh (2011) talked about therapeutic lifestyle changes (TLCs) such as a good diet, exercise, spiritual involvement, service to others, and time in nature which can have significant contributions to mental health as effective as medications and psychotherapy. Berman et al. (2012) found that their participants, diagnosed with major depressive disorder (MDD), showed significant improvements in mood or positive affect after engaging in a 50-minute nature walk as compared to a walk in an urban setting. Despite being asked to think of a negative event prior to the walk, there was an increase in positive mood. The participants, though they were ruminating on the negative event, may have thought about it adaptively while walking. Similarly, Korpela et al. (2016) found a significant increase in positive mental well-being and decrease in depression over the eight-week intervention program and even, three months after. Participants experienced nature walks during the intervention program and these led to increased positive mental well-being which facilitated the decrease in depression.

Wind horst and Williams (2015) found that nature connectedness was positively associated with well-being measures. Spending time in an accessible, expansive natural place with trees and/or body of water which was quiet and quite removed from man-made stimuli and urban sounds helped to increase mental health benefits. Based on the qualitative data gathered, the respondents pointed to the following elements of the natural places which led to better mental health: stimulus for self-reflection and becoming attuned to the self, provision of a sense of relaxation and calmness, and being far from daily life stressors. Recently, White et al. (2017) found from their study that when people visit nature places regularly, they felt happier and that life was meaningful. These nature places could be the neighborhood with green places or the coast. With individuals who visit nature places on a daily basis, the level of well-being was higher.

The concept of "therapeutic landscapes" or places with healing elements came out in the early 1990s (Gesler, 1992). In the literature review of Berto (2014) on restrictiveness, the concept of "restorative environment" was focused on. These are natural places that help individuals to develop more positive emotional states, cognitive functioning, and behaviors, thus, making it possible for individuals to confront daily stressors adequately. Whatever these places are called, Bierski (2016) proposed that recovery from mental ill-health was an on-going process of learning how to live in one's environment and as part of that environment. That environment could be a place or a state of mind, characterized by calmness and serenity and which becomes a stimulus for recovery. The recovery itself is a continuous interaction or relationship with the environment as one navigates it and experiences the effects of the interactions.

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Depression and Grit

The depression scores were found to have a weak and negative relationship with grit levels (Table 5). The correlation produced a p-value of 0.004 ($p < 0.05$) which is significant. Thus, as depression levels increase, grit levels decrease.

Duckworth et al. (2007) stated that grit is a helpful trait during challenging experiences, which are numerous during university life with all the academic demands and social responsibilities that students have to attend to. These could be sources of psychosocial vulnerabilities which may predispose individuals to develop depression, more so, in the presence of a significant life stressor (Denton et al. 2012).

Grit has been shown to be a protective factor against suicide and depression. In a pioneering study on grit and gratitude as means to reduce suicidal ideations in university students, Kleiman et al. (2013) found that with high grit levels, there was a decline in suicidal ideations and depressive symptoms. They explained that grit helps in persevering at goals even in the presence of challenges, failures, loss or pain. It confers a sense of flexibility in the face of goal obstructions, brings about a sense of hope since grit is future-oriented, and helps in the maintenance of life goals that bring about a sense of purpose in life. Due to these, grit is a source of resiliency in life or a protective factor against suicide and depression (Kleiman et al., 2013). Grit, along with high gratitude levels, enhance meaning in life, acting as a buffer against suicide. Grit can be part of therapeutic interventions since grit can be intentionally cultivated over time (Duckworth et al., 2007). Pennings et al. (2015) found that at high levels of grit, both hopelessness and current suicidal ideation (preparations for suicide) decreased significantly. At low levels of grit, these two variables increased significantly. They pointed to grit as a possible protective factor against suicidal ideation even with feelings of hopelessness in individuals since it may help to inhibit behaviors which are not aligned to one's life goals. Similarly, Blalock et al. (2015) found that high levels of grit reduces the risk for suicidal ideation brought about by negative life events among university students. Grit, as a psychological strength, gives people the drive to push through difficult times and focus on their long-term goals beyond current negative events. Recently, Vainio et al. (2016) found from their study of grit among early adults in the university that grit was moderately and positively related to psychological well-being and satisfaction with life. They explained that grit's focus on the persistent pursuing of long-term goals seems to be linked to psychological well-being and life satisfaction which also focus on long-term events such as personal growth and finding purpose in life.

However, high grit levels do not always produce positive outcomes. Anestis and Selby (2015) found that high grit levels may facilitate suicidal behaviors and non-suicidal self-injury behaviors among university students. If the individual has developed suicidal thoughts, grit may strengthen their persistence through difficult emotional experiences of fear of pain and death during suicide ideation and attempts. When gritty individuals decide to pursue death and make it their goal, grit may facilitate suicidal behaviors.

CONCLUSIONS AND RECOMMENDATIONS

The study aimed to determine the relationship among connectedness to nature, grit, and depression among adolescent college students. The findings show that nearly three-fourths of the respondents were in the average levels for both connectedness to nature and depression while

Around two-thirds had an average grit level. The relationships among the three variables were all significant. As connectedness to nature levels increase, grit levels likewise increase. As connectedness to nature levels and grit levels increase, depression levels decrease. Both connectedness to nature and grit emerge as potential protective factors to lower depression symptoms. The current study points to the possible combined effects of these two trait variables and warrants further research.

The findings support the promotion of engagement with nature as a means for improving mental health and well-being. There are many possible activities involving natural elements or activities in the outdoors for individuals of various ages which can be done at the family, school and community contexts or which can be integrated easily into existing intervention programs. Berman et al. (2012) emphasized how interactions with nature are accessible and affordable. Further, preservation of existing large natural areas and the creation of green spaces could be prioritized by community planners to ensure access to such natural spaces where connectedness to nature can be enhanced.

Likewise, the results support the inclusion of grit enhancement in intervention programs or psychoeducation classes for the youth. Activities to enhance grit can be done by strengthening skills related to its core components of perseverance, goal-setting, and goal-achieving.

Depression awareness campaigns must continue to be implemented in school and community settings with the inclusion of connectedness to nature and grit as potential protective factors.

Some limitations in the present study need to be addressed in future research. First, the sample was limited to university students and cannot be generalized to other samples, thus, replications with adolescents from community samples and older adults are needed. Second, self-report measures only were used and further studies may include interview methodologies for

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more in-depth information. Third, future research can look into causality among the variables or the combined effect of connectedness to nature and grit on lowering depression.

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Lived Experiences of COVID-19 Survivors in Samar, Philippines



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ABSTRACT: The outbreak of Covid-19 pandemic significantly threatened the health of million people all over the world. As early as September 20 of the year 2020, a total of 33,692,000 confirmed cases were recorded across the globe which resulted major restriction in human mobility as a response to contain its spread (WHO, 2020). A qualitative study using transcendental (descriptive) phenomenological approach was conducted to explore the lived experiences of Covid-19 survivors in Catbalogan City were active cases was recorded. Key informants of the study were identified using a purposive sample who qualifies with the criteria of those: (a) tested positive from RT-PCR and deemed as recovered from Covid-19 and; (b) specifically residing in city and of legal age. Data was saturated on the 10th informants. Result showed that these Covid-19 survivors experienced heightened challenges in their physical, psychological and social aspect. Dominant challenge was concerned on their psychological which stemmed from the distress due to the financial restriction they have to suffer from the inevitable quarantines that can affect their livelihood, the fear of unknowingly infecting others, the solitude of isolation and the thought of imminent death they attribute to the disease. However, despite the overwhelming challenges they are facing, they were able to endure and challenge their situation by redirecting themselves on their determination which concerns with their families/dependents welfare and their will to pursue own personal goals. Moreover, because of the support (monetary or non-monetary) they received throughout their recovery process, their intensified situation became manageable especially with the psycho-social support from their families and peers which significantly promoted their fast recovery. Over all, in spite of the challenges that these individuals have experienced, they were able to proceed with their respective lives by asserting their unique experience in an optimistic matter which is incumbent for their re-integration in the society.

KEYWORDS: Covid-19 Survivorst; Challenges; Re-integration to Society

1. INTRODUCTION

A global health emergency was declared due to the novel Corona Virus disease 2019 (COVID-19) as it spread throughout the world in the first quarter of 2020 (WHO, 2020). From 1 to 33,692,000 confirmed cases of the virus as of September (20), the COVID-19 has been considered as one of the "dark days" in the global history which affected almost all countries in the world. It caused the world to shift to a "new normal" which limited the human mobility and hit the healthcare system of the entire world (Mehra & Siddiqi, 2020). As the Covid-19 pandemic rapidly sweeps across the world, it is inducing a considerable degree of fear, worry and concern in the population at large and among certain groups in particular, such as older adults, care providers and people with underlying health conditions.

Every day the world is counting increasing digits of confirmed cases with some who have died and more than half who have survived (Sahoo, 2020). The inflating rate of recovered cases of COVID-19 shed light that the containment of the spread of the virus is not too far to reach. In the Philippines, 0.29% of the population have been confirmed as COVID-19 positive and 1.8% of the confirmed patients have died due to the virus. Most of the patients are asymptomatic or have minimal symptoms, and 81% already have recovered (DOH, 2020).

Literature regarding the preventive measures, laboratory testing, and management protocols is ever increasing. Also, a large number of studies were conducted related to the health care workers' experiences in the midst of the pandemic. However, few literatures have been documented regarding the experiences of the recovered patients (about how they fought the virus, what they felt during their isolation, etc.) in Samar.

Hence, with this study, the researchers explored and come-up with an empirical understanding on the unique lived experiences of COVID-19 survivors. In addition, a comprehensive analysis of COVID-19 survivors was provided which information generated

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would be valuable to the community, LGUs and other social entities whose are responsible in policy making and implementation of programs that shall assist these COVID-19 survivors as they re-integrate to the community.

2. METHODOLOGY

2.1. Research Design

A qualitative study using transcendental (descriptive) phenomenological approach was used to examine the lived experiences of COVID-19 survivors. As defined, phenomenology is a qualitative scientific method that allows the researcher to consider phenomena, which take place in a given person.

Phenomenology moves between the descriptions of the phenomenon to our understanding of it. Its fundamental intention is to access the consciousness of the individual and grasp what this consciousness is capable of revealing regarding the phenomena that it has experienced (Coony et. al., 2012). The main idea of empirical phenomenology is that scientific explanation must be grounded in the first-order construction of the actors; that is, in their own meanings. Such type of research focused on meaning making of experience, behavior and narratives, etc. (Walters, 2017). Thus, it aims to describe the narratives and experiences of COVID-19 survivors.

2.2. Participants

Using purposive sampling, respondents were identified who qualifies the inclusion criteria set forth by the researchers which include: 1) only recovered patients above 18 years old; and 2) participants who publicly declared in social media (e.g., Facebook, Twitter, Instagram, etc.) that they were COVID-19 positive. Data was saturated on the 10th informants.

2.3. Data Gathering Procedure

A semi-structured, in-depth telephone interview was made at a time convenient for participants. With participants' permission, all interviews were audio-recorded. Semi-structured Interview guide was validated by experts in the field of social sciences/psychology. Preliminary interview includes participants' age, marital status, and employment if there is. It was followed by broad-generating questions on their experiences as COVID-19 survivors followed up by open-ended questions relating to their physiological, psychological, and re-integration experiences to the community. Lastly, informants were also given the chance to express their thought/s voluntarily to ensure that they were given enough consideration that relates to their experiences.

2.4. Data Analysis

The responses of the participants served as the units of analysis of the study. It made use of the Colaizzi's method. The analysis includes reading of the transcript several times to gain an understanding of the meanings, identify significant meanings, phrases, codes and organizing it into categories and developing of themes.

Hyper RESEARCH software was used to code, retrieve and conduct qualitative data analysis. It is a licensed commercial software package used by researchers within the sciences, social sciences, and professions including education and medicine. It helps the qualitative researcher analyze a range of multimedia data in addition to text-analysis date, including video and audio.

2.5. Ethical Consideration

The researchers were fully aware on the sensitivity of the study relating to the experiences of Covid-19 survivors. Hence, ethics approval for this research was sought from the Institutional Research Ethics Review (IRERC).

Moreover, the study objectives and voluntary nature of the study was explained to the participants and oral informed consent was obtained before each telephone interview. Confidentiality was assured by using numbers instead of names and removing identifying information from the transcripts.

Furthermore, all audio-recording and transcripts was secured and discarded after using the data for analysis.

3. RESULTS

From the data analyses, 5 major themes emerged on the lived experiences of these Covid-19 survivors.

Each theme was explained by its corresponding subthemes that relates to the experiences of these Covid-19 survivors from dealing the disease until their re-integration process to the community.

Illustration below shows the findings emerged from the analyses of the data.

Table 1. Summary of Results emerged on the data analysis

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LIVED EXPERIENCES OF COVID-19 SURVIVORS IN CATBALOGAN	
THEMES	SUBTHEMES
Adversities Owing to Contraction of Covid-19	<ul style="list-style-type: none"> • Physical Exhaustion • Psychological Distress • Dealing Stigma • Financial Restrain
Major Concerns on Isolation Facilities	<ul style="list-style-type: none"> • Food Distribution • Poor Utility • Regular Monitoring
Enthusiasm towards Recovery	<ul style="list-style-type: none"> • Unconditional Love for Families and Dependents • Pursuing Personal Goals
Assistance	<ul style="list-style-type: none"> • Monetary Support • Non-monetary Support • Psychosocial Support
Re-Integration Process	<ul style="list-style-type: none"> • Perceiving Positively • Spiritual Resiliency

3.1. Theme (1): Adversities Owing to Contraction of Covid-19

The first theme can be best explained by four (4) subthemes which include; **physical exhaustion, psychological distress dealing the stigma and financial restrain** that surrounds from being contracted of Covid-19. From the analysis, it can be understood that these Covid-19 survivors experienced heightened challenges in dealing with the disease.

3.1.1. Subtheme A: Physical Exhaustion

Informants were asked about the physical symptoms that they experienced of being contracted from Covid-19. It was reported that they experienced restless coughing, colds, fever and even headaches which can be attributed to the symptoms of Covid-19 as specified by the World Health Organization (WHO) that a person who is contracted of this infectious disease can experience mild to severe respiratory illness that can disrupt their daily functioning (WHO, 2020). They also emphasized that experiencing these symptoms heightened their situation in dealing with the disease making them feel uneasy and lethargic.

Significant statements that illustrate this subtheme are as follows:

- “Una, sge akon ubo tapos nagkahiranat ako. After 3 days, nawara na akon panrasa ngan panhamot tapos danay masakit akon ulo. Makuri kay napaluya ha lawas. (At first, I am coughing restlessly and a fever. After 3 days, my sense of smell and taste disappeared and sometimes I experience headache. Its difficult because I feel lethargic.)” **[Informant 3]**
- “Although mild la an akon symptoms, makuri gihap kay sge imo ubo nga danay madali ka hingalon. (Although my symptoms were just mild, it’s still difficult because of coughing which leads to catching your breath.” **[Informant 7]**

Subtheme B: Psychological Distress

The constant fear on the health risk associated of Covid-19 that may bring to the family members of these contracted individuals, the feeling of helplessness, the isolation they must undergo to protect their loved ones and other losses they have to experience owing to quarantining their closed-contact which is commonly their family members has put these Covid-19 survivors under immense pressure.

This claim is reflected in statement below:

- “I feel helpless. I have to be alone and isolated so that my family won’t get infected from the virus.” **[Informant 5]**
- “When I tested positive, my mind went blank. I was shock with the thought na positive ako kay waray man akon symptoms na gin aabot. Aside from the shock, nahadlok ako para ha safety han akon family labi nagud akon mother. Knowing na pati hira sigura ig ka-quarantine gud kay close-contact man, nabaraka ako duro para ha ira. (When I tested positive, my mind went blank. I was shock with the thought that I am positive because I don’t have any symptoms. Aside from the shock, I feared for the safety of my family especially my mother. Knowing that they’ll be quarantine for sure since they were a closed-contact, I am extremely worried for them). **[Informant 2]**
- “didto han nakadto na ako ha facility ha covered court, damo la nga negative akon naiisip. Danay naiisip ko, what if mamatay ako? Mga sugad hito na butang, dre ko naiiwasan isipon sanglit nagtitinagis ako mag-usa ha akon kwarto bago kumaturug. (During my stay in the facility, I keep on thinking a lot of negativities. Sometimes I thought what if I die? I can’t help to think things like that so I cried myself to sleep). **[Informant]**

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3.1.2. Subtheme C: Dealing the Stigma

Negative comments and judgement looks are anxiety-provoking situations either received directly or indirect. Informants shared that aside from the physical exhaustion, the sense of imminent death and the fear of unknowingly infecting others, dealing with the stigma has also heightened the situation of these Covid-19 survivors not only for themselves but also to their families.

This was reflected in the following statement:

- “It was hard not only for me but to my family as well. After my discharge from the isolation facility in Juvies Resort, I still have to undergo home quarantine for 7 days. We order our foods and basic necessities through Hi-Bes and Food Panda which is basically online. The problem is, people were reluctant to accept or deliver our order because of fear they might get infected.”

[Informant 5]

- “Pagna-gawas ako ha balay, napapansin ko baga han naiwas akon mga kapit-bahay ha akon. Waray ako nababatian ha ira directly, pero mafefeel man gihap ito naton ha ira action diba?. (Whenever I go out from our house, I noticed that our neighbour avoids me... I don't hear anything from them directly, but we can feel it through their action, right? [Informant 10]

3.1.3. Subtheme D: Financial Restrain

Financial problem also added to the predicament of these Covid-19 survivors. It was remarked by some of these informants that due to the inevitable quarantine and isolation they must undergo not only themselves but also their closed-contact family, it impacted great deal of losses on their livelihood.

- “...even before dida han positive ko ha test, kami na tanan ginquarantine na kay closed-contact man kami han akon kilala na nagpositive liwat...naperdi an amon pakabuhi kay waray man mag-aabri han amon tindahan kay taman man kami kailangan igquarantine... nagkakadudunot gad an mga gulay na amon paninda. (Even before I tested positive, my whole family was quarantined since we were a closed contact of someone we know who tested positive as well... our livelihood was negatively affected because no one will tend since all of us were quarantined... the vegetables we sell got rotted)” [Informant 1]

3.2. Theme (2): Major Concerns on Isolation Facilities

The second theme explained the experiences of these Covid-19 survivors during their stay on the health care facilities provided for their isolation. Subthemes emerged from the experiences of the informants constitute to the problems they perceived that must be given proper address to alleviate the burden of these Covid-19 patients for their fast recovery.

3.2.1. Subtheme A: Food Distribution

Upon asking about the informants' experiences during their stay on the isolation facilities they were assigned, it was reported that it was hard for some of them since not all are capable of providing their own food. Participants expressed gratitude that somehow, they were provided free foods however, they can't help to feel disappointment with the portion given to them. Others were fortunate to have someone send support for food personally but for some, it was a challenge for them.

- “makuri gihapon labi na an “rasyon”, sobra kaguti an ginhahatag. Ultimito usa nga baduya, gintutunga pa nira. Imbes na iisipon nala namon kun paano kami mauupay hine na amon sakit, nakakadugang pa ha pinsaron an pagkaon. (It was difficult especially the food ration, they gave us too little. Even a piece of fritter was divided into two. Instead that we focus on how we can get better with the disease, thinking about food also adds to our concern).” [Informant 1]

- “an pinaka- una ko nga napansin han nakadto ako ha facility is an panhahatag han pagkaon. Dre gud nasusunod an distancing kay may pila man... naisip ko, paano kaya mauupay kun ma e-expose kami ha kada-usa. (The first thing I noticed during my stay in the facility is the process of food distribution. Social distancing was not followed because we need to line-up... I realized how we can get better if we will be exposed to each on another). [Informant 9]

3.2.2. Subtheme B: Poor Utility

Some informants affirmed that inadequate and poor utilities on the isolation sites heightened their circumstances on dealing with the disease. They added that not only it contributes to their inconvenience but also they feared that it might implicate their condition.

Significant statements illustrated on the following:

- “...kamakuri han tubig... (...insufficient supply of water)” [Informant 2]
- “...an C.R. usa la sanglit permi pila an paggamit. Nag-aalang ako danay paggamit kay bangin lumala lugod akon sakit kay tirimpo manla kami ginagamit na C.R. (... there is only one C.R. so we need to line-up to use. I am hesitant sometimes to use because what if, my condition worsen since we are only using one C.R.” [Informant 4]
- “didi ako na-assigned ha may Payao na facility... grabi, kapapaso duro han lugar sanglit, naduroy la panluya amon lawas. (...I was assigned in Payao facility... the place was very hot which makes us more feel exhausted).” [Informant 8]

3.2.3. Subtheme C: Regular Monitoring

Regular or continuous monitoring to patients ensures the clinical process to minimize the risk of developing further complications of ill patients (Physiopedia, 2021). According to some informants, the moment they were admitted to the facility,

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they seldomly received further assistance regarding their health condition. They affirmed that this lack of attention heightened their feelings of helplessness.

- “tikang han nagpagsulod ko ha facility hasta nala na discharge ako, as in, ika-usa la ako kumustaha han doctor kun ano akon pamati... para ha akon makuri it sugad hito kay dre kami maaram kun naupay ba amon condition or nalala. (...from the moment I was admitted until my discharged, really, I was assessed by the doctor just once about my condition... for me, it was hard because we don't know about our condition if it gets better or gets worsen).” [Informant 1]

- “after 14 days, gin-inform ako na magawas na kuno pero kailangan la gihap mag home quarantine for 7 days... Nag worry ako para ha akon family nga mag-quarantine ako ha balay kay waray na ako igtest utro kun negative ba, basta tapos na an 14 days, ginpapagawas na nira. (After 14 days of my quarantine, I was informed that I will be discharged from the facility but still, need to home quarantine for 7 days. I feel worried for my family with the thought of undergoing home quarantine because I was not tested again to prove that I am already negative from Covid-19, as long as 14 days were over, they permit discharge).” [Informant 6]

3.3. Theme (3): Enthusiasm Towards Recovery

The third theme emphasized the juggles of these Covid-19 survivors to in dealing with the disease. In spite of their heightened situation, they were able to overcome their dilemma by getting the strength and motivation from their families and dependents to avoid giving them further inconvenience, even for the sake of pursuing their own happiness.

3.3.1. Subtheme A: Unconditional Love for Families and Dependents

Majority of the informants shared that they were the breadwinner of their family. They were the hope and strength of their families and dependents. Apart from being the breadwinner, others were also aware of their families' situation and capacity. Being aware of the role they have and the situation of their respective families, these Covid-19 survivors gave their best to overcome the challenges owing to the disease despite of their condition to avoid further inconvenience for their families and dependents.

This claim was reflected on the following statements:

- “bisan makuri an akon kamutangan ngadto ha facility, naniguro ako na maupay. Naisip ko, mag iniha pa ngani ako, mas kukurian akon family bisan hit pagdinulong la hit akon pagkaon asay pa kay waray gud adto na time pasaherosan kay ECQ pa adto. (Even though my situation in the facility was not good, I persevered to get better. I realized, the longer my stay here (facility), the more my family will suffer even delivering food to me especially there's no public vehicle that time due to ECQ).” [Informant 3]

- “para ha akon anak... siguro asya ito pagkag-anak kana ginhihimo mo nga tanan bisan ano pa kakuri imo kamutangan para ha ira. Waray ako magpadara akon sakit, ginbuhat ko tanan, pag-exercise ngan proper hygiene para mapadali akon pag-upay. (...for my child... probably, it's an instinct of a parent to do whatever it takes no matter how hard your situation for the sake of your child. I did not allow myself to be defeated with the virus; I exercised and keep myself with proper hygiene to fasten my recovery).” [Informant 5]

- “Tulo (3) naman la kami han akon bugto na grade 7 ngan ako lola kay amon parents bulag man tapos may iba na nga pamilya, waray gud iba na nasuporta ha amon panginahanglan kun dire ako. One time han nakadto ako naka isolate ha covered court, nagkachat kami han akon bugto, nagpakiana ako kun kumaon na hira...naluoy ako kay waray kuno hira bugas kay sarado an tindahan na amon nauutangan. Waray ko na huna-hunaa kun ano man an kakulangan ngadto ha facility, importante makagawas na ako kay dre la ako it apektado kundi pati hira gihap. (...there were 3 of us in the family with my grade 7 younger brother and my grandmother because our parents were separated and they have their own families already so, no one supports our needs except me. One time during my isolation in covered court, my brother and I have a chat (messenger) asking him if they already ate... I felt bad for them for they don't have food because the store we can ask for credit was close. Right then, I decided to focus on getting my condition better because I am not the only one affected but them (family) as well).” [Informant 9]

3.3.2. Subtheme B: Pursuing Personal Goals

Pursuing personal goals allows individual to develop sense of determination to take responsible for their own action. It was remarked by some of the respondents that apart from being motivated for the sake of their families and dependents, they were able to challenge their circumstances through developing resolution that aroused from their personal life goals. Additionally, they affixed that they were able to endure the hardships for the sake of not putting all their sacrifices in vain.

Significant statements that reflect this claim are as follows:

- “Naisip ko, kagagraduate ko la ngan damo pa akon pangarap. Kailangan ko maniguro para maabot ko akon mga hingyap...Gusto ko pa magkapamilya... (I realized, I just graduated and I still have a lot of goals. I need to overcome this for the sake of my aspirations. I wanted to have a family).” [Informant 6]

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- “Always ko gin re-remind akon sarili, mas damo pa na kakurian an akon gin-agihan para la mahingadi ako yana tak posisyon (work). Dre ako masuko para tak kabubuwason. (... I always reminding myself that, I already experienced a lot of struggles to be in this position. I won’t give up for my future). [Informant 10]

3.4. Theme (4): Assistance

The fourth theme explains the assistance that these Covid-19 survivors received which supported them to endure and challenge their circumstances. Informants expressed their heartily gratitude to the innumerable people who extended themselves in supporting both monetary and non-monetary assistance that alleviated the burdens owing to their heightened situation. Subthemes emerged include: financial, non-monetary supplies and the unconditional love and support of their families and peers that boosted their moral.

3.4.1. Subtheme A: Monetary Support

The heightened situation of these Covid-19 survivors in providing the basic necessities to aid their recovery process somehow become manageable because of monetary assistance they receive from the government.

- “dida han nagpositive ako, nakakarawat ako han 5K tikang ha gobyerno... nakabulig gihapon adto hin dako parti han akon talagugti na panginahanglan. (When I tested positive, I received 5K (five thousand pesos) from the government. It helped me a lot for my basic needs). [Informant 4]

3.4.2. Subtheme B: Non-Monetary Support Aside from the monetary assistance that these informants received, some of them also reported that they were provided with medicinal supplies from the provincial and municipal offices.

Significant statements illustrated on the following claims.

- “...thankful gihap kami kay libre kami tanan han mga bulong ngadto ha facility sanglit dire na kami namomroblema parti han medisina. (...We’re thankful because we are provided with free medicine so we do not worry about it anymore).” [Informant 5]

- “waray gud akon family kuri-e hin duro kay gintatatagan man kami hin medisina.. dire na paraliton. (...it’s not too hard for my family because we are provided with free medicine.. we don’t have to buy).” [Informant 7]

3.4.3. Subtheme C: Psychosocial Support

The heightened feelings of isolation due to the inevitable quarantines that these informants must go through became bearable for because of the unconditional love and support they received from their families and peers. They were able to endure their circumstance despite of the shortcomings in their resources and the facilities.

- “waray gud ako kahulop duro kay akon mga kasangkayan sge man an kumusta ha akon. Damo la an napadara ha akon mga pagkaon tikang ha akon mga ka officemate ngan kasangkayan. (I did not lose hope because my friends constantly checked on me. I received lot of food deliveries from my colleagues and friends).” [Informant 2]
- “...ha facility, pasalamat ako han akon mga nakaupod ngadto kay ginshi-share nira an ira mga foods sanglit bisan dre sakto para ha akon an rasyon. (...I am thankful to the persons I’m with, in the facility because they shared their foods even the food rations given to us was not enough for me).” [Informant 8]
- “waray ko napansin an adlaw kay sge man communication namon akon family ngan mga kasangkayan. Waray ko gud ako na bored ha isolation facility. (I did not notice the days passing because we constantly communicate with my families and friends. I did experienced boredom in the isolation),” [Informant 10]

3.5. Theme (5): Re-Integration Process

After the recovery on the disease of these informants, another level of challenge they have to deal concerning on how they re-integrate to the mainstreaming in the community. Despite of the fact that some of the informants reported negative experiences relating to being positive from the virus, somehow, they were able to re-integrate in the community by developing personal and spiritual resiliency.

3.5.1. Subtheme A: Perceiving Positively

In spite of the negative setbacks that these Covid-19 survivors received directly or indirectly from their community, their neighbors in particular, they were able to re-integrate in the society by perceiving things in a positive perspective by keeping a mindset that this will eventually pass somehow.

It was reflected on these following statements:

- “damo akon nababati na dire maupay ha amon hagrani pero dre ko nala gin ma-mind. Instead na ig- stress ko tak sarili hito na mga maglain na yakan, naging thankful lugod ako kay mas nakikilala ko an mga tawo na ungod an pagbulig ha akon hine na mga panahon. (I am hearing a lot of unpleasant things from my neighbors but I don’t mind it at all. Rather than stressing

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myself over such negative statements, I am grateful instead because it allows me to know the persons who genuinely help me during these times).” [Informant 5]

- “initially, makuri hiya. Nalugi amon business kay nagkadudunot man an gulay pero tungod hadto na eksperyensya, mas nakilala namon an kakayahan han amon pamilya ha pagsolve hit problems. (Initially, it was hard. Our business suffered losses because our vegetable products got rotten but through that experience, we came to know the capability of our family to deal with problems).” [Informants 8]

3.5.2. Subtheme B: Spiritual Resiliency

On the process of re-integration of these Covid-19 survivors to the community, these informants have developed their spiritual aspects to deal with the challenges throughout their lives. They affixed that they were able to manage and proceed with the challenges through contemplating with their actions and building strong relationship to our Almighty God.

- “nabubuhay ko pagpadayon ha akon kinabuhi tungod hit akon pagtuo ha aton Ginoo na nabulig ngan naalay ha akon permi labi na gud para ha akon pamilya. (I was able to proceed with my life because of my faith to our God who guides me and blessed me in every step of the way, especially for my family).” [Informant 1]

- “...narealized ko gud na, life is short. As much as possible, buhaton naton an maupay para ha aton igkasi-tawo kay at the end of the day, igbabalik gihap nira ito na maupay na imo binuhatan. (I realized that, life is short. As much as possible, we must do good deeds to other people because at the end of the day, they will reciprocate the good deeds you did to them).” [Informant 7]

- “Maaram ako na makuri gud talaga labi na damo it mga tawo na makakasina ha imo. Ayaw la kita pagpadara ha iba nga mga tawo, instead pagpray nala kita kay ha katapos-tapusan Diyos la gehap it makakbulig ha aton. (I am aware that it’s difficult because lot of people will criticize you. We should not get swayed by these people. Instead, let’s pray because in the end, it is only God who can help us).” [Informant 9]

4. DISCUSSION

Based from the result of the study, it showed that Covid-19 survivors have faced intensified challenges owing to their experience. Findings revealed primary adversities they suffered which include; physical challenges associated from the symptoms of the disease which resulted exhaustion to their bodies and, the psychological challenges from the anxiety-evoking situations owing to the contraction of the virus. It was confirmed by these informants that dealing with such adversities have heightened their circumstances. It was consistent with the study conducted by Moradi et al., (2020) which the results showed that during pandemics such as the COVID-19 pandemic, in addition to physical and exhausting symptoms of the disease, patients experience disturbances such as psychological distress and the burden of being a carrier that practically threatened their condition.

It was emphasized that the dominant factor that contributes to their psychological distress is the fear of putting their families’ health on the risk of the virus and unknowingly infecting others. Other factors include their heightened financial sources, the feeling of isolation and the sense of imminent death.

The second theme highlighted the problems that these informants have perceived must be given proper attention to alleviate the burden of the infected patients on the isolation facility towards fast recovery. They affirmed that, factors under quality of utility, poor management and inconsistent closed-monitoring amplified their circumstances. According to a recent survey from the Indian Psychiatric Society, it was reported that there is an increase amounting to 20% on to the mental illnesses in their country since the corona virus takes place (OCHA, 2020). They also emphasized that this scenario calls for the importance of psychosocial support and regular monitoring for Covid patients to minimize the risk of developing mental related health problem.

Majority of the respondent remarked that upon their admission to the facility until their discharged, they were assessed only once and did not received follow-ups. Some of the informants also added that, even after their discharged they were reluctant to undergo home quarantine for they feared infecting their family due to lack of evidence-based assessment proving that they were already recovered from the disease. In the study of Wen Li et al. (2020) findings showed that most clinically stable COVID-19 patients suffered from significant posttraumatic stress symptoms associated with the COVID-19 prior to discharge. From the result, the authors emphasized that appropriate crisis psychological interventions and long-term follow-up assessments should be initiated to these individuals considering the negative detrimental impact of their experience. Additionally a scoping review on the evidence-based for intervention concerning with the public health due to the outbreak of pandemic was conducted by Kunzler et al., (2020) where they reported that responding immediately to the needs based on the availability of proper intervention showed for beneficial effects that enable people to better cope with the distress of the high-risking disease.

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The third major theme comprises the juggles of these Covid-19 survivors towards recovery. Sources of motivation emerged from their determination to continuously support the needs of their families and even pursuing their personal goals in life. They were able to challenge their circumstances by strengthening their mentality that the love they had for their families and their determination to pursue their personal goals were much stronger than the disease.

Moreover, the fourth theme explains the assistance that these Covid-19 survivors received which is incumbent for their recovery and played an important role in minimizing the burden associated from being a carrier of the disease. Informants constantly confirmed that aside from the monetary and non-monetary supports that they received from the government and concerned agencies, the psychosocial support from their families and peers has imparted a significant positive effect for their recovery process. They affirmed that they were able to endure the solitude owing to their isolation because of the constant communication they had to one another even at the expense of online platforms. In addition, the feelings of helplessness and distress in fulfilling their basic needs became manageable for them because of the genuine solicitude coming from their families and peers. This findings show that psychosocial support that stems from the people close to you played a vital role towards recovery of these Covid-19 survivors. This finding was supported through a study conducted by Foley et al. (2020), examining the importance of psychological support during Covid-19. Their study highlighted the need and importance of these psychological supports from people around us, may it be our family; caretaker or clients must be initiated in alleviating the psychological distress associated in this time of pandemic. The result of their study showed that there is an increase psychological distress and as experienced by their participants resulted from too little psychological support they received.

Furthermore, rather than manifesting obstructive resolution to the negative issues that revolves around with their experience to the community, these individuals asserted the situation in a more optimistic perspective and redirecting their spiritual resiliency which is essential for their re-integration to the society.

5. CONCLUSION

Covid-19 survivors experienced heightened challenges in their physical, psychological and social aspect. These challenges derived from the following: (a) primary symptoms of being a carrier which leads them to experience mild to severe physical exhaustion; (b) psychological challenges stemmed from the distress due to the financial restriction they have to suffer from the inevitable quarantines that significantly affected their livelihood, the fear of unknowingly infecting others, the solitude of isolation and the thought of imminent death they attribute to the disease. However, despite the overwhelming challenges they are facing, they were able to endure and challenge their situation by redirecting themselves on their determination which concerns with their families/dependents welfare and their will to pursue own personal goals. Moreover, because of the support (monetary or non-monetary) they received throughout their recovery process, their intensified situation became manageable especially with the psycho-social support from their families and peers which significantly promoted their fast recovery. Over all, in spite of the challenges that these individuals have experienced, they were able to proceed with their respective lives by asserting their unique experience in an optimistic matter which is incumbent for their re-integration in the society.

6. RECOMMENDATIONS

Based on the results of the study, it is humbly recommended that government and other concerned agencies to provide appropriate and necessary informational materials to help empower the society, understand and see situation of these survivors with a silver lining.

It is also important that these survivors should be provided or supported with necessary assistance which is in paramount importance of their re-integration process.

Additionally, further studies were recommended to understand its implications to survivors and individual, in general.

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Knowledge, Perception and Uptake of Vaccine of Hepatitis B Virus among Residents of Ondo State



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ABSTRACT: Hepatitis B virus (HBV) is one of the viral diseases that is threatening the global health. This study was carried out to analyze knowledge, perception of hepatitis B virus and its vaccine uptake among residents of ondo state, south west of Nigeria. The study was a descriptive survey that involved the use of questionnaire to facilitate the sampling and interview of respondents. This included recruiting residents who gave their consent in three communities (Ile-Oluji, Ondo and Owo) at three different senatorial districts (south, central and North) of the state (one community per senatorial district). Four hundred and fifty consented to participate in the study and were selected. A validated self-administered questionnaire was used for data collection. Descriptive statistics and Chi-square tests were used to analyze the data. It was observed that the Knowledge of the subject matter needed much improvement in all the towns, especially the undeveloped ones in the state on awareness, perception and knowledge of the virus and the availability of its vaccine uptake.

KEYWORDS: HBV, epidemiology, disease, chi-square, vaccine.

1. INTRODUCTION

Hepatitis was described in the Babylonian Talmud in the fifty century BC, and was referred to by Hippocratic over 2000 years ago. Despite this ancient knowledge, the first human Repetitious virus, Hepatitis B, was not isolated until 1963 (Rodríguez-Frías et al 2001). This was followed quickly by the purification of Hepatitis A in 1973, and more recently by the isolation of viruses C, D, E and G. These viruses are known to infect the human liver (Cristina 2007, Wieland, S. F. (2015). Gerlich, W. H. (2013 Thomas et al 2015). According to Reif. (1981). this disease is a general cause of chronic Hepatitis, liver cirrhosis and hepto-cellular carcinoma worldwide, which translates to a major basis of morbidity and mortality. Although, there are more than twenty other viruses, which infect the human liver, these are not considered "Hepatitis viruses" as these other viruses tend to infect organs other than the liver more seriously. These include common viruses such as Cytomegalovirus (CMV), Mumps, Rubella, Epstein-Barr virus (EBV) as well as Rassa Fever and yellow fever viruses. Any infection that results in inflammation of the liver is called Hepatitis (Greek Hepaticus, liver). However, not all hepatitis is caused by viruses, because, HEPATITIS means "inflammation of the liver", and can also be caused by other types of infection, such as, bacteria, fungi, e. t. c., including toxic drugs; poisons; alcoholism and so on (Drexottetal;2005). But of interest to this study is Hepatitis virus, one of the most common infectious diseases, causing an estimated 1.5million deaths worldwide each year and infects more than 300 million people, it is a common cause of liver disease and liver cancer. HBV, a member of the Hepadnaviridae family, is a small DNA virus with infrequent structures similar to retroviruses. HBV imitates through an RNA transitional and can incorporate into the host genome. The exceptional features of the HBV replication cycle discusses a distinct ability of the virus to persist in infected cells as debated by (Liang, T. J. (2009).

Hepatitis B remains one of the major causes of human miseries in the world notwithstanding a thorough understanding of its transmission and prevention. The Hepatitis B virus is normally transmitted through blood transfusion, contaminated equipment, drug users, unsterile needles, or body secretions (saliva, soren, sweat, breast milk, urine), in a study carried out by Vishal Khandelwal et al, 2017, where he represented the interested of the oral health professionals, through a cross sectional study among 240 students of dental course, reveals that 21% failed to recognize saliva as the mode of transmitting Hepatitis B. This study shows that a reasonable awareness existed among the professionals at risk of contraction, talk less of the illiterates and indigenes of the undeveloped communities. The virus also can pass from the blood of an infected mother through the placenta

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to infect the foetus. Being a vaccine preventable disease, the vaccination of newborns has dramatically changed the narrative of HBV infection (Yasobant S, et al, 2017, Jones et al 2011 , Palmeira 2012, Ranger-Rogez & Denis, F. O. (2004)).

The WHO has been on the trail of creating more awareness through campaigns to reduce the HBV infections by 80% globally. A study by Angela O. Eni et al, 2019, shows that the working class has better awareness of the virus than others categories of respondents. Each year an estimated 200, 000 people are infected in Nigeria with HBV and about 1000 person die yearly from hepatitis related cirrhosis and about 5000 people die from HBV related liver cancer. HBV is second only to tobacco as a known cause of rumen cancer. A good knowledge and awareness of the virus may reduce infection rate, an adequate knowledge in a civilized environment will include standard precautionary policy against the virus, apart from lectures on HPV and the annual Hepatitis day.

Worldwide, HBV infects over 300 million people (Schlesinger & Schlesinger, 2001). The clinical signs of Hepatitis B vary widely, most cases are symptomless. However, sometimes fever, loss of appetite, abdominal discomfort, nausea, fatigue, and other symptoms progressively appear following a maturation period of 1 to 3 months. The virus infects liver Hepatic cells and causes liver tissue deterioration and therefore occasions the release of liver associated enzymes (transaminases) into the blood stream. This is followed by jaundice, the accumulation of bilirubin (a breakdown product of hemoglobin in the skin and other tissue which brings about the appearance of the distinctive yellow. The impact of the distinctive yellow jaundice Hepatitis B on the victims' skin has made it an infrequently detectable disease through recorded history. The virus persists in about 10 percent of infected immunocompetent adults, and in as many as 90 percent of infants infected prenatally depending on the ethnic group of the mother. About 350 million people worldwide persistently carries Hepatitis B. Actually, one in twenty infections result in chronic hepatitis, defined as persistent hepatitis virus six months after the onset of the acute illness (Donohue, W., & Benson, J. (2007, WHO 2015).

In a research conducted by Adekanle O et al, 2015 Among health worker, it reveals that health workers of an institution has low perceived risk of the virus infection and low vaccination coverage despite high awareness of the vaccine. Showing that the mode of transmission commonly known at the tertiary hospital is by blood, compared to the knowledge of saliva as a medium of transmission. This case is however different outside Nigeria, where the coverage of knowledge on knowledge of transmission among health workers is higher

According to the study by Taylor et al (2005), which investigated knowledge and awareness of Hepatitis B among randomly selected Vietnamese adults living in the United States, it shows that 81% of the 715 adults that participated in the study had heard of hepatitis B and 67% had been tested for HBV. The knowledge of the infection was generally good, with about three-quarters knowing the different ways of transmission but only 69% knew about infection through unprotected sex.

In a study by Nguyen et al., (2010) carried out in the U.S. among Vietnamese-Americans, 1704 respondents participated in a computer-assisted telephone interview survey. The interviews included questions about knowledge, beliefs and communication regarding HBV testing. The study showed that 17.7% reported a family history of hepatitis B and 61.6% had been tested for hepatitis B. Only 26.5% reported that they had been vaccinated against HBV, which was disappointingly low. Knowledge about modes of transmission was high regarding partaking in needles share and childbirth, moderate concerning toothbrush share and small concerning unprotected sex. A majority of the participants thought erroneously about other possible ways of transmission, that food or respiratory droplets could transmit the disease.

Hwang, Huang and Yi (2008) investigated knowledge about HBV and predictors of HBV vaccination among 251 Vietnamese American college students. More than half of the participants were aware that HBV can be transmitted via unprotected sex and contaminated blood, though most of the participants' thought that HBV was transmitted through food and water. Less than one third knew that Asian Americans have higher risk of being infected with HBV than other people. About 87% had heard about HBV before and they had suggestively better knowledge related to those who had not heard about the disease. The knowledge was also greater among those who had been screened for, or vaccinated against HBV, or had family members diagnosed with HBV or liver cancer. The study also indicated that women had greater knowledge about HBV compared to men. About 43% of the participants reported being vaccinated against HBV and they also had greater knowledge than those who had not been vaccinated. Older participants or participants who were sexually active and/or knew someone with HBV were less possible to have been vaccinated.

The HBV vaccine gives healthy infants, children and adults a protective concentration of anti-HBs in 90-100% of the cases if following the vaccination plan appropriately. The vaccine is typically given in a three-dose series. Persons who are immune suppressed or over 40 years old are less likely to develop protective concentrations (Shepard, Simard, Finelli, Fiore & Bell, 2006). It is not known if the HBV vaccine gives lifelong protection against HBV and if boosters are necessary. However, it is known that the protection is long lasting, at least 10-15 years, if the vaccination schedule is followed correctly (Banatvala, J et al 2000 and

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Van der Sande et al 2007, Socialstyrelsen. (2008).). Fever and pain at the injection site are the most common side effects of the HBV vaccine, although, allergic reactions have been reported but are not common (Shepard et al., 2006).

The challenges in the area of HBV-associated disease are the lack of knowledge in predicting outcome and progression of HBV infection and an unmet need to understand method of transmission, while looking at our society and hospital, there are cases whereby unscreened blood is transmitted to a patient, and a case of multiple sex partner people having unprotected sex or body secretions (saliva, soren, sweat, breast milk, urine) and making use of sharp objects without any care.

2. METHODOLOGY

2.1 Study Area

The study was conducted in Ondo State, Nigeria. The state is located in the south-western part of the country and lies between longitude 4031' and 6000' east of the Greenwich Meridian and latitude 5015' and 8015' north of the Equator. It is bounded by Ekiti and Kogi State in the north; Edo State in the east; Ogun and Osun States in the west and the Atlantic Ocean in the south. The state has a population of 3,441,024 (NPC, 2006) and covers an area of 14,793sq.km at 120 kilometres north of the ocean. The state is made up of 18 Local Government Area (LGAs). The tropical climate of the state is broadly of two seasons: rainy season (April-October) and dry season (November-March). Temperature throughout the year ranged between 210C to 290C and humidity is relatively high. The annual rainfall varied from 2,000mm in the southern areas to 1,150mm in the northern areas.

2.2 Target Population/ Sample Size

The target populations for the study were the population of Ondo Town, Ile Oluji and Owo. From the above named town 343 respondents participated in the research.

2.3 Method of Data Analysis

The data were analyzed using Microsoft Excel. Descriptive statistics was used to illustrate the data in Tables, Bar Chart, and Pie Chart. Measures of central tendency were employed to calculate the Means, Variance and Standard Deviation.

2.4 Table Presentation: Tables, which convey information that has been converted into words or numbers in rows and columns, have been used for nearly 2,000 years. Anyone with a sufficient level of literacy can easily understand the information presented in a table. Tables are the most appropriate for presenting individual information, and can present both quantitative and qualitative information.

2.5 Graph presentation: Whereas tables can be used for presenting all the information, graphs simplify complex information by using images and emphasizing data patterns or trends, and are useful for summarizing, explaining, or exploring quantitative data.

3. DATA PRESENTATION

This division presents data analysis, findings and discussion of the study in line with the research objectives.

3.1 SECTION A: This section provides detail on socio demography of the respondents, which includes age, marital status, religion occupation and level of education of respondents.

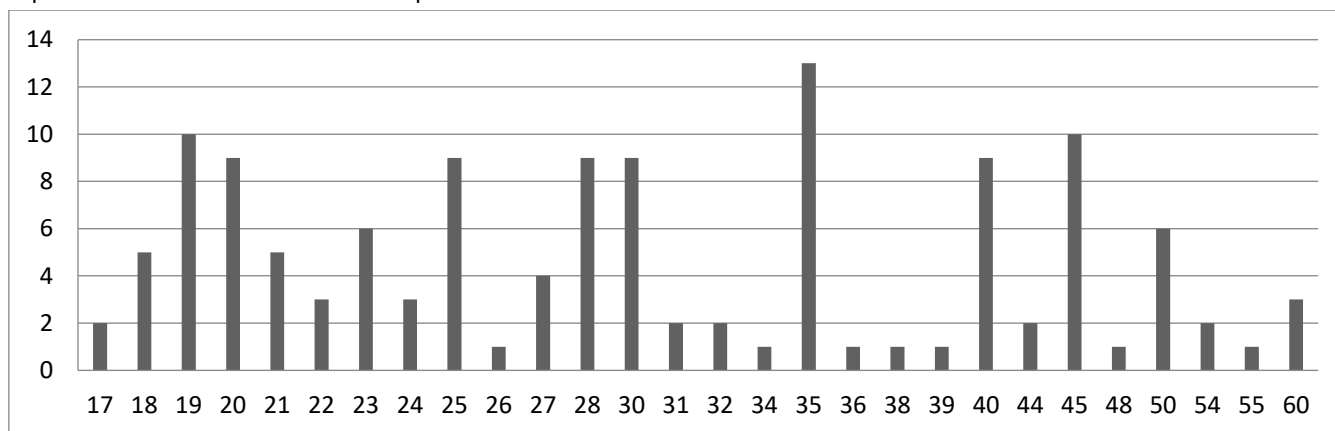


Figure 1: Age frequency of Ondo Respondents

Interpretation: The bar chart above illustrates the age distribution of respondents in Ondo town that took part in the research. The mean age of the respondents is 31 years and the mode is age 35 years.

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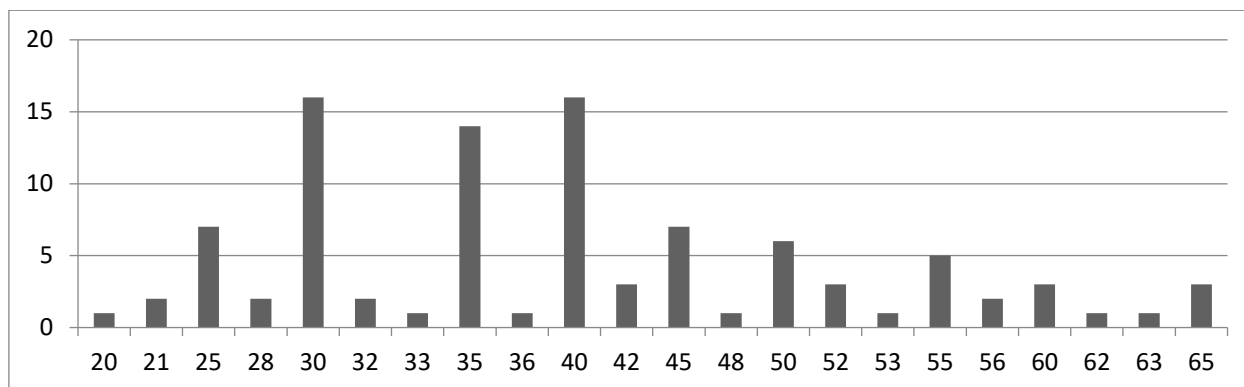


Figure 2: Age frequency of Owo respondents

Interpretation: The bar chart above illustrates the age of respondents that participated in this study in Owo. The modal age in this group is 40 years.

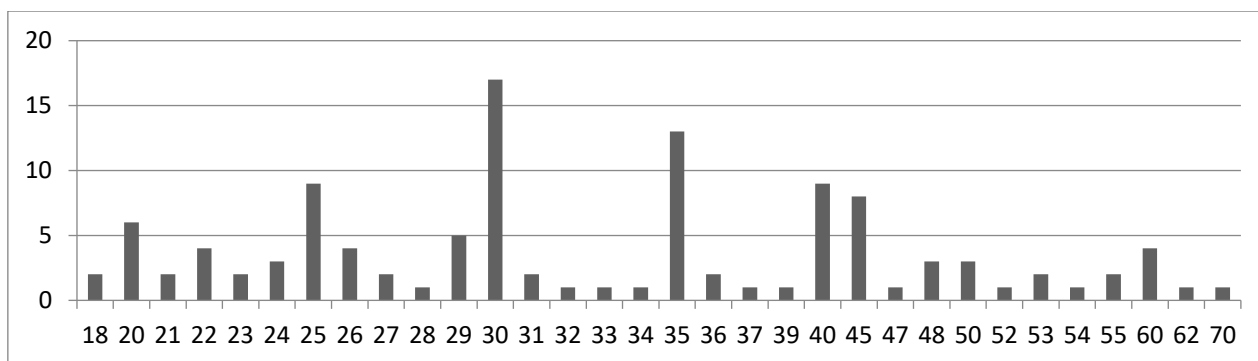


Figure 3: Age frequency of Ile-Oluji respondents

Interpretation: The bar chart above illustrates the age of respondents that participated in the research in Ile Oluji. 18 years was the minimum age in this group and 70 years was the maximum. The modal age of this group is 30 years.

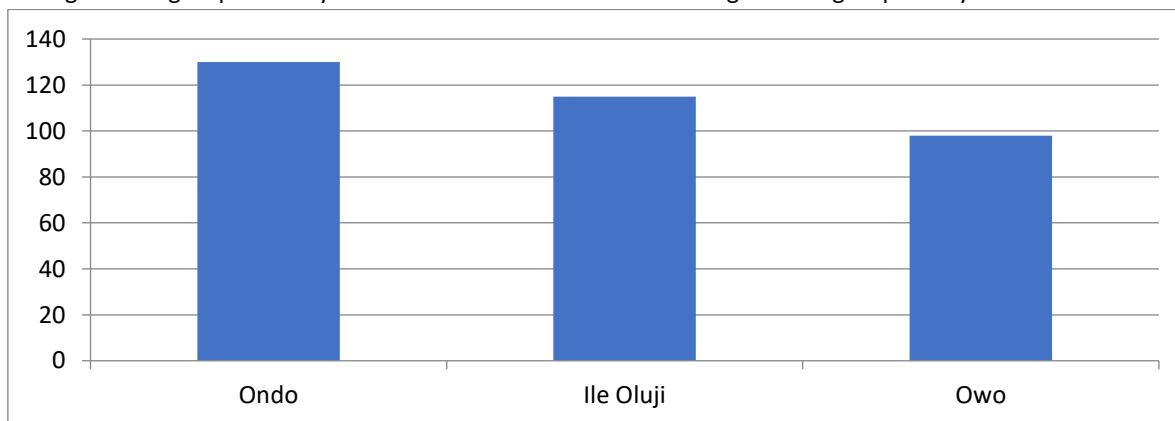


Figure 4: Town(s) under study

Interpretation: The bar chart above illustrates numbers of respondents from the three town under study. The total respondents were 343. Ondo town contributed 37.9%, Ile Oluji 35.5% and Owo contributed 28.6%.

Table 1: Marital status of respondents

Marital Status	Ondo (130)	Owo (98)	Ile-Oluji (115)
Single	50.8%	44.9%	44.3%
Married	40.0%	54.1%	49.6%
Divorced	3.8%	1.0%	2.6%
Separated	5.4%	0.0%	2.6%
Cohabiting	0.0%	0.0%	0.9%
Total	100	100%	100%

Source: Research survey

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Interpretation:The above shows the marital status of the respondents for the three towns under survey, larger percentage of respondents in Owo and Ile-Oluji, 54.1% and 49.6% respectively are married while the larger percentage in Ondo (50.8%) are single.

Table 2: Religion of respondents

Religion	Ondo (130)	Owo (98)	Ile-Oluji (115)
Christianity	50.8%	91.8%	70.4%
Islam	48.5%	8.2%	29.6%
Traditional	0.8%	0.0%	0.0%
Total	100%	100%	100%

Source: Research survey

Interpretation:The above statistics shows the religion of the respondents. Christianity is the most practiced religion by the respondents with 50.8%, 91.8% and 70.4% in Ondo, Owo and Ile-Oluji respectively.

Table 3: Ethnicity of respondents

Ethnic Group	Ondo (130)	Owo (98)	Ile-Oluji (115)
Yoruba	68.5%	98.0%	88.7%
Igbo	23.1%	2.0%	5.2%
Hausa	8.5%	0.0%	0.9%
Others	0.0%	0.0%	5.2%
Total	100%	100%	100%

Source: Research survey

Interpretation:The table above shows the ethnic group of the respondents, 68.5%, 98.0% and 88.7% of the respondents in the towns under survey are Yoruba, 23.1%, 2.0% and 5.2% are Igbo while Hausa and other ethnic groups were captured in the research.

Table 4: Highest education level of respondents

Education status	Ondo (130)	Owo (98)	Ile-Oluji (115)
Primary	13.1%	25.5%	13.9%
Secondary	42.3%	43.9%	52.2%
Tertiary	44.6%	30.6%	33.9%
Total	100%	100%	100%

Source: Research survey

Interpretation:The statistics above describes the educational status of the respondents. All respondents have primary certificate but few went further to Secondary and later finished up to tertiary level. 44.6%, 30.6% and 33.9% in the towns under survey went to a tertiary institution.

Table 5: Occupation of respondents

Occupation	Ondo (130)	Owo (98)	Ile-Oluji (115)
Trading	52.3%	31.6%	40.0%
Civil Servant	10.0%	3.1%	7.8%
Artisan	13.1%	40.8%	33.9%
Others	24.6%	24.5%	18.3%
Total	100%	100%	100%

Source: Research survey

Interpretation: The above statistics shows the occupation of the respondents. 52.3% of the respondents from Ondo are civil servant, 40.8% of respondents in Owo are artisans.

Knowledge, Perception and Uptake of Vaccine of Hepatitis B Virus among Residents of Ondo State

4.2 SECTION B: Awareness and general knowledge of Hepatitis B.

Table 6: Awareness and general knowledge of Hepatitis B

Have you heard about Hepatitis B before?			
Response(s)	Ondo (130)	Owo (98)	Ile-Oluji (115)
Yes	80.0%	61.2%	59.1%
No	20.0%	38.8%	40.9%
Total	100.0%	100.0%	100.0%
Hepatitis B disease is caused by Hepatitis B virus			
Response(s)	Ondo (130)	Owo (98)	Ile-Oluji (115)
Yes	98.5%	60.2%	91.3%
No	1.5%	39.8%	8.7%
Total	100.0%	100.0%	100.0%
Hepatitis B's attack on the liver cells can lead to cancer			
Response(s)	Ondo (130)	Owo (98)	Ile-Oluji (115)
Yes	78.5%	64.3%	90.4%
No	21.5%	35.7%	9.6%
Total	100.0%	100.0%	100.0%

Source: Research Survey

Interpretation: The above statistics were analysis obtained from the questionnaires on the awareness and general knowledge of Hepatitis B. The table above shows that 80%, 61.2% and 59.1% of the respondents are aware and heard of Hepatitis B. The table also shows that a very good significant of the respondents (78.5%, 64.3% and 90.4% respectively) knows that Hepatitis B's attack on the liver can lead to cancer.

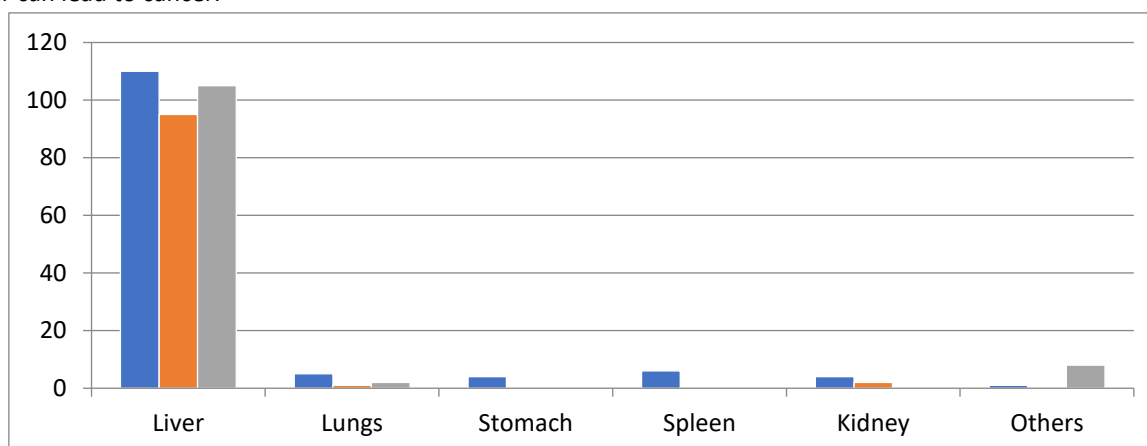


Figure 5: Hepatitis B primary affect which organs

Interpretation: The bar chart illustrates respondents' knowledge of the primarily affected organ in body. Majority of the respondents were aware that the liver is mostly damaged by HBV.

Table 7: Effect of Hepatitis B on the Body

S/N	Response(s)	Ondo (130)			Owo (98)			Ile-Oluji (115)		
		True	False	Do not know	True	False	Do not know	True	False	Do not know
1	Liver Failure	88.5%	4.6%	6.9%	70.4%	28.6%	1.0%	90.4%	0.9%	8.7%
2	Cirrhosis	53.8%	31.5%	14.6%	65.3%	31.6%	3.1%	70.4%	16.5%	13.0%
3	Death	90.8%	6.2%	3.1%	70.4%	27.6%	2.0%	90.4%	1.7%	7.8%

Source: Research Survey

Interpretation: The table above illustrates respondents' idea on the effect of Hepatitis B on the Body. 88.5%, 70.4% and 90.4% of the respondents in Ondo, Owo and Ile Oluji respectively knows that the disease affects the liver and eventually leads to death.

Knowledge, Perception and Uptake of Vaccine of Hepatitis B Virus among Residents of Ondo State

Table 8: Knowledge of symptoms of Hepatitis B

S/N	Signs and symptoms of Hepatitis B	Ondo (130)			Owo (98)			Ile-Oluji (115)		
		True	False	Do not know	True	False	Do not know	True	False	Do not know
1	Joint pain	65.4%	20.8%	13.8%	66.3%	31.6%	2.0%	87.0%	4.3%	8.7%
2	Abdominal pain	39.2%	42.3%	18.5%	67.3%	30.6%	2.0%	86.1%	4.3%	9.6%
3	Fever	89.2%	6.9%	3.8%	67.3%	28.6%	4.1%	86.1%	9.6%	9.6%
4	Yellowish skin and white eyes (Jaundice)	46.2%	38.5%	15.4%	59.2%	37.8%	3.1%	73.9%	10.4%	15.7%
5	Dark urine	32.3%	51.5%	16.2%	64.3%	32.7%	3.1%	75.7%	10.4%	13.9%
6	Loss of appetite	86.9%	7.7%	5.4%	65.3%	28.6%	6.1%	83.5%	7.0%	9.6%
7	Nausea and vomiting	73.8%	15.4%	10.8%	64.3%	30.6%	5.1%	82.6%	8.7%	8.7%
8	Weakness and fatigue	82.3%	10.0%	7.7%	66.3%	29.6%	4.1%	84.3%	6.1%	9.6%

Source: Research Survey

Interpretation: The statistics above shows how knowledgeable the respondents are on the signs and symptoms of Hepatitis B. In Ondo, 89.2% of the respondents believe that fever is one of the symptoms of HBV, 86.3% believe that loss of appetite is also a symptom and 82.3% of the respondents said weakness and fatigue are signs and symptoms of Hepatitis B.

Table 9: Knowledge of Hepatitis B transmission mode

S/N	Mode of transmission of Hepatitis B	Ondo (130)			Owo (98)			Ile-Oluji (115)		
		True	False	Do not know	True	False	Do not know	True	False	Do not know
1	Unprotected sex	88.5%	9.2%	2.3%	72.4%	24.5%	3.1%	81.7%	2.6%	15.7%
2	Sharing of IV drug needles	76.2%	13.1%	10.8%	56.1%	40.85%	3.1%	86.1%	5.2%	8.7%
3	Living in a household with an infected person	14.6%	80.8%	4.6%	60.2%	37.8%	2.0%	72.2%	17.4%	10.4%
4	Human bites	33.1%	44.6%	22.3%	69.4%	25.5%	5.1%	75.7%	12.2%	12.2%
5	Eating food prepared by infected individuals	15.4%	80.8%	3.8%	58.2%	39.8%	2.0%	61.7%	28.7%	9.6%
6	Casual contacts e.g. hugging, holding hands	33.8%	27.7%	38.5%	52.0%	40.8%	7.1%	59.1%	32.2%	8.7%
7	Having job that can expose you to human blood	62.3%	22.3%	15.4%	61.2%	33.7%	5.1%	80.0%	12.2%	7.8%
8	Sharing earrings, razors, toothbrush with infected person	88.5%	33.1%	8.5%	67.3%	27.6%	5.1%	91.3%	0.9%	7.8%
9	Unsterilized needle	58.5%	33.1%	8.5%	62.2%	34.7%	3.1%	90.4%	1.7%	7.8%
10	Mother to child transmission	83.8%	6.2%	8.5%	67.3%	29.6%	3.1%	88.7%	2.6%	8.7%
11	Piercing needle	72.3%	15.4%	12.3%	65.3%	30.6%	4.1%	85.2%	7.0%	7.8%

Source: Research Survey

Table 10: Knowledge on preventive measures

S/N	Preventive measures of Hepatitis B	Ondo (130)			Owo (98)			Ile-Oluji (115)		
		True	False	Do not know	True	False	Do not know	True	False	Do not know
1	Hepatitis B vaccine	86.9%	5.4%	7.7%	69.4%	28.6%	2.0%	87.0%	5.2%	7.8%

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2	Correct condom uses with sexual partners	84.6%	10.8%	4.6%	71.4%	27.6%	1.0%	80.9%	5.2%	7.8%
3	Covering all cuts carefully	53.1%	38.5%	8.5%	66.3%	29.6%	4.1%	88.7%	3.5%	7.8%
4	Washing your hand thoroughly with soap	86.9%	8.5%	4.6%	79.6%	17.3%	3.1%	81.7%	10.4%	7.8%
5	Avoiding direct contact with blood and fluids	87.7%	9.2%	3.1%	68.4%	29.6%	2.0%	86.1%	6.1%	7.8%
6	Proper disposal of sanitary napkins	23.1%	54.6%	22.3%	62.2%	35.7%	2.0%	82.6%	9.6%	7.8%
7	Avoiding sharing sharp items such as razors, nail clippers, toothbrushes, earrings or body rings	80.8%	10.8%	8.5%	74.5%	23.5%	2.0%	80.9%	11.3%	7.8%
8	Make sure new, sterile needles are used for ear or body piercing, tattoos and acupuncture	45.4%	33.1%	21.5%	66.3%	29.6%	4.1%	73.0%	19.1%	7.8%

Source: Research Survey

Interpretation: The table above shows the knowledge of Hepatitis B transmission mode and preventive measures of Hepatitis B. Majority of the respondents believed that unprotected sex and piercing needles are common means of how HBV is transmitted but the statistics also show that in Owo, 60.2%, 58.2% and 52.0% believe that HBV can be transmitted by living with an infected person, eating food prepared by an infected person and casual contact with infected persons. Hence, this shows that Owo indigenes require deep sanitization on the mode of transmitting HBV. The second table above also shows that 86.9% of the respondents say it is true that Hepatitis B vaccine and thorough washing of the hands with soap is an effective preventive measure against HBV. 87.7% and 84.6% of the respondents say it is true that correct use of condoms with sexual partner and avoiding direct contact with blood fluids are also good preventive measures.

4.3 SECTION C: Perception relating to: Susceptibility, Severity, Barriers, Benefits, Self-Efficacy and Vaccine uptake

Table 11: Perceived susceptibility to Hepatitis B

S/N	Statement	Ondo(130)		Ile Oluji (115)		Owo (98)	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
1	Hepatitis only affects the rich	18.5%	81.5%	20.0%	80.0%	21.4%	78.6%
2	I live in the village; the virus cannot get here	13.1%	86.9%	15.7%	84.3%	18.4%	81.6%
3	Hepatitis B can affect everyone	86.9%	13.1%	81.7%	18.3%	87.8%	12.2%
4	Only women should be worried about Hepatitis B	36.2%	63.8%	14.8%	85.2%	16.3%	83.7%
5	I am of the opinion that a person that does not eat balance diet is at higher risk of contracting Hepatitis B	81.5%	18.5%	29.6%	70.4%	18.4%	81.6%

Source: Research Survey

Interpretation: The table above illustrates the perceived susceptibility to Hepatitis B from the three towns under study. 86.9%, 81.7% and 87.8% of respondents from Ondo, Ile Oluji and Owo respectively agree that Hepatitis B can affect everyone. It would be noticed that 81.5% of respondents in Ondo agree that lack of balance diet put people at higher risk of contracting HBV while 70.4% and 81.6% disagree in Ile-Oluji and Owo respectively.

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Table 12: Perceived severity to Hepatitis B

S/N	Statement	Ondo		Ile Oluji		Owo	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
1	I believe that Hepatitis B is a serious disease	96.2%	3.8%	79.1%	20.9%	80.6%	19.4%
2	Hepatitis B can be fatal	88.5%	11.5%	75.7%	24.3%	77.6%	22.4%
3	If I have liver cancer my career would be endangered	79.2%	20.8%	57.4%	42.6%	75.5%	24.5%
4	If I have Hepatitis B; my financial status will deteriorate	51.5%	48.5%	47.0%	53.0%	70.4%	29.6%
5	If I got liver cancer, it would be more serious than other diseases	76.2%	23.8%	66.1%	33.9%	74.5%	25.5%
6	Adults do not need to test for Hepatitis B	23.8%	76.2%	27.0%	73.0%	17.3%	82.7%
7	Having to test for Hepatitis B is not important because it is not a serious disease	58.5%	41.5%	28.7%	71.3%	20.4%	79.65

Source: Research Survey

Interpretation: The table shows result in percentage on perceived severity of Hepatitis B. 76.2%, 66.1% and 74.5% of respondents in Ondo, Ile Oluji and Owo agrees that liver cancer would be more serious than other diseases, while 58.5% of respondents in Ondo agrees that testing for hepatitis B is not important.

Table 13: Perceived benefits of Hepatitis B vaccine

S/N	Statement	Ondo		Ile Oluji		Owo	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
1	If I Vaccinate my Child against HBV, I do not worry about the child getting cancer later in adulthood	40.0%	60.0%	58.3%	41.7%	65.3%	34.7%
2	Testing is the only way I can find out if I have HBV disease	88.5%	11.5%	48.7%	51.3%	84.7%	15.3%
3	Testing for HBV test will help me find and treat HBV early before it causes liver cancer	90.0%	10.0%	55.7%	44.3%	88.8%	11.2%
4	The HBV test will help you not to worry as much about liver cancer	78.5%	21.5%	46.1%	53.9%	85.7%	14.3%
5	Testing, immunizing against and treating HBV is an easy way to prevent liver cancer	58.5%	41.5%	56.5%	43.5%	87.8%	12.2%
6	Testing for and treating HBV will decrease my chances of dying from liver cancer.	75.4%	24.6%	51.3%	48.7%	87.8%	12.2%
7	If I am tested and found to have HBV, the treatment may not be as treatment for liver cancer	35.4%	64.6%	53.9%	46.1%	85.7%	14.3%
8	I think getting the vaccine is cheaper than treating the disease	83.1%	16.9%	47.8%	52.2%	60.2%	39.8%

Source: Research Survey

Interpretation: The table result above is about perceived benefits of Hepatitis B vaccine, the result above shows that majority of the respondents agree that HBV test will decrease their chances of dying from liver cancer, 52.2% of respondents in Ile-Oluji disagrees that the vaccine is cheaper than treating the disease.

Table 14: Perceived barriers to Hepatitis Band Vaccine uptake

S/N	Statement	Ondo		Ile Oluji		Owo	
		Agree	Disagree	Agree	Disagree	Agree	Disagree

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1	Compared with other health problems having to test for HBV is not important	32.3%	67.7%	36.5%	63.5%	40.8%	59.2%
2	I am aware that Hepatitis B has a vaccine	75.4%	24.6%	32.2%	67.8%	85.7%	14.3%
3	Getting vaccinated for Hepatitis B when pregnant will result in a miscarriage	73.1%	26.9%	32.2%	67.8%	69.4%	30.65
4	I am afraid to have Hepatitis B test because it might show that I am infected	74.6%	25.4%	41.7%	58.3%	79.6%	20.4%
5	You are worried about having the HBV test because you do not understand what will be done	70.8%	29.2%	47.0%	53.0%	81.6%	18.4%
6	I cannot afford the cost of Hepatitis B vaccine	31.5%	68.5%	45.2%	54.8%	78.6%	21.4%
7	Vaccination centers are too far from where I live	33.1%	66.9%	40.0%	60.0%	73.5%	26.5%
8	Health workers are not friendly at health centers close to me	21.5%	78.5%	33.9%	66.1%	24.5%	75.5%

Source: Research Survey

Interpretation: The table result above is about the perceived barriers to Hepatitis B, the result above shows that 70.8% and 81.6% of respondents in Ondo and Owo agrees that they are worried of going for HBV test because they do not know what will be done to them, also, 73.1% and 69.4% of the respondents in Ondo and Owo thinks the vaccine can cause miscarriage for pregnant women.

Table 15: Perceived self-efficacy to Hepatitis B and Vaccine uptake

S/N	Statement	Ondo		Ile Oluji		Owo	
		Agree	Disagree	Agree	Disagree	Agree	Disagree
1	I am certain that I can take myself for Hepatitis B test even if I have to pay for the test	82.3%	17.7%	60.9%	39.1%	89.8%	10.2%
2	I am certain that I can take myself for Hepatitis B vaccination, even if I have to pay for the vaccination	83.8%	16.2%	47.8%	52.2%	87.7%	12.2%
3	I believe my job will not be affected even if I am tested positive for HBV	46.2%	53.8%	45.2%	54.8%	86.7%	13.3%
4	If I am tested and found to have Hepatitis B, I am certain that I can take myself for Hepatitis B treatment, even if the treatment center is far from where I live.	86.9%	12.1%	50.4%	49.6%	83.7%	15.3%

Source: Research Survey

Interpretation: The table result above is about perceived self-efficacy to Hepatitis B, the result above shows that 86.9%, 50.4% and 83.7% agrees that if tested to and found to have Hepatitis B, they are certain they will take themselves to the treatment center irrespective of where they live. 46.2%, 45.2% and 13.3% agrees that their job will be affected if tested positive for HBV and 52.2% respondent in Ile-oluji disagrees he/she could be vaccinated.

4.4 DATA ANALYSIS

Table 16: Chi Square analysis on the Knowledge of Hepatitis B

Characteristics	Have you heard about Hepatitis B before?		Chi-Square P-value ($\alpha=0.05$)
	Yes	No	
Town			
Ondo	104	26	0.001
Ile-Oluji	68	47	
Owo	60	38	

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Religion			
Christianity	155	82	0.350
Islam	76	29	
Traditional	1	0	
Level of Education			
Primary	34	24	0.008
Secondary	98	60	
Tertiary	100	27	
Occupation			
Trading	101	44	0.028
Civil Servant	20	5	
Artisans	54	42	
Others	57	20	

Significant factors at $\alpha = 0.05$

Interpretation: The table above shows result of chi square analysis from the cross tabulation of respondents socio-demography characteristics on knowledge of Hepatitis B. At $\alpha = 0.05$, the results above shows the town and the level of education of the respondents, which is significantly associated with their response(s) on the knowledge of Hepatitis B.

5. CONCLUSION

The results show that knowledge of HBV infection in Ondo State, Nigeria is relatively high, and is unevenly distributed among towns in the state. Knowledge needs to be worked on, so as to improved in all towns especially to smaller ones in the state. To promote future research, and subsequent high-quality translation to health settings, I suggest that guidelines should be developed to ensure consistency for data collection across the state, and hence improve the quality of reporting. For example, the routine recording of age and sex, among other relevant population and individual variables, will support deeper insights into the true HBV situation, and lead to tangible improvements for patients and their communities.

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Relations of Learners' Attitude and Academic Performance in Online Distance Learning In Araling Panlipunan



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ABSTRACT: Online learning is not a new trend in education, some of the universities and colleges have been using it. Online distance learning is one of the three learning modalities that Pulo National High School implemented this SY 2020-2021. It is a big challenge for the teachers and school administration to venture into this platform since they are used in the traditional face to face mode of instruction. Araling Panlipunan is the subject that learners either love or hate. Among the attitude problems that the teachers encountered in teaching the subject is the interest and engagement. Will the attitude and academic performance of the learners towards Araling Panlipunan changes as the mode of teaching changes? The research uses descriptive methods as means for gathering data and information and interpreting the learners' attitude and academic performance in online learning modality. Correlational method is used to find out if there is a significant relationship between the learners' attitude and academic performance in the subject Araling Panlipunan in the online learning modality. The findings reveal that mean scores obtain from the learners' self-assessment attitude is 4.19 which interpreted as positive attitude. Academic achievement of the learners in the fourth grading period is at 90.47 and as classified as Advanced in the levels of proficiency. With regards to the relations of attitude and academic performance, shows that there is a negligible, positive correlation between attitude and academic performance, which is not statistically significant ($r = 0.043$, $N = 169$, $p < 0.05$). Positive attitude does not guarantee high academic performance. Since there is a minimal relation and is not statistically significant between the attitude and academic performance.

KEYWORDS: descriptive method, online distance learning, learner's interest, academic performance, Araling Panlipunan

INTRODUCTION

Araling Panlipunan is one of the integral subjects in the K-12 Curriculum that aims to teach learners to become responsible and productive citizens of the country. It is also stated in K-12 Araling Panlipunan Curriculum, that the purpose of teaching Araling Panlipunan is to develop the learners' understanding of basic concepts and issues of historical, geographical, political, economics and related disciplines so that he may know, produce, mature and be with. Curriculum emphasizes understanding not memorization of concepts and terminology. As proof of deep understanding, the learner is required to produce its own definition and interpretation of each subject studied and its translation in a different context, especially its application in the real life of meaning itself to him and in society at large. Studying social studies is an integral part of the curriculum because it provides information, knowledge, skills, and attitudes that help inculcate values for them to be a proactive and responsible citizen of the country. It is also making the learners be aware of the national and global issues that may affect our lives. To materialize this purpose, teachers' competence in the field is necessary.

Araling Panlipunan is the subject that learners either love or hate. Among the attitude problems that the teachers encountered in teaching the subject is the interest and engagement. Social Studies subject is perceived by many learners as a boring subject because it deals with memorization of past events and dates. This was hold true when Pulo National High School conducted a survey for the planning for Enhanced- School Improvement Plan last 2016. Araling Panlipunan subject ranked second to the least favorite subjects. Among the reasons cited why it was least favorite subject were, teachers' attitude and teaching strategies, difficulty in the subject, activities provided by the teachers and teachers' attendance. Teachers play an important role for the subject to like by the learners. The most influential person in contributing to the positive attitude of the learners towards the subject are the teachers. It is in the teachers' way of conveying the importance of Araling Panlipunan that learners may develop positive attitude toward the subject. Also providing learners with meaningful learning experiences that the interest and actively

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engagement in the subject will be developed. This was the state of Araling Panlipunan for the past years but under the new circumstances will it be the same?

As the beginning of the school year 2020-2021 approaches and with the outbreak of the COVID 19 cases in the Philippines continue to increase, Department of Education announced that education must continue. Every school crafted and implemented its own Basic Education-Learning Continuity Plan (BE-LCP) specifically designed for the school's current situation. Included in the school's LCP is the adoption of different learning modalities like blended learnings, distance learnings, and home-schooling and other modes of delivery shall be implemented depending on the local COVID Risk Severity Classification and compliance with minimum health standards.

Distance learning is an educational process where learners receive instruction through online classes, video recordings, video conferencing and other audio/visual technology medium. Online learning is not a new trend in education, some of the universities and colleges have been using it. Online distance learning is one of the three learning modalities that Pulo National High School implemented this SY 2020-2021. It is a big challenge for the teachers and school administration to venture into this platform since they are used in the traditional face to face mode of instruction. School administration plays an important role to fully implement online teaching. Online teaching has its costs and logistics: online platform to be used, equipment and capacity building for teachers.

That is the reason that compels the researchers to conduct the study. Will the attitude and academic performance of the learners towards Araling Panlipunan changes as the mode of teaching changes too; Will there be a relationship between the attitude and academic performance of the learners under the new normal.? That will be answered by this study as Department of Education faces new normal in the field of education.

METHODS

The research used descriptive methods as means for gathering data and information and interpreting the learners' attitude and academic performance in online leaning modality. Correlational method was used to find out if there is a significant relationship between the learners' attitude and academic performance in the subject Araling Panlipunan in the online learning modality.

The respondents of this study were the selected Grade 7 online learners of Araling Panlipunan in Pulo National High School for the SY 2020-2021. In determining the sample size, the researcher used Slovin's Formula for accuracy and small marginal error. The sample size of this study was 169 online distance learning learners. The following computation was used to came up with the sample size.

$$n = \frac{N}{1 + Ne^2}$$

where:

$$n = \frac{293}{1 + (293)(0.05)^2}$$

n = sample size

N = population size

$$n = \frac{293}{1.7325}$$

E = desired margin of error

$$n = 169$$

Two instruments were used in the research, the first instrument was the self- assessment attitude checklist designed to measure the attitude of the students towards learning Araling Panlipunan in the online distance learning. It is composed of ten statements that measured the students' attitude on learning the subject with two dimensions: implementation and teacher's competence in the online platform. The survey was evaluated on a five-point Likert scale: strongly disagree-1, disagree- 2, undecided-3, agree-4 and strongly agree-5. The instrument was developed by the researcher and undergone content and language validation by the specialists and experts. It was given to the learners at the end of the first grading period to measure their attitude in the subject in the online distance learning. The respondents answered the survey using google form send by the Araling Panlipunan teachers. The attitude was analyzed using mean and interpreted using the interpretations in the Table 1.

The second instrument was the academic performance by the learners as measured by their grades in the subject Araling Panlipunan in the fourth grading period. The data was collected using google form and validated by the Araling Panlipunan teachers in the online distance learning. The grades were analyzed using mean and interpreted using the level of proficiency in Table 2.

Table 1. Interpretation of Attitude

Scale	Interpretation
2.51- 5.00	Positive Attitude
1.00 - 2.50	Negative Attitude

Table 2. Level of Proficiency/Academic Achievement

Level of Proficiency	Equivalent Numerical Value
Beginning	74% and below
Developing	75-79%
Approaching Proficiency	80-84%
Proficient	85-89%
Advanced	90% and above

Source: DO No. 31, s.2012

RESULTS AND DISCUSSION

The following results appeared from the study to obtain the relations of attitude and academic performance of the learners in the online distance learning modality.

Research Question 1: What is the attitude of learners towards the subject Araling Panlipunan in an online distance learning?

Research question sought to find out from the respondents their attitude in Araling Panlipunan in the online distance learning modality.

Table 3. Attitude of the Respondents towards Araling Panlipunan in the ODL

No.	Indicators	Average	Interpretation
Dimension 1: Implementation of Online Distance Learning			
1	I enjoy learning Araling Panlipunan subject using online distance learning.	4.15	Positive Attitude
2	I believe that learning online gives me an opportunity to learn new skills and knowledge in Araling Panlipunan.	4.29	Positive Attitude
3	I believe that studying Araling Panlipunan using online distance learning can help me in life.	4.02	Positive Attitude
4	I learn more efficiently in Araling Panlipunan using online distance learning.	3.83	Positive Attitude
5	I am coping well in studying Araling Panlipunan in the online distance learning	3.92	Positive Attitude
Dimension 2: Teacher's Competence in online distance learning			
6	I enjoy learning the subject Araling Panlipunan because my teacher is proficient in the use of online platform.	4.45	Positive Attitude
7	I enjoy learning Araling Panlipunan because my teacher uses instructional videos and different online applications like kahoot, menti, jamboard and others.	4.28	Positive Attitude
8	Learning Araling Panlipunan is easy and interesting because my teacher is providing activities that are easy to understand and learn.	4.19	Positive Attitude
9	My teacher shows appreciation and provide feedback mechanism in our outputs and completed learning tasks.	4.37	Positive Attitude
10	I enjoy learning Araling Panlipunan because the teacher come to class prepared and equipped with knowledge and skills about the topic and in the online platform.	4.43	Positive Attitude
MEAN		4.19	Positive Attitude

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Table 3 shows the attitude of the learners in Araling Panlipunan in the online distance learning. An average mean of 4.19 reveals that Grade 7 learners in Araling Panlipunan have positive attitude towards the subject. The factors that affect the learners' positive attitude on the subject can be contributed the enjoyment brought by the technology and to the teachers' competence in the implementation of the online platform. Most of the learners' positive attitudes in the subject can be attributed to the fact that they belong to the Generation Z or they are digital natives. Teachers' style and delivery of the lesson maybe factors on the positive attitude of the learners as shown in the average scores in the indicators 6-10. This results clearly indicated that the positive attitude of the learners is greatly influenced by the teacher's way of teaching (Guanzon. 2015) and in the study of Ushida (2005) that states that teachers can be influential in affecting the students' motivations and attitudes. This is also consistent with the findings of Elfaki, et.al. (2019) that shows the positive attitude towards e-learning.

Research Question 2: What is the academic performance of the learners in Araling Panlipunan in an online distance learning?

Research question two sought to find out the academic performance of the respondents in the first grading period in the online distance learning.

Table 4. GWA of the Grade 7 Respondents:

Respondents	GWA (4 th Grading Period)
169 Respondents	90.47

Table 2 shows that the average of the 169 respondents is 90.47 which can be categorized under Advanced in the Levels of Proficiency. The student in this level exceeds the core requirements in terms of knowledge, skills and understanding. And can transfer them automatically and flexibly through authentic performance tasks. This is similar to the study of Calingacion, et al (2018) that the use of technology increases the performance level of the learners in Araling Panlipunan.

Research Question 3: Is there a significant relationship between the attitude and academic performance of the learners in Araling Panlipunan in an online distance learning?

Research question three sought to answer if there is a significant relationship between the attitude and academic performance of the learners in the online distance learning.

Table 5. Descriptive Statistics

	Mean	Std. Deviation	N
Attitude	4.1923	.63170	169
Academic Performance	90.4675	4.72460	169

Table 6. Correlations

		Attitude	Academic Performance
Attitude	Pearson Correlation	1	.043
	Sig. (2-tailed)		.582
	N	169	169
Academic Performance	Pearson Correlation	.043	1
	Sig. (2-tailed)	.582	
	N	169	169

$p < 0.05$

Table 6 shows that there was a negligible, positive correlation between attitude and academic performance, which was not statistically significant ($r = 0.043$, $N = 169$, $p < 0.05$). Positive attitude does not guarantee high academic performance. Since there was a minimal relation and was not statistically significant in the attitude and academic performance as shown in the table. This was contrary to the studies of Alpacion, et.al. (2014), Panganiban, et.al.,(2019) and Calisang (2017) which show that there is a significant relationship between attitude and their academic performance.

CONCLUSIONS

Global pandemic brings changes in the educational system. School year 2020-2021, new normal is widely used to describe the sudden shift of our educational system into implementing different learning modalities like online distance learning. Based on the findings, the following were concluded:

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1. Learners in the online learning modality have positive attitude towards the subject Araling Panlipunan and factors affecting are the technology and the teachers' competence and teaching styles.

2. Many of the learners in the online distance learning have a high academic performance. They can easily transfer or apply their knowledge, skills, understanding on the subject to their everyday living.

3. There is a negligible, positive correlation between attitude and academic performance. This implied that positive attitude in the subject Araling Panlipunan does not mean that they will have high academic performance. This may be an interesting note which indicates that learners are still adjusting to the new type of teaching.

RECOMMENDATIONS

Based on the conclusions drawn, the following were recommended:

1. Online teachers in the subject Araling Panlipunan should be consistent in implementing varied teaching activities and utilize different online applications to make the lessons interesting and provide new learning experiences for the learners.

2. Araling Panlipunan online teachers should contextualized and localized lessons for the learners to easily apply the teachings of the subject in their real-life scenarios. Integrate technology and activities that will enhance the learners critical and creative thinking skills.

3. Online teachers in the subject Araling Panlipunan should sustain the positive attitude of the learners for a higher academic performance. Teachers may provide orientation for the learners to be familiarize with different applications and programs online.

4. Further research should be conducted in other learning modalities implemented.

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The Effect of Image, Service Quality, and Reputation on Customer Satisfaction And Loyalty: A Study in Bpjs for Employment at the Yogyakarta Branch Office



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ABSTRACT: This study was conducted to determine the effect of image, service quality, and reputation on customer satisfaction and loyalty. The method used was the Structural Equation Modeling analysis which incorporated qualitative methods. The data were obtained from questionnaire results taken from 268 respondents of BPJS for Employment participants. The results of this study generally indicate four points. First, the image of BPJS for Employment positively affects service quality, reputation, and customer satisfaction. Second, service quality positively affects consumer satisfaction and the reputation of BPJS for Employment. Third, customer satisfaction positively affects reputation and consumer loyalty. Fourth, BPJS for Employment's reputation positively affects customer loyalty.

KEYWORDS: image, service quality, reputation, customer loyalty satisfaction, BPJS for Employment.

INTRODUCTION

National development in the workforce sector is intended to achieve the ideals and goals of the Indonesian nation. It aims to create a fair and prosperous society based on Pancasila and the 1945 Constitution. In this case, apart from natural resources, human resource factors have an important role in the development and progress of the country, one of which is the workforce (Tunggal, 2014). In the implementation of national development, the workforce has a very important role and position as actors and development targets. Thus, they are required to participate and play an active role with entrepreneurs to improve and raise the nation's standard of living by increasing production and work productivity (Hendrik, 2020).

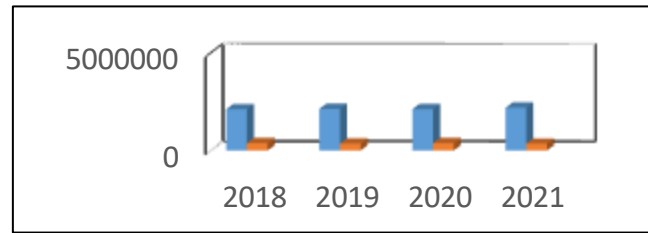
The Social Security Implementer Agency, hereinafter abbreviated as BPJS, is a legal entity established to administer the health insurance program (Kemenkes-RI, 2015). BPJS consists of BPJS for Health and BPJS for Employment. As part of the Central Java & DIY Regional Office, BPJS for Employment at the Yogyakarta Branch Office is the organizer of social security for employees in the city of Yogyakarta. The following is the membership growth of BPJS for Employment at the Yogyakarta Branch Office.

Table 1. Membership Growth of BPJS for Employment at the Yogyakarta Branch Office

YEAR	PU	BPU	JAKON	TOTAL
2018	247.455	22.103	109.245	378.803
2019	266.197	24.08	62.787	353.064
2020	281.197	22.659	78.873	382.729
2021 (AGUSTUS)	267.769	13.144	71.123	352.036

Based on table 1 above, the membership growth of BPJS for Employment at the Yogyakarta Branch Office in 2018 was 378,803 people. In 2019, there were 353,064 people. In 2020, it reached as many as 382,729 people. From 2021 to August, the membership growth reached as many as 352,036 people. Meanwhile, the comparison of the participation rate of BPJS for Employment and the working population in the Special Region of Yogyakarta Province are contrasted in the following graph:

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Graph 1. The participation rate of BPJS for Employment Contrasted with the Working Population in the Special Region of Yogyakarta Province

In doing business activities, a company generally must pay attention to customer orientation which deals with what a company must do to satisfy the customers. By paying more attention to these aspects, the company's goals will ultimately be achieved. Customers are the key to the company's success. In the world of business, especially those engaged in the service sector, satisfaction is the dominant and decisive factor in maintaining and developing the company. Failures in satisfying customers will make a company faces more complex problems from the impact of bad-mouthing. Generally, dissatisfied customers will share their bad experiences with 11 other people (Keller, 2014).

Several factors can affect customer satisfaction and loyalty. These factors consist of image, service quality, and reputation. Several studies, such as research on the effect of commitment to loyalty and research on the effect of image on loyalty, conclude that image simultaneously has a significant influence on loyalty (Nifita, 2019). Research on the effect of service quality and company reputation on customer loyalty shows that partially service quality influences customer loyalty (Fahlepi, 2018). Based on this notion, research entitled *The Effect of Image, Service Quality, and Reputation on Customer Satisfaction and Loyalty: A Study in BPJS for Employment at Yogyakarta Branch Office* was conducted.

THEORETICAL APPROACH AND LITERATURE REVIEW

Loyalty

Loyalty is customer behavior in repurchasing and how customers express the products they use and other behaviors that describe customer reactions to products that have been used or felt (Griffin, 2005). Based on this understanding, it can be concluded that loyalty is a sense of faithfulness. Customer loyalty cannot be bought and forced. It is obtained through satisfaction received over time and effort. Loyalty is not generated by money. It is because loyalty cannot be traded and it comes from the bottom of the heart that occurs due to the satisfaction received and felt by the customer because very good services are experienced by them and it continues to be done without a time limit (Rahmayanti, 2013). Therefore, loyalty measurement indicators can be identified from several indicators regarding consumer behaviors. These indicators include conveying positive things to others, giving recommendations about the company's products to others, being eager to make repeated transactions, and not switching to similar companies.

Consumer Satisfaction

Consumer satisfaction is the extent to which the benefits of a product are perceived by what customers expect (Utami, 2019). Furthermore, Oliver explains that customer satisfaction is a part of marketing and plays an important role in the market. Consumer satisfaction is the level of a person's feelings after comparing the performance of the product he feels with his expectations. Consumer satisfaction or dissatisfaction is a response to the evaluation of the perceived discrepancy or disconfirmation between previous expectations and the actual perceived performance of the product after use (Keller, 2014). The indicators for measuring customer satisfaction can be identified from the indicators of satisfaction with service, expectations are met, and the level of satisfaction is high.

Image

Corporate image is the impression, feeling, and view of the public towards the company, the impression that is deliberately created from an object, person, or organization (Fakhrudin, 2020). Corporate image is an impression that is attached to the consumers' minds about the company, both in the quality of services or products provided or in the company's good reputation in the community (Priyadi, 2020). This ability can affect their perception of what is offered and will have an impact on customer buying behavior (Sofia, 2020). The indicators for measuring consumer satisfaction can be identified from the indicators of innovative institutions, established institutions, reliable institutions, business in an ethical way, openness in providing services, and responsiveness to consumers.

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Service Quality

Service is any action or activity that can be offered by one party to another, which is essentially intangible and does not result in the ownership of anything (Keller, 2014). Service quality is a measure of how well a service meets customer expectations (Fahlepi, 2018). The indicators for measuring customer satisfaction can be identified from the indicators of good service, superior service, and reliability.

Reputation

Reputation is a condition that makes a company able to put a high price on its products and makes it difficult for competitors to compete with the company (Ruslan, 2008). Companies can build various kinds of reputation, such as quality reputation, marketing reputation, product innovation reputation, and so on. A company's reputation will decline when it fails to meet market requirements (Kamilullah, 2018). The indicators for measuring customer satisfaction can be identified from indicators of well managed, good employees, and focus on customers.



Figure 1. Framework

EMPIRICAL REVIEW AND HYPOTHESIS DEVELOPMENT

Relationship between Image and Service Quality

Putra's research (2017) aimed to explain the effect of product innovation, price, brand image, and service quality on customer loyalty in the city of Denpasar. The results of the study proved that image is related to service quality. Improving the service quality to customers is mostly done by companies to maintain and improve the company image. Lai's research (2019) on hotels in Macau declared that image is related to service quality.

H1: Image positively affects service quality.

Relationship between Image and Satisfaction

Lestari (2017) stated that image affected customer satisfaction. It happened because when customers find it difficult to evaluate product quality, company image can be used as a benchmark for customer satisfaction. Lai's research (2019) on hotels in Macau declared that image is related to customer satisfaction.

H2: Image positively affects satisfaction.

Relationship between Service Quality and Customer Satisfaction

Service quality is a comparison between perceived service and expected service. The increasingly tough competition makes customers always look for the best. Consequently, the better the quality of services provided by the company, the higher the satisfaction perceived by consumers. This is supported by Kapuy's research (2019) which stated that Trustworthiness and Reputation have a significant effect on the customer satisfaction variable. Lai's research (2019) on hotels in Macau declared that service quality is related to the quality of customer satisfaction.

H3: Service quality positively affects customer satisfaction.

Relationship between Service Quality and Reputation

Research on the effect of service quality on company reputation stated that service quality had a positive effect on company reputation (Metha, 2017). Lai's research (2019) on hotels in Macau declared that service quality affects reputation.

H4: Service quality positively affects reputation.

Relationship Between Customer Satisfaction and Customer Loyalty

Research conducted by Hendrik (2020) identified the influence of company reputation and customer satisfaction on customer loyalty for Wardah products in the city of Padang. It stated that customer satisfaction has a positive effect on customer loyalty. Khasanah's research argued that customer satisfaction has a positive effect on customer loyalty (Khasanah, 2021). Lai's research (2019) on hotels in Macau revealed that customer satisfaction affects customer loyalty.

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H5: Customer satisfaction positively affects customer loyalty.

Research Method

In this study, the population included all participants in BPJS for Employment at Yogyakarta Branch. The sample was determined by the purposive sampling technique. The criteria of respondents are the registered participants of BPJS for Employment at the Yogyakarta Branch Office evidenced by a membership card. The samples used were 268 participants of BPJS for Employment at the Yogyakarta Branch. They were given a questionnaire that measured the variables in this study. Then, the results of the data would be analyzed using the Structural Equation Modeling (SEM) technique.

Structural Equation Model

To prove the hypotheses, this study used the calculation of Structural Equation Models (SEM) with AMOS 24 software. The development of the model in this study was based on the concept of data analysis. In general, this research model consisted of one exogenous variable and four endogenous variables. The exogenous variable in this study is the Institutional Image (II). The endogenous variables in this study are Service Quality (SQ), Customer Satisfaction (CS), Institutional Reputation (IR), and Customer Loyalty (CL).

Confirmatory Analysis

The confirmatory analysis was used to test concepts that were built using several measurable indicators. In the confirmatory analysis, the first seen was the loading factor value of each indicator. The loading factor can be used to measure the construct validity. By doing this, a questionnaire is declared valid if the survey questions can express variables measured by the questionnaire. According to Hair et al. (2010), the minimum number of factor loading is ≥ 0.5 or ideally ≥ 0.7 . If there is a value below 0.5, it will be removed from the analysis. Furthermore, a reliability test was carried out. The reliability coefficient ranges from 0 to 1 so the higher the coefficient (close to number 1), the more reliable the measuring device. A construct reliability is considered good if it has value > 0.7 and its extracted variance value > 0.5 (Yamin & Kurniawan, 2009). The validity and reliability of test results are shown in Table 2.

Table 2. Validity and Reliability Test Results

Variable	Indikator	Loading Factor	Loading Factor ²	λ_{ej}	CR	AVE
Institutional Image	II1	0,875	0,765625	0,234375	0,9334	0,700674833
	II2	0,845	0,714025	0,285975		
	II3	0,863	0,744769	0,255231		
	II4	0,755	0,570025	0,429975		
	II5	0,846	0,715716	0,284284		
	II6	0,833	0,693889	0,306111		
	α	5,017	4,204049	1,795951		
α^2	25,170289					
Service Quality	SQ1	0,862	0,743044	0,256956	0,92775	0,810764667
	SQ2	0,911	0,829921	0,170079		
	SQ3	0,927	0,859329	0,140671		
	α	2,7	2,432294	0,567706		
	α^2	7,29				
Customer Satisfaction	CS1	0,889	0,790321	0,209679	0,87849	0,707200667
	CS2	0,791	0,625681	0,374319		
	CS3	0,840	0,7056	0,2944		
	α	2,52	2,121602	0,878398		
	α^2	6,3504				
Institutional Reputation	IR1	0,886	0,784996	0,215004	0,9271	0,809212
	IR2	0,884	0,781456	0,218544		
	IR3	0,928	0,861184	0,138816		

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	ã	2,698	2,427636	0,572364		
	ã²	7,279204				
Customer Loyalty	CL1	0,900	0,81	0,19	0,93245	0,77546225
	CL2	0,897	0,804609	0,195391		
	CL3	0,886	0,784996	0,215004		
	CL4	0,838	0,702244	0,297756		
	ã	3,521	3,101849	0,898151		
	ã²	12,397441				

Based on Table 2, all indicators in this study already have a loading factor value of more than 0.5. The construct reliability of all variables has shown ≥ 0.7 . As for the Extracted Variance in this study, each variable also has a value of ≥ 0.5 . Thus, it can be concluded that the questionnaire used for this research is declared valid and reliable.

Furthermore, the compatibility of the confirmatory model was tested using the Goodness of Fit Index. Hair et al. (1998) divided the criteria for GOFI (Goodness of Fit Index) into 3 types. They include Absolute Fit Indices, Incremental Fit Indices, and Parsimony Fit Indices. These three types of GOFI have 25 criteria in total. However, according to Hair et al. (2010), Sem-AMOS analysis does not require the fulfillment of all criteria. Four to five criteria alone are sufficient as long as there are criteria representing each of the three types of GOFI. In this study, several criteria were taken from each type of GOFI namely Chisquare, Probability, RMSEA, and GFI representing Absolute Fit Indices, CFI and TLI representing incremental fit indices then PGFI and PNFI representing Parsimony Fit Indices.

Table 3. Initial GOF Test Results

Fit Index	Goodness of Fit	Criteria	Cut-off value	Description
Absolute Fit	Chisquare	Small	527,080	Not
	RMSEA	≤ 0.08	0,099	Not Fit
	GFI	≥ 0.90	0,809	Not Fit
Incremental Fit	NFI	≥ 0.90	0,910	Fit
	CFI	≥ 0.90	0,933	Fit
Parsimony Fit	ECVI	<ECVI Saturated	2,311	Not Fit
	CMIN/DF	< 2	3,635	Not Fit

By observing the results of the Goodness of Fit test in Table 3, five criteria are found as not fit. Therefore, to increase the GOF value, modification of the model needs to be made. This modification has to refer to the modification index table by providing a covariance relationship or eliminating indicators that have a high MI (Modification Index) value. After modification, the results show that the value of Goodness of Fit has fulfilled all criteria so that the model in this study can be declared to be fit as in Table 3.

Table 4. Final GOF Test Results

Fit Index	Goodness of Fit	Criteria	Cut-off value	Description
Absolute Fit	Chisquare	Small	206,434	Fit
	RMSEA	≤ 0.08	0,056	Fit
	GFI	≥ 0.90	0,926	Fit
Incremental Fit	NFI	≥ 0.90	0,965	Fit
	CFI	≥ 0.90	0,984	Fit
Parsimony Fit	ECVI	<ECVI Saturated	1,350	Fit
	CMIN/DF	< 2	1,827	Fit

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RESULTS AND DISCUSSION

Hypothesis Test

The next analysis is a full model of structural equation model (SEM) analysis to test the hypotheses developed in this study. The results of the regression weight test in this study are shown in Figure 2.

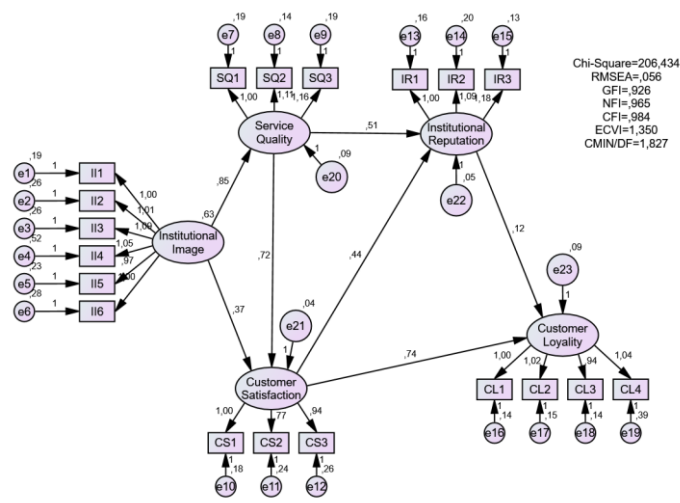


Figure 2. Full Model Path Diagram

Table 4. The Results of the Regression Weight Hypothesis Test

			Estimate	S.E.	C.R.	P	Label
SQ	<---	II	,849	,054	15,655	***	par_14
CS	<---	II	,371	,102	3,631	***	par_15
CS	<---	SQ	,721	,114	6,335	***	par_16
IR	<---	SQ	,509	,220	2,311	,021	par_17
IR	<---	CS	,436	,196	2,225	,026	par_18
CL	<---	CS	,741	,140	5,285	***	par_19
CL	<---	IR	,123	,148	,830	,406	par_20

If the test results show a CR value above 1.96 and the probability value (P) is below 0.05/5%, the proposed research hypothesis is declared accepted. From the table of the results of the hypothesis test, the results of this study are stated as follows:

1. II has a positive and significant effect on SQ. This result is shown by a positive estimate value of 0.849, a t-statistic value above 1.96 namely 15.655, and a P-value below 0.05 namely 0.000. Thus, H1 in this study is supported.
2. II has a positive and significant effect on CS. It can be seen by a positive estimate value of 0.371, a t-statistic value above 1.96 namely 3.631, and a P-value below 0.05 which is 0,000. Considering these values, the H2 in this study is supported.
3. SQ has a positive and significant effect on CS. This result is proven by a positive estimate value of 0.721, a t-statistic value above 1.96 which is 6.335, and a P-value below 0.05 namely 0,000. So, the H3 in this study is supported.
4. SQ has a positive and significant effect on Ir. This result can be seen by a positive estimate value of 0.509, the t-statistic value above 1.96 which is 2.311, and a P-value below 0.05 namely 0.021. Thus, the H4 in this study is supported.
5. CS has a positive and significant effect on Ir. This result is proven by a positive estimate value of 0.436, a t-statistic value above 1.96 which is 2.225, and a P-value below 0.05 which is 0.026. Hence, the H5 in this study is supported
6. CS has a positive and significant effect on Cl. It is evidenced by a positive estimate value of 0.741, a t-statistic value above 1.96 which is 5.285, and a P-value below 0.05 which is 0,000. Thus, the H6 in this study is supported.
7. AE has a positive and not significant effect on NB. It is shown by a positive estimate value of 0.123, a t-statistic value below 1.96 which is 0.830, and a P-value above 0.05 namely 0.406. Thus, the H7 in this study is not supported.

Mediation Test

The mediation test is seen from the significance of the Sobel Test. The results of the Sobel Test analysis are stated as follows:

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Table 5. The Results of the Sobel Test

Hypothesis	Statistic Test:	Std. Error:	P-value:
H8	5,86760589	0,10432347	0,00
H9	0,77852187	0,06888438	0,4362614

By observing Table 5, it can be concluded that

H8: SQ mediates II and CS

Based on the results of the Sobel Test, the relationship value between KRE and NB mediated by AE has a significance value of 0.000 and below 0.05. Hence, it can be concluded that SQ significantly mediates the relationship between II and CS. So, the H8 in this study is supported.

H9: IR mediates CS and CL

Based on the results of the Sobel Test, the relationship value between KRE and NB mediated by AE has a significance value of 0.436 and above 0.05. Thus, it can be concluded that SQ does not significantly mediate the relationship between II and CS. Hence, the H9 in this study is not supported.

IMPLICATION

Relationship Between Image and Service Quality

Based on the research results, there is a positive influence between image and service quality. This result is in accordance with the study conducted by Putra (2017). His study stated that image has a positive relationship and influences service quality. The service quality variable is measured by indicators of good, reliable, and superior service. Reliable service shows that the institution can provide targeted services. This relates to one of the indicators of the institution's image, namely an institution that can be relied on. This is in accordance with the service principle provided by BPJS for Employment. As a public service institution, conducting targeted services must be prioritized. The services provided by BPJS for Employment will build an image that the institution is good and reliable in solving a problem.

Relationship Between Image and Satisfaction

Based on the results of the study, there is a positive influence between image and satisfaction. It is corresponding with the results of Lestari's research (2017) which stated that image affects customer satisfaction. A good image shows that there is customer satisfaction with the company. Regarding BPJS for Employment, one of the images that keeps being built is the openness in providing services and the responsiveness to consumers. Providing excellent service is one of the priorities that must be met. BPJS for Employment as a public service institution must prioritize services that can be precisely received by the target. Conducting this service will lead to satisfaction for customers. Satisfaction with the services experienced by customers will make them have a good view and impression of BPJS for Employment.

Relationship Between Service Quality and Customer Satisfaction

Based on the results of this study, there is a positive influence between service quality and customer satisfaction. This is supported by research conducted by Utami (2019) and Risal (2019). They concluded that there is an effect of service quality on consumer satisfaction. The quality of service can be measured by reliable service. In providing services, BPJS for Employment uses the right-target principle. This means that the services provided to customers are compatible with customers' needs. This is related to one of the indicators of customer satisfaction, namely satisfaction with service. This satisfaction appears due to the quality of service provided by BPJS for Employment which meets customers' needs.

Relationship Between Service Quality and Reputation

Based on the results of the study, there is a positive influence between service quality and reputation. It is identical to Metha's research (2017) which stated that service quality has a positive effect on a company's reputation. The quality of service can be measured by reliable service. BPJS for Employment uses the right-target principle in providing its services. It means the service experienced by the customer is compatible with the customer's needs. It relates to one of the indicators of reputation, namely the institution is well managed. Delivering services that meet the customers' needs requires good service management. This management shows a good reputation or public perception of BPJS for Employment.

Relationship Between Customer Satisfaction and Reputation

Based on the results of the study, there is a positive influence between satisfaction and reputation. This is in accordance with Hendrik's research (2020) proving that the company's reputation gives a positive and significant effect on customer satisfaction.

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Customer satisfaction can be measured by indicators of satisfaction with services. As an institution that provides public services, BPJS for Employment must prioritize good service for its customers. Delivering good service affects indicators of the company's reputation which is well managed and focused on customers. Delivering good service shows that the focus of the company's performance is on customers being well served. The provision of this service also requires good management in terms of human resources, facilities and infrastructure, and so on.

Relationship Between Customer Satisfaction and Customer Loyalty

Based on the results of the study, there is a positive influence between satisfaction and loyalty. This idea is synonymous with Khasanah's research which concluded that customer satisfaction has a positive effect on customer loyalty (Khasanah, 2021). Customer satisfaction can be measured by indicators of expectations being met. BPJS Employment has services that are engaged in public services. This requires prioritizing targeted services. The needs of the customer must be mapped properly. This is related to one of the indicators of customer loyalty, namely the willingness to make the transaction. Assuring customers' expectations makes them willing to transact at BPJS. Furthermore, if customers' expectations are met, there are recommendations and trust to continue using the services provided by BPJS for Employment.

CONCLUSION

Research conclusions from this study are stated as follows: partially 1) the image of BPJS for Employment positively affects service quality, reputation, and customer satisfaction; 2) service quality positively affects consumer satisfaction, and the reputation of BPJS for Employment 3) customer satisfaction positively affects reputation and consumer loyalty; 4) BPJS for Employment reputation positively affects customer loyalty.

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Evaluation of Psycho-Emotional Disorder and Quality of Life in Patients with Duodenal Ulcer after Triple Therapy



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ABSTRACT: this study consists in a detailed analysis of the psycho-emotional disorder (level of anxiety and depression), quality of life (physical, social and psychological components) and clinical (objective data and scarring stages) indicators of patients with duodenal ulcer in dynamics after the use of three-component therapy, including drugs such as Famotidine and Sulpiride.

KEY WORDS: peptic ulcer, psycho-emotional disorder, hospital anxiety and depression scale, quality of life.

RELEVANCE

Duodenal ulcer (DU) is the most common pathology of the gastrointestinal tract (GIT), and in modern gastroenterology, the choice of adequate treatment regimens is one of the most urgent problems. [3] DU is a disease of multifactorial genesis, however, at present, in the etiopathogenesis of the disease, great importance is attached to the acid-peptic factor and the infectious agent in 100% of cases [4]. Everyone knows the postulate of K. Schwartz (1910) that "There is no ulcer without acid" and therefore the modern strategy for the treatment of DU is aimed primarily at suppressing the secretion of hydrochloric acid, neutralizing it, and protecting the mucous membrane from the effects of aggressive factors.

Since in 1823 r. William Prout established the main component of gastric juice, various methods were proposed to neutralize hydrochloric acid. At the beginning, antacids were developed, later - anticholinergic drugs (non-selective), and in 1976 the first histamine H₂-receptor blocker cimetidine was used for the first time, which opened a new era in gastroenterology in the treatment of DU, gastroesophageal reflux disease, chronic pancreatitis. Since several generations of histamine H₂ receptor blockers have appeared, one of the latest is famotidine.

It is known that the life of a modern person is characterized by frequent and often constant nervous stress. Each human body adapts to emerging situations in its own way: in some cases, changing the attitude to emotionally significant events, in others - through a complex mental processing of emotions that directs the flow of excitations to visceral organs with the formation of functional deviations, true somatic diseases or emotionally affective states. (neurosis, depression). At the same time, the choice of the target organ is very wide [1, 3, 8], however, in this report, we will focus only on the pathology of the digestive organs, since in the pathogenesis of diseases such as DU, gastric ulcer (PU) [2] are involved in the greatest degree of psychosomatic and vegetative influences, since the motor function of the stomach and intestines is controlled primarily by the autonomic nervous system [2]. This is also evidenced by diagnostically significant changes in segmental autonomic tone in patients with PU [7].

In connection with the above, in the treatment of PUD, psychotropic therapy is used [1, 6, 8], most often with tricyclic antidepressants (amitriptyline) [1, 8]. In recent years, among the drugs that have a psychopharmacological effect, the atypical antipsychotic sulpiride has been distinguished. Its main feature is the almost complete absence of extrapyramidal side effects. That is why it is recommended for the treatment of the entire spectrum of psychosomatic diseases, various forms of depressive syndrome, neurosis, including biopsychosocial diseases of the digestive system. The problem of studying the quality of life (QoL) of patients with PU is given little attention. WHO experts believe that it is especially important to study QoL in chronic diseases that require long-term treatment. It is in these situations that the patient needs to assess changes in his physical, mental and social status, so the study of QoL is relevant.

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The aim of our research work was to improve the psycho-emotional disorder and quality of life in patients with duodenal ulcer by improving the quality of pathogenetic therapy of psychovegetative-dependent diseases of the digestive system.

Objective of the study: to evaluate the clinical efficacy of the use of the drug "Sulpiride" in the complex of three-component therapy for DU, the first component of which was the drug "Famotidine" .

MATERIAL AND RESEARCH METHODS

The study involved 65 patients with DU, aged 18 to 68 years, with a disease duration of 1 to 10 years. Of these, 39 men and 26 women. Examination and treatment were carried out upon admission to the hospital in the stage of exacerbation of DU. Upon admission, all patients underwent anamnesis of life and disease, analysis of clinical symptoms of the disease, biochemical blood tests, coprogram and fecal occult blood analysis, chest X-ray, ECG, abdominal ultrasound. To assess the quality of life of patients, the "Short Questionnaire of WHO to assess the quality of life" was used. At the same time, the psycho-emotional state was assessed using the Hospital Anxiety and Depression Scale (HADS).

According to modern data [4] H. pylori is detected in more than 90% of patients with DU and therefore the definition in patients of the examined group did not seem appropriate. Verification of the diagnosis and the rate of scarring of the ulcer were determined according to the results of esophagogastroduodenoscopy (EGDFS) performed according to the usual method. Long-term DU was detected in 64% of patients, late-onset DU in 36% of patients. The largest sizes of ulcers (less than 0.5 cm) were registered in 16% of patients, medium sizes (0.5-1.0 cm) - in 64%, large (1.1 - 3 cm) - in 20% of patients.

All patients with PUD were divided into two into 2 groups. The 1st (main) group included 33 patients who, along with standard antiulcer therapy, received proslupin at a dose of 200 mg per day for 2 weeks. The 2nd (control) group included 32 people who received only standard antiulcer therapy. All patients were prescribed a three-component therapy, the first component of which was the drug Famotidine at a dose of 20 mg 2 times a day and in group 2 in combination with the drug Sulpirid at a dose of 200 mg per day for 2 weeks. The effectiveness of treatment and symptoms were analyzed on days 1, 10, 20 after taking the drug.

RESEARCH RESULTS

The leading complaints when contacting the clinic in both groups of patients were pain in the epigastric region, heartburn, nausea, belching, and flatulence. In 75% of patients, pain was localized in the epigastric region. Irradiation of pain was noted in 46% of patients, of which 61% - in the back and lower back, 23% - in the right hypochondrium, 13% - in the region of the heart. 71% of patients characterized pain sensations as insignificant and average intensity. In 82% of patients, a combination of pain and dyspeptic syndromes was noted. In the study of the quality of life in all patients, deviations in physical and psychological well-being were found (Fig. No.1). As well as self-perception, micro-social support and social well-being are extremely unfavorable.

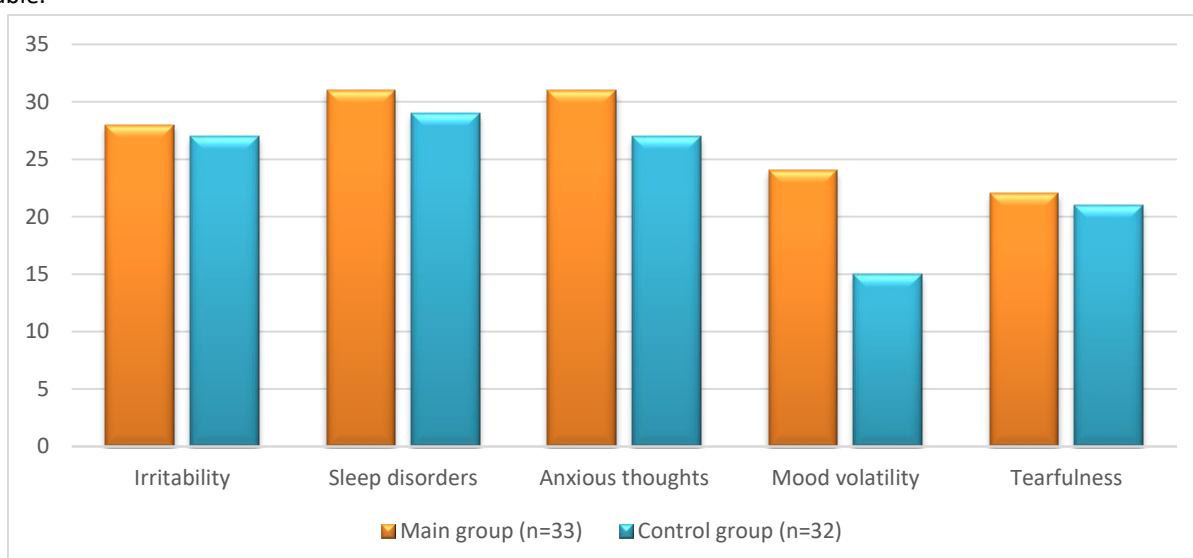


Figure 1. Index of subjective data of patients in both groups.

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According to subjective complaints, the psycho-emotional state of the patients was relatively equal (1:1,5). At the same time, complaints such as irritability (84%), sleep disturbance (94%) and anxious thoughts (93%) were observed to a greater extent in both groups.

For a more detailed analysis of the psychological sphere, we used the HADS psychodiagnostic method (Fig. No.2, 3), which also served as a criterion for evaluating the applied psychopharmacotherapy in the main group.

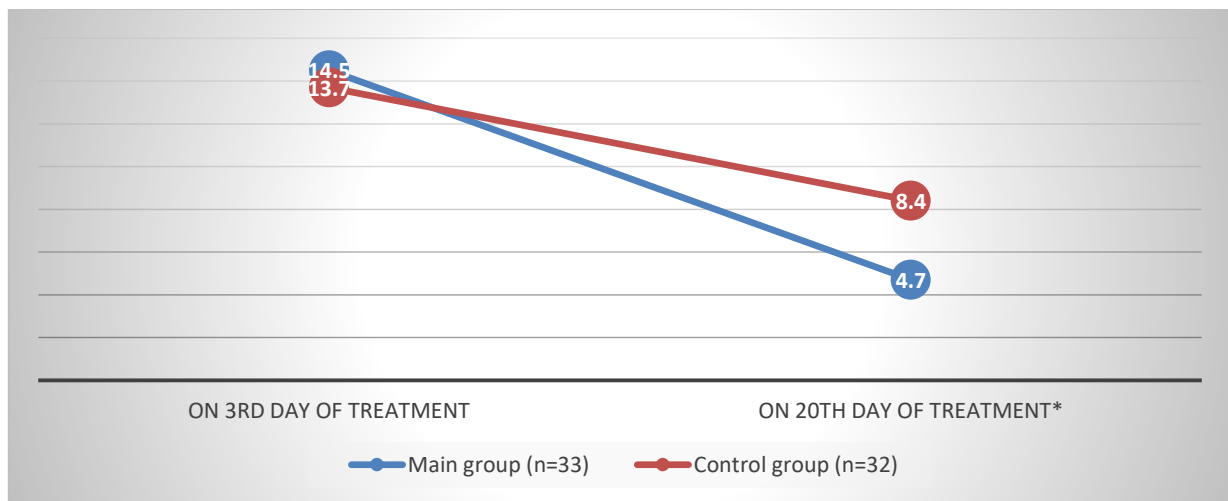
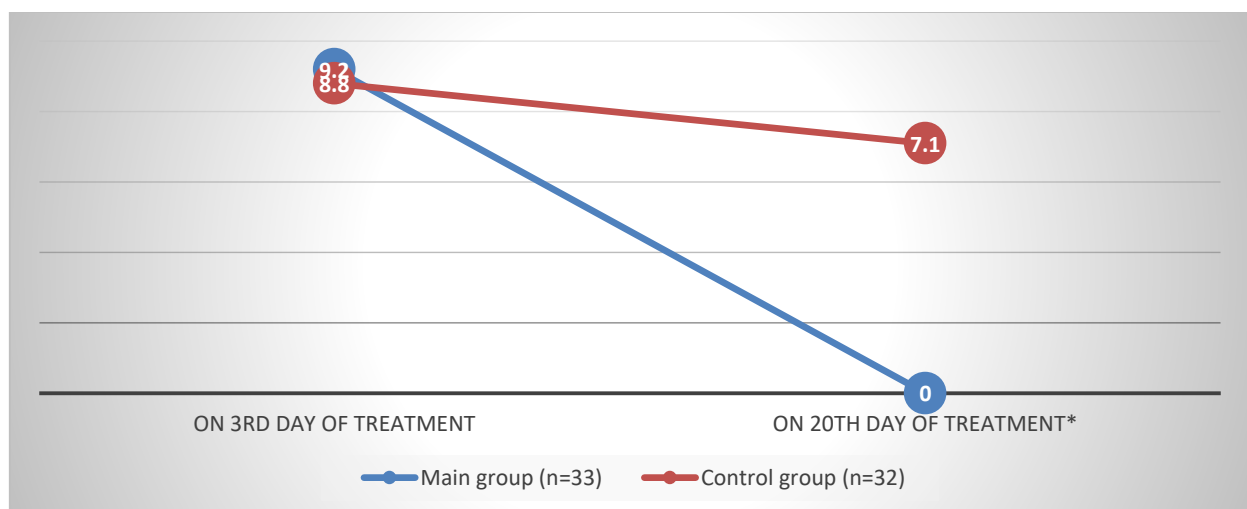


Figure No.2 Comparative analysis of the HADS anxiety score in both groups



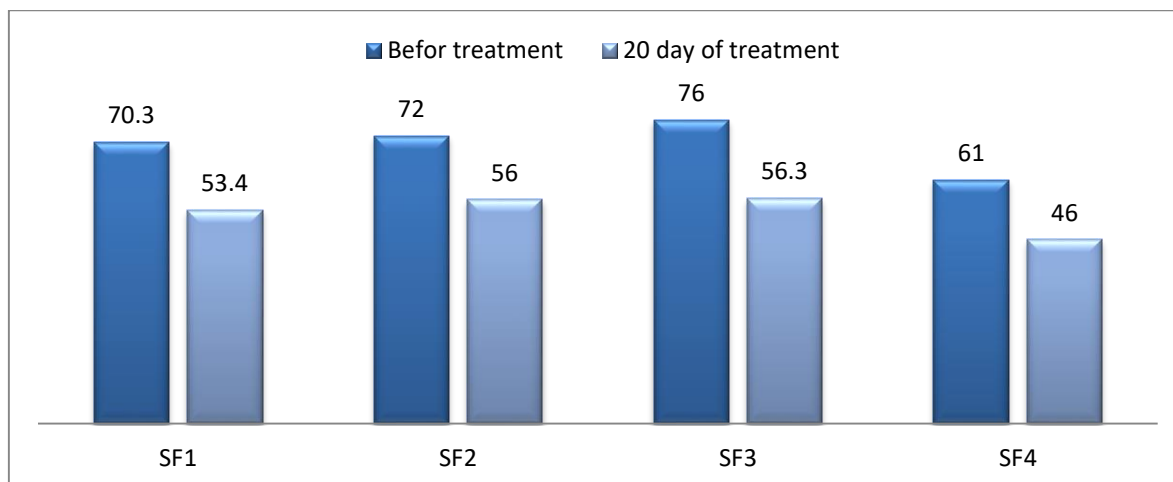
*error rate ≤ 0.03

Figure No.3 Comparative analysis of the HADS depression score in both groups

According to the data obtained, it follows that in the main group, the indicators of anxiety and depression significantly decrease on the 20th day after treatment to 4.6, which is the norm. However, these indicators do not show a downward trend in the control group. In this connection, it can be concluded that the drug Sulpirid effectively improves the psycho-emotional state of patients with DU.

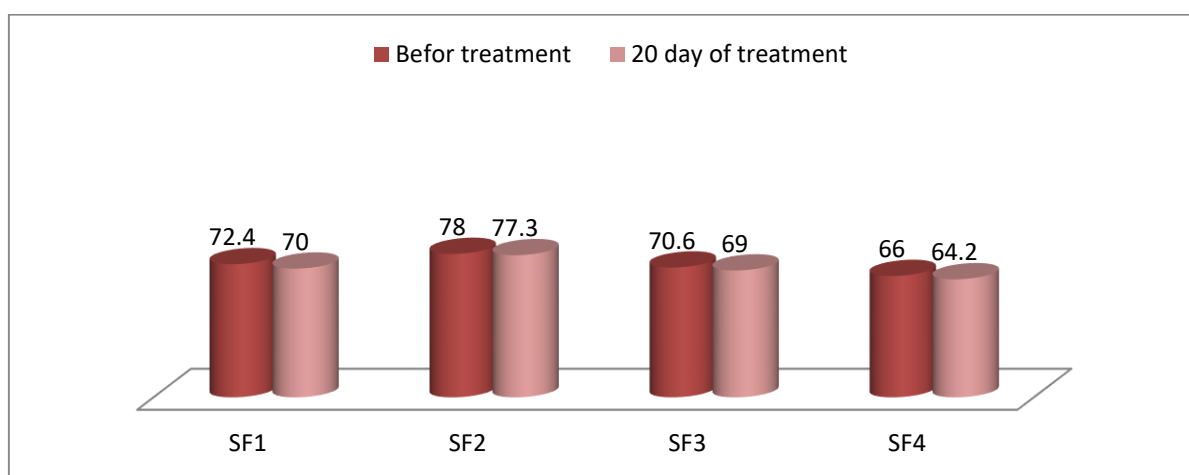
In dynamics, the analysis of subjective data showed that in 33 patients (67.7%) a decrease in pain was noted already on the 2nd day when using triple therapy, the first component of which was the drug famotidine, and in the remaining patients on the 4th and 5th -th day. Complete relief of pain on the 5th day was noted in 31 patients (88.6%) of DU and in 5 patients the pain syndrome disappeared on the 7th day of triple therapy in both groups. In the main group, who received triple therapy and sulpiride, there was a significant increase in the quality of life, compared with the control group, where the quality of life indicators remained unchanged (Fig. No.4, 5).

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SF1 – physical sphere; SF2 - psychological sphere; SF3 - social sphere; SF4 - environment. ($p \geq 0.05$)

Figure 4. Quality of life indicator in dynamics in the main group



SF1 – physical sphere; SF2 - psychological sphere; SF3 - social sphere; SF4 - environment. ($p \geq 0.05$)

Figure 5. Quality of life indicator in dynamics in the control group

A slight increase in the quality of life in the control group was observed due to the use of three component therapy for DU.

In addition, the most informative in assessing the effectiveness of the ongoing complex treatment were the data of endoscopic examination, so the rate of scarring of the ulcer in patients with DU, who additionally received sulpiride, was 0.0625 ± 0.0018 cm²/day, and in the control group - only 0.0312 ± 0.0035 cm²/day ($t=8$). Thus, the rate of scarring of the ulcer in the main group increased twice as compared to the control group.

CONCLUSION

Studies have shown that the use of Sulpiride at a dose of 200 mg / day in the complex therapy of DU, the first component of which is Famotidine at a dose of 40 mg per day, is advisable to use in all patients with DU with deviated self-perception, psycho-emotional disorder and social well-being.

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Principles of Development of Uzbek Folk Applied Decorative Art



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ABSTRACT: The article analyzes the principles of development of Uzbek folk arts and crafts ganch carving, ceramics, carpet weaving, doppi embroidery, artistic embroidery, and textiles.

The wonderful works of folk decorative art created in the territory of our country have not only reached us, but also their production traditions have been passed down from generation to generation and developed by skilled craftsmen. The wood, plaster and marble carvings, embroidered pottery, colorful textiles and embroidery, national costumes, jewelry, which have been preserved so far, have a general character and reflect the specifics of each region.

KEYWORDS: Uzbek folk arts and crafts, ganch carving, ceramics, carpet weaving, doppi embroidery, artistic embroidery, textiles

INTRODUCTION

Remarkable works have been created in the field of fine arts on the territory of Uzbekistan since the time of primitive society. Primitive rock paintings found in many parts of the country amaze with their beauty, colorfulness and realism.

Wonderful works of folk arts and crafts created on the territory of our country have not only come down to us, but the traditions of their production have been passed down from generation to generation and developed by skilled craftsmen. Wood, plaster and marble carvings, embroidered ceramics, colorful textiles and embroidery, national costumes, and decorations that have survived to this day are of a general nature and reflect the specifics of each region.

Applied decorative art has been formed over the centuries as an integral part of the everyday life of the representatives of each region, embodying its national characteristics. But while the industries that have come down to us have retained their production style and great art, they have changed considerably in content and form.

Nowadays, ganch carving is one of the most popular arts. The ancient **ganch carvings** found in historical monuments are mostly volumetric and distinguished by realistic images. The ganch is thickly plastered on the walls, columns, and ceilings, and the pattern image is drawn directly on the ganch itself.

If ancient ganch carving is characterized by almost three-dimensional realistic meaning and ornamental motifs, in the Middle Ages there are luxurious ornaments with deep carvings, mainly in plant and geometric shapes.

THE MAIN FINDINGS AND RESULTS

By the turn of the century, the art of pottery began to spread architectural patterns made of fine relief, delicate and colorful flat background. Nowadays, in architecture, there is an attempt to combine ganch carving with more ornate colored flowers and paintings. Therefore, most of the masters were not only sculptors, but also masters of painting. In addition to ganch, they also know how to make and paint various cornices, columns and brackets, grilles and other details used in construction.

The artistic style of pottery from Uzbek **handicrafts** has been formed for a long time, and in some districts the originality of the types and patterns of dishes is preserved. The patterns on the dishes are mostly done in **kalami, chizma** or **harroji** style, sometimes they are used together.

In recent years, **carpet weaving** has a long historical tradition, especially from the fields of applied arts, which have been revived and developed. Carpet and sholcha weaving, according to archeological data, has come down to us from the 1st millennium BC. Uzbek carpets and rugs decorated with lush flowers are available in eight or nine colors, the most common of which are dark and light red.

According to researchers, there are three main schools of carpet weaving in Uzbekistan: Samarkand, Andijan and

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Khorezm.

The carpet will have a variety of textures, stitches and prints. Uzbek carpets are mainly woven. They are made of camel's hair, sheep's wool, cotton fiber and silk by women seamstresses on a low simple loom set up indoors.

Until the end of the last century, plant dyes were used in carpet weaving, and now chemically prepared aniline dyes are used.

Doppi embroidery is the pride of the Uzbek people. Tashkent, Chust, Samarkand, Boysun, Shakhrisabz doppias are popular in Uzbekistan and are decorated with unique patterns. The national types of doppi are mainly iroki, chust doppi, carpet doppi, chakma bur, red flower, piltadozi, zardoppi. In the following years, new content patterns appear in doppi sewing. For example, great embroiderers sewed and sold skullcaps with patterns, names and numbers, such as "canal", "airplane", "parachute", "dove". Of all the arts, **goldsmithing** has a great reputation and respect. Such intoxicating works of art have been sung and talked about a lot in the distant past.

By the beginning of the century, unique gold embroidery schools were established in Bukhara, Samarkand, Fergana and other places.

There are two types of gold embroidery: the general background is completely **embroidered** - the floor is embroidered and placed on a special thick paper cloth with a flower (pattern), the overall dice are woven on the picture - **embroidery**.

Embroidery is mainly decorated with traditional floral ornaments, but in the modern spirit there are also patterns such as stars, cotton flowers. At the same time, skilled craftsmen have created large thematic panels.

One of the most important applied arts that has survived to our time is artistic **embroidery and textiles**. Such handicrafts are well developed in Margilan, Bukhara, Samarkand, Karshi, Kitab, Khiva, Tashkent.

Art embroidery has long been a favorite profession among Uzbeks. There is almost no family that does not know the profession of embroidery. There are many traditional types of Uzbek embroidery.

Beautiful works of art created by skilled Uzbek embroiderers, such as suzana, zardevor, gulkorpa, sheets, have become permanent exhibits in museums of foreign countries such as Germany, USA, Belgium and India.

Hand-knitted and machine-knitted suzani are very floral, made by chain embroidery or kergi chamberak method. Suzanas are mainly woven in large cities, but in some regions unique styles and patterns have been created. Sewing machine embroidery is now practiced by many masters, whose products are embroidered in a new sense, even with landscape and architectural patterns.

Uzbek **weavers** weave two types of artistic fabrics: cotton and semi-silk striped fabrics and colorful silk fabrics. The most common of these are the silk-based **beqasam**, woven from cotton yarn on the back, an old Fergana pattern of purple, a mixture of green and white, and partly a dark red and yellow fabric. Blue and dark green beqasam are widespread in Fergana and Tashkent.

Khanatlas, which is still the most popular of colored silk fabrics, has a great reputation not only in Uzbekistan, but also in Central Asia and other countries. Its decorations were constantly changing and enriching. In the following years, the beauty and variety of the atlas became so rich that it was difficult to separate some of its copies. Khanatlas created different patterns of fabrics in a certain content, depending on the demand of the textile period. But on the basis of all the patterns, we discover a unique beauty, woven from a mixture of different plant elements, geometric ornaments, dark red and blue-green, yellow and white. In Bukhara and Surkhandarya regions, mainly dark green and white-yellow satin with a red pattern is preferred. At present, Uzbek masters produce many new types of satin, such as chess satin, peacock pattern, as well as canvas-type silk fabrics.

These created national fabrics are widely used by modern clothing designers in creating their collections. Clothing collections made of national fabrics created in our country are presented in the world's largest fashion houses, gaining the recognition of industry professionals and art lovers.

Skilled designers Diara Usmanova and Madina Kasymbaeva in their new collection, called SAADI x SUZANI, created a modern interpretation of suzana embroidery on fabrics in a completely new direction.

In the spring-summer 2022 collection, the LALI brand presented a unique interpretation of modern urban fashion and urban style, which is gaining a new look in the youth fashion of Central Asian megacities. The seriousness of the urban style is met with a revolt of ethnic embroidery and eco-friendly fabrics.

Masters of the Tashkent fashion house LALI tried to cross the past with the future on the basis of ancient techniques of Uzbek embroidery: the word and the cut of historical oriental clothes.

Designer Dildora Kosimova also uses up-to-date and inexhaustible silk, adras, chit, chiffon and gray fabrics in each season. In her recent work, she has created a wonderful collection of women's clothing in Margilan silk and adras fabric.

The traditional elements of embroidery, chitgar, which is a type of Uzbek applied art, belong to the collections of L.

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Boboeva and L. Sayfi.

In the works of L. Boboeva, familiar fabrics take on a new look. In creating her collections, she opened up a wonderful world of Uzbek traditional silk fabrics and was one of the first designers to use them extensively in the creation of clothing models. Lola Boboeva is constantly innovating, for example, models made of beqasam are based on the national costume technique, which is characterized by its completeness and elegance. Lola skillfully combines traditions with modern styles in modern fashion.

CONCLUSION

In short, it can be said that the Uzbek people have created the most wonderful, unique and unique examples of our applied cultural art with its multifaceted and rich traditions, which have been developing in all directions for a long time.

The rapid development and continuous improvement of the Uzbek national decorative art is reflected in the legendary combination of plaster, tile, painting, calligraphy, stone carving, embroidery and other types of our world-famous architectural monuments.

At present, this traditional art is enriched with new types and areas. It is especially noteworthy that in addition to the decoration of applied art, the booming growth of fine arts, which is expressed in new content and forms. The transition of our country to independence and the path to independence allows us to rise to a new level of development and achieve greater results not only in folk arts, but also in all fields of art, including fine arts.

The spiritual culture of the great state of the future will also be great.

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Industrial Fishing in Obolo (Andoni), 1970-2020



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ABSTRACT: The paper explores the impact of industrial fishing on the Obolo (Andoni) people. The Obolo people sometime called Andoni are among the various ethnic groups found in the Niger Delta region precisely, the Eastern Niger Delta. Presently the Obolo speaking people are found in two local government areas, namely; Andoni local government, administered by the Rivers State government, while the Eastern Obolo Local Government is in Akwa Ibom State. Traditionally, fishing is the main occupation of the people. Other occupations of the people include, commerce, farming and marine transportation. The Obolo people are artisanal fishermen and women who engaged in fishing in the creeks, rivers and later in the open sea (Atlantic Ocean). The emergent of industrial or mechanized fishing which probably began in Nigeria in the 1950s has led to an increase in both Nigerian and foreign fishing trawler vessels; which ultimately led to what is described in fishery as “by-catch” and “discard”. Ukpatu (2012:3) defines the “by-catch” as anything the fishermen does not intend to catch namely; sea turtle, fish, crabs, shrimps, sharks, weed and sea debris; while “discard referred to the sub-set of the by-catch or portion of the catch that is thrown over into the sea, Andoni Forum, USA (2004:1). The by-catch is a new trend in fishing among the Obolo in particular and the coastal communities in general. The new trend is described in Obolo language as “Kpokpoben” meaning “don’t select” or “just carry” or “trawler”. The Kpokpoben provides employment, food, boast economic activities of the people of the coastal communities. In spite of what seem to be the advantages, its adverse effects include, depletion in natural fish stock, damage to fishing gears, loss of lives and property. Other adverse effects are increase in sea piracy and water pollution. The study recommends among others, the review / overhaul of the fishery laws in Nigeria, equipping the Nigerian Navy with modern security gadgets and mounting an enlightenment campaign in English and Local languages to create an awareness on the adverse effects of the kpokpoben on the Andoni environment

INTRODUCTION

The Obolo inhabit the extreme corner of the Eastern Niger-Delta region of Nigeria. The territory has between the Bonny river to the west, Bonny to the South west, Ogoni to the North west, Ibibio to the northeast, Cross River to the east and the Atlantic Ocean to the South. Andoni Forum in (2004:2). The Obolo territory is divided by the estuary of the Imo River to the Atlantic Ocean into Eastern and Western Obolo (Andoni). The Obolo settlement stretched originally from the estuary of the Cross River to Inyong Okpon / Nyamkpo – the precursor of Finima and Bonny today. As a littoral community, her predominant occupation is fishing, salt making (in precolonial) trading and marine transportation. The Obolo people are famous creeks/rivers fishermen and women. They also engage in open sea fishing, usually in groups of five or more. Many of the fishermen now use outboard engines.

Our area of study, politically comprised the two local government areas of Obolo speaking people administered by Rivers State and Akwa Ibom State respectively. These local government areas are, Andoni local government with its headquarters at Okoroete administered by the Akwa Ibom State government. They speak the same language “Obolo”.

It is not certain when mechanized fishing began in Nigeria. It may have started in the 1950s. The emergence of industrial fishing has tremendous effects on the artisanal Obolo fishermen and women. The industrial fishing has increased “the-catch” and “discard” with its implications on the Obolo environment. Despite what seem to be an economic advantages of industrial fishing on the people, the trend if not check may adversely affect the people in no distant time.

FISHING IN OBOLO (ANDONI)

Obolo is geographically located in the Eastern Niger Delta, presently in the South-South geopolitical zone of Nigeria. Naturally the people’s occupation are affected by the area in which they live. The environment is vast and congenial network of creeks, waterways and myriads of mangrove clad dictate their occupation. The people derived their main livelihood in farming, trading and marine transportation. Fishing activity in the area could be divided into two, namely; traditional or subsistence and

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commercial. Ama-Ogbari (2009:20) classifies fishing in the Niger Delta into three-subistence or domestic, pond and extensive commercial fishing. The Obolo do not engage in pond fishing but rather in subsistence and later commercial fishing.

Traditional fishing was an age-long economic activity and occupation of many people in the Niger Delta Ama ogbari (2009:20) including the Obolo people. The Obolo adopted various traditional fishing method which include, "Edek" "Aloru" "Ugbu" and "Oket". The first two were restricted to the men folk while Ugbu involved both men and women and "Oket" specifically restricted to the women.

The materials used for making traditional fishing gear include raffia bamboo and locally produced ropes. The method of fishing was the damming of the creeks and this was common among the women. The "Aloru" fishing trap were common among the men and was done in the rivers – like Imo and Andoni. Ama Ogbari (2009:20) describes the damming of the creek as "screening method". According to him, this involve the construction of fences along the mudflats to trap the fishes at the ebb tide. Some of the fishing activity was done at the fishing camps/settlement locally called "Elekpon" or "Okwaan Mbon". Canoes and paddles were bought from Nembe, Opuoko (Ogoni) and Oron for fishing.

The coming of Europeans, in the nineteenth and twentieth centuries revolutionized fishing in Obolo. Nets of different sorts and outboard engines were introduced. Modern methods of fishing were adopted and commercial fishing was also practiced. Offshore fishing was embarked upon, while the traditional method is still in use. The various fishing gears introduced include, cast net, drift net, gill net, encircling net, spear, hook and drag nets. All these were used/and are still in use by the Obolo fishermen.

FISH PRESERVATION AND DISTRIBUTION

The Obolo (Andoni) like their coastal neighbours evolved various methods of fish preservation. The preservation methods depends on the fishes involved. In homes and fishing settlements, the smoke-drying techniques are used. Small fishes were smoked on a mat-like structure called in Obolo language "Ngada" or "Odidu", made from raffia palm/palm front, and nypa palm. The fishes are arranged on it and placed on the fire altar to smoke-dry. For the larger fishes, they are either cut into two or more pieces depending on the size, stick sharpened at the end threaded through the fish eyes and placed on the fire altar. However, smaller fishes like tilapia are arranged on what is called in Obolo language "akasi" (racket) and place on the fire altar.

Other methods include, sun-dried especially crayfish, and salting. The salting was usually applied to fishes, the people want to use for cooking soup or other delicacies or give as gift to neighbours, inlaws, relations and friends. Roasting was another method. The fishes were roasted for either immediate use or for cooking, or for later use. Also, electric oven has been introduced of recent, for drying fishes. Of recent cool room/refrigerators of various sizes have been built in several fishing pools powered by generator / solar. These are found at Oyorokoto fishing settlement, Down Bilo, and Elekpon Okoroete.

In terms of distribution, fishes caught were sold locally or fish traders travelled in hand paddled canoes from fishing settlement to fishing settlement selling and reselling fishes and other items. The dried fish were taken to markets in the hinterland-like kaa, (Ogoni), Egwenga (now Ikot Abasi) Ukam, Ete (all in Akwa Ibom) Aba and Port Harcourt.

HISTORY OF INDUSTRIAL FISHING IN NIGERIA

There may be no records of when industrial fishing started in Niigeira. Etim, Belhabib and Pauly traced the history of industrial fishing to the 1950s and classified Nigerian marine fisheries into coastal small-scale (artisanal and subsistence) on-shore and off-shore (distant water). The coastal small-scale fishery refers to the artisanal fishermen who operates within five nautical miles from the coastline and also within the creeks/rivers / lagoons. It is labour intensive and not for commercial purposes. Many Obolo are in the group of the artisanal fishing.

On the other hand, the industrial fishing is commercial. It is capital intensive and utilise large fishing vessels with in-board engine and mechanically operated wrenches, Etim et al 2016. Over the years, there has been an increase in the number of trawler vessels operated by– both Nigeria and foreign fishermen in the Nigerian territorial water.

Between 1950 and 2010, over three hundred and sixty-two (362) trawlers have operated Nigeria; Ukpatu (2012) put the number at one hundred and seventy-three (172) and as of November 2009. It is instructive to note that there are conflicting figures on the number of fishing trawler, licensed by the Federal Department of Fisheries to trawl in the Nigerian waters. However, one thing is certain that industrial fishing started in Europe, spread to Africa (Nigeria inclusive) .

In Nigeria, most of the trawlers are owned by Nigerians; for instance, the IBRU and GLOBE fisheries, while others are owned by foreign firms. There are also foreign fishing vessels illegally operating in the Nigerian waters. The British Broadcasting Cooperation (BBC); "Focus on Africa", Wednesday 29 June, 2015 reported that there are illegal fishing activities in the West African Territorial waters by foreign trawlers from China and Korea. These fishing trawlers though have created employment and revenue to the owners and government, their activities have also encouraged illegal trade in the coastal communities.

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THE EMERGENCE OF KPOKPOBEN

The 1970 and 1980s witnessed a new trend in fishing among the Obolo people known as “Kpokpoben” in Obolo language. The researcher described this trend as “fishing without fishing- gear”. As earlier mentioned, the increase in fishing trawlers in the Nigerian waters has led to an increase in by-catch. These by-catch which is untargeted or accidental catch are supposed to be thrown back to the sea according to the fisheries regulation. The ones that are not dead will go and reproduce. The trawler crew selected fin fishes and crabs above 3cm and 10cm respectively at sea for their own use and instead of throwing the by-catch into the sea, decide to exchange it with food stuff, tobacco, Indian hemp and local gin (Ogogoro). Ememugwem (2009:140) describes the by-catch as rotten fishes and attributed it as one of the causes of water pollution.

Initially, the by-catch were given free to the local fishermen in the early 1970s. But as the demand for it increases, the crew decided to ice the by-catch for sell to the local fishermen. Local sources state that the Obolo fishermen started the business in the 1970s and by the 1980s made good fortune from it.

Between 1980 and 2000, the business become very popular, lucrative, and was joined by people from Ibeno and Mbo. Among the Ibeno and Mbo, it is known as “trawler”. The Obolo people started the business with local canoe without outboard engine, later used outboard engines ranging from fifteen horse power to seventy-five horse power. With larger boat constructed with planks by carpenters, high horse power of outboard engines are used.

Sigismund says that to embarked on Kpokpoben business, will require between 1 million and 1.5million naira as of 2022, that is excluding the cost of the boat engine, personnel and other materials.

The following centres were known for this business in Obolo environment: Inyong Ile, Oyorokoto, Muma, Down bilo (all in Andoni local government area in Rivers State); Elekpon Okwaan Obolo, Ogbogbo uti, Agansa, Okoroinyong and Amazaba, (in Eastern Obolo local government in Akwa Ibom State). Some of these settlements were fishing ports. Outside Obolo environment; Ibeno, Mbo and Utawa (all in Akwa Ibom State). The business has grown to a point where the trawler crew no longer accept cash but encourage prospective buyers who now make payment through the banks and present the tellers or print out for the transaction.

SOCIO-ECONOMIC IMPACT

In spite of the growing emphasis on the production of food crops, fishing remains the major economic activity among the Obolo people and other coastal communities. The advent of industrial fishing in Nigeria had both positive and negative impact on the Obolo people in the Eastern Niger Delta region of Southern Nigeria.

On the positive side, industrial fishing by-catch creates employment for the Obolo people especially the youth. Many youths are involved in the Kpokpoben business though there is no statistical figure to that effect. Going by the fact that each canoe or boat is made up of at least four people, when multiplied by about hundred boats involved, that is about four hundred people, in addition to the women who are involved in buying and selling. There are many youths, men and women who also engaging in clearing and drying the fishes.

In addition, some women are engaged in what is known in Obolo language as “akasi” (racket) making for drying the fishes. Those selling planks equally enjoy patronage as these planks are used for building local boats for the Kpokpoben business. Carpenters from the area and Oron are engaged in the building of the boat. To build a boat, one needs between forty and fifty planks of about 1.75 metres each.

Furthermore, Kpokponben serves as a source of food as fish provides proteins. Ukpatu (2012:2) says that the fish provides sustainable remedy to animal protein deficiency for local people. Though Ememugwem (2009:140) describes the Kpokpoben fishes as rotten and small in size, that was at the early stage of the business, because now the trawler crews iced the fishes before selling them. The trawler crews have gone further to provide ice blocks to the prospective buyers to help preserve the by-catch. Currently, most of the fishes consumed in the coastal and urban areas are Kpokpoben. Other coastal communities have also joined the business because of the profit involved.

In addition, there is an influx of people from hinterland to the Obolo community as a result of the business – Kpokpoben. These include the Igbo, Ilaje (Yoruba from Ondo), Hausa and foreigners – Ghananians, Togolese and Sierra Leonians. The Igbo traders for instance, who migrated into the Obolo area have provided credit assistance for some of the Kpokpoben businessmen to enable them build the boat, buy outboard engines and even cash to support their business. These migrants have also established shops and mechanic workshops in the area.

Again, the influx of migrants into the area have led to cultural diffusion as some marriages have been contracted between the Obolo and some of the migrants. The Ghanaian and Sierra Leonian cloth and clothing have been introduced into the area and other coastal communities. The Obolo people have also imbibe/the Igbo and Yoruba music.

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Also, people are enrolled into cooperative societies to enable them obtain credit facilities for their business from commercial banks. The culture of saving money have been imbibed by the people. Apart from saving money, the various cooperative societies have contributed to the formation of town-unions and social clubs.

The marine transporters are not left out of the business, as they convey traders and artisans from one fishing settlement to another. They also convey traders and other people to various markets within the coastal areas and urban markets at Port Harcourt and Ikot Abasi through the waterways.

Conversely, industrial fishing has contributed to the decline or depletion in fish stock. The inshore industrial fishery operates from about five nautical miles of the coast to the edge of the continental shelf. The artisanal fishermen are affected because these trawlers have encroached into the areas of the artisanal fishing. The fishery laws in Nigerian spells out the limits of operations of trawlers but they have violated the stipulated guidelines. As Calvert (2010; 228-238) puts it, trawlers deplete even the inshore stocks that are only barriers to famine for many coastal folks. This is true because of the method of fishing adopted by these fishing companies – hauling huge trawl nets, sometimes twenty miles long, and this threaten the livelihood of the local fishermen. These fishing companies for instance, hauling huge trawl nets of various sizes resulting in more catch for them (trawlers) and less catch for the local fishermen. The Obolo fishermen like their counterparts in the coastal communities in Lagos, Ondo, Delta, Bayelsa and Cross River States are affected by industrial fishing as aforementioned.

It is instructive to note that both Nigerian and foreign trawlers trawling the Nigerian territorial waters employ modern technology to fish which also results in over fishing and increase by-catch. They trawl for about twenty-two hours in a day and don't adhere to the prescribed gears for trawling.

Another adverse effect is drainage done to the fishing equipment/ gears and canoes of the local fishermen. Sometimes these trawlers will over run the canoes of the local fishermen resulting in canoes mishap, loss of lives and fishing gears. Enemugwem (2009:140) says that on weekly basis, two or three out of five persons in speed boats lost their lives while trying to buy from trawlers. In some cases, the whole five persons will lose their lives. For instance, Chief Isaac Mboh from Okoronboko in Andoni local government area of Rivers State and Elder Clifford Atairet from Okoroete in Eastern Obolo local government area of Akwa Ibom State, in a separate oral interviews narrated their ordeals with two fishing companies stationed at Port Harcourt, the Rivers State capital. They sued the Globe Fishing company to court in Port Harcourt and Calabar respectively for damage done to their boats/fishing gears, and lost their suits probably due to their inability to secure a good lawyer. The aforementioned case is one out of a hundred. The local fishermen alleged intimidation and harassment from both Nigerian and foreign trawlers. For example, some of the trawlers, sometimes threatened them (local fishermen) with guns, when the latter complained of damage done to their fishing gears.

The industrial fishing has stimulated crimes especially sea piracy. The upsurge in activities of sea pirate in Obolo area may be attributed to Kpokpoben business. The Obolo territory was not known to be infected by sea pirate but now it is a den of pirates. Pirates have made the Kpokpoben businessmen and trawler crews (both local and foreign) their target. Sea pirates attack and rob the Kpokpoben businessmen of money and other belongings and where money is not available, collect their fuel/fuel tanks, and outboard engines. For the foreign trawlers, foreign currencies, fish, food items, arm and ammunitions are their target. Same goes with the Nigerian trawlers.

Sea pirates have extended their activities to the creeks in the area. In October 2016, pirates killed two Yoruba fishermen at Agansa, a fishing settlement in Eastern Obolo local government in Akwa Ibom State. The story is the same at other fishing camps – like Oyorokoto, Down bilo, Ogbogbo uti, Utawa in Ikot Abasi, Ibeno and Mbo all in Akwa Ibom State. Sea pirate activities in the area is also a threat to foreign investors especially shipping companies. There is also an increase in teenage pregnancy and HIV in the area as a result of influx of migrants. This has resulted in high mortality rate among children and adults who could not assess HIV treatment.

Apart from sea piracy, there are threats to marine biodiversity and ecosystem as the sub-set of the unutilised by-catch are thrown into the sea. This has contributed to water pollution which is dangerous to human health. Also, used plastic water bottles, canned drinks, plastic bags, water proof, cigarette packets by the trawler crews are usually emptied into the sea and this also is a source of water pollution. This may be responsible for environmental diseases suffered by the people.

The trawler crews by selling by-catch and other fishes meant for export by their companies to the fish mongers, have not only robbed their companies of the revenue but also starve the government of the needed fund for development. According to Nte (now a village head of Emeroke 1), a former accountant with one of the fishing companies in Port Harcourt, "the trawler crew, bribe their way so that they could be sent on board especially deckhand workers; and attribute the retrenchment of workers in the fishing companies to the illegal activities of the trawler crew who were in the habit of selling fish and shrimps to fish mongers at sea.

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Moreso, effective planning for the fishery sector may be hindered for lack of data and adequate information. Accurate and authentic catch may not be known by the Federal Department of Fishery (FDF).

CONCLUSION

It is obvious that industrial fishing (by-catch) had created employment, provide food (protein) and boost the economic activities of the Obolo people in the coastal region of the Eastern Niger Delta in Nigeria. Other advantages include, formation of cooperative societies, reduce youth restiveness and crime.

On the contrary, the adverse effect on the people is enormous. These are depletion of natural fish stock as a result of the use of under-sized nets by both local and foreign trawlers. This increase by-catch and reduce the catch of the artisanal fishermen.

Again, it increases sea pirate activities in the area, which has crippled economic activities on our waterways and may discouraged investors from coming to the area and by implication the Niger Delta region. Therefore, the people's hope lies in government overhauling the fishery laws, increase naval patrol to arrest and bring to book, those involve in the Kpokpoben business, pirates and encourages the coastal people to establish fish farms.

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Histological study of Sweat gland in Cattle

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ABSTRACT: The depth of sweat gland of the skin in non-lactating cow at lateral surface was found higher in the present study and pregnant cow showed higher sweat gland length at dorsal aspect of the body. Whereas width was more in lactating cow. The sweat gland were tubule acinar glands. The secretory saccules were either oval or elongated in shape. The secretory portions were lined with flat cuboidal epithelial cells. These glands were located deeply in the dermis below the sebaceous glands. The secretory material was observed in the lumen of these glands. The sweat glands were lined by simple cuboidal epithelium with a oval nuclei.

KEY WORDS: Histology, Sweat gland, Cattle

INTRODUCTION

In the common domestic breeds the adequate data are not available in the literature. Hence, the present investigation has been made to study the histology of sweat glands.

MATERIALS AND METHODS

The experiment was conducted on 15 (fifteen) female cattle. The 15 cows were divided into following equal groups.

1. Lactating cows
2. Non lactating cows
3. Pregnant cows

The skin biopsy samples were collected at the site of Dorsal, lateral and ventral aspects at the level of the 7th rib.

The obtained skin sample was washed in normal saline solution to remove blood clots. The skin samples were immediately preserved on either of following fixatives.

Ten per cent formalin, ten per cent buffered neutral formalin, Bouin's fluid. After preservation small pieces of tissue were processed in the laboratory by adopting standard method of dehydration and clearing through ascending grades of Ethyl alcohol and xylene, respectively. The tissues were then embedded in the paraffin wax of melting point 56 to 58°C. The longitudinal and transverse sections of 5 to 6 microns thickness from the tissue were obtained on the glass slide by manually operated rotary microtome machine (Singh and Sulochana, 1997). Then the tissue sections were stained by following staining methods.

- a) Harrie's haematoxyline and eosin stain for general histology (Mukherjee, 1992).
- b) Van Gieson's stain for collagen fibers (Singh and Sulochana, 1997).
- c) Silver impregnation stain for Reticular fibers (Mukherjee, 1992).
- d) Verhoeff's stain for vesicular and elastic fibers (Mukherjee, 1992).
- e) Crossman's modification of Mallory's triple stain for collagen and Elastic fibers (Singh and Sulochana, 1997).
- f) Periodic acid Schiff (PAS) stain for carbohydrate like glycogen, reticulum and mucin (Mukherjee, 1992).

The stained sections were studied for various histological and histomorphological parameters of sweat glands. The measurements were taken from longitudinal and transverse sections under simple microscope.

The data collected was subjected to statistical analysis as per the standard procedures of Panse and Sukhatme (1967).

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RESULTS AND DISCUSSION

The sweat gland were tubule acinar glands. The secretary saccules were either oval or elongated in shape. The secretary portions were lined with flat cuboidal epithelial cells (Plate 1) . These glands were located deeply in the dermis below the sebaceous glands (Plate 2). The secretary material was observed in the lumen of these glands (Plate 2). The sweat glands were lined by simple cuboidal epithelium with a oval nuclei.

The myoepithelial cells were interposted between basement membrane and the tubular cells of the sweat gland. These cells formed basket like network around the secretary unit.

The sweat glands were found oval and rounded in lactating cows. In lactating cow, the sweat glands were densely arranged near to dermis as compared to non-lactating and pregnant cows.

The average depth of sweat glands of skin in pregnant cow was on the dorsal, lateral and ventral regions ranged from 624.16 to 993.56, 818.38 to 924.62 and 846.6 to 927.94 μm with a mean of 848 ± 26.70 , 878.14 ± 13.23 and 874.99 ± 13.97 μm , respectively. The average milk was 75 to 90 lit/30 days and fat per cent was 4.7. The density was decreased at the dorsal region and was higher in ventral region (Table 1).

The mean values of sweat gland length recorded at different body regions in cow ranged from 84.66 to 169.32, 116.2 to 132.8 and 107.90 to 124.50 μm , with a mean of 143.59 ± 7.6 , 123.34 ± 2.35 and 114.04 ± 1.6 μm at dorsal, lateral and ventral body regions, respectively (Table 2).

The mean values of sweat gland diameter in cow are presented in the table 7. The sweat gland diameter ranged from 12.92 to 121.78, 76.36 to 94.66 and 64.70 to 76.36 μm , with a mean of 112.38 ± 1.57 , 80.17 ± 0.9 and 69.21 ± 1.13 μm at dorsal, lateral and ventral body region, respectively.

In non-lactating cow the sweat gland was found tubular and coiled. The average depth of sweat glands of skin in cow was at the dorsal, lateral and ventral regions ranged from 727.08 to 946.20, 828.34 to 926.28 and 776.88 to 945.50 μm , with a mean of 872.99 ± 26.72 , 884.61 ± 13.25 and 841.88 ± 13.95 μm , respectively. The density decreased in the dorsal region and was higher in ventral region.

The mean values of sweat gland length recorded at different body regions of cow ranged from 205.80 to 239.04, 154.38 to 192.56 and 169.32 to 185.92 μm with a mean of 215.10 ± 7.4 , 164.67 ± 2.37 and 178.95 ± 1.5 μm at dorsal, lateral and ventral regions, respectively. The mean values of sweat gland diameter in cow are presented in the Table 3.

The sweat gland diameter ranged from 49.80 to 63.08, 56.44 to 63.08 and 46.48 to 58.10 μm with a mean of 56.10 ± 1.57 , 57.93 ± 0.8 and 51.29 ± 1.15 μm in dorsal, lateral and ventral body regions, respectively.

The sweat glands were bowl and gourd type in the pregnant cows. The average depth of sweat glands in cow at the dorsal, lateral and ventral regions ranged from 682.26 to 833.32, 750.32 to 896.40 μm and 813.40 to 932.92 μm with a mean 712.13 ± 26.73 , 822.29 ± 13.23 and $880.13, 13.95$ μm , respectively. The average milk yield was 75 to 90 lit/30 days and fat per cent was 4.7. The density was decreased at the dorsal region and found higher at ventral body region.

The mean values of sweat gland length recorded at different body regions in cow ranged from 232.40 to 249.00 μm , 195.88 to 29.16 and 174.30 to 184.26 μm with a mean of 239.87 ± 7.6 , 203.18 ± 2.39 and 180.61 ± 1.5 μm in dorsal, lateral and ventral regions, respectively.

The mean value of sweat gland diameter in cow was presented in the Table 7. The sweat gland diameter ranged from 81.34 to 89.64, 48.10 to 58.10 and 79.68 to 86.32 μm with a mean of 85.56 ± 1.59 , 52.94 ± 0.8 and 83.00 ± 1.13 μm at dorsal, lateral and ventral body region, respectively.

The mean values of sweat gland depth below the skin surface in cow was found somewhat similar as recorded by the Nay and Hayman (1956) and Govindaiah (1979) in Zebu and European cattle. Benjamin and Nair (1963) and Choudhary and Sabhu (1963) in Haryana crossbred, Patel (1984) in Kankrej crossbreds, and Bhayani *et al.* (1989) in kankrej cows.

The length of sweat glands recorded in cow was found lesser when compared with the reports of Findlay and Yang (1950) in Aryshire cattle, Chaudhary and Sadhu (1963) in Haryana cattle, Pan (1963) in Sahiwal cattle. Nay and Jenkinson (1964) in British dairy cattle. Amakiri (1974) in Friesian cattle, Patel (1984) in kankrej crossbreds and Bhayani *et al.* (1989) in kankrej cows. This variation found in length of sweat gland might be due to the breed difference.

The mean diameter of sweat gland in cow was found lesser when compared with the reports of Findlay and Yang (1950) in Aryshire cattle and Bhayani *et al.* (1989) in kankrej cows.

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Table 1: Showing the measurements of the depth of sweat gland

Region / group	Dorsal		Lateral		Ventral	
	Range	Mean+SE	Range	Mean+SE	Range	Mean+SE
Lactating (μm)	624.16-993.56	848.56 \pm 26.70c	818.38-924.62	878.14 \pm 13.23b	846.60-927.94	874.99 \pm 13.97b
Non-lactating (μm)	727.08-946.20	872.99 \pm 26.72a	828.34-926.28	884.61 \pm 13.25b	776.88-945.50	841.88 \pm 13.95
Pregnant (μm)	682.26-833.32	772.73 \pm 26.73b	750.32-896.40	822.29 \pm 13.23a	813.40-932.92	880.13 \pm 13.95
	Sig.		S1		S2	

S1 = significant at 1% level

Sig = significant at 1% level

S2 = significant at 1% level

Table 2: Showing the measurements of the length of sweat gland

Region / group	Dorsal		Lateral		Ventral	
	Range	Mean+SE	Range	Mean+SE	Range	Mean+SE
Lactating (μm)	84.66-169.32	143.59 \pm 7.6a	116.20-132.80	123.34 \pm 2.35a	107.90-124.50	114.04 \pm 1.6
Non-lactating (μm)	205.80-239.04	215.10 \pm 7.4b	154.38-192.56	164.67 \pm 2.36b	169.32-185.92	178.95 \pm 1.5
Pregnant (μm)	232.40-249.00	239.87 \pm 7.6c	195.88-209.16	203.18 \pm 2.39c	174.30-184.26	180.61 \pm 1.5
	Sig.		S1		S2	

S1 = significant at 1% level

Sig = significant at 1% level

S2 = significant at 1% level

Table 3: Showing the measurements of the width of sweat gland

Region / group	Dorsal		Lateral		Ventral	
	Range	Mean+SE	Range	Mean+SE	Range	Mean+SE
Lactating (μm)	12.92-121.78	112.38 \pm 1.57a	76.36-84.66	80.17 \pm 0.9a	64.70-76.36	69.21 \pm 1.13a
Non-lactating (μm)	49.80-63.08	56.10 \pm 1.57b	56.44-63.08	57.93 \pm 0.8b	46.48-58.10	51.29 \pm 1.15b
Pregnant (μm)	81.34-89.64	85.56 \pm 1.59c	48.10-58.10	52.94 \pm .8c	79.68-86.32	83.00 \pm 1.13
	Sig.		S1		S2	

S1 = significant at 1% level

Sig = significant at 1% level

S2 = significant at 1% lev

Histological study of Sweat gland in Cattle

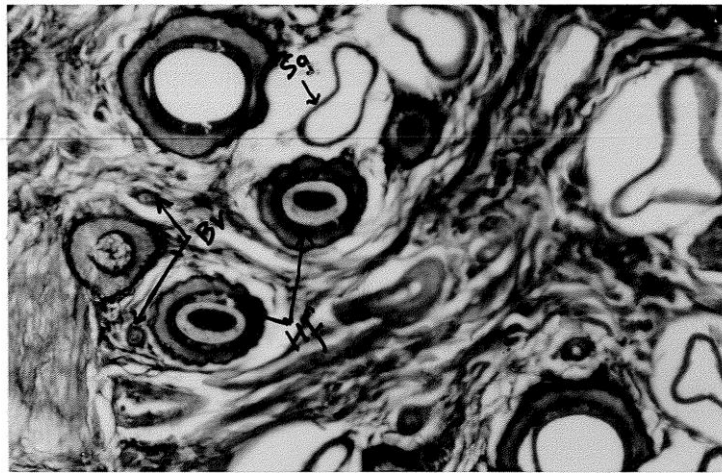


Plate 1: Microphotograph of transverse section of skin from lactating cow showing Sg – Sweat gland, Bv – Blood vessel, Hf – Hair follicle

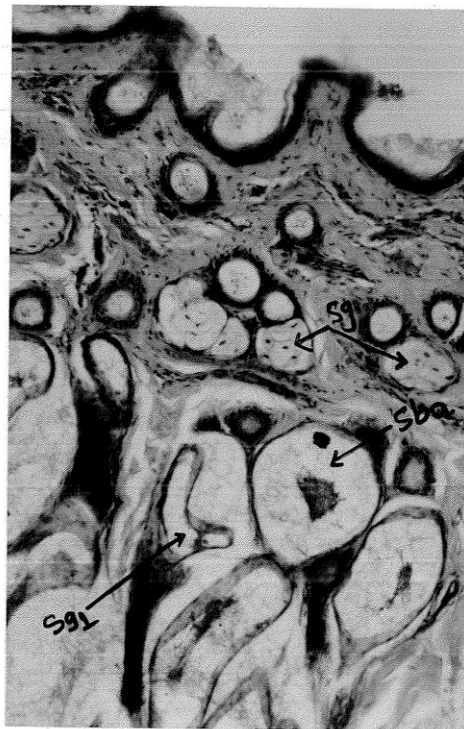


Plate 2: Microphotograph of transverse section of skin from lactating cow showing Sg – Sebaceous gland, Sba – Sweat gland activity, Sg1 – sweat gland (Haematoxylin and Eosin Stain, 100x)

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Mathematical Modeling of the Reliability of Ferromagnetic Current Converters with Adjustable Range for Traction Power Supply Devices



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ABSTRACT: The factors affecting the operational reliability of primary measuring transducers (PMT) developed on the basis of ferromagnetic current transducers with adjustable range (FMCT RD) are highlighted. An assessment and analysis of the system of basic quantitative indicators of reliability for each of the proposed three current converters, which differ in the principles of operation and the number of assembly units, is made. A maintenance and repair strategy is indicated, combined with the use of methods and tools of a modern diagnostic system that ensures the reliability of these converters, using a combination of three groups of stages: during design, during their operation and repair.

KEYWORDS: ferromagnetic current converters, operational reliability, assessment of point indicators of reliability, gamma resource, diagnostics, maintenance and repair strategy.

INTRODUCTION

The development of new, operation and improvement of existing systems of high-speed traction power supply requires a change in the methods of analysis and calculation of structural and parametric reliability, taking into account operating experience, a set of initial data of the results of the experiment, and the calculation of general reliability indicators, analysis of options for ensuring reliability, forecasting gamma resources, the end result of which is to provide optimal maintenance schedules for power supply facilities [1,2].

Research aimed at improving methods for improving the design, manufacture and operational reliability of technical facilities with enhanced functionality and dynamic range, as well as ensuring accuracy and reliability through the use of a new maintenance and repair system, combined with functional diagnostics for high-speed power supply facilities at the present time is important and relevant.

To ensure the principle of compliance with the operation process of the developed ferromagnetic current transducers with an adjustable range (FMCT AR) [3], used for systems of energy-intensive traction power supply systems, a systematic approach is required with a separate assessment of the reliability of each design, taking into account their operating principle.

The task is to analyze the options for ensuring reliability, taking into account the analysis of test results and the assessment of reliability indicators that allow objectively taking into account the experience of their operation, data of experiments, to justify their increased metrological and adjustment characteristics while significantly reducing material and financial costs.

THE MAIN FINDINGS AND RESULTS

Let us give examples of the calculation and comparative evaluation of the reliability indicators of the three ferromagnetic current converters proposed by us with an adjustable range [4,5,6].

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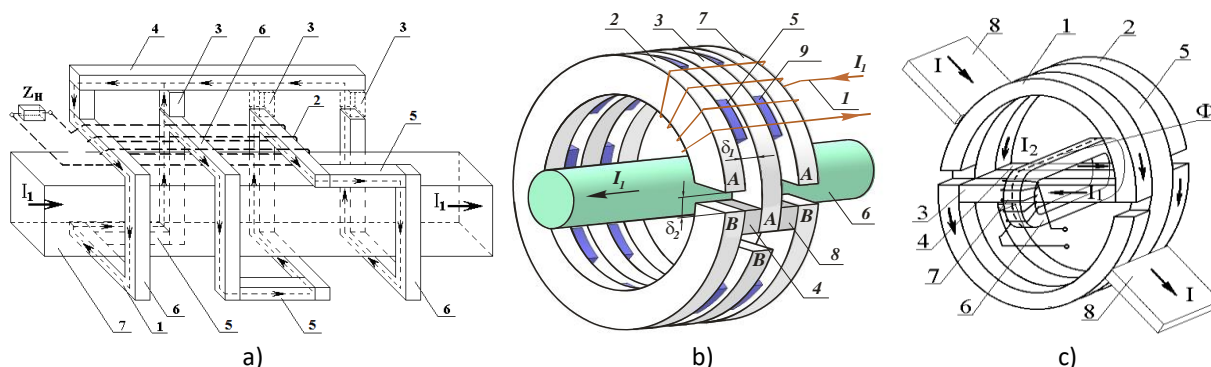


Fig.1. Designs of ferromagnetic current transducers with adjustable range

a) a device for non-contact measurement of currents; b) a device for converting direct current into alternating current; c) adjustable current transformer

Experimental studies on the calculation of reliability indicators and analysis of their results were carried out in agreement with the parent organization represented by the Power Supply Center "O'zbekiston temir yo'llari" during 2020-2021. In accordance with GOST 17510-72 and GOST 17509-72.

The observation plan is selected [N, U, T], where N is the number of installations, determined by the formula

$$\delta + 1 = \frac{2N}{\chi^2_{(1-\beta);2N}}; \delta - \text{relative error}; \chi^2_{(1-\beta);2N} - \text{quintile distribution of the number of } \chi - \text{chi squared at the number of degrees}$$

of freedom. N=50 FMCT AR were placed under observation; T - observation time. After the failure, the current transducers were not replaced with new ones. Total testing time $T_0 = 200 \times 10^3$ hour During the specified time of testing, the winding insulation, their input and output terminals failed, the working positions of the converters changed. The output voltage readings were corrected taking into account the mathematical expectations $M[u(t)]$ and the dispersion $D[u(t)]$.

In total, failures of elements of the PMT were observed. FMCT AR was made according to the scheme No. 1, No. 2 and No. 3, respectively, of the first and second types. The developments on the assembly units of the converters are given in the table №1.

Table No. 1

Operating hours of the converter according to scheme No. 1, hour	80;82;94;98;101;140,3;142;170,4;181,7;	$\sum t_i = 1472$
Operating hours of the converter according to schemes No. 2,3, hour	51;78;93;101;103;111;121;127;130;131;132;148;151;157;163;171;174;178;180;182;193;195;197	$\sum t_i = 3267$

Considering that the time to failure is subject to the exponential law of distribution of failures in the insulation of the PMT windings, we will determine according to GOST 17509-72 [7,8] separately for the assembly elements of the FMCT AR according to the scheme of Fig. 1. T_{mt} - Mean time to failure; $P(t)$ -probability of no-failure operation att = 400×10^3 hour; failure rate " λ " and gamma resources for $\gamma = 90$.

Let us find an estimate of the distribution parameter $\hat{\lambda}_1$. Since for the exponential law " λ "= λ =const, we will determine the failure rate calculated according to Table 9, given in accordance with GOST 175-72 [7], for the plan [N, U, T]:

$$\hat{\lambda}_1 = \frac{d}{\sum_{i=1}^d t_i + (N-d)T_0} = \frac{2}{1472 + (50-2) \cdot 200 \cdot 10^3} = 0,21 \cdot 10^{-6} \text{ 1/hour}$$

Let's define two-sided confidence limits for " λ " with confidence probability $\beta=0.9$. For the plan [N, U, T] according to Table 1 of Appendix 1 to GOST 17509-72 we have:

Calculation of the lower bound:

$$\lambda_{1H} = \frac{\hat{\lambda}NT\chi^2_{\frac{1+\beta}{2},2d}}{d\left(2N-d+\frac{1}{2}\chi^2_{\frac{1-\beta}{2},2d}\right)} = \frac{0,21 \times 10^{-6} \cdot 50 \cdot 54,5}{2\left(2 \cdot 50 - 2 + \frac{1}{2} \cdot 5,45\right)} = 0,105 \cdot 10^{-6} \text{ 1/hour,}$$

along the upper border:

$$\hat{\lambda}_{1B} = \frac{\hat{\lambda}NT\chi^2_{\frac{1+\beta}{2},2d}}{d\left(2N-d+\frac{1}{2}\chi^2_{\frac{1+\beta}{2},2d}\right)} = \frac{0,21 \cdot 10^{-6} \times 50 \times 15,7}{2\left(2 \cdot 50 - 2 + \frac{1}{2} \cdot 15,7\right)} = 0,780 \cdot 10^{-6} \text{ 1/hour,}$$

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where values are $\chi^2_{\frac{1-\beta}{2}, 2d} = 5,45$ и $\chi^2_{\frac{1+\beta}{2}, 2d} = 15,7$ Are found according to the tables [10]. distribution quintiles χ squared.

The calculated values of the lower and upper limits of the distribution parameter, respectively $\widehat{\lambda}_{1H} = 0,105 \cdot 10^{-6}$ and $\widehat{\lambda}_{1B} = 0,780 \cdot 10^{-6} 1/\text{hour}$, with a probability of 0.9 on the interval $(0,105 \cdot 10^{-6}; 0,780 \cdot 10^{-6} 1/\text{hour})$ cover the true values of the parameter $\widehat{\lambda}$.

Calculation of a point estimate of the mean time to failure (according to table 8): $T_{1m} = \frac{1}{\widehat{\lambda}} = \frac{1}{0,21 \cdot 10^{-6}} = 4,760 \cdot 10^6$ hour.

Lower and Upper Confidence Limits for Mean Time to Failure:

$$T_{1m.d} = \frac{1}{\widehat{\lambda}_B} = \frac{1}{0,780 \cdot 10^{-6}} = 1,28 \cdot 10^6 \text{ hour};$$

$$T_{1m.t} = \frac{1}{\widehat{\lambda}_H} = \frac{1}{0,105 \cdot 10^{-6}} = 9,52 \cdot 10^6 \text{ hour}.$$

Let us determine the probability of failure-free operation of 1-FMCT $t = 400 \cdot 10^3$ hour according to table No. 8 GOST 17509-72:

$$P(t)_B = e^{-\widehat{\lambda}t} = e^{-0,21 \times 10^{-6} \cdot 400 \cdot 10^3} = 0,919.$$

Bilateral confidence limits for $P(t)$ can be determined using the found values λ_B and λ_H :

$$P(t)_B = e^{-\lambda_H t} = e^{-0,105 \cdot 10^{-6} \cdot 400 \cdot 10^3} = 0,958;$$

$$P(t)_H = e^{-\lambda_B t} = e^{-0,780 \cdot 10^{-6} \cdot 400 \cdot 10^3} = 0,730.$$

Let's define 90% resource ($\gamma=90\%$), for 1-FMCT according to the formula of Table No. 8 GOST 17509-72:

$$T_{1Y} = \frac{1}{\widehat{\lambda}} \left(-\ln \frac{\gamma}{100} \right) = \frac{1}{0,21 \cdot 10^{-6}} \left(-\ln \frac{90}{100} \right) = 0,501 \cdot 10^6 \text{ час}$$

t.e. 90%total elements of the FMCT has a resource of less $0,501 \cdot 10^6$ hour.

Bilateral 90% Resource Confidence Bounds:

$$T_{1YH} = \frac{1}{\lambda_B} (-\ln 0,9) = \frac{1}{0,78 \cdot 10^{-6}} (-\ln 0,9) = 0,135 \cdot 10^{-6} \text{ hour}$$

$$T_{1YB} = \frac{1}{\lambda_H} (-\ln 0,9) = \frac{1}{0,105 \cdot 10^{-6}} (-\ln 0,9) = 1,003 \cdot 10^{-6} \text{ hour}$$

Calculation and evaluation of the reliability indicators of the PMT of the second and third versions of the FMCT AR.

Failure rates:

$$\widehat{\lambda}_{2,3}^n = \frac{d^n}{\sum_{i=1}^d l_i + (N-d)L_0} = \frac{2}{3267 + (50-2)200 \cdot 10^3} = 0,15 \cdot 10^{-6} 1/\text{hour},$$

Bilateral confidence limits for $(\lambda^n)_{2,3}$ with confidence probability $\beta=0.9$ according to the second and third versions of the FMCT AR:

Calculation of the lower bound:

$$\widehat{\lambda}_{2,3H}^n = \frac{\widehat{\lambda}^n N \chi^2_{\frac{1-\beta}{2}, 2d}}{d(2N-d) + \frac{1}{2} \chi^2_{\frac{1-\beta}{2}, 2d}} = \frac{0,15 \cdot 10^{-6} \times 50 \cdot 5,45}{2(2 \cdot 50 - 2 + \frac{1}{2} \cdot 5,45)} = 0,083 \times 10^{-6} 1/\text{hour}$$

upper bound calculation:

$$\widehat{\lambda}_{2,3B}^n = \frac{\widehat{\lambda}^n N \chi^2_{\frac{1+\beta}{2}, 2d}}{d(2N-d) + \frac{1}{2} \chi^2_{\frac{1+\beta}{2}, 2d}} = \frac{0,150 \cdot 10^{-6} \cdot 50 \cdot 15,70}{2(2 \cdot 50 - 2 + \frac{1}{2} \cdot 15,70)} = 0,556 \times 10^{-6} 1/\text{hour}$$

Calculation of $\widehat{\lambda}_{2,3H}^n = 0,083 \cdot 10^{-6}$ and $\widehat{\lambda}_{2,3B}^n = 0,556 \cdot 10^{-6}$ cover the true values of the parameters $(\lambda^n)_{2,3}$ with probability $\gamma=0,9$.

Point estimate of the average value of the operating time of the PMT of the second and third variants of the FMCT AR to failure according to table 8 (GOST 17509-72):

$$T_{avg} = \frac{1}{0,150 \cdot 10^{-6}} = 6,667 \cdot 10^6 \text{ hour}.$$

Confidence limits of the average operating time, respectively, for the lower and upper limits:

$$T_{2,3avg u}^n = \frac{1}{\widehat{\lambda}_u^n} = \frac{1}{0,556 \cdot 10^{-6}} = 1,798 \cdot 10^6 \text{ hour};$$

$$T_{2,3avg l}^n = \frac{1}{\widehat{\lambda}_l^n} = \frac{1}{0,083 \cdot 10^{-6}} = 12,048 \cdot 10^6 \text{ hour}.$$

Probability of failure-free operation of the PMT of the second and third variants of the FMCT AR $l = 400 \cdot 10^3$ hour is determined according to table 8 GOST 17509-72:

$$P_{2,3}(l) = e^{-\widehat{\lambda}_{2,3}^n l} = e^{-0,150 \cdot 10^{-6} \cdot 400 \cdot 10^3} = 0,941$$

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According to the above values $\hat{\lambda}_{2,3l}^n, \hat{\lambda}_{2,3u}^n$ find, respectively, bilateral confidence bounds for $P_{2,3}(l)$:

$$P_{2,3}(l)_u = e^{-\hat{\lambda}_{2,3l}^n} = e^{-0,083 \cdot 10^{-6} \cdot 400 \cdot 10^3} = 0,967;$$

$$P_{2,3}(l)_l = e^{-\hat{\lambda}_{2,3u}^n} = e^{-0,556 \cdot 10^{-6} \cdot 400 \cdot 10^3} = 0,800.$$

According to the calculated options, we determine 90% resource ($\gamma = 90\%$) according to the formula 8 GOST 17509-72:

$$T_{2,3\gamma}'' = \frac{1}{\hat{\lambda}_{2,3}''} \left(-\ln \frac{\gamma}{100}\right) = \frac{1}{-0,150 \cdot 10^{-6}} \left(-\ln \frac{90}{100}\right) = 0,702 \cdot 10^6 \text{ hour.}$$

Bilateral Confidence Bounds of 90% Resource.

$$T_{2,3\gamma}'' = \frac{1}{\hat{\lambda}_{2,3u}''} \left(-\ln \frac{\gamma}{100}\right) = \frac{1}{0,083 \cdot 10^{-6}} \left(-\ln \frac{90}{100}\right) = 1,269 \cdot 10^6 \text{ hour;}$$

$$T_{2,3\gamma}'' = \frac{1}{\hat{\lambda}_{2,3l}''} \left(-\ln \frac{\gamma}{100}\right) = \frac{1}{0,556 \cdot 10^{-6}} \left(-\ln \frac{90}{100}\right) = 0,189 \cdot 10^6 \text{ hour}$$

Comparative assessment and analysis of the reliability indicators of the PMT FMCT AR for the first option, as well as for the second and third options, shows that their difference is due to different technical resources, properties of the materials used and their operating conditions. Therefore, it is expedient in order to reduce costs, it is necessary to carry out maintenance and repair (MR) by conducting a more advanced diagnostic system according to Fig. 2, which accordingly shows the scheme of the MR strategy according to the real state of the FMCT PMT. It improves the reliability of the instrument, the safety during maintenance, and the real economic efficiency.

The relationships indicated in fig. 2. Must be guaranteed primarily by the operational manufacturability, implemented by fulfilling conditions 8-12, ensuring higher simplicity and safety of work performed under high voltage in cramped conditions and time pressure.

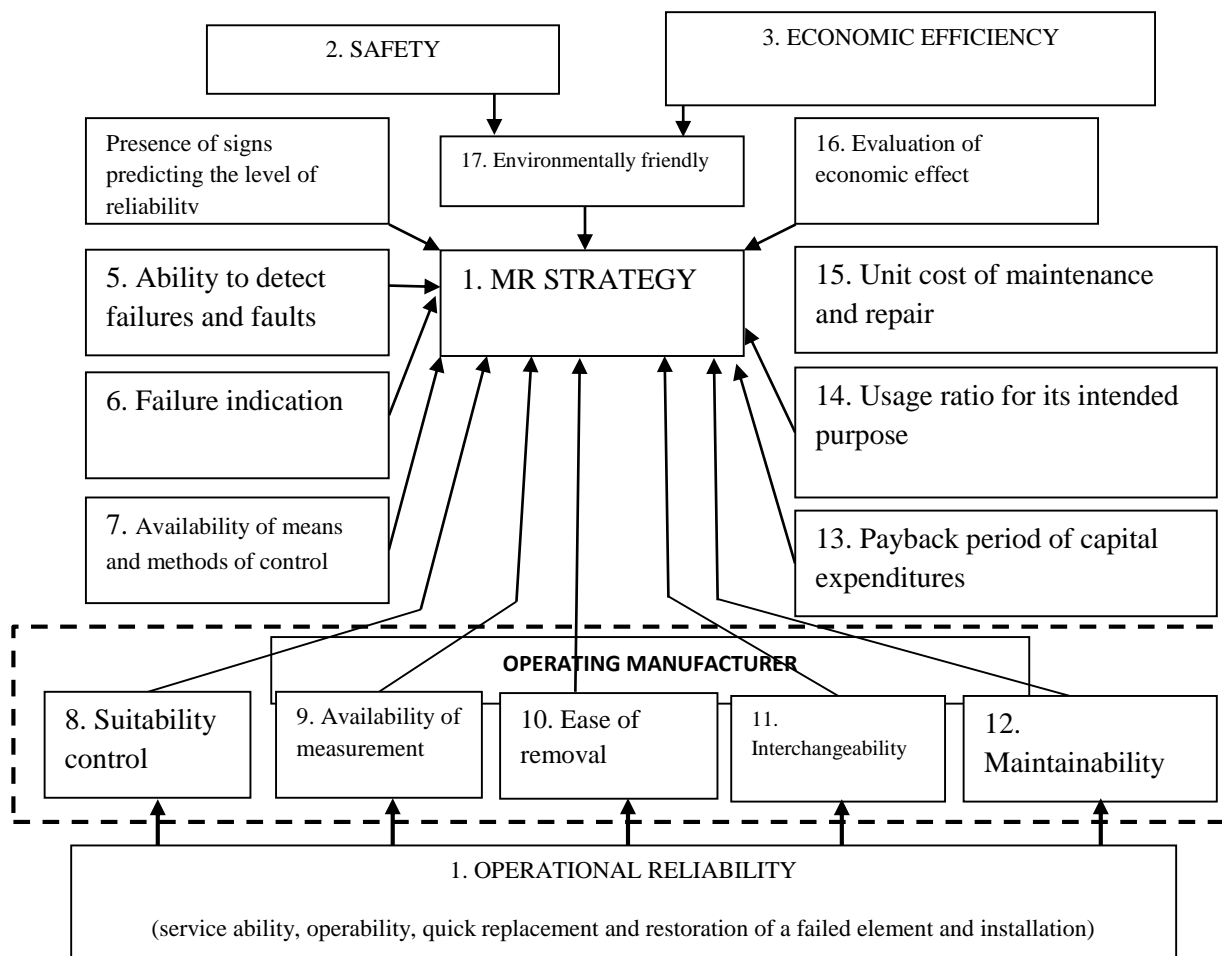


Fig.2. Conditions for the implementation of the strategy for the maintenance and repair of elements of the PMT of traction power supply systems, taking into account the normal indicators of reliability and the real state.

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Naturally, the proposed strategy is easier to implement in the maintenance and repair of power supply facilities, which provides for the fulfillment of conditions 4-12 at the design stage, prefabrication, as well as during operation and reconstruction. The implementation of indicators 13-16 will provide an economic effect associated with the optimal frequency of preventive examinations using a technical diagnostic system.

CONCLUSION

An analysis of the calculated reliability indicators of the considered ferromagnetic current converters with adjustable ranges, taking into account the implementation of maintenance and repair, shows that the two-sided confidence probability of their failure-free operation is more than 0.9, which meets the requirements of automatic control systems for traction power supply of an electrified railway. Differences in the reliability indicators of each device are explained by the difference in materials, as well as their electrical and magnetic properties.

It can be said that individual elements of diagnostics have long been used to monitor the state of the most vulnerable elements of the PMT. But long-term operation and the existing system of maintenance and repair (MR) shows the need for the use of methods and means of technical diagnostics, which is embedded in almost every control scheme with adjustable traction power supply.

The widespread introduction of diagnostic methods and tools will make it possible, instead of scheduling the MR, to apply the planning of diagnostic checks according to the real state.

The above material can serve as a methodological basis for drawing up plans for improving design and operational work. It is possible to ensure the reliable functioning of the PMT FMCT in the power supply system using a combination of three groups of proposed PMT: ensuring reliability during design, operation and during repairs.

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Factors Affecting the Expansion of Voluntary Health Insurance Participants in Ninh Binh, Vietnam



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SUMMARY: Health insurance is one of the pillars of social security in Vietnam. Moving towards universal health insurance is the right direction to support the country's sustainable economic development. Ninh Binh is a province with high rate coverage of health insurance compared to other provinces and cities across the country. However, to reach 100% of the people participating in health insurance, there are still many difficulties. With 205 valid questionnaires, the research team used quantitative research method to assess the factors affecting the expansion of voluntary health insurance participants in Ninh Binh province, Vietnam. Through analyzing the reliability of the scale, exploratory factor and linear regression, the research team has pointed out the factors that have a strong impact on the expansion of health insurance participants such as income or communication. From this result, the research team identified difficulties and existences in the expansion of voluntary health insurance participants in the province such as precarious income, certain employer's limited awareness of health insurance policies, health system's ability to respond and inadequate quality care for people

KEYWORDS: Health insurance, Ninh Binh, Vietnam

1. INTRODUCTION

Statistics of Vietnam Social Insurance showed that, in recent years, health insurance coverage has been expanded, health insurance participant proportion has increased rapidly. In 2021, the whole country had 58.97 million participants, by 2019, the health insurance coverage rate nationwide reached more than 89% of population with 85.945 million people, exceeding the set target of 85% by 2020 [6]. According to experts, health insurance coverage has increased rapidly because the Health Insurance Law much focuses on benefits of health insurance participants, such as the poor, near-poor, and ethnic minorities living in areas with difficult and extremely difficult economic and social conditions, relatives of martyrs and people with meritorious services. In 2019, the universal health insurance coverage in Ninh Binh was 85%, exceeding the target of 85% set by the government [7]. In spite of positive result of participants in the province, it is much more difficult to achieve universal health insurance coverage because the group of non-participants in health insurance gathers in the informal sector.

According to the Informal Labor Report (2018), the informal sector labor force in Ninh Binh province accounts for a high proportion of more than 60% of the province's total labor force [9]. People working in the informal sectors face many difficulties such as precarious and unstable jobs, low income, long working hours in small-scale production and business establishments and inattentive working conditions. In particular, labor contracts are unavailable or are only verbally agreed, which means that employees are not allowed to pay social insurance, health insurance or any other allowances or social welfare. From this fact, it is necessary to conduct research on factors affecting the expansion of voluntary health insurance participants in Ninh Binh province. The research will contribute to enriching the theoretical and practical basis for universal health insurance.

2. THEORETICAL FOUNDATIONS, RESEARCH MODELS AND HYPOTHESES

2.1. Theoretical foundations

Health Insurance

In the consolidated document 01/VBHN-VPQH Health Insurance Law No. 25/2008/QH12 dated November 14, 2008 of the National Assembly, effective from July 1, 2009, as amended and supplemented by: Law No. 46/2014/QH13 dated June 13, 2014 of the National Assembly amending and supplementing a number of articles of the Health Insurance Law, effective from

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January 1, 2015. Health insurance is a compulsory insurance form that is applied to the subjects specified in this Law for health care, not for profit, organized by the State [4].

Health insurance participants

Employees working under indefinite-term labor contracts or labor contracts with a term of full 3 months or more in accordance with the labor law; employees who are managers of enterprises enjoying salaries and wages according to provisions of the law on wages and salaries; cadres, legally specified civil servants and public employees [4].

2.2. Research model and hypothesis

Based on general theory of consumer behavior, the research team presented and applied Ajzen and Fishbein's Theory of Reasoned Action (TRA) and Planned Behavior (TPB) models to prepare a research model for factors affecting the expansion of health insurance participants [1]. Accordingly, there are 6 factors affecting employees' intention to participate in health insurance in informal sectors in Ninh Binh province, with assumption that 5 factors: Moral Responsibility; Knowledge; Attitude; Behavior; Communication have a positive relationship on people's intention to participate in health insurance. On the contrary, the research team also thinks that Income has a negative effect on people's intention to participate in health insurance.

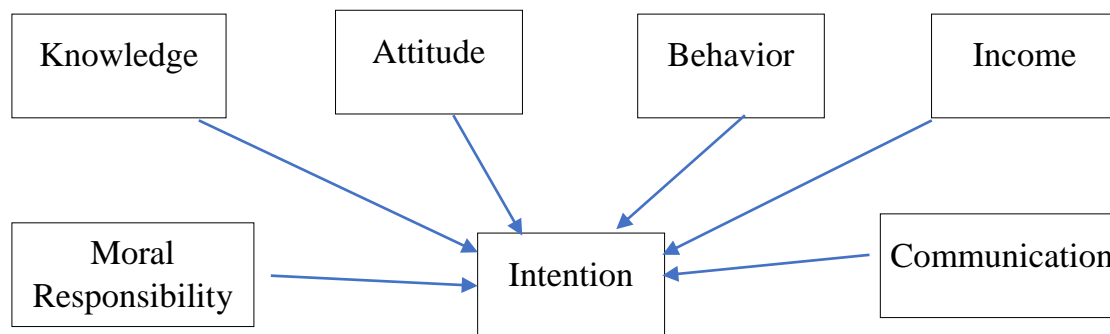


Figure 1: Model of factors employee's intention to participate in health insurance

Source: Application of theory and collected results

Attitude towards health insurance: The intention to participate in health insurance will increase when employees have a positive attitude towards it. Thus, attitude has a positive influence on intention to participate in health insurance.

Knowledge of health insurance: The better people's understanding of health insurance policies is, the higher their intention to participate in health insurance. Knowledge about health insurance has a positive effect on intention to participate in health insurance.

Income: intention to participate in health insurance is inversely proportional to employee's income

Moral responsibility: Moral responsibility has a positive effect on the intention to participate in health insurance.

Controlling behavior: Behavioral control has a positive effect on intention to participate in health insurance.

Health insurance communication: Health insurance communication has a positive influence on the intention to participate in health insurance.

3. RESEARCH METHODS

In the theoretical basis, the research team gave an overview of health insurance such as the concept, characteristics, roles and participants of health insurance. Along with that, the topic has synthesized theories related to consumer behavior such as the theory of rational action TRA and the model of intended behavior TPB. Based on the theoretical basis of the models and the conditions of income, understanding, and moral responsibility, etc., the research team has applied to build a model of Factors affecting the expansion of insurance participants. health care in Ninh Binh province.

The study uses a quantitative method with the goal of testing the proposed research model. The survey sample was taken by the convenience method. The sample size taken depends on the analytical method, this study uses descriptive statistics and some tests, so according to Hoang Trong and Chu Nguyen Mong Ngoc (2008), the sample size is equal to at least 5 times the observed variable [8]. Therefore, with 250 questionnaires distributed during the investigation in Ninh Binh province, the research team collected 225 votes, of which 20 were invalid, the remaining 205 votes were given. Input and data analysis are sufficient to ensure the analytical methods in the study with 30 component variables. Using a questionnaire to survey the opinions of workers in Ninh Binh province who have never or are currently participating in health insurance. The study used descriptive statistical analysis software SPSS 22.0 to process the collected information.

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4. RESEARCH RESULTS

Determining that the development of health insurance is one of the important tasks towards the goal of universal health insurance. In the past 5 years, Ninh Binh has had many solutions to develop health insurance participants in the province, contributing to the rate of 92% of the population participating in health insurance, exceeding 7% of the target of Resolution No. Provincial Party Committee XXI, term 2015-2020. In order to gradually increase and move towards universal health insurance coverage, Ninh Binh's health insurance industry has strengthened propaganda on health insurance policies, creating consensus from the Party committees and authorities of different localities. levels, economic organizations to the masses. Along with that, coordinate with related agencies and units to implement synchronously and drastically, such as assigning annual health insurance targets to localities and spending budget to support the purchase of insurance cards. health care for the people.

4.1. Some results of sample characterization

From the number of valid questionnaires, the research team coded and entered the data. Based on the results of data cleaning with the data analysis software SPSS22, the results obtained are 205 questionnaires that are valid and have been cleaned. After conducting the survey to collect information and process data, we have general information about the surveyed sample and the following factors:

Table 1. Results of study sample characteristics

Scale		Frequency (Person)	Percentage (%)
Gender	Female	124	60.5
	male	81	39.5
Age	15 to 25	21	10.2
	26 to 35	30	14.6
	36 to 45	49	23.9
	46 tu 55	28	13.7
	From 56	77	37.6
Education level High	School	22	10.7
	Intermediate college	131	63.9
	University	38	18.5
	Other	14	6.8
Occupation	Agriculture, forestry and fishery	46	22.4
	Light industry, garment, construction, housework	110	53.7
	Education, health, culture, society	24	11.7
	Retail trade	8	3.9
	Other	17	8.3

Source: Processing of the research team's investigation results

4.2. Survey data analysis results

Cronbach's alpha reliability

Analyze the reliability of the scale Using the analysis of the scales by the Cronbach's alpha reliability coefficient will help us to eliminate the observed variables that are not suitable for the study of the topic and at the same time it limits the variables that do not contribute usefully to the topic. It is difficult to determine the variability and identify errors in the variables. They are considered garbage variables and will be removed in the next analysis steps. According to Hoang Trong and Chu Nguyen Mong Ngoc. (2005). "The requirement for Cronbach's Alpha coefficient must be greater than 0.6 but preferably greater than 0.7". However, when analyzing, if there are observed variables in the table that violate one of the following two principles, they will also be disqualified. The first principle is that it is mandatory to remove the variable that is the correlation coefficient of the total variable less than 0.3, 0.4 or 0.5 (depending on the purpose or novelty of the research content). In the content of this study, the research team that chooses the total correlation coefficient less than 0.3 will be excluded. The second rule is the Cronbach's alpha coefficient if the variable type is larger than the current Cronbach' Alpha coefficient.

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Table 2. Scale reliability coefficient testing results

Scale	Initial observed variable	Cronbach's Alpha	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Remaining observed variable
Moral Responsibility	6	0.801	0.41	0.80	6
Knowledge	5	0.928	0.723	0.927	5
Attitude	3	0.926	0.807	0.925	3
Behavior	3	0.879	0.740	0.789	3
Income	5	0.941	0.825	0.930	5
Communication	5	0.897	0.720	0.881	5
Intention	3	0.877	0.757	0.833	3

Source: Processing of the research team's investigation results

The research team has performed the analysis of the scale in turn using the Cronbach's alpha reliability coefficient for each scale and is summarized in Table 2. It can be seen that the minimum total variable correlation of the scales is guaranteed to be > 0.5 is suitable for research purposes. Calculation results of Cronbach's Alpha coefficient according to each research component according to many opinions, the scale with Cronbach's Alpha coefficient of 0.8 or higher is a good scale, from 0.7 to nearly 0.8 is used. Okay. This can show good scales and ensure reliability for future research and analysis. Data on Cronbach's alpha coefficient if the variable type (the largest) is smaller than the reliability coefficient, and both conditions are satisfied for keeping the observed variable for the following analyses. With the data satisfying the requirements of the above reliability analysis, all variables included in the Cronbach's alpha analysis were kept for the following analyses. Therefore, it can be concluded that: the scale used in the study is appropriate and reliable and can be used to conduct factor analysis and further research steps.

Exploratory factor analysis

The analysis of Cronbach's Alpha reliability coefficient in the previous section helped confirm that the reliability of these scales is completely consistent with the research topic. However, the analysis of Cronbach's Alpha reliability coefficient is only performed according to each scale. This result does not mean that the scales are not related to each other. For example, the observed variable of one scale has a relationship with the observed variable of another scale, leading to the scale not reaching the convergent value and discriminant value due to error because the variables are correlated with each other. together. The Cronbach Alpha method is used to evaluate the reliability of the scale. The Exploratory Factor Analysis (EFA) method, for short, helps us to evaluate two important types of values of the scale: convergent value and discriminant value. According to Hoang Trong and Chu Nguyen Mong Ngoc, (2005). The condition for exploratory factor analysis is to satisfy the following requirements: Factor loading > 0.5 , $0.5 \leq KMO \leq 1$: KMO coefficient (Kaiser-Meyer-Olkin) is the index used to consider the appropriateness of factor analysis. A large KMO value is appropriate for factor analysis. Also according to Hoang Trong and Chu Nguyen Mong Ngoc, (2005), Bartlett's test has statistical significance (Sig. < 0.05): This is a statistical quantity used to consider the hypothesis that the variables have no correlation in the total. body. If this test is statistically significant (Sig. < 0.05), the observed variables are correlated with each other in the population. Percentage of variance $> 50\%$: Shows the percentage variation of the observed variables. That is, considering the variation is 100%, this value tells how much the factor analysis explains. Table 3, the combined results of EFA exploratory factor analysis for each scale showed that the KMO coefficient (Kaiser-Meyer-Olkin) > 0.5 for all scales. This satisfies the first condition for this analysis. Next, we see that the value Sig < 0.05 is the standard guarantee for all the scales of the independent variable components, the total variance extracted is greater than 50% as prescribed and all converge to only 1. common factor, with all factor weights being 0.5.

Table 3. Synthesized results of exploratory factor analysis (EFA) for each scale

Scale	KMO coefficient	Sig	Total variance explained	Number of factors eliminated	Number of converging factors
Moral Responsibility	0.733	.000	68.230	3	2
Knowledge	0.859	.000	77.830	0	1
Attitude	0.750	.000	87.202	0	1

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Behavior	0.731	.000	80.620	0	1
Income	.904	.000	80.879	0	1
Communication	.849	.000	71.058	0	1
Intention	.743	.000	80.338	0	1

Source: Processing of the research team's investigation results

With the results of exploratory factor analysis for each scale, all the conditions mentioned above are guaranteed. After removing the three non-converging variables, namely Moral Responsibility 4,5,6 the 24 observed variables of this independent scale are kept for the next step of analysis.

After performing exploratory factor analysis, we have 24 observed variables that are eligible to be included in exploratory factor analysis for all independent variable scales. From the table of exploratory factor analysis results for all components of the scale of independent variables, we see that the total variance extracted is 77.237% > 50%. KMO index of 0.839 ensures the requirement, in addition, sig also gives a result of 0.000 < 0.05, ensuring our analysis. The final step is to check the results of the factor rotation matrix to see how many factors the observed variables will converge on and which factors are made up of. Performing the factor rotation matrix shows us that 24 observed variables still converge on the 6 initial construction factors including the group of factors of income, knowledge, communication, attitude, behavior, moral responsibility with all factor weights as large as 0.5.

Table 4. Extracted from Table of Exploratory Factor Analysis EFA common to all scales of independent variables

KMO		.839							
Sig		.000							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.924	25.643	25.643	6.924	25.643	25.643	4.111	15.226	15.226
2	4.311	15.967	41.611	4.311	15.967	41.611	3.980	14.741	29.968
3	2.912	10.784	52.395	2.912	10.784	52.395	3.605	13.352	43.319
4	2.240	8.296	60.691	2.240	8.296	60.691	2.632	9.748	53.067
5	1.851	6.857	67.548	1.851	6.857	67.548	2.390	8.851	61.918
6	1.534	5.680	73.228	1.534	5.680	73.228	2.273	8.417	70.335
7	1.083	4.009	77.237	1.083	4.009	77.237	1.864	6.902	77.237
8	.883	3.269	80.506						

Source: Processing of the research team's investigation results

Regression analysis After performing EFA analysis to test the convergent validity and discriminant validity of the scales, we will test the hypotheses proposed in the research model. To do this we will use multivariate regression. Multivariate regression analysis, we need to note the preconditions for this method, including: The sum of the remainders = 0 and the residuals are normally distributed. There is no collinearity (independent variables are not highly correlated with each other). No autocorrelation occurs. There is no unequal variance. To evaluate the relationship and impact direction of the group of income, knowledge, communication, attitude, behavior, and ethical responsibility in the analysis above, this study used the analytical method. Regression analysis with the help of SPSS software 22. In the regression equation to be performed, it is a multivariate regression equation, in order to determine the important role of each component in evaluating the relationship. between intentions for the components of the scale mentioned above. The multivariable regression equation showing the relationship between intention for the components of the built scale has the following form:

$$Y = a_0 + a_1 X_1 + a_2 X_2 + a_3 X_3 + a_4 X_4 + a_5 X_5 + a_6 X_6$$

In there:

Y: The dependent variable represents the predictive value of the intention to participate in health insurance of informal sector workers.

a₀, a₁, a₂, a₃, a₄, a₅, a₆: are regression coefficients

X₁, X₂, X₃, X₄, X₅, X₆: Are the independent variables in order of income, knowledge, communication, attitude, behavior, and moral responsibility.

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The results of the linear regression analysis are as follows:

Table 5. Linear regression results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.822a	.676	.666	.51547

Source: Processing of the research team's investigation results

We see that Adjusted R square = .666(>0.5) shows 6 components that affect the intention to participate in health insurance of workers in Ninh Binh province. Thus, the fit of the model is relatively high. Looking at the results of the regression analysis, we see that the preconditions for the regression analysis are satisfied. Thus, we can consider the results of the regression analysis to be reliable. However, this fit is only true for the sample data. To test whether the model can be inferred for the real population, we must test the model's fit:

Hypothesize H₀: The factors Moral Responsibility, Knowledge, Attitude, Behavior, Income, Communication and Intention have no relationship with each other.

H₁: The factors Moral Responsibility, Knowledge, Attitude, Behavior, Income, Communication and Intention have a relationship with each other.

Choose significance level = 0.05, corresponding to 95% level

Table 6. ANOVA testing

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	109.565	6	18.261	68.725	.000 ^b
	Residual	52.610	198	.266		
	Total	162.176	204			

Source: Processing of the research team's investigation results

The results of the ANOVA test show that the F-test value reaches the value of 68,725 at the significance level sig = 0.000 < α = 0.1. Thus, we reject hypothesis H₀, accept hypothesis H₁, that is, 6 independent variable components Moral Responsibility, Knowledge, Attitude, Behavior, Income, Communication and Intention have each relationship. Therefore, the model fits the data set and can be generalized to the population.

Table 7: Results of multivariate regression model

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.	Collinearity Statistics	
		B	Std. Error	Beta	t		Tolerance	B
1	(Constant)	1.351	.363		3.727	.000		
	Knowledge	.080	.037	.095	2.164	.032	.858	1.165
	Attitude	.140	.037	.169	3.823	.000	.838	1.193
	Behavior	.197	.041	.225	4.844	.000	.757	1.321
	Communication	.285	.052	.266	5.514	.000	.704	1.420
	Income	-.319	.036	-.412	-8.927	.000	.770	1.299
	Moral Responsibility	.195	.047	.178	4.140	.000	.891	1.123

Source: Processing of the research team's investigation results

The table of regression results shows that, in addition to the regression coefficients of Income bearing negative signs, the regression coefficients of the factors Knowledge, Attitude, Behavior, Communication, Moral Responsibility all have positive signs and R = .822a > 0 (Table 5) shows that these components have a positive and negative impact on the intention to participate in health insurance. Thus, the hypothesis of the research model is accepted that the components of knowledge, communication, attitude, behavior, and moral responsibility have a positive relationship with the intention to participate in health insurance on Ninh Binh province. Particularly, the income component has a negative impact on the intention to participate in health insurance.

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The table of regression results also shows that the variance exaggeration factor $VIF < 2$, proves that we do not suffer from multicollinearity problem in this study.

V. DISCUSSING THE RESULTS

Assess the importance of factors affecting the intention to participate in health insurance in Ninh Binh province. From the results of the regression table (Table 8) allows us to test the regression coefficients in the model. Components with statistical significance less than 5% are kept, and components with statistical significance greater than 5% are discarded. The larger the beta coefficient of a component, the more important it is, showing the degree of influence on the dependent variable from the above table of regression analysis results, we can see that the constant is not statistically significant, so the constant does not affect the regression equation we mentioned above. The remaining 6 factors are suitable, of which 5 factors have a positive influence on intention and 1 factor has a negative effect. Specifically, the income component has the strongest influence first with a Beta coefficient of (-0.412) ($t = -8.927$ and $Sig < 0.05$), followed by the communication component with a Beta coefficient of 0.266. ($t = 5.514$ and $Sig < 0.05$) the second largest influence. Third is the behavioral component with a Beta coefficient of 0.225 ($t = 4.844$ and $Sig < 0.05$). The fourth component is moral responsibility with a Beta coefficient of 0.178 ($t = 4.140$ and $Sig < 0.05$). The fifth is the attitude component with a Beta coefficient of 0.169 ($t = 3.823$ and $Sig < 0.05$). Finally, the knowledge component with a Beta coefficient of 0.095 ($t = 2.164$ and $Sig < 0.05$) is also the component that has the lowest influence on the intention to participate in health insurance in Ninh Binh province.

So the regression equation for the standardized Beta coefficients is as follows:

Intention = - 0.412 Income + 0.266 Communication + 0.225 Attitude + 0.178 Moral Responsibility + 0.169 Behavior + 0.095 Knowledge

Although up to now, Ninh Binh province has achieved over 92% of the coverage target, but this result cannot be confirmed as sustainable, due to many objective and subjective reasons. In which, the expansion of participants in health insurance, especially voluntary health insurance, still faces many difficulties; awareness of health insurance policies of some employers is still limited, the situation of evasion of health insurance premiums has not been thoroughly resolved; The health system's ability to respond to and quality of health care for people is still inadequate, there is still overcrowding in hospitals, administrative procedures and prices for medical services are still high. convenience... affects service quality and patient benefits. In addition, the propaganda and dissemination of policies and laws on health insurance are not synchronized, a part of people and workers do not understand their rights and obligations when participating in insurance. medical. For Ninh Binh, the percentage of population living and working in agriculture and rural areas is quite high, especially in mountainous communes, coastal communes and self-employed workers, whose income is still low, not stability. The network of collection agents is still thin, has not yet reached villages and neighborhoods, most of them are part-timers who are not really effective, and are still passive in advocacy and object development. Many Party committees and authorities have not really intended to lead and direct the implementation of health insurance policies....

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Marketing Activities and Profitability of Small and Medium Enterprises in Municipality of Estancia, Iloilo



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ABSTRACT: The emergence of small and medium enterprises (SMEs) has indeed revolutionized the world's economy. Small and medium enterprises have made tremendous economic impact in most economies of countries around the world, especially those which were devastated by either natural or man-made disasters. The inroads of SMEs in the market had paved the way for most countries like the Philippines to prime its economy and moved forward towards economic recovery and growth.

Estancia is one of the municipalities in the province of Iloilo which had lately been blessed with the coming of SMEs that are engaged in business with both consumable and non-consumable goods. The interest of identifying the factors that influenced the sales and after sales of SMEs in the locality was the primary reason why this research study was conducted. This study aimed to describe the marketing activities of the 152 SMEs in Estancia, Iloilo in terms of sales and after sales using the research-made questionnaire as instrument of the study.

The results of the study showed that the marketing activities of the SMEs in terms of sales and after sales were satisfactory and mostly likely have caused the business to be stable and provided business operators to upgrade the quality of their life. As SMEs continue to act and provide as one of the pillars of the town's economic recovery and growth, there is a need for the Local Government Unit (LGU) to provide the necessary avenues for collaboration and synergy with them. The LGU should try to see to it that through its comprehensive land use planning, priority should be given to the SMEs in the town particularly in terms of their location as to type of business and ensure the sustainability of their business.

KEYWORDS: Marketing activities, profitability, consumable and non- consumable goods

1. INTRODUCTION

The heart of business success lies in its marketing. According to Margareta (2016), most aspects of small and medium business depend on successful marketing. Without marketing, potential customers may never be aware of the business offerings, business may not be given the opportunity to progress and succeed. Using marketing to promote products or commodities provides business with a chance of being discovered by prospective customers. For a business to succeed, the products it provides must be known to potential buyers. Unless business is known in the community and has communication with customers readily available, it allows small and medium enterprises to be successful and grown in the marketplace.

In the European Union, Small and medium-sized enterprises (SMEs) are non-subsidiary, independent firms which have characteristics as they employ fewer than a given number of employees. However, the limitation numbers of employee are various across countries. Some countries set the limit at 200 employees.

In United States SMEs can be defined as a firms with fewer than 500 employees. The direct result of managing various economic resources and their efficient use within operational, investment and financing activities is in the SMEs level performance (Burja, C., 2011, in Margaretha, F., & Supartika, N., 2016).

In Indonesia, the role and contribution of SMEs in the national economic structure not only become one of the national priorities but also the hope for accelerated development. National SMEs firm is one of the pads that keep the national economy especially when there is a shocks or external pressure. If the current global economy worsens, SMEs firm act as a pillar of national economic growth and job creation (Salaman, et. al., 2016).

Small and business enterprises contribute significantly to economic growth, social stability and equity. This is one of the most important vehicles through which low income people can escape poverty. With limited skills and education to compete for formal

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sector jobs, these men and women find economic opportunities in small and medium enterprises or business owners and employers (Businessword.com, 2007).

Given their dynamic and productive characteristics, small and medium enterprises (SMEs) are seen as crucial for a country's economic growth, employment creation and innovation (Aldaba, 2007). As of 2008, the Philippines had a little over 761,000 registered enterprises with 91.6% for micro enterprises and 31.2% small and medium enterprises. In terms of country's employment data, small and medium enterprises have contributed an estimated of 28% share (Aldaba,2007). As new technologies and globalization reduces the importance of economies of scale in many activities, the potential contribution of small and medium enterprises is being shown (Policy Brief,2000).

In the Municipality of Estancia, which is a second class municipality in the province of Iloilo, small and medium enterprises had been established knowing that it is known around the country as a center of commercial fishing and it carries the name as "Little Alaska" of the Philippines (www. Iloilo.gov.ph.) The title however, has gradually receded because of the continuing depletion of the municipality's aquatic and marine resources due to unregulated illegal fishing and related activities in this place. Hence, the once flourishing fishing industry in the town gradually becomes an alternative means of livelihood because other means of generating income developed like the increasing number of small and medium enterprises (SMEs).

Hence, it is within the foregoing context that the researcher would like to find out the marketing activities and profitability of the small and medium enterprises in Estancia, Iloilo. This study would like also to ascertain whether these marketing activities and profitability of SMEs contribute to the economic development and may help alleviate the scarcity of employment opportunities in the said place.

This study was conducted to determine the marketing activities and profitability of small and medium enterprises in Estancia Iloilo.

Specifically, this study sought to answer the following questions:

1. What is the socio demographic profile of small and medium enterprises owners in terms of sex, monthly income, type of business, and length of business establishment?
2. What is the level of marketing activities of small and medium enterprises (SME's) owners in terms of sales and after sales when they are taken as an entire group and when classified according to sex, monthly income, type of business and length of business establishment?
3. What is the level of profitability of small and medium enterprises owners in terms of consumable goods and non-consumable goods when they are taken as entire group and when classified according to sex, monthly income, type of business and length of business establishment?
4. Is there a significant difference in the level of marketing activities of small and medium enterprises (SME's) owners in terms of sales and after sales when they are classified according to sex, monthly income, type of business and length of business establishment?
5. Is there a significant difference in the level of profitability of small and medium enterprises (SME's) owners in terms of consumable goods and non-consumable goods when they are classified according to sex, monthly income, type of business, and length of business establishment?
6. Is there a significant relationship between the level of marketing activities and the level of profitability of SMEs owners when they are classified according to sex, monthly income, type of business, and length of business establishment?

This study was supported by the basic "Marketing Theory" which states that to maximize sales, a company must position its products or services in the marketplace in such a way that consumers believe they need a particular product or services or that a product or services they need has a particular benefit. It is therefore on the basis of the foregoing theory that this study was conceived and developed.

The aim of this study is to find out the marketing activities and profitability of small and medium enterprises (SMEs) which have started to develop and increased in number in the town of Estancia, Iloilo. Likewise, it is geared to address by gathering the necessary data the truth behind the presumption that the economic recovery and continuous economic growth of the locality is associated with the increasing number of SMEs and the contention of Gilmore et al (2001) as cited by Hassan (2014), which stated that " small and medium business is likely to be haphazard, informal, loose, unstructured, spontaneous and more reactive than proactive due to the characteristics and limitations of their owner-manager, resources, market impact-and organizational structures" (Gilmore et al., in Hassan, 2014). Their marketing activities tend to be pragmatic, practical and adopted to suit their unique situation (Carson and Gilmore 272, in Hassan, 2014), and informal and unplanned, relying on the intuition and energy of an individual, i.e. owner manager (Hassan, 2014).

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CONCEPTUAL FRAMEWORK AND SCHEMATIC DIAGRAM

This study is anchored on the concept of Drucker (1998) which states that “the purpose of business is to create and keep customers, it has two central functions: the basic function of marketing is to attract and retain customers at a profit”. Profitability is the ratio to measure the performance of the company. It is the main aspect in a company’s financial reporting. The profitability of a company shows the company's ability to generate earnings for a certain period at a consumable goods and certain non-consumable goods (Margaretha, F. & Supartika, N., 2016).

Marketing facilitates the exchange process by providing a variety of marketing activities that benefit customers and other stakeholders. It involves adjusting the whole activity of a business to the needs of the consumers and other stakeholders.

With the aforementioned conceptual framework, this study is premised on the principle that certain demographic profiles (independent variable) of the respondents and the level of their marketing activities in terms of sales and after sales (intervening variables) influence to a varying degree or extent the profitability of the SMEs owners (dependent variables). Figure 1 presents the schematic diagram of the study.

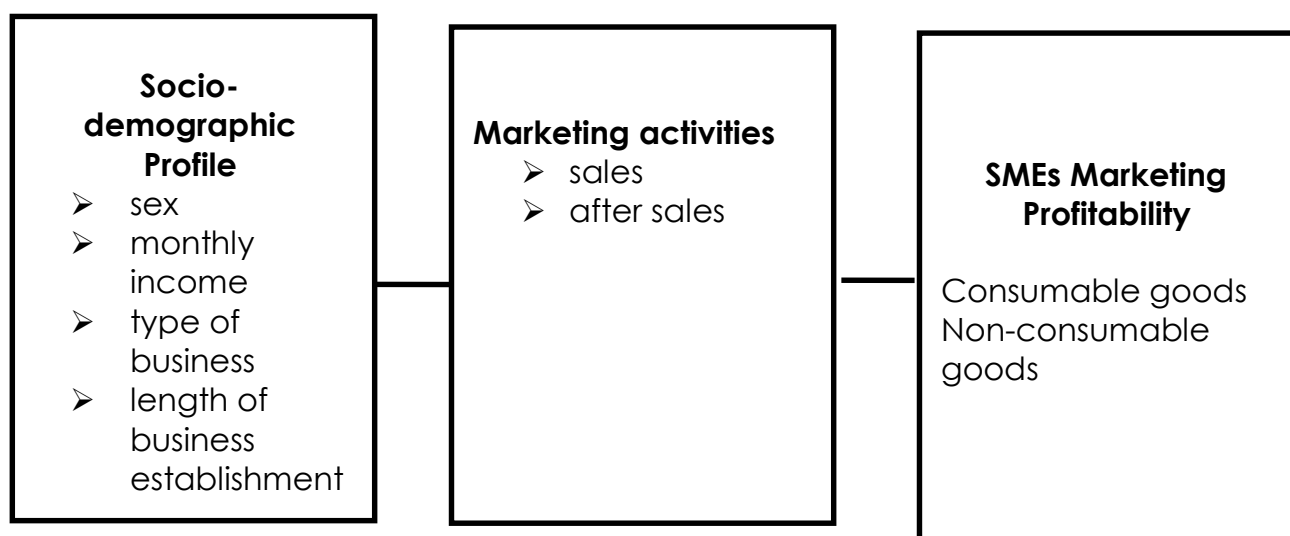


Figure 1. The systematic diagram showing the relationships among the variables used in the study.

A. Research Design

The study utilized a descriptive method of research. Descriptive research is defined as a purposive process of gathering, analysing, classifying and tabulating data about prevailing conditions, practices, beliefs, processes, trends, and making accurate interpretation about such data with or without the aid of statistical method (Calderon, 1993).

It also aims to describe the status, events, places, people, or subjects as they exist (Padua, 2000) and so, in this study, descriptive research will be used to determine the marketing activities and profitability of small and medium enterprises’ owners in the Municipality of Estancia, Province of Iloilo that could recompense the loss of the fishing industries which lead to the socio-economic development of the place.

The researcher likewise employed the correlation research of the descriptive method to determine the relationships between the independent and dependent variables. The researcher used the quantitative approach to determine the marketing activities and profitability of SME’s in the Municipality of Estancia, Iloilo. This method deemed appropriate for the present study because it sought to describe marketing activities and profitability of SME’s respondents.

B. Participants of the Study

The respondents of the study are the small and medium enterprises owners in Estancia, Iloilo. According to the LGU, there are 250 SMEs establishments operating in the locality.

Random sampling was used to identify the respondents and the Cochran’s Formula as a means to determine the sample size:

$$\begin{aligned}
 N &= \frac{\frac{t^2 PQ}{d^2}}{1 + \frac{1}{N} \left(\frac{t^2 PQ}{d^2} - 1 \right)} \\
 &= \frac{\frac{(1.96)^2 (0.5)(0.5)}{0.05}}{1 + \frac{1}{250} \left[\frac{(1.96)^2 (0.5)(0.5)}{0.05} - 1 \right]} \\
 &= \frac{384.16}{1 + \frac{1}{250} (383.16)} \\
 &= \frac{384.16}{2.53264} \\
 &= 151.68 \\
 &= 152
 \end{aligned}$$

Where:

N = Total population (250)

t = area of both tails at 1.96

d = margin of error at 0.05

p = is the estimated proportion of an attribute that is present in population (0.5)

q = estimated of variance (0.5)

Instrument Development

In gathering the data for the study, the researcher – made questionnaire was used. It consists of two parts: Part 1: Socio-demographic profile of small and medium enterprise owners Part 2: Determination of marketing activities (sales and after sales) and profitability of small and medium enterprise owners which consists of the items with the corresponding rating scale and verbal interpretation such as: 1= never, 2= seldom, 3=fairly often, 4=often and 5= all the time respectively.

Further, to determine the level of marketing activities and profitability, the researcher used the following rating scale and verbally interpreted as follows:

Grand Mean values Verbal Interpretation

4.21 - 5.0	-	outstanding
3.41 - 4.20	-	Satisfactory
2.61 - 3.40	-	Satisfactory
1.81 - 2.60	-	Moderately Satisfactory
1.00 - 1.80	-	Unsatisfactory

The questionnaire was subjected to validation by a panel of jurors who are knowledgeable of the topic. They determined whether the items were accepted, rejected or revised. The researcher set an 80% agreement to all items as recommended by the jurors.

The questionnaire were submitted for reliability testing to 30 owners of small and medium enterprises in Balasan, Iloilo utilizing Cronbach Alpha.

The 0.05 significant level was used as the basis for accepting or rejecting the null hypotheses.

C. Data Gathering Procedure

Data Gathering and Procedure

After having established the validity and reliability of the questionnaire, the instrument was reproduced according to the number of respondents. The survey was fielded from to November 2016 to December 2016. Prior to the conduct of the study, the researcher gave a letter of request to the respondents of the study to grant her permission to administer her researcher - made questionnaire. The respondents were given copies of the validated instruments, with assurance that their answers will be treated with confidentiality.

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To obtain a high percentage of return, the researcher distributed the questionnaire personally and retrieved them on the agreed schedule. The data gathered were tallied, interpreted, and analysed.

Data Analysis and Interpretation Procedure

For the interpretation of data, the following statistical tools were used:

Frequency counts was used to determine the responses of the respondents when they were classified according to their socio demographic profile.

Mean was used to determine the perceptions of the respondents towards the level of marketing activities and profitability of small and medium enterprises.

T- test was used to determine the significant difference of the level of marketing activities of SMEs owners when they were grouped according to the following: sex, monthly income, type of business, and marketing activities.

This was also used to determine the significant difference of the profitability of SMEs owners when they were grouped according to the following: sex, monthly income, type of business, and length of business.

Person- r was used to determine the significant relationship between the level of marketing activities and the level of profitability of small and medium enterprises when they were classified according socio demographic profile.

Profile of the Respondents

The data came from a questionnaire that was completed by 152 Small and Medium Enterprises (SMEs) business owners from various business establishments in Estancia, Iloilo. The socio-demographic characteristics of the small and medium enterprises / owners are summarized in table 2.

The survey population contained a higher concentration of female SME's owners, as 108 (71.1 per cent) respondents while 44 (28.90 per cent) are male SME's owners or a difference of 64 (42.11 percent).

Table 2 shows two type of business that continue to thrive and prosper in the municipality of Estancia, 99 (65.10 per cent) respondents are into selling non-consumable goods which are more dominant in the market and 53 (34.90 percent) are engaged in selling consumable goods.

Eighty five (85) respondents of 55.90 per cent whose length of business is above 5 years while 67 (44.10 per cent) respondents whose length of business is 5 years and below.

Likewise, ninetyfour (94) respondents have monthly income of 31,000 and below (61.80 per cent) while 58 respondents having monthly income of 31,000 and above (38.20 per cent).

Table 2. SMEs Personal and Business Profile.

VARIABLES	FREQUENCY	PERCENTAGE
Sex		
Male	44	28.90
Female	108	71.10
Total	152	100.00
Monthly Income		
31,000 and above	58	38.20
Below 31,000	94	61.80
Total	152	100.00
Type of Business		
Consumable	53	34.90
Non-Consumable	99	65.10
Total	152	100.00
Length of Business		
5 years and below	67	44.10
Above 5 years	85	55.90
Total	152	100.00

Presentation of Data/Results

Level of Marketing Activities of the Respondents in Terms of Sales

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The data in table 3 presents similarities in the degree of assessment on the level of marketing activities in terms of sales as perceived by the respondents. All the ten (10) items were found to be “very satisfactory” with a grand mean of 3.64. 1-“Greetings customers” (x=3.77); 2- “Assisting customers” (x=3.77); 3- “Staying in the store to guide staff” (x=3.45); 4- “Offer discount for frequent customers” (x=3.45); 5- “Making products available at all times” (x=3.59); 6- “Being ready for customers’ questions” (x=3.61); “Offering prices among the competitors” (x=3.51); 8- “Maintaining friendly atmosphere while taking talking to the customers” (x=3.78); 9- “Asking questions to the customers in order to know what they need (x=3.78); 10- “Maintaining proper display of products with tags (x=3.63).

Table 3. Level of marketing activities of the SMEs in terms of sales

Marketing activities	Mean	Description
1. Greeting customers.	3.70	Very satisfactory
2. Assisting customers.	3.77	Very satisfactory
3. Staying in the store to guide staff.	3.61	Very satisfactory
4. Offer discounts for frequent customers.	3.45	Very satisfactory
5. Making products available at all times.	3.59	Very satisfactory
6. Being ready for customer’s questions.	3.61	Very satisfactory
7. Offering prices among the competitors.	3.51	Very satisfactory
8. Maintaining friendly atmosphere while talking to the customers	3.70	Very satisfactory
9. Asking questions to the customers in order to know what they need	3.78	Very satisfactory
10. Maintaining proper display of products with tags.	3.63	Very satisfactory
Grand Mean	3.64	Very satisfactory

Grand Mean values Description

4.21 - 5.0	-	Outstanding
3.41 - 4.20	-	Very Satisfactory
2.61 - 3.40	-	Satisfactory
1.81 - 2.60	-	Moderately Satisfactory
1.00 - 1.80	-	Unsatisfactory

Level of Marketing Activities of the Respondents in Terms of After Sales

Table 4 presents the level of marketing activities of the small and medium enterprises in term of after sales. The level of marketing activities of the respondents in terms of after sales fall within two categories namely “very satisfactory” and “satisfactory”. Perceived within the range of “very satisfactory” are marketing activities 1- “Assisting customers as to the proper handling” (x=3.51); 4-“Providing follow-up call to customers” (x=3.34); 5- “Providing remedies to customers”(x=3.47); 6- “Implementing the usual “no return no exchange policy” to customers (x=3.53); 7-“ Saying thank you after selling the products to the customers” (x=3.68); 8-“Cordial and nice to customers anywhere”(x=3.75); 9- “Making sure that the change is given”(x=13.72); 10-“ Giving the necessary receipts of purchased to the customers after products were sold” (x=3.52); and perceived within the range of “satisfactory” 2-“ Giving a call or text to customers after product delivery” (x=3.19); and 3-“Giving tips as to how customers should take care of their purchases” (x=3.21).

Table 4. Level of marketing activities of the SMEs in terms of after sales

Marketing activities	Mean	Description
1. Assisting customers as to the proper handling	3.51	Very satisfactory
2. Giving a call or text to customers after product delivery.	3.19	Satisfactory
3. Giving tips as to how customers should take care of their purchases.	3.21	Satisfactory
4. Providing follow – up call to customers.	3.34	Very satisfactory
5. Providing remedies to customers.	3.47	Very satisfactory
6. Implementing the usual “no return no exchange” policy to the customers.	3.53	Very satisfactory
7. Saying thank you after selling the products to the customers.	3.68	Very satisfactory
8. Cordial and nice to customers anywhere.	3.75	Very satisfactory

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9.	Making sure that the customer's change is given.	3.72	Very satisfactory
10.	Giving the necessary receipts of purchase to the customers after products were sold.	3.52	Very satisfactory
Grand Mean		3.49	Very satisfactory

Grand Mean values Description

4.21 - 5.0	-	Outstanding
3.41 - 4.20	-	Very Satisfactory
2.61 - 3.40	-	Satisfactory
1.81 - 2.60	-	Moderately Satisfactory
1.00 - 1.80	-	Unsatisfactory

Level of Marketing Activities (Sales) when Respondents were Grouped According to Profile

The data in Table 5 present similarities in the degree of perception on the level of marketing activities (sales) when respondents were grouped according to profile. All the 4 categories were found to be "very satisfactory". The following categories are as follows: A. Sex: "male" (x=3.48); "female" (x=3.78); B. Monthly Income: "31,000 and above" (x=3.70); below 31,000 (x=3.60); C. Type of Business: "consumable" (x=3.58); "non-consumable" (x=3.58); D. Length of Business: "5 years and below" (x=3.66); and "above 5 years" (x=3.62).

Table 5. Level of marketing activities (Sales) when respondents were grouped according to profile.

VARIABLES	MEAN	DESCRIPTION
Sex		
Male	3.48	Very satisfactory
Female	3.71	Very satisfactory
Monthly Income		
31,000 and above	3.70	Very satisfactory
Below 31,000	3.60	Very satisfactory
Type of Business		
Consumable	3.75	Very satisfactory
Non-Consumable	3.58	Very satisfactory
Length of Business		
5 years and below	3.66	Very satisfactory
Above 5 years	3.62	Very satisfactory

Level of Marketing Activities (after sales) when Respondents were Grouped According to Profile

Table 6 presents the data of the level of marketing activities (after sales) when respondents are grouped according to profile. Only the category under Sex has a "satisfactory" rating "Male" (x=3.24); the rest of the categories were found to be "very satisfactory", Sex-"Female" (x=3.60); Monthly Income- "31,000 and above" (x=3.56); "Below 31,000" (x=3.45); Type of Business- "Consumable" (x=3.54); "Non-consumable" (x=3.46); Length of business- "5 years and below"(x=3.44); and "Above 5 years" (x=3.53).

Table 6. Level of Marketing Activities (After Sales) when Grouped According to profile.

VARIABLES	MEAN	DESCRIPTION
Sex		
Male	3.24	Satisfactory
Female	3.60	Very satisfactory
Monthly Income		
31,000 and above	3.56	Very satisfactory
Below 31,000	3.45	Very satisfactory
Type of Business		

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Consumable	3.54	Very satisfactory
Non-Consumable	3.46	Very satisfactory
Length of Business		
5 years and below	3.44	Very satisfactory
Above 5 years	3.53	Very satisfactory

Level of Profitability (Consumable Goods) of the SMEs

The data in Table 7 present similarities in the level of profitability of Small and Medium Enterprises(SMEs) owners when they are grouped in terms of consumable goods. All the 10 marketing activities were found to be "satisfactory" with a grand mean of 3.01. 1(x=3.09)- "Pastries" (x=3.07); 2- "Bottled Water" (x=2.97); 3- "Fruits" (x=2.99); 4- "Vegetables" (x=3.09); 5- "Burger" (x=3.06); 6- "Beverages" (x=3.09); 7- "Laundry Products" (x=3.02); 8- " Condiments" (x=2.94); 9- "Canned goods" (x=2.87); 10- "Sanitary needs" (x=2.96).

Table 7. Level of Profitability (Consumable) of the SMEs

Marketing activities	MEAN	DESCRIPTION
1. Pastries	3.07	Satisfactory
2. Bottled Water	2.97	Satisfactory
3. Fruits	2.99	Satisfactory
4. Vegetables	3.09	Satisfactory
5. Burger	3.06	Satisfactory
6. Beverages	3.09	Satisfactory
7. Laundry Products	3.02	Satisfactory
8. Condiments	2.94	Satisfactory
9. Canned Goods	2.87	Satisfactory
10. Sanitary Needs	2.96	Satisfactory
Grand Mean	3.01	Satisfactory

Level of Profitability (Non-Consumable Goods) of the SMEs Owners

Table 8 shows that the perceived level of profitability of the SMEs owners in terms of non-consumable goods is "satisfactory", this is shown by the grand mean of 2.85. Similarly, all 10 items were also found to be "satisfactory". 1- "Office Supplies (x=2.87); 2- "School supplies" (x=2.77); 3- " furniture" (x=2.75); 4- "Beauty products" (x=2.77); 5- " Laptop" (x=2.88); 6- "Auto supply" (x=2.78); 7- "Gadgets" (2.91); 8-"Electrical supplies" (x=2.75); 9-"construction supplies" (x=2.95); 10- "Appliances" (x=2.93)

Table 8.Level of profitability (non-consumable) of the SMEs

Marketing activities	MEAN	DESCRIPTION
1. Office Supplies	2.87	Satisfactory
2. School Supplies	2.77	Satisfactory
3. Furniture	2.75	Satisfactory
4. Beauty Products	2.77	Satisfactory
5. Laptop	2.88	Satisfactory
6. Auto Supply	2.78	Satisfactory
7. Gadgets	2.91	Satisfactory
8. Electrical Supplies	2.95	Satisfactory
9. Construction Supplies	2.91	Satisfactory
10. Appliances	2.93	Satisfactory
Grand Mean	2.85	Satisfactory

Level of Profitability (Consumable Goods) when Grouped According to Profile

Table 9 also shows similarity in the level of profitability of SMEs owners in Estancia, in terms of consumable goods. All the 8 items under the four categories namely, sex, monthly income, type of business, and length of business, were found to be "satisfactory".

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1- "Male" ($x=2.98$); 2- "Female" ($x=3.02$); 3- "31,000 and above" ($x=2.86$); 4- "Below, 31,000" ($x=3.11$); 5- "Consumable good" ($x=3.02$); 6- "Non-consumable goods" ($x=3.00$); 7- "5 years and below" ($x=3.18$); and 8- "Above 5 years" ($x=2.88$).

Table 9. Level of profitability (consumable) when grouped according to profile.

VARIABLES	MEAN	DESCRIPTION
Sex		
Male	2.98	Satisfactory
Female	3.02	Satisfactory
Monthly Income		
31,000 and above	2.86	Satisfactory
Below 31,000	3.11	Satisfactory
Type of Business		
Consumable	3.02	Satisfactory
Non-Consumable	3.00	Satisfactory
Length of Business		
5 years and below	3.18	Satisfactory
Above 5 years	2.88	Satisfactory

Level of Profitability (Non-consumable Goods) when Grouped According to Profile.

The data in Table 10 also presents similarity in the perceived level of the respondents in terms of profitability (non-consumable goods) when they are grouped according to profile. All 8 items under the four categories namely, sex, monthly income, type of business, and length of business were found to be "satisfactory". 1- "Male" ($x=2.83$); 2- "female" ($x=2.87$); 3- "31,000 and above" ($x=2.87$); 4- "Below 31,000" ($x=2.87$); 5- "Consumable" ($x=2.82$); 6- "Non-consumable goods" ($x=2.87$); 7- "5 years and below" ($x=3.03$); 8- "Above 5 years" ($x=2.73$).

Table 10. Level of profitability (non-consumable) when grouped according to profile.

VARIABLES	MEAN	DESCRIPTION
Sex		
Male	2.83	Satisfactory
Female	2.87	Satisfactory
Monthly Income		
31,000 and above	2.79	Satisfactory
Below 31,000	2.89	Satisfactory
Type of Business		
Consumable	2.82	Satisfactory
Non-Consumable	2.87	Satisfactory
Length of Business		
5 years and below	3.03	Satisfactory
Above 5 years	2.73	Satisfactory

Differences in the Level of Marketing Activities between SMEs Owners' Sex

This study found out that there was a significant difference in the level of marketing activities between the respondents' sex using t-test a statistical tool. As shown in table 11, the computed value or the probability is 0.022, $t(152)=-2.312$ which is lower than 0.05 alpha level of significance. It is assumed that female respondents are more aware of marketing activities as compared to their male counterpart.

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Table 11. Test for Differences in the Level of Marketing Activities between Sex of the SMEs Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
2.51	.115	-2.312	152	0.022	-27218	.1177	-.50475	-03961	Significant

*p<0.05 (significant)

Differences in the Level of Marketing Activities between SMEs Owners' Monthly Incomes

Presented in table 12 is the result of the independent sample t-test on the differences in marketing activities of the respondents according to their monthly income. With alpha level .05, this study did not reveal any statistically significant differences between monthly income of 31,000 below and 31, 000 above ($t(152) = 0.885, p=0.378$).

Table 12. Test for Differences in the Level of Marketing Activities between Monthly Income of the SME's Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
0.169	.681	.885	152	0.378	.09870	.11154	-.12169	.31909	Not Significant

*p > 0.05 (not significant)

Differences in the Level of Marketing Activities between SMEs Owners' Type of Business

Table 13 displays the result of comparison of consumables goods and non – consumables goods as a type of business of the respondents. There appears to be no significant difference in the level of marketing activities between the groups of consumable and non – consumable ($t(152) = 1.002, p=0.308$).

Table 13. Test for Differences in the Level of Marketing Activities between Type of Business of the SMEs Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
0.091	.763	1.022	152	0.308	.11611	.11369	-.10835	.34057	Not Significant

*p > 0.05 (not significant)

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Differences in the Level of Marketing Activities between SMEs Owners' Lengths of Business

With an alpha level 0.05, the results demonstrated clearly in table 14 that there was no significant difference in the level of marketing activities between the length of business ($t(152) = .340, p = 0.734$) of SMEs owner

Table 14. Test for Differences in Marketing Activities between Length of Business of the SMEs Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
2.374	.125	-.340	152	0.734	-.03716	.10938	-.25328	.17895	Not Significant

* $p > 0.05$ (not significant)

Differences in the Level of Profitability between SMEs Owners' Sex

Presented in table 15 is the result of independent sample t-test on the differences in profitability of the respondents according to their sex. With alpha level of 0.05, this study did not reveal any statically significant differences in the level of profitability between male and female. ($t=152$) = .259, $p = 0.796$ in terms of the level of profitability.

Table 15. Test for Differences in Profitability between Sex of the SMEs Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
1.083	.300	-.259	152	0.796	-.03868	.14932	-.33372	.25637	Not Significant

* $p > 0.05$ (not significant)

Differences in the Level of Profitability between SMEs Owners' Monthly Income

Results indicate as shown in table 16 that there was no substantial difference in the level of profitability in terms of monthly income of the respondents. ($t=152$) = -1.279, $p = 0.203$

Table 16. Test for Differences in Profitability between Monthly Income of the SMEs Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
1.566	.213	-1.279	152	0.203	-.17731	.13868	-.45134	.09672	Not Significant

* $p > 0.05$ (not significant)

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Differences in the Level of Profitability between SMEs Owners' Types of Business

Table 17 illustrates that there was no statically significant differences as to the level of profitability between type of business ($t=152$) = -.095, $p = 0.924$) of the respondents.

Table 17. Test for Differences in Profitability between Type of Business of the SMEs Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
.002	.961	-.095	152	0.924	-.01352	.14213	-.29436	.26732	Not Significant

* $p > 0.05$ (not significant)

Differences in the Level of Profitability between SMEs Owners' of Length of Business

With an alpha level 0.05, the results demonstrated clearly in table 18 that there was a substantial deference in the level of profitability between the length of business ($t(152) = 2.080$, $p = 0.039$).

Table 18. Test for Differences in the Level of Profitability between Length of Business of the SMEs Owners

Levene's Test for Equality of Variances		t-test for Equality of Means							
F	Sig.	T	Df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Confidence Interval of the Difference		Probability
							Lower	Upper	
.080	.777	2.080	152	0.039	.27978	.13450	.01401	.54555	Significant

* $p < 0.05$ (significant)

Relationship between the Level of Marketing Activities and the Level of Profitability of SME's Owners

Table 19 below represents the results of a Spearman's rho paramedic test of correlations with an alpha level of 0.05. Finding revealed that there was no statistically significant positive correlation between marketing activities and profitability of SME's ($r = -0.025$, $N = 152$, $p = 0.755$).

Table 19. Relationship between the Level of Marketing Activities and the Level of Profitability of SMES

Category	Spearman's rho Value	Significance (2-tailed)	Probability
Marketing Activities and Profitability	-0.025	0.755	Not Significant

* $p < 0.05$ (significant)

2. RESULTS AND DISCUSSION

Analysis of the study

Identify the socio demographic profile of small and medium enterprises (SMEs) owners in terms of sex, monthly income, type of business, and length of business establishment.

The data was generated from 152 small and medium enterprises owners in Estancia, Iloilo using a teacher-made questionnaire as the main data gathering instrument.

Sex. In terms of sex of the total 152 SMEs owners 108(71.10%) were females and 44(28.70%) were males. In other words, majority of the SMEs establishments in the town are owned and managed by women entrepreneurs. Obviously, women outnumbered the men insofar as business in the locality is concerned.

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Monthly Income. Majority of the Small Medium Enterprises (SMEs) owners in the place have monthly income below 31,000, 95(61.80%), while 58 (38.20%) generate a monthly income of 31,000 and above. The figure implies that owners of SMEs in the locality are neither rich nor poor but may be classified as part of the middle class in reference to the economic strata of the country which pictures out the pyramidal positions of classes where majority are poor at the bottom, a considerable middle class at the center and a few wealthy class at the top.

Type of Business. The town is 135 kilometers away from the city of Iloilo and apparently, the residents' day to day life necessitate the use of goods that are either consumable or non-consumable for their maintenance or survival and thus, majority of SMEs owners are engaged in selling non-consumable goods 99(65.10 percent) and 53 (34.90 percent) are into consumable goods.

Length of Service. Estancia is known around the country as a center for commercial fishing, so much so that it shares to carries the name of "Alaska" of the Philippines, with Carles (the true Alaska of the Philippines) as a testament to its location adjacent to Carles' bountiful marine resources (www.estancia.gov.ph). The turn of events characterized with political and economic development and upheavals have indeed paved the way for the introduction of SMEs in the town. Due to the continuing decline of the once flourishing marine industry in the town, residents and migrants alike have started to engage into SMEs hence, the number of years of their operations are only limited to above 5 years 85(55.90 percent) and 5 years and below 67(44.10 percent). As shown by the data, majority of SMEs owners in the place have been into business for more than 5 years.

Level of Marketing Activities in Terms of Sales

The "very satisfactory" marketing activities of the SMEs owners in Estancia maybe due to their sense of concern for customers and market place (Collins and Shaw, 2001). As expected, when ideals state of affairs cannot be met, at least certain aspects of it are achieved as what SMEs owners are doing in their business venture and activities in the locality. The identified marketing activities of SMEs included in this study were all found to be at the forefront of their marketing activities.

The result is partly supported by the findings of Awan, A.G. & Hashmi, M.S., 2014) in their study "marketing practices of small and medium size enterprises: a case study of SMEs in Multan district", wherein they stated that "SMEs knowledge of the products and market helps entrepreneurs to build and maintain their customers and communication skills will help entrepreneurs to build and maintain their customers. The practices of the SMEs owners that could attract and motivate customers to patronize their business products are extremely important for the success of their business endeavors.

Level of Marketing Activities after Sales

The marketing activities of the SMEs owners in Estancia was generally "very satisfactory". These findings are supported by one of the 20 traits of great sales people, which says that, " Salespeople don't think in terms of sales but rather in terms of building a business. Great sales people are building a business, not just trying to make a sale. When you think beyond a sale, you're going to get other people's attention much more easily. They're going to be more interested in what you have to say. You want something that's going to survive beyond one sale" (Cardone, G., 2012).

Marketing activities do not end after the sales are made. After sales service refers to various processes which make sure customers are satisfied with the products and services of the organization (www.managementstudyguide.com). According Levitt (1983, in Egonsson,E., et al, 2013), the sale of a product is only the beginning of a seller-buyer relationship where the long term-bond between the two parties is the key for long-term profitability.

As shown by the result of the study, most of the marketing activities after sales of the SMEs owners exemplify the ideal marketing strategies of business organization including SMEs.

Level of Marketing Activities (Sales) When Grouped According to Profile

Result of this study showed that the marketing activities of SMEs owners in Estancia when they are grouped according to profile was "very satisfactory". This finding implies that there are similarities in the level of marketing activities among respondents when they are grouped according to profile.

Level of Marketing Activities (after sales) when Grouped According to Profile

The level of marketing activities of SMEs owners in Estancia after sales was generally "very satisfactory". This finding indicates that SMEs owners do not only react to the current behavior and needs of their customers but also have marketing skills that allow them to project and anticipate customers future needs and buying behavior. Their relationship with customers is not a once and for all deal that terminates right after the transaction but are characterized with elements that enabled customers to go back and sustain the so called "customer and seller" relationship.

Level of Profitability (Consumable Goods)of the SMEs

Result of this study shows that the SMEs owners in the locality are doing fairly well in their business activities relative to certain consumable product-lines included in this study. Their level of profitability when they are grouped in terms of consumable goods

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was “satisfactory”. Consumables (also known as consumable good, nondurable goods, or soft goods) are goods that according to the 1913 edition of Webster Dictionary, are capable of being consumed that maybe destroyed, dissipated, wasted, or spent. John Locke specified these as consumable commodities (online dictionary).

The “satisfactory” level of profitability of SMEs owners in relation to certain consumable products may be attributed to the fact that these products are goods that require replacement because they are used up or transformed in their use. The market for these goods tends to be consistent and can be strong place for investment even during periods of economic uncertainty, as the need for such products cannot be put off by consumers.

Level of Profitability of Non-Consumable Goods

The findings of this study showed similarities in the level of profitability of non-consumable goods that are being sold by SMEs owners in Estancia, Iloilo. The level of profitability of SMEs owners in Estancia in terms of non-consumable goods is “satisfactory”. According to Robert, J.L. (2016), “in reality there is really no such thing as a non-consumable goods, as every good is consumed, consumable referring to being used up rather than eaten”. Non-consumable goods as being referred in this study pertain to goods that are durable. As shown by the findings of this study, despite of the fact that these goods are durable, but yet their marketing performance and profitability have been marked to be “satisfactory”.

Level of Profitability of SMEs Owners in terms of(Consumable Goods) when Grouped According to Profile

Results show that the level of profitability of SMEs owners in terms of consumable goods remain the same even if respondents are grouped according to sex, monthly income, type of business, and length of business. These product-lines are profitable in the locality.

These findings are indications that there is a sense of sustainability if one will engage into making business with such goods. Likewise, it indicates that consumable products tend to be included as part of man’s fundamental needs and hence, cannot be sacrificed despite scarcity and financial insecurity among consumers.

Level of Profitability of SMEs Owners in terms of (Non-Consumable goods) when Grouped According to Profile

When respondents are taken as a whole and grouped according to sex, monthly income, type of business, and length of business, the level of their profitability remains constant vis-à-vis their sales on non-consumable goods. Their level of profitability is “satisfactory”. This finding implies that the level of profitability of the SMEs owners in the locality is not influenced by their socio demographic profile. Their level of profitability can be associated to the goods that they are selling like non-consumable goods examples of which were included as variables of this study.

Differences in the Level of Marketing Activities between SMEs Owners in terms of Sex

The result of this study showed a significant difference in the level of marketing activities when respondents were grouped according to sex. The difference is supported by Ritson, M.(2013) wherein he stated that “women have a massive genetic advantage when it comes to marketing: their brains are better designed for it”.

Difference in the Level of Marketing Activities between SMEs Owners Monthly Income

Result of the study showed that there is no significant difference in the marketing activities of the SMEs owners when they are grouped according to monthly income. The findings revealed that regardless of the difference in the percentage of those who are earning a monthly income of 31,000 and above and those whose monthly income are below 31,000, their marketing activities appear to be the same. The result of no significant difference indicates that in cases where there are differences in the SMEs level of marketing activities and insofar as this study is concerned the difference can never be attributed to the monthly income.

Difference in the Level of Marketing Activities between Type of Business of the SMEs Owners

It is very interesting to know that there is no significant difference in the marketing activities among SMEs owners when they are grouped according to type of business. The findings implied that the type of business whether consumable or non-consumable cannot be used as a reference in determining the difference in the marketing activities among SMEs owners in Estancia. Likewise, it indicates that the marketability of the both consumable and non-consumable goods tends to be the same.

Difference in the Marketing Activities between Length of Business of the SMEs Owners

Another surprising result showed that there is no significant difference in the marketing activities among SMEs owners when they are grouped according to length of their business. It means that regardless whether an SME’s owner has been in business for more than 5 years or less than 5 years their marketing activities tend to be parallel with each other. They tend to share common degree of marketing activities insofar as length of business is concerned.

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Differences in the Profitability between Sexes of the SMEs Owners

Results of the study shows that the level of profitability of SMEs owners in Estancia when they are grouped according to sex is not significant. The degree of difference between the percentage of males and females SMEs owners does not affect their level of profitability. It could be contended therefore, that on the basis of this finding the SMEs owners in Estancia are fairly doing well vis-à-vis profitability of their business is concerned.

Differences in the Level of Profitability between SMEs Owners' Monthly Incomes

It also quite surprising to know that the difference in percentage between SMEs owners in Estancia who are earning a monthly income of 31,000 and above and those whose monthly income is below 31,000 is quite high, and yet when they are grouped and subjected to a t-test at 0.05 alpha level to test the degree of difference, a no significant difference was found. Their level of profitability is not directly related to the difference in their monthly income.

Difference in Profitability between Types of Business of the SMEs Owners

The result of this study also revealed that there is no significant difference in the profitability of SMEs owners when they are grouped according to types of business. Findings also showed that their profitability level remains the same regardless as to whether they are engaged in selling consumable or non-consumable goods.

Difference in the Level of Profitability between SMEs Owners Length of Business

When SMEs owners are grouped according to length of business, their profitability level showed a significant difference. This finding implies that the length of business are normally associated with experiences, knowledge, and the development of effective skills in doing marketing jobs. Likewise, marketing strategies are also being developed and reinforced as one's experiences continue to progress and move forward.

Level of Relationship between the Level of Marketing Activities and the Level of Profitability of SMEs

As shown by the result of the study, there is no significant relationship between the level of marketing activities and the level of profitability among SMEs owners in Estancia. It implies that profitability level is not significantly related to the level of marketing activities. The level of profitability of the respondents' is independent of their marketing activities.

3. CONCLUSION

Findings of the Study

On the socio demographic profile of small and medium enterprises (SMEs) owners in terms of sex, monthly income, type of business, and length of business.

Majority of the SMEs owners in Estancia are females. Among SMEs owners in Estancia, there is a big margin of difference between those who are engaged in selling consumable and non-consumable goods. Majority of the SMEs owners in the town have income below 31,000 and likewise, majority of them have been in business for more than 5 years from time of survey of this study.

On the level of marketing activities of small and medium enterprises (SMEs) owners in terms of sales and after sales when they were taken as an entire group, and grouped according to sex, monthly income, type of business, and length of business establishment.

Level of Marketing Activities (sales) and after sales of SMEs Owners:

The level of marketing activities of SMEs owners in Estancia as a whole, in terms of sales was found out to be "very satisfactory". While the respondents' level of marketing after sales were found out to be "satisfactory" on certain categories and "very satisfactory" on most categories.

On the other hand, when respondents were grouped according to profile, their level of marketing in terms of sales was found to be "very satisfactory". However, the marketing activities in terms of after sales differed when respondents were grouped according to sex the "male" was found to have a "satisfactory" rating while the "female" and the rest of the categories were found to be "very satisfactory".

The result is partly supported by the findings of Awan, A.G. & Hashmi, M.S., (2014) in their study "marketing practices of small and medium size enterprises: a case study of SMEs in Multan district", wherein they stated that "SMEs knowledge of the products and market helps entrepreneurs to build and maintain their customers and communication skills will help entrepreneurs to build and maintain their customers. The practices of the SMEs owners that could attract and motivate customers to patronize their business products are extremely important for the success of their business endeavors.

On the level of profitability of small and medium enterprises (SMEs) owners in terms of consumable goods and non-consumable good when they are taken as an entire group and when grouped according to sex, monthly income, type of business, and length of establishment.

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When respondents are taken as a whole, the level of profitability of SMEs owners in terms of consumable goods and non-consumable goods is "satisfactory". Likewise, when grouped according to profile the level of profitability of SMEs owners in Estancia in terms of consumable and non-consumable goods is also "satisfactory".

Significant difference in the level of marketing activities of small and medium enterprises (SME's) owners in terms of sales and after sales when they were classified according to sex, monthly income, type of business and length of business establishment.

There is a significant difference in the level of marketing activities of SMEs owners in Estancia, when they are grouped according to sex. The level of marketing activities of female SMEs owners significantly differed from their male counterparts.

However, there is no significant difference in the level of marketing activities of the respondents when they are grouped according to monthly income. Likewise, there is also no significant difference in the level of marketing activities of SMEs owners in Estancia, when they are grouped according to type of business and length of service.

Significant difference in the level of profitability of small and medium enterprises (SME's) owners in terms of consumable goods and non-consumable goods when they are classified according to sex, monthly income, type of business and length of business establishment.

There is no significant difference in the level of profitability of SMEs owners in Estancia, when they are grouped according to profile. Significant relationship between the level of marketing activities and the level of profitability of SMEs owners when they are classified according to sex, monthly income, type of business and length of business establishment.

There is no significant relationship in the level of marketing activities of SMEs owners in Estancia, Iloilo and the level of their profitability.

Conclusions

Based on the findings of the study, the following conclusions are hereby presented:

SMEs owners in Estancia, Iloilo are doing marketing activities regardless of their socio-demographic profile in accordance with the principles and ideals of marketing. The level of their marketing activities both during sales and after sales enabled them to attract customers that patronized their products both consumable and non-consumable not just on case to case basis as walk in customers but as repeat customers and thereby developed the so called "seller and customer relationships".

The profitability level of SMEs owners in Estancia as to type of business when they are grouped according to profile portrayed a typical business operation where profits are naturally generated regardless of external conditions and other intervening corollaries in the conduct of business. Their profitability level remains constant regardless of their socio demographic profile.

Likewise, the profitability of SMEs owners in running their business in the locality is not related to their marketing activities. Regardless of their marketing activities SMEs owners tend to be profitable in their business independent of strategies and other marketing activities that they employed.

RECOMMENDATIONS

To strengthen and encourage more SMEs owners and operators in the town, the Local government Unit (LGU) should provide them with a better local tax system, one that is not burdensome and assist them in terms of location and accessibility of their business to customers and public transport system.

Them to respond to the market demands of their customers especially that the place is currently undergoing a better headway for a cityhood.

SMEs owners should collaborate not only with the LGU but also with the academe in order to enhance their managerial skills and marketing strategies by having a member of the family enrolled in any business courses in the college.

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An Ubiquitous Home Based Food ordering Application



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ABSTRACT: Food ordering apps generally work as mediators between restaurants and customers. It has become easy for the customers to get any food they want from a restaurant to be delivered directly to the home. But there is no option of home cooked food in those food ordering apps. There are times when people staying far from their home feel like having home cooked meals daily and not preferring restaurants. Home chef app works as a bridge between the home chef and the customers hence serving the customers the authentic meals which gives them the feel of home. The app provides them with variety of meal plans from different home cooks from the locality. They can subscribe the meal plan according to their wish. The trial pack makes it easy for one to choose the chef according to his/her need. This way of subscribing the food makes the customer to eat the local homemade food along with the health taken care of. The online mode of payment makes the subscription of meal plan easy. After the successful payment the food will be delivered to the given address according the subscribed plan. Customer feedback will help in good customer chef relationship.

KEYWORDS: Restaurants, Online, App, Home Chef, Plan, Subscription, Feedback

I. INTRODUCTION

Eating out can be a very pleasurable experience but it is healthier to eat at home and usually much more comfortable. These days' people prefer home cooked meals than the restaurant food for their full day schedule to keep themselves healthy and fit. The Home Meals app is nothing but a meal subscription app which allows the users to subscribe for a meal pack based on his or her preferences[1]. This app is a whole new way to order meals that delivers fresh homemade food by the home cooks, straight to the customer's door everyday based on customer's subscription plan. The home cook can add the menu of the meals specifying the categories. The menu consists of the food served for breakfast, lunch and dinner. The customer can look into the menu and subscribe for the meal pack based on the home cook's interest[2]. The cooks can even alter the menu if required. With an option to choose from diet or regular meal plans, the app brings an ability to have authentic homemade food from homemakers around the area. The customer who orders the food can discover local home-based cooks in the nearby locality by specifying the location; he can also view the unique menu and let the chef handle cooking exclusively based on the customer's subscription. Price of the food items or the subscription will also be mentioned in the menu. The customer can select the duration, specify the type of the meal either veg or non-veg and choose the payment options and confirm the order. The users have an option to select duration of one day, or one week or can even subscribe for a month[3]. Rating for the food delivered and the feedback to the chef will also be included in the app to ensure the best user experience. Functionality for users includes preferences for meals, specify veg or non-veg and select the chef based on location preferences. The user can search and browse meals by category. The user also has an option to choose a chef and can try his special meals. A basic communication capability between users and cooks is achieved by a review and feedback page. The new cooks or chef can register to the app as a Chef. He can manage his account, specify the menu, accept or decline the subscription[4]. The chef also has a review page where he gets feedback of his previous orders and helps him improve. The Chef can also add individual items if he wishes to sell the food in the Quick Order option and user can order them if needed. The quick order option also helps the customer to just have a trial of any home cook dishes before he subscribes to the plan.

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II. OBJECTIVE

The major goal of this application is to allow users to have authentic home cooked food. It has an option to choose the chef from whom the user wants to have the meal. It also helps to reduce the dependency on restaurants. This app provides different subscription plans so that the user can choose based on his choice, option to choose the type of meal and try meals from different chef. It provides a platform for the cooks to sell their meals. Cooks need not have to work with the restaurant to sell their meals and provide employment opportunities to home cooks[5].

III. LITERATURE SURVEY

Home Chef allows customers to subscribe their meals from the chef who are nowhere related to any restaurants. They can have homemade food for the period of their subscription. The customers just have to order from the chefs they want and the food will be available for them for the days that they have ordered for. Since our app is similar to apps like Masala Box, Oota Box, Scriberr, etc., we have done a quick check on how it works and what are the features that it provides. It provides with the meal plan based on location and the chef[6]. The users can choose the chef and meal plan based on their wish and order it. It gives us the option to view and order food for either a week or a month. It also has the feature of describing the calories that the food has.

Masala Box: This app allows the customers to get homemade meals delivered with just a click. It allows the users to personalize the profile, add the address and choose the meal plan. All this is done in a simple way with the help of the app. It also allows the customers to stay updated with the new offers and new meal plans. Oota Box: Oota Box has partnered with home makers in over 70 locations who love to cook. The food is prepared in their own houses; they put in all the effort to make the food fresh, hot, healthy and hygienic, in a neatly packed meal box. Customers can use the platform to find a chef around them, connect with them to place an order and have the food either picked up or opt-in for the delivery service if the chef provides one.

IV. DESIGN

Proposed System:

Our app also provides with the homemade food in subscription based on location. The chef can update the food plans using the tags. The customers can view and order for a particular duration. It includes diet and regular plans as well. One just need to select start date, duration and the meals that they want and confirm their subscription by payment. There is also an option of quick order for which one have to select the food items and just order.

A. USE CASE DIAGRAM

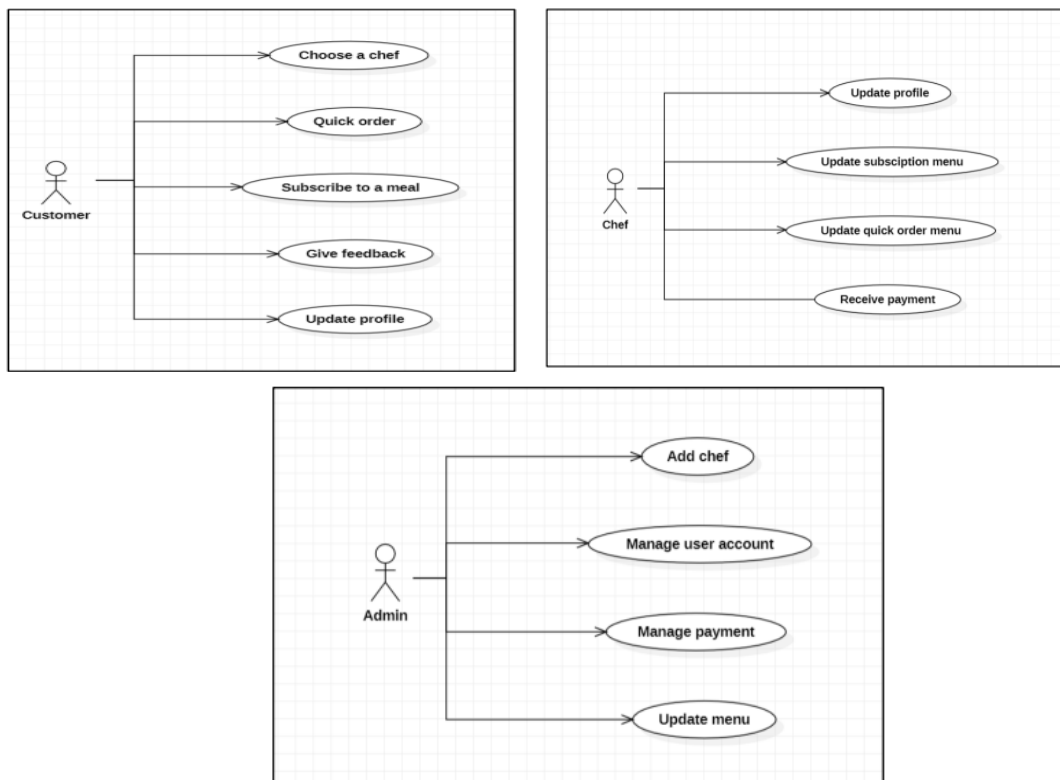


Figure (1): Use case diagram for a. customer, b. Chef, c. Admin

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B. SEQUENCE DIAGRAM

A sequence diagram will be made up of a group of diagrams. Lifelines and the items they represent, as well as the signals they convey during their various interactions, they exchange over time. Subscription and quick order sequence diagrams are shown in Figures (2) and (3). In figure (2) when the customer opens the app, it displays the home page followed by that choose chef to view menu. Then a plan is selected for subscription. The order is placed followed by payment. The figure (3) depicts quick order. Here the customer opens the app and select the chef to view menu. Then a food item is selected for quick order. The order is placed followed by payment.

Subscribe to meal plan:

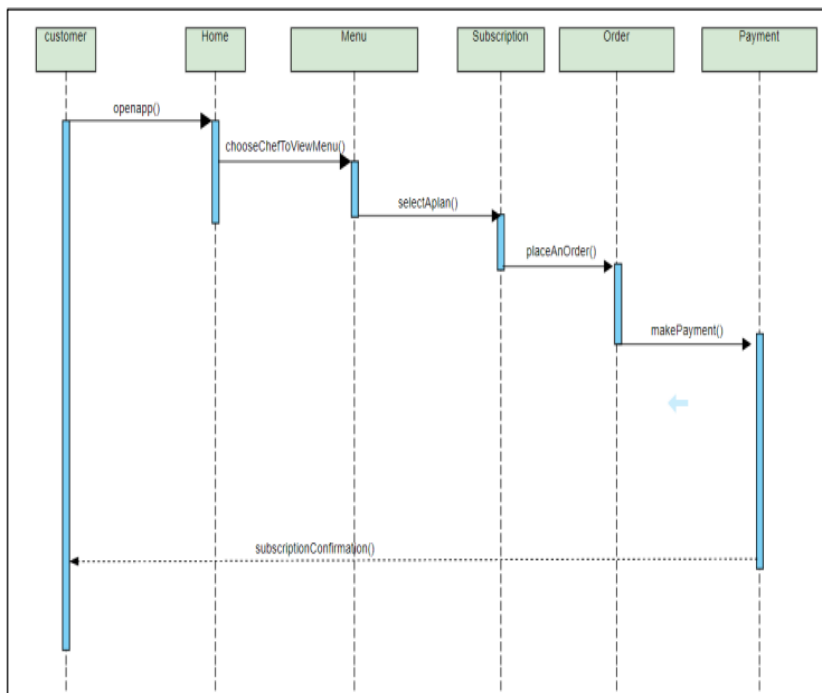


Figure (2): Sequence diagram for subscription

Quick order:

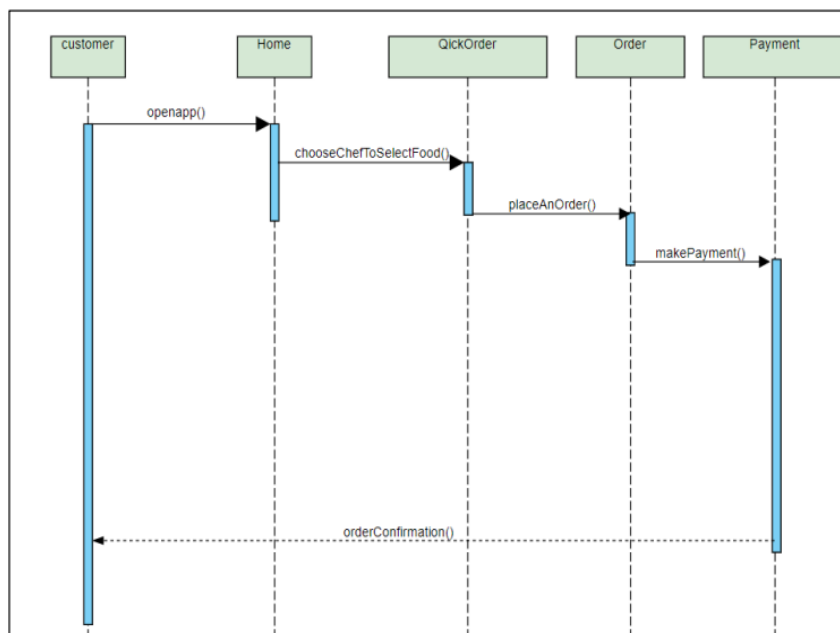


Figure (3): Sequence diagram for quick order

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C. DATABASE SCHEMA

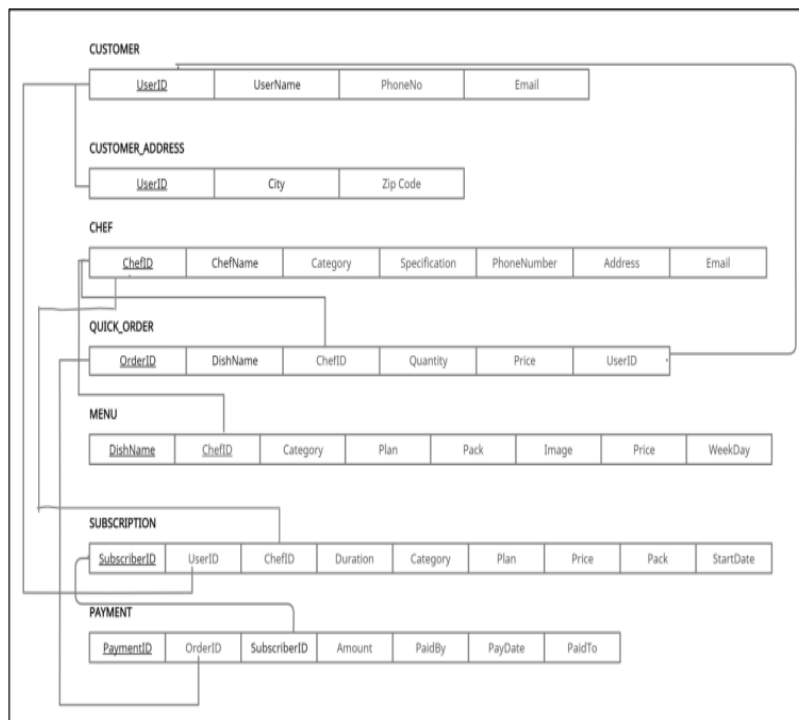


Figure (4): Database schema diagram

V. METHODOLOGY

The project is a mobile application which has two users, the home cooks and the customers. The home cooks add the food for the quick ordering of food to the customers. The cooks can also add a subscription plan for the customers. The menu of the subscription plan is set by the cooks and can be updated if required. The customers can choose a chef based on the location preferences and order a food or can even subscribe to a meal plan for a specified period. The app provides an option to subscribe for a day, or a week or even for a month. The customer has to confirm the order by making a payment. One can unsubscribe to the meal plan prior a day. The customers can also give feedback to the chef which will help the chef improve.

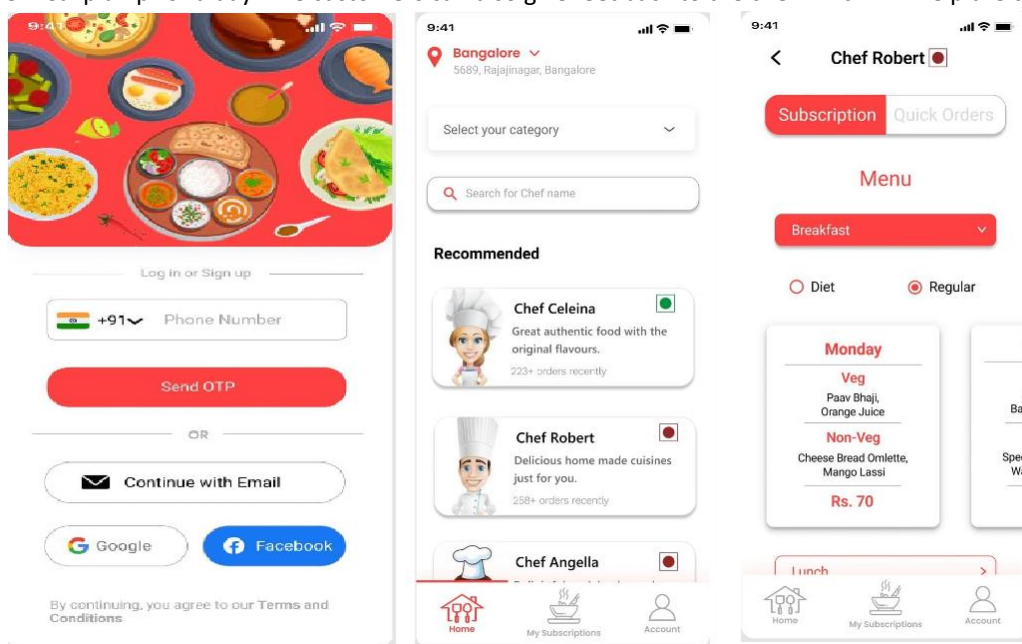


Figure (5): User Interface of Application Access

Home Chef allows customers to subscribe their meals from the chef who are nowhere related to any restaurants. The home chef app allows the home cooks a platform where they can sell their home-made meals directly to the customer without any restaurant involved as a middle man. It provides the users an option to customize their meal plan according to their lifestyle

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either choosing a diet plan or a normal plan. One can easily use the app and subscribe for the meal pack they wish to subscribe from the chef of their choice. The app also provides the user to have different subscription plans based on his preferences. The review and feedback option helps the chef to improvise based on customers feedback which will help them for next orders. The quick order option helps the chef to sell individual items and the customer can order it if required.

The user can login to the app using his or her phone number. The person will be logged in to the app on entering the OTP received. The other ways of logging in is through Email, Google or Facebook. On successful login the customer will receive a screen where he/she has to enter the location followed by which a list of all chefs available in that particular location will appear.

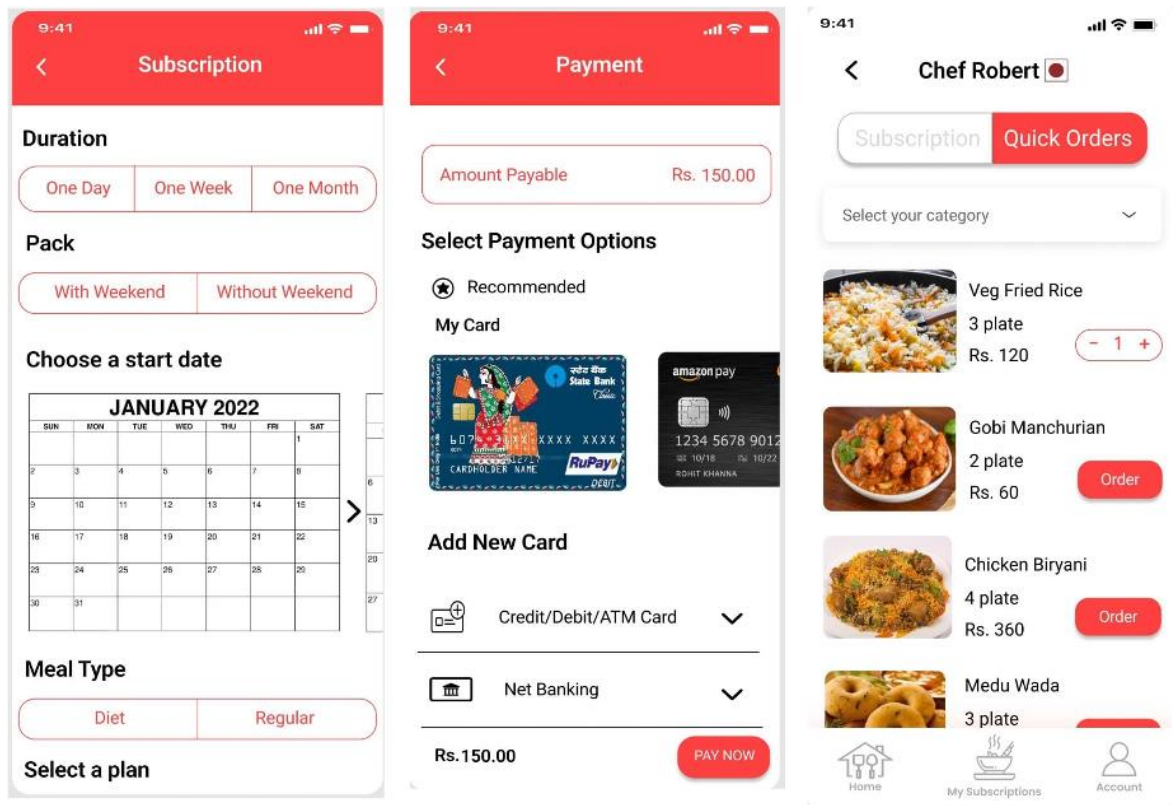


Figure (5): User Interface of Food Ordering Process

After selecting the Chef, the user gets an option to select either quick order or subscription. On selecting subscription, a menu will appear for breakfast, lunch and dinner. The menu for diet or regular plan will appear according to the user's choice. Followed by which the user will have to select the period of subscription and finally subscribe by doing the payment. The quick order is an option given for the customers to order the food items by selecting the quantity. It is the food items that are excess which are added by a chef.

VI. CONCLUSIONS

Home Chef allows customers to subscribe their meals from the chef who are nowhere related to any restaurants. The home chef app allows the home cooks a platform where they can sell their home-made meals directly to the customer without any restaurant involved as a middle man. It provides the users an option to customize their meal plan according to their lifestyle either choosing a diet plan or a normal plan. One can easily use the app and subscribe for the meal pack they wish to subscribe from the chef of their choice. The app also provides the user to have different subscription plans based on his preferences. The review and feedback option helps the chef to improvise based on customers feedback which will help them for next orders. The quick order option helps the chef to sell individual items and the customer can order it if required.

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Cholera Epidemiology, Management and Control in the Sub-Saharan Africa



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SUMMARY: Cholera is a very devastating disease caused by a mono-flagellated gram negative bacillus called *Vibrio cholera*. It is currently endemic in Africa most especially the sub-Saharan part where the organism thrives well under the favourable climatic condition of the region, thereby causing havoc especially among children and women. In spite of the various interventions, the disease poses a great burden in Africa as aggravated by many influencing factors present in the region. This review presents crucial aspects of the disease that are of importance to stakeholders. Specifically, it covers the history of cholera and the biology of *Vibrio cholera* including the serogroups and virulence factors. The etiology, transmission and prevalence of the disease are thoroughly reviewed. All the information obtained from past literatures which have been combined in this report have broadened our knowledge on the current approaches needed in the treatment and management of cholera as well as the various control mechanisms as standard guidelines in the alleviation of the disease in the sub-Saharan Africa.

KEY WORDS: Cholera, Control, Influencing factors, Management, Sub Saharan-Africa

INTRODUCTION

Cholera is one of the tropical diseases caused by *Vibrio cholera*, a gram negative motile bacterium. The organism belongs to the family Vibrionaceae that shares some characteristics with the family Enterobacteriaceae. There are more than 200 serogroups but *V. cholera* O1 and *V. cholera* O139 are the most common serogroups associated with epidemic cholera (Sharifi-Mood and Metanat, 2014). *Vibrio cholera* O1 is divided into classical and El Tor biotypes, and into three serosubtypes - Ogawa, Inaba, and Hikojima. The virulence factors are coded for in the genome, especially the large plasmid. Cholera toxin (ctx) is encoded by ctx genes (Nelson *et al.*, 2009; Adagbada *et al.*, 2012). Cholera is spread through the fecal-oral route, either directly from person-to-person or indirectly through contaminated fluids from an environmental reservoir of varying duration, food and potentially flies and fomites (Ebob, 2019). Every year, approximately 3-5 million cholera cases occur, worldwide. During the nearly five decades until 2017, African countries reported over 4 million cholera cases to the WHO. Cholera infection rate, sex and age distribution and seasonality are not constant (Adagbada *et al.*, 2012)

It has been described as a waterborne and foodborne bacterium that can cause global pandemics. This characteristic makes it unique among the pathogens that cause diarrhea (Jahan, 2016). Cholera has proven to be one of the deadliest diseases known in history. Although it is a global disease, Africa has been the worst hit in pandemic cases. It is now said to be endemic in Africa. Many factors account for the heavy burden of *V. cholera* in the Sub-saharan Africa. *Vibrio cholera* is a mesophile, that is it lives within an optimum temperature value of 37°C hence it is physiologically adapted to such an environment (Haneef *et al.*, 2015). Malnutrition is common among children in the less developed countries around the sub-saharan Africa, a factor that has been reported to promote cholera. This is associated with lowering of immunity of the children thereby allowing the pathogen to invade gastrointestinal tracts to cause cholera. In some cases, the presence of other pathogens of bacterial and viral origin such as HIV is a predisposing factor. Environment is a major determinant of cholera outbreak. Many outbreaks have been recorded in swampy and coastal environment across Africa (Ebob, 2019).

Other associated factors include contamination of water and food as a result of poor hygiene or poor sanitation. These are characteristics of densely populated environment where the number of people living in an area is beyond the carrying capacity of such an environment. Pressure is exerted in such an area which may lead to heavy pollution and contamination of water (Deen *et al.*, 2019). Also, there are evidences that raining season and flood aggravate cholera burden, thus both climate and season are implicated. Migration of people increase population density and further increase the spread of the pathogen to non

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endemic regions. Poor socioeconomic status and deficient health system of an area may influence the outbreak of cholera. All these factors are characteristics of sub-Saharan African regions that probably account for the high burden of cholera (Ebob, 2019). This paper reviews crucial aspects of public health education on cholera outbreaks that are of significant importance to stakeholders. All the information obtained from past literatures which have been combined in this report would broaden our knowledge on the current approaches needed in the management and control of cholera in the sub-Saharan Africa.

HISTORY OF CHOLERA OUTBREAK

Cholera has proven to be one of the deadliest diseases known in history and it was thought that Hippocrates (460-377 BC) first gave a perfection description of the disease in the fifth century BC. Asia was reported as the home of cholera from where it spread to other parts of the world 1991 (Jahan, 2016). John Snow, a legendary epidemiologist, was the first person to work on cholera in the 18th century when he established a relationship between cholera disease and polluted water (Codeço and Coelho, 2006). Hence, his work especially on the Soho cholera outbreak of 1854 helped to gain insight into how cholera could be controlled by looking into the sources of water intake. Robert Koch, in 1883, stated that cholera was primarily caused by a curve shaped bacillus called *Vibrio cholera* (Sepulveda *et al.*, 2006). As a result of defective waste management system, another cholera outbreak occurred in Germany where more than 10,000 people were killed in 1892. Cholera outbreaks were later reported in Indonesia in 1961; West Africa in 1970 and Americas in 1991 (Jahan, 2016). So far, seven cholera pandemics have been recorded globally. Africa was the worst hit in the seventh pandemic. The narration currently is the endemicity of the disease in Africa. Historically, it was first reported in Africa in 1836 killing more than 20,000 people in Zanzibar (Olago *et al.*, 2007) followed by another occurrence in Egypt in 1848 with many casualties and in West Africa in 1868 (Mengel *et al.*, 2014). Sub-Saharan African countries had experienced frequent cholera outbreaks that accounted for > 86% of reported cases and deaths worldwide in 2011. As at 2018, cholera outbreaks were reported in seven Sub-Saharan African countries including Cameroon, Democratic Republic of Congo, Tanzania, Kenya, Mozambique, Zambia and Zimbabwe (Gwenzi and Sanganyado, 2019). Major cholera epidemic recorded in Nigeria occurred in 1992, 1995 and 1997 with casualties. Although all parts of Nigeria are vulnerable to cholera infection, it is endemic in the Northern part (Adagbada *et al.*, 2012).

BIOLOGY OF VIBRIO CHOLERA

Structure and Physiology of *V. cholera*

Vibrio cholera (family Vibrionaceae) is a curved or comma-shaped Gram-negative bacillus that shares some characteristics with the family Enterobacteriaceae. It is a bacillus of variable sizes ranging from 1-3 µm in length and 0.5-0.8 µm in its diameter (Adagbada *et al.*, 2012; Sharifi-Mood and Metanat, 2014). As a motile bacterium, it has a single flagellum. *V. cholera* is aerobic and sometimes, facultatively anaerobic gram-negative bacterium. The natural habitat of *V. cholera* is the aquatic environment but it can survive within and outside the aquatic environment. It is halophytic (salt tolerant) and it grows with a temperature range of 10 to 43°C but optimally at 37°C. The organism can be inactivated at pH values less than 4.5 at room temperature and it grows in optimum pH of 7.6, with a range of 5.0 to 9.6 (Haneef *et al.*, 2015). *Vibrio cholera* is the causative agent of cholera that has both human and environmental stages in its life cycle (Nelson *et al.*, 2009). It has been described as a waterborne and foodborne bacterium that can cause global pandemics which makes it unique among the diarrheal pathogens (Jahan, 2016).

Serogroups and biotypes

Vibrio cholera exists in different types based on serological characteristics. The organism is differentiated on the basis of the O antigen of its lipopolysaccharide (Piarroux and Faucher, 2010; Sharifi-Mood and Metanat, 2014). There are two antigenic structures namely; flagellar antigen (H) and a somatic O antigen. The O-antigen confers pathogenicity to the organism. There are more than 200 serogroups but *V. cholera* O1 and *V. cholera* O139 strains are the most common serogroups associated with cholera (Piarroux and Faucher, 2010). Hence, toxigenic strains are found within these two groups. They are known to produce cholera toxin (Sharifi-Mood and Metanat, 2014). There are two distinct biotypes from the O1 serogroup: El Tor and Classical, which are further subdivided into two to three strains depending on source of the reports. Some authors reported only the Inaba and Ogawa strains while some reported three strains with the addition of Hikojima strain. The El Tor strain remains the dominant strain globally (Adagbada *et al.*, 2012; Nelson *et al.*, 2009; Sharifi-Mood and Metanat, 2014).

The Genome and Virulence Factors

Pathogenicity of *V. cholera* has been confirmed to have genetic basis that encodes the secretion of cholera toxin (Heidelberg *et al.*, 2000). The organism has both large and small chromosomes (Ebob, 2019). The large chromosome encodes genes that govern DNA replication, transcription and translation. It also carries genes for metabolic pathways and those encoding the surface antigens, pili and toxins (Heidelberg *et al.*, 2000). The small chromosome consists of a large plasmid which

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is a self replicating circular chromosome that carries many virulence factors along the segments. The two chromosomes are similar to an extent by sharing the same type of genes coding for similar products (Ebob, 2019; Heidelberg *et al.*, 2000). Virulence factors are present in all chlorogenic *V.cholera* strains in form of toxins. Many factors may account for pathogenicity and virulence of the organism. However, toxin production is implicated in the manifested cholera symptoms of *V.cholera* such as diarrhea (Nelson *et al.*, 2009). Cholera toxin is in form of AB₅-subunit that consists of structures which binds to the epithelial cells and releases certain enzymes (Burrus *et al.*, 2006). The organism possesses colonisation factor and toxin co-regulated pilus (TCP). The pilus colonisation factor is encoded by the *tcpA* gene (Adagbada *et al.*, 2012). Apart from toxins that are the main virulence factors, some cholera toxin confers antibiotic resistance which is coded for by the large and small chromosome, especially the large plasmid (Nelson *et al.*, 2009). According to Adagbada *et al.* (2012), the most important virulence genes in *V. cholera* strains are *ctx* genes (*ctxA* and *ctxB*) that encode the production of the cholera toxin.

ETIOLOGY AND TRANSMISSION

The disease known as cholera has been described as an acute infectious, secretory, and painless diarrheal disease caused by *Vibrio cholera* (Ebob, 2019). It arises as a result of water or food contamination caused by the faeces of a *V. cholera* infected symptomatic or non symptomatic patients. Contaminated food or water intake by healthy persons may result in cholera. The bacteria may be found in the faeces between 7-15 days of exposure (Ebob, 2019; Horwood and Greenhill, 2013). Therefore, the route of spread of cholera is fecal-oral (Deen *et al.*, 2019). It can occur from person-to-person or through contaminated water, food, flies and fomites (Sack *et al.*, 2004). Epidemic cholera often occurs in such a way that there is an interaction between the aquatic environment and fecal-oral route (Deen *et al.*, 2019). *V.cholera* cells in contaminated aquatic environment is hosted and disseminated by chironomid eggs, planktons, benthic biota and sediments as reservoirs. These reservoirs are transferred to aquatic birds and fishes which are taken up by man. Gwenzi and Sanganyado (2019) in their review presented a diagram sourced from Vezzulli *et al.* (2010) showing the reservoirs of *V.cholera* in an aquatic ecosystem and how the reservoirs affect man (Figure 1). Cholera infected persons excrete *V. cholera* in their stool. The organisms appear as a mixture of free-swimming aggregate of cells. The bacteria alternate between motile and biofilm forms to colonize the small intestine. The biofilm form is more resistant to stressful conditions in the host as a very effective strategy for adaptation (Faruque *et al.*, 2006; Silva and Benitez, 2016). The fecal-oral transmission may be facilitated by a transient hyperinfective state of *V. cholera* in fresh stool and this may increase the transmission within a short time especially in areas with high population density (Eisenberg *et al.*, 2013; Deen *et al.*, 2019).

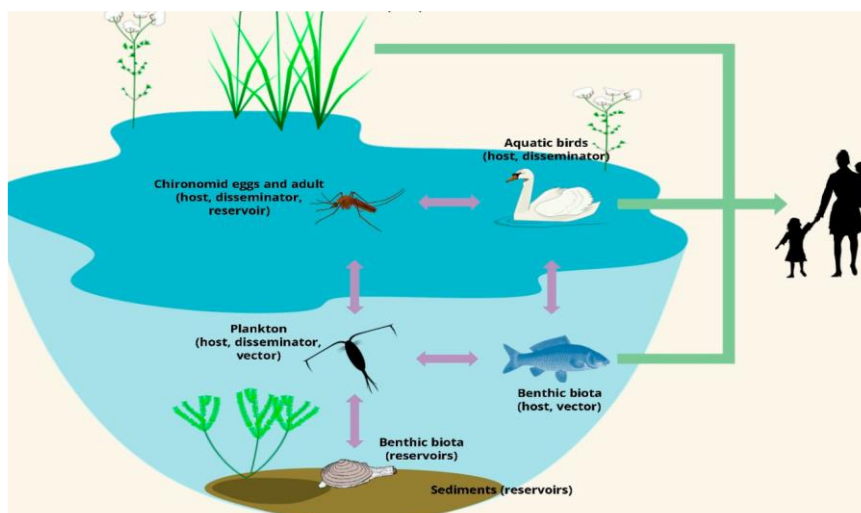


Figure 1: Host and reservoirs of *V.cholera* in a typical aquatic environment (adapted from Gwenzi and Sanganyado (2019) as sourced from Vezzulli *et al.* (2010)

SYMPTOMS AND COMPLICATIONS

Symptoms begin with sudden onset of a painless but voluminous watery diarrhea usually without vomiting. Symptoms may be mild or severe (Sharifi-Mood and Metanat, 2014). In many cases, there are no symptoms. In some symptomatic patients, severe dehydration may arise from acute diarrhea and vomiting. This is because a large volume of water and salts is frequently lost and it is characterized by gray or opaque white mucus stool. Dehydration is a serious matter that may cause of death if not quickly treated (Harris *et al.*, 2012). One out of 20 patients infected with *V. cholera* has severe watery diarrhea (Ebob, 2019). Patients with severe cholera may have a stool volume of more than 250 mL/kg of body weight in 24 hours (Sharifi-Mood and Metanat,

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2014). Due to this large volume of diarrhea, there may be uncontrolled bowel movements that may cause total dehydration (Jackson *et al.*, 2013). Other symptoms may include intense thirst, muscle cramps, weakness, anuria, sunken eyes and consequently kidney failure, shock, coma, and death. Even after recovery, patients may exist in a carrier state (Sharifi-Mood and Metanat, 2014; Ebob, 2019). During dehydration there are complications of hypoglycemia, hypokalemia (potassium loss in stool) and bicarbonate loss in children. Hypokalemia is intense among children with existing malnutrition. Other complications associated with cholera in children are: hypocalcemia, hyperphosphatemia, acidemia and other unusual clinical presentation that may account for high mortality rate of cholera cases.

PREVALENCE AND BURDEN OF CHOLERA

Studies have shown an annual increase in cholera cases globally. For instance, there were 600,000 approximated cases between 2000-2004 whereas the figure rose to approximately 800,000 cases between 2004-2008, (Kanungo *et al.*, 2010). In 2006, 52 countries reported 200,000 cases including 6000 deaths with a fatality rate of 2.7% (CDC, 2020). About 5 million cholera cases and 120,000 deaths were reported in the past few decades (Jahan, 2016) but Africa took the lion share. Between 2008 and 2012, the annual cholera burden was estimated at 2.86 million cases with about 95,000 deaths. Many authors have argued that the cholera cases are grossly underreported. Under-estimation of cases is likely to have taken place due to difficulty in data collection and presence of asymptomatic cases. The above figures are likely to have been obtained from laboratory data alone (Jahan, 2016). According to the WHO (2020), researchers have estimated that each year there are 1.3 million to 4.0 million cases of cholera and 21,000-143,000 deaths worldwide. According to WHO, cholera is now endemic in many parts of Africa. African countries had reported over 4 million cholera cases to the WHO in the last five decades. Explosive outbreaks had been confirmed in the Democratic Republic of the Congo (DRC), Ethiopia, Nigeria, Somalia, South Sudan, Sudan, and Zambia with fatality rates as high as 6.8% in some regions. With underreporting and inadequate surveillance systems, the number of cholera cases in Africa is probably much higher than what is officially reported (Deen *et al.*, 2019). The temporal occurrence of cholera varies around Africa. In the DRC, cases occur year-round with a rise in incidence during the rainy season. Elsewhere in Africa, cholera generally occurs in explosive outbreaks, as in Zimbabwe, which reported 128,208 cases and 5634 deaths between August 2008 and mid-January 2009. An assessment of 78 cholera outbreaks in Mozambique from 2009 to 2011 showed an average duration of 7.2 weeks with 68% of cases and 89% of deaths occurring within the first six weeks of an outbreak (Deen *et al.*, 2019). As analysed in Adagbada *et al.* (2012), cholera cases in Nigeria varied from place to place across demographic parameters such as age groups, sex and seasonality. At a particular time, fatality rate was as high as 13% in Nigeria. In Abeokuta, South-western Nigeria, between November 2005 and January 2006, 11 deaths from the 115 cases with case fatality rate of 9.6% were reported. The 2010 outbreak was very devastating where fatality rate in Plateau State was 23.0%. Here, women and children accounted for 80% of reported cases.

FACTORS INFLUENCING CHOLERA OUTBREAKS

Existing reports in literatures have extensively discussed the interrelationship among some factors and cholera outbreaks generally. They are: Host susceptibility factors, environment, climatic factors, seasonal factors, high population density, poor hygiene, migration, socioeconomic status, health system deficiencies and type of regions. These factors are analysed below:

Host susceptibility factors

V. cholera is not acid-resistant therefore, use of antacids, proton pump inhibitors and histamine receptor blockers are likely to increase the risk of *V. cholera* infection (Sharifi-Mood and Metanat, 2014). Increase in the level of gastric acidity is reported to inhibit *V. cholera* and reduce the chances of cholera infection (Van Loon *et al.* 1990; Zuckerman *et al.* 2007). People who produce less stomach acid such as young children, older people, and those taking drugs that reduce stomach acid are also susceptible (Adagbada *et al.*, 2012). Malnutrition is a major challenge in poor countries and it is a situation whereby people especially children do not have access to the right type of food needed for their growth and development (Harris *et al.*, 2008). Examples include, energy rich food, protein, fats and oil, minerals and vitamins. Malnourished children are susceptible to all types of infection including *V. cholera* due to weak immune system. Therefore, host nutritional status is a major factor. This is why infants that are not properly breast fed are predisposed to cholera in endemic regions (Clemens *et al.*, 1990; Deen *et al.*, 2019). The incidence of cholera is twice in people with type O blood compared with other blood groups. The reason for increased susceptibility in type O blood is unknown (Deen *et al.*, 2019; Kuhlmann *et al.*, 2016). The O phenotype corresponds to an unmodified H antigen and is associated with a decreased risk of infection with *V. cholera*. However, once the host is infected the O phenotype is associated with an increased risk of severe symptoms (Nelson *et al.*, 2009). The host immune system is the critical defence mechanism against cholera. However, infection with cholera can result in a range of responses, from severe and life threatening diarrhoea to mild or unapparent infections (Adagbada *et al.*, 2012). In endemic regions, the majority of cases

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occur among children less than 5 years of age and in reproductive-age women (Jahan, 2016). Some studies showed that people infected with human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS), malaria, and tuberculosis often have weakened immunity, and are more susceptible to co-infections with other infectious diseases. Also, *Helicobacter pylori* infection increases individual susceptibility to cholera (Sharifi-Mood and Metanat, 2014).

Environment

Numerous cholera foci in Africa have been located in estuarine areas. The complex biological systems constituting the aquatic environmental reservoir are critical to long-term survival of epidemic *V. cholera*. Pathogenic vibrios are commensal with numerous organisms such as algae, crustaceans, floating aquatic plants like water-hyacinth (Feikin *et al.* 2010), phytoplankton, and zooplankton such as copepods (Reyburn *et al.*, 2011; Acosta *et al.* 2001; Colwell *et al.* 2003). In response to nutrient deprivation, vibrios can enter a dormant state and persist in an aquatic environment; subsequent changes in water temperature, salinity, pH, and nutrients can resuscitate vibrios and lead to their multiplication, causing epidemics (Reyburn *et al.* 2011). In Africa, water likely plays a major role in triggering cholera outbreaks, with lagoons and estuaries contributing to coastal disease, and lakes and rivers contributing to inland disease (Mengel *et al.*, 2014; Rebaudet *et al.*, 2013).

Contamination and poor sanitation

Several factors influence the occurrence and development of epidemics in sub-Saharan Africa.

In sub-Saharan Africa, cholera frequently causes large outbreaks and epidemics presumably due to lack of safe water, poor sanitation and inadequate case management (Mengel *et al.*, 2014). The onset of an outbreak in a new location can result from person to- person transmission when a symptomatic or asymptomatic carrier enters a susceptible population or when an individual comes in contact with contaminated environmental sources (Nelson *et al.* 2009). Once cholera has infected individuals in a new area, initial propagation depends on the extent of individual bacterial shedding, host and organism characteristics, and the likelihood of additional persons coming into contact with an infectious dose. Shedding may occur before and up to 7 months after symptom onset (Utsalo *et al.* 1999). Symptomatic persons shed substantially more (107–109 *V. cholera* per ml of stool) than asymptomatic persons (103 *V. cholera*/ml). The infectious dose for a susceptible individual is 104–1011 (Nelson *et al.* 2009; Kaper *et al.* 1995; Zuckerman *et al.* 2007). After excretion by the patient, *V. cholera* acquires a hyper-infectious state that lasts for at least 5 h in an aquatic environment (Merrell *et al.* 2002; Nelson *et al.* 2009; Morris, 2011). More virulent strains, or the introduction of equally virulent strains into an immunologically naïve population, can increase the risk of outbreaks and may have contributed to ongoing epidemics in Africa (Kaper *et al.* 1995; Keddy *et al.* 2007; Mengel *et al.*, 2014; Quilici *et al.* 2010; Piarroux and Faucher 2012).

Food may become contaminated with *V. cholera* in the natural environment, during preparation of food or storage of leftovers (Kaper *et al.* 1995; Estrada-García and Mintz 1996; Albert *et al.*, 1997). Because vibrios concentrate in the gastrointestinal tracts of mollusks, crustaceans, and fish that ingest copepods (Estrada- García and Mintz 1996), the consumption these seafoods has been incriminated in cholera outbreaks as shown in figure 1. Transmission of *V. cholera* O1 has been associated with eating of unwashed raw vegetables or fruits (Albert *et al.* 1997; Dubois *et al.*, 2006) and with poor hygiene practices during meal preparation, as observed in fish gutting processes. Inadequately stored and reheated food has been shown to transmit cholera. In Africa, this has been observed, for example, with cooked rice in Guinea and cooked pigeon peas in Malawi (Mengel *et al.*, 2014).

Climatic and Seasonal factors

Beside its seasonal variations, the burden of cholera has exhibited important interannual fluctuations in numerous coastal African countries. For instance, early 1990s cholera epidemics in

Ghana, Togo, Benin, and Nigeria showed a significant synchrony with rainfall. Sometimes, these global climatic forces have provoked local hydrometeorologic disasters, which have been contemporaneous with several cholera epidemics (Gwenzi and Sanganyado, 2019; Rebaudet *et al.*, 2013). Weather and climate play a critical role in cholera dynamics due to a variety of reasons (De Magny *et al.* 2012). In Africa, the climate influences cholera outbreaks in specific ways (Bompangue *et al.* 2011), with an increase in the frequency and size of outbreaks during the hot and rainy seasons, as has been documented in Zanzibar (Schaetti *et al.* 2009), the South Kivu district bordering Lake Tanganyika in DRC (Bompangue *et al.* 2009), Angola (Colombo *et al.* 1993), and five countries in West Africa. Climate may influence cholera dynamics by affecting water supplies. Heavy rainfall may increase contamination through overflow and disruption of water networks (Griffith *et al.* 2006; Guévert *et al.* 2006; Sasaki *et al.* 2009), as observed with rainfall in Dakar, Senegal, that exacerbated a cholera epidemic (De Magny *et al.* 2012). Flooding can cause draining of sewage into rivers and lakes Cholera Outbreaks in Africa and increase runoff from latrines or pit toilets, which then contaminates shallow and uncovered wells as noted in Senegal, Zambia, Cameroon, and Zimbabwe (Adagbada *et al.* 2012; Guévert *et al.* 2006; Mengel *et al.*, 2014; Sasaki *et al.* 2008, Ako *et al.* 2009; De Magny *et al.* 2012; Luque Fernandez *et al.* 2012). Based on the report given by the WCAR (2020), heavy rains in August 2020 caused massive flooding in some countries of the

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West and Central Africa region with nearly 1,660,000 people affected in Nigeria, Niger, Cameroon, Mali, Chad, Burkina Faso, Gambia and Guinea (OCHA). Most of the areas affected by the floods are cholera hotspots and some of them were already affected by cholera outbreak. The risk of new outbreaks and the spread of ongoing cholera epidemics are very high during this period of flooding (WCAR, 2020). Cholera is rare during the winter as the temperature is low and there is little rainfall. Gradually, the temperature gets hotter till the monsoon arrives. The incidence of cholera is low in the actual monsoon period as compared to pre-monsoon period. This lower incidence in the monsoon period is explained by the dilution effect reducing the amount of bacteria in the aquatic environment (Jahan, 2016).

High population density

High population density combined with poor quality informal housing may influence cholera incidence and outbreak amplification (Griffith *et al.* 2006; Penrose *et al.* 2010) by facilitating person-to-person transmission and increasing the burden on inadequate sanitation facilities. In Harare, 2008–2009, cholera attack rates ranged from 1.2 cases per 1,000 people in low-density residential suburbs to 90.3 per 1,000 in an overcrowded suburb (Luque-Fernandez *et al.* 2011), with similar trends observed in Ghana (Osei and Duker 2008) and Uganda (Legros *et al.* 2000). A strong association exists between increased cholera incidence and the absence of sanitation facilities (Sasaki *et al.* 2008; Griffith *et al.* 2006; Mahamud *et al.* 2012) or proximity to waste dumps (Osei and Duker 2008). In Africa, only 34 % of the population has access to improved sanitation facilities, ranging from 9 % in Niger, to 74 % in South Africa (WHO, 2020).

Poor hygiene

Poor hygiene practices, for example the absence of soap in the household, also increase cholera risk (Dubois *et al.* 2006; Guévert *et al.* 2006). Severe outbreaks can occur where a lack of functional hygiene and sanitation services coincides with high population density, such as in refugee camps (Boelaert *et al.* 1995; Shultz *et al.* 2009; Goma Epidemiology Group 1995; Griffith *et al.* 2006), during gatherings (Manga *et al.* 2008) and in prisons (Griffith *et al.* 2006). Markets, fairs, and other cultural and social events have been shown early on to provide a forum for increased food-borne cholera transmission. *V. cholera* can survive on produce for two to five days and easily spread because of crowding, and the absence of latrines and running water. In Lusaka, Zambia, 2004, raw vegetable consumption from the Soweto market was strongly associated with cholera, whereas water source contamination or treatment practices were not (Dubois *et al.* 2006); a similar situation has been observed in Guinea-Bissau (Luquero *et al.* 2011). Fecal-oral cholera spread is facilitated by sharing glasses and plates, as often occurs in traditional African settings. Funerals may propagate cholera spread through local rites such as washing the deceased's body followed by preparing and serving a large community meal (Germani *et al.* 1998; Gunnlaugsson *et al.* 1998; Griffith *et al.* 2006).

Cholera has been proven to be transmitted through fecal-oral route via contaminated food, carriers of the infection and inadequate sanitary conditions of the environment. The principal mode of transmission however remains ingestion of contaminated water or food. In Nigeria, the 1996 cholera outbreak in Ibadan (Southwest) was attributed to contaminated potable water sources. Street vended water and not washing of hands with soap before eating food are possible reasons for the 1995-1996 cholera outbreaks in Kano state. Drinking water sold by water vendors was also connected with increased risk of contracting the disease. In Katsina, the outbreak of the disease was linked to faecal contamination of well water from sellers. The recent 2010 outbreak of cholera was speculated to be directly related with sanitation and water supply. The hand dug wells and contaminated ponds being relied on by most of the Northern states as source of drinking water was a major transmission route during the outbreak. Perhaps, these wells were shallow; uncovered and diarrhoea discharge from cholera patients could easily contaminate water supplies (Adagbada *et al.*, 2012).

Migration

Human travel via land, sea, rivers, and air drives the wide geographic spread of cholera (Mari *et al.* 2012; Manga *et al.* 2008; Duval *et al.* 1999). Susceptible people may become infected while traveling and introduce the disease in their home communities (Manga *et al.* 2008); inversely, through fecal shedding, asymptomatic or recovered cholera patients may be responsible for long-range dissemination of vibrios to a foreign environment (Mari *et al.* 2012). For example, fishermen on the Rift Valley lakes travel long distances and may return to their lakeside cities and trigger cholera outbreaks (Piarroux and Faucher, 2010). Additional overcrowding increases risk of contact with vomitus, excreta and contaminated water or food (Adagbada *et al.*, 2012).

Socioeconomic status

In sub-Saharan Africa, risk factors for cholera infection, transmission and propagation are very specific to the local socioeconomic context and might vary among sub-regions and geographical areas. In more developed regions, natural contamination through infected seafood or vegetables are more likely to account for cholera cases, while in poor settings, risk factors will rather be a lack of potable water and proper sanitation (Griffith *et al.* 2006), mostly resulting from human crises and possibly exacerbated by natural disasters such as flooding. Political instability and civil wars have been shown to increase the risk

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of cholera outbreaks especially in vulnerable populations such as refugees that have even less access to adequate water and sanitation facilities. Climatic factors periodically aggravate these difficult conditions and can lead to more frequent and more deadly cholera outbreaks. In Africa, cholera can be considered primarily as a disease of poverty (Bateman, 2009).

Health system deficiencies

Health system deficiencies contribute to outbreak magnitude. For example, poor surveillance can delay diagnosis and reporting and lead to delays in the implementation of control measures (Gunnlaugsson *et al.* 2000; Einarsdottir *et al.* 2001; Ahmed *et al.* 2011, Nguyen *et al.* 2014). Inadequate treatment facilities may lead to an increase in the risk of nosocomial transmission (Daniels *et al.* 1999; Kyelem *et al.* 2011).

Regions

The frequency, severity, and duration of cholera infections vary and keep on changing in different parts of the world. Cholera is endemic in Africa, south and southeast Asia. In contrast, cholera is almost eradicated from most of the developed countries. Between 1999 and 2005, Africa accounted for about 90% of the cholera cases and 96% of the cholera-related deaths worldwide. In contrast, other regions such as parts of South America have historically had only sporadic epidemics. During 2013, a total of 56,329 cases were reported from Africa, which shows a decrease of 52% as compared to 2012 when 117,570 cases were reported. Africa accounted for 43.6% of the total cases in 2013 as compared to 93–98% of the total cases during the period 2001–2009. In contrast, 11,576 cases were reported from Asia, representing an increase of 57% as compared to 2012 when 7367 cases were reported from Asia. In 2013, a total of 26 countries reported deaths due to cholera; 17 of these countries belonged to Africa. The case fatality rate was <1% in 4 countries, 1–5% in 17 countries, and >5% in 5 countries. In 2013, a majority (65%) of the deaths were reported from the African continent. A total of 1366 deaths were reported with a case fatality rate of 2.43% (Jahan, 2016).

DIAGNOSIS OF *V. CHOLERA*

Culture and Microscopy

Laboratory diagnosis is necessary not only for identification of microorganism, but also for epidemiological purposes. For definitive diagnosis, direct microscopic examination of stool including dark-field examination. *Vibrio cholera* exhibits variable sizes from 1-3 µm in length and 0.5-0.8 µm in its diameter (Haneef *et al.*, 2005). Isolation by stool culture is the gold standard method for the laboratory diagnosis (Sharifi-Mood and Metanat, 2014). Although, other causes of diarrhea may be considered, but the clinical picture of cholera is unlikely to be confused with any other enteric diseases. This is especially true in adults, in whom no other infectious disease causes such profound dehydration, quickly. As vibrio grows at a high pH or in bile salts that's why many of the selective media used for enteric pathogens do not support the growth of *V. cholera*. On thiosulfate-citrate-bile-sucrose-agar (TCBS), the sucrose-fermenting *V. cholera* grows as large, smooth, round yellow colonies. By using specific antiserum, positive immobilization test can be observed for the *V. cholera*.

Biochemical Tests

two different antigenic structures; a flagellar antigen (H) and a somatic O antigen, non-acid resistant with infectious dose 10³-10⁶ and 10²-10⁴ organisms ingested with water and food respectively. *V. cholera* is not fastidious in nutritional requirements for growth though, organism needs an adequate buffering system. Non toxigenic strains of *V. cholera* are also present in environment, only strains encoding cholera toxin, haven filamentous bacteriophage (CTXΦ) cause cholera. Colonies of *V. cholera* are lactose-negative, but sucrose-positive. Contrasting other Enterobacteriaceae, *V. cholera* is oxidase-positive. The differentiation of the somatic antigen leads to pathogenic and nonpathogenic strains. Among more than 200 serogroups of *V. cholera* *V. cholera* O1 and *V. cholera* O139 are the most common serogroups associated with epidemic cholera (Haneef *et al.*, 2005). *V. cholera* can be recognized in microbiology laboratories using selective media and biochemical tests by eagerly grown-up from clinical specimens, including stool and rectal swabs.

Molecular characterization

Polymerase chain reaction (PCR) has been developed to identify *V. cholera*. This test has a high sensitivity and specificity. However, this test is used only for screening of food samples (Sharifi-Mood and Metanat, 2014).

TREATMENT AND MANAGEMENT OF CHOLERA

Oral or intravenous hydration is the most important aspect in the treatment of cholera. In conjunction with suitable hydration, treatment with antibiotics is also recommended. Antibiotics should be prescribed for patients severely or moderately dehydrated and those who lost a large volume of stool during the rehydration therapy. Antibiotic therapy is also recommended for all hospitalized patients. Antibiotics should be selected using local antibiotic susceptibility patterns. In most countries, doxycycline is recommended as the first-line treatment for adults, and azithromycin as the first-line treatment for pregnant

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women and children. Other antibiotics effective against *V. cholera* are trimethoprim-sulfamethoxazole (TMP-SMX), erythromycin, and ciprofloxacin. Azithromycin is more effective than erythromycin and ciprofloxacin. There are no guidelines to recommend antibiotics as prophylaxis for cholera prevention. All guidelines recommended that antibiotics should be administered along with aggressive hydration. Treatment with a single 300 mg dose of doxycycline has shown to be equivalent to tetracycline treatment for 3 days. Resistance to tetracycline and other antimicrobial agents among *V. cholera* has been reported in endemic and epidemic cholera settings (Sharifi-Mood and Metanat, 2014).

PREVENTION AND CONTROL OF CHOLERA IN SUB-SAHARAN AFRICA

Good hygiene

Basic hygiene measures such as hand washing with soap have shown protection against cholera in Nigeria (Hutin *et al.* 2003), Zambia (Dubois *et al.* 2006; Sasaki *et al.* 2008), Kenya (Mahamud *et al.* 2012) and Guinea-Bissau. Having access to a clean latrine in or outside the household also may decrease cholera risk (Mahamud *et al.* 2012; Mengel *et al.*, 2014). WHO recommends safe water supply and adequate sanitation and hygiene (WASH) as the main steps to prevent cholera.

Acidic food

Growth of *V. cholera* is inhibited in acidic foods. In an epidemic in Guinea, eating tomato sauce (pH 5.0) was shown to protect against symptomatic cholera. For similar reasons, lime juice, which has been used as prophylaxis in northern Indian regions during the cholera season (Anand 1995), had a strong protective effect when added to sauce, as exemplified in Guinea-Bissau, 1996 (Mengel *et al.*, 2014; Rodrigues *et al.* 2000).

Food with low moisture content

Vibrio survival is reduced in food with lower water content and higher osmolality such as dried, salt-preserved, and sugar-preserved foods (Estrada-Garcia and Mintz 1996). Consumption of dried fish has been shown to have a protective effect (Dubois *et al.* 2006; Lucas *et al.* 2005; Mengel *et al.*, 2014).

Cholera modeling and forecasting tools

Climate teleconnections are linked to outbreaks of human and animal diseases. These results point to the fact that such relationships between cholera and hydroclimatic factors can be further developed into predictive modeling tools to forecast outbreaks of cholera and potentially other water-borne diseases. Such forecasting tools may provide key information to better target financial and public health resources in the control and prevention of cholera in SSA and other regions (Gwenzi and Sanganyado, 2019).

Health education

Health education is recommended for high-risk groups. Considering children and pregnant women and immune-compromised patients as high risk groups is very important (WHO, 2020).

Oral cholera vaccines

Official recommendations also include the use of oral cholera vaccines (OCVs) for control of cholera outbreaks. Two cholera vaccines are available and recommended by WHO. Oral cholera vaccines are safe, effective and currently licensed by WHO as follows: 1-Dukoral (Crucell, Leiden, Netherlands), and 2-Shanchol (Shantha Biotechnics Ltd., Basheerbagh, Hyderabad, India). Both vaccines are given as a two-dose regimen. Vaccines are safe and provide sustained protection for several years. In 2010, they were added to WHO recommendations to control cholera outbreak. However, doubts about feasibility, timeliness, and acceptability by the people at risk, and the fear of discouraging to use other preventative routes have discouraged their use during epidemics (WHO, 2020).

Efficient surveillance system

A well-organized, multi-sectoral approach is required to control cholera outbreaks (WHO, 2020). The effectiveness of public health interventions depends on an efficient surveillance system. There must be frequent and timely information-sharing at local as well as global level. The administration of cholera vaccines may be considered for high risk population in high risk areas. Funds and resources should be provided to the deserving countries to improve cholera prevention and preparedness activities (WHO, 2020).

International travel and trade

Currently, there is no obligation of cholera vaccination for international travel. It is learned with experience that quarantine and restrictions on travel and trade are not very effective in controlling the spread of cholera. However, the travelers should be provided information regarding signs, symptoms, and prevention of cholera. The neighboring countries of cholera affected areas should be advised to enhance their surveillance system for early detection and prompt response if any outbreak occurs (WHO, 2020).

CONCLUSION

Effective control of cholera in the Sub Saharan Africa requires integrated approaches of health education, intervention and good socio-economy. The influencing factors promoting the infections must be properly studied through research. Efforts must be made by stakeholders to enlighten the general public on public health and good hygiene. Improvement on health care facilities is important to ensure quick and accurate diagnosis of cholera and also to provide the needed treatment intervention. Vaccine must be made available and should be administered to all age groups in the rural and urban environment. There is need to intensify efforts on data collation and reporting on cholera outbreak for quick intervention being an infectious disease.

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Hydrochemical and Bacteriological Studies of Streams in Calabar South Local Government Area, Nigeria



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ABSTRACT: This paper presents the results of hydro-chemical and bacteriological analysis of water obtained from streams in Calabar South Local Government Area in Nigeria. Water samples were collected from five different streams in the local government area. The water samples were analysed for physico-chemical and bacteriological parameters. From the analytical results obtained, the different parameters tested were as follows: pH (3.81 – 5.35), TDS (2.28mg/l – 152.75mg/l), turbidity (0.12NTU – 44.07 NTU), DO (7.10mg/l – 10.40mg/l), BOD (0.35mg/l – 0.56mg/l), Fe (0.14mg/l – 0.91mg/l), Pb (0.03mg/l – 0.59mg/l), Zn (0.02mg/l – 0.87mg/l), Mn (0.76mg/l – 1.82mg/l), Cu (0.02mg/l – 0.18mg/l), THC (28 per 0.1 ml – 96 per 0.1ml), and total coliform count (23mg/l – 88 mg/l). Most of these parameters were highly objectionable for portable water sources. The bacteriological analysis showed isolation of specified bacterium from all the samples. It was observed that the water sources were quite unreliable for drinking when compared with the World Health Organization (WHO) Standards.

KEYWORDS: Water samples, Stream, Bacteriological, Physico-chemical parameters and Calabar South.

1.0 INTRODUCTION

Water is a chemical compound with each of its molecules containing two hydrogen atoms and one oxygen atom (Kumar, 1990). It is an essential constituent of all animals and vegetable matter and can be considered as the most important raw material of civilization since without it man cannot live and industries cannot operate (Duggal, 1996). Water pollution may lead to stream insanitation; the use of polluted water by communities for their daily requirements would mean taking unsafe water which may cause the sporadic outbreak of water borne diseases. Water pollution has resulted in organisms drying off at a very alarming rate and our drinking water has become affected, as in our ability to use water for recreational purposes (Udomessien, 2003).

Surface water degradation has become a matter of increasing National and Global concern as the impact of organic and inorganic contaminants continue to render vital water resources less suitable for their intended uses. The protection of the aquatic environment and its associated resources is one of the programmes of action enlisted in Agenda 21 of the United Nations geared towards achieving sustainable development (United Nations and Development, 1988). In many African countries, it has been reported that 80% of human's illnesses are attributed to contaminated water supplies (Calamari, D. and Naeve, H; 1994). In natural aquatic ecosystems heavy metals occur in low concentrations normally at the nanogram to microgram per litre level. In recent times however, the occurrence of metal contaminants especially the heavy metals in excess of natural loads, has become a problem of increasing concern. This phenomenon according to Calamari, D. and Naeve, H. (1994) has arisen as a result of rapid population growth, increased urbanization, expansion of industrial activities, exploration and exploitation of natural resources, extension of irrigation and other modern agricultural practices as well as the lack of environmental regulations.

The significance of water route in spread of diseases varies both with the diseases and the local circumstance (Adesiyun and others, 1983). Wolf (2001) added that harmful chemicals such as pesticides from agriculture and heavy metals like lead and mercury from industries can build in the food chain where they can reach toxic levels in fish and other sea animals. The effects of water pollution by chemicals include cancer, arthritis, skin irritation and eruption, heart diseases, central nervous system problems, skin rashes, kidney problems and bronchitis.

The objectives of this study are to create awareness of the dimension of water pollution and their respective consequences, to develop attitude of responsibility towards quality of water and to determine the present bacteriological and physico-chemical qualities of water sources available to the population at Calabar South local government area whose number, quality, sources and activities are ever increasing.

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The incidents of water borne diseases, and epidemics nationwide arising from drinking water of doubtful quality have become of great concern. The primary purpose of the guideline for drinking water quality is the protection of public health (WHO, 2006). As described by Horsefall and Spiff (1998), water quality standard is a measure, principle or rule established by authority set to protect the water resource for uses such as drinking water supply, recreational uses and aesthetics, agriculture (irrigation and livestock watering), protection of aquatic life and industrial water supplies.

1.1 The Study Area

Calabar South local government area of Cross River State constitutes the study area. The landscape is dominated by two major rivers, the Calabar River in the north – west and the Great Kwa River in the eastern part. The area lies between latitudes $04^{\circ} 55' 30''$ N and $04^{\circ} 58' 30''$ N and longitudes $08^{\circ} 15' 30''$ E and $08^{\circ} 21' 00''$ E with an annual rainfall of 200mm to 350mm. The temperature of the area is generally high; the annual mean maximum and minimum temperatures are 31°C and 23°C respectively with mean relative humidity of 84mm. It experiences two seasons, the wet and dry season. The wet season lasts from April to September with a peak in June and July; the dry season is from October to March.

According to the result of the 2006 population census, Calabar South local government area has a total population of one hundred and ninety one thousand, six hundred and thirty (191,630) people. The state map showing the location of the local government area within Cross River State is shown in Plate 1.

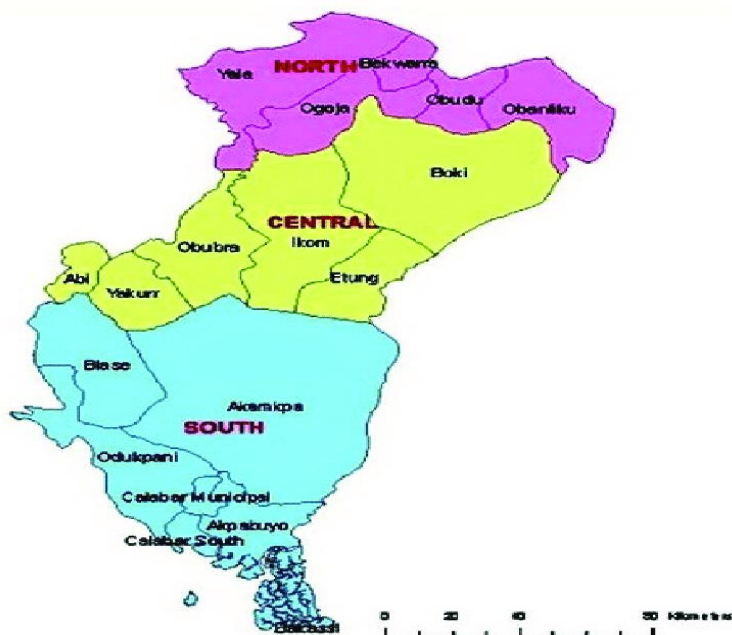


Plate 1: Cross River State Map Showing Different Local Government Areas

2.0 LITERATURE REVIEW

The provision of safe and potable water to rural and urban communities in the world is a necessary condition for development. This is one of the central objectives of the World Health Organization (Pollard et al 2006). Safe drinking water and adequate sanitation are essential for human health.

Ground, surface and rain water are the major sources of water for the populace. Surface water is often the most appropriate source of water for drinking and other domestic uses as it does not contain high mineral content. However, surface water is often contaminated by people and animals who defecate in or near the water source. Eighty percent of diseases in the third world are due to poor water quality and sanitation. There are many disease causing microbes and chemicals found in contaminated and polluted water which are harmful to human beings when they are consumed in drinking water (WHO, 2006).

According to Okafor, 1985, the sanitary quality of water is the relative extent of the absence of suspended matter, colour, taste, unwanted dissolved chemicals, bacteria, inactive or faecal pollution and other aesthetically offensive objects. In general, certain requirements must be met for water to be fit for human consumption. If these requirements are met, then the water could be described as “wholesome”, “potable”, or simply “good water” (Eja, 2002). The results of water quality measurements must be crosschecked with the established standards. In other words, man’s ability to control the quality of water is based on regularly making a series of physico-chemical and bacteriological tests, results of which are compared with established standards and a deviation from these standards calls for remedial actions. This is the essence of water quality control (Eja, 2002).

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In order to maintain water quality, guidelines for drinking water was set up by the World Health Organization (WHO). A guideline value represents the level (a concentration or number) of a constituent that ensures aesthetically pleasing water and does not result in any significant risk to the health of the consumers (WHO, 1984, 1985 and 2006). Tables 1 and 2 show the drinking water quality standards from the World Health Organization which is similar to the Nigerian Federal Ministry of Environment's Standards.

Table 1: World Health Organization's and Federal Ministry of Environment's Drinking Water Standard.

Parameter	Drinking Water Quality as per		
	EQS Standard	WHO Standard	EC Standard
pH	6.0 – 8.5	6.5 – 8.5	6.5 – 8.5
TDS (mg/l)	1,000	1,000	1,000
Iron (mg/l)	0.3 – 1.0	0.3	0.2
Sodium (mg/l)	200	200	175
Chloride (mg/l)	150 - 600	250	250
Sulphate (mg/l)	400	400	25
Flouride (mg/l)	1.0	1.5	1.5
Arsenic (mg/l)	0.05	0.05	0.05
Ammonium (mg/l)	0.5	1.5	0.5
Nitrate (mg/l)	10	10	10
Phosphate (mg/l)	6.0	-	5.0
Potassium (mg/l)	12.0	-	10
Endrin (mg/l)	0	0.2	0.2
Heptachlor ($\mu\text{g/l}$)	0	0.1	0.1
DDT($\mu\text{g/l}$)	0	1.0	0.1

Source: WHO, 2006

Table 2: Drinking Water Quality Standards

Parameters	Maximum WHO Permissible Limit
Al	0.2mg/l
Ca	75mg/l
Fe	0.3mg/l
NO ₂	50mg/l
pH	6.5 – 8.0
TDS	1000mg/l
E. Coli	0
Total Coliform count	10
Faecal streptococcus	0
<i>Clostridium perfringens</i> spore	0
Colour	15 TCU
Turbidity	5 NTU
Odour	Objectionable
Taste	Unobjectionable
Temperature	Ambient
Aluminum (Al)	0.2 mg/L
Arsenic (As)	0.01 mg/L
Barium	0.7 mg/L
Cadmium (Cd)	0.003 mg/L
Chloride (Cl)	250 mg/L
Chromium (Cr6+)	0.05 mg/L

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Conductivity	1000 μ S/cm
Copper (Cu+2)	1 mg/L
Cyanide (CN-)	0.01 mg/L
Fluoride (F-)	1.5 mg/L
Hardness (as CaCO ₃)	150 mg/L
Hydrogen Sulphide (H ₂ S)	0.05 mg/L
Iron (Fe+2)	0.3 mg/L
Lead (Pb)	0.01 mg/L
Magnesium (Mg+2)	0.20 mg/L
Manganese (Mn+2)	0.2 mg/L

Source: WHO, 2006

3.0 MATERIALS AND METHODS

3.1 Sample Collection And Preparation

In order to get fair and adequate representations of the various streams, their sample site, elevation and coordinates are presented in Table 1. Surface water samples were randomly collected between 7.00am and 9.30am fortnightly from the upstream, mid-stream and downstream respectively from the stations in May, June and September 2011 while operating from a dug-out canoe. The samples were collected in 1 litre polythene bottles with screw caps at approximately 30cm below the water surface. The bottles were treated with 5% nitric acid and rinsed with distilled water before use. The samples were fixed with 5% nitric acid to minimize the adherence of heavy metals to the walls of the bottles.

Water samples were transported to the laboratory in an ice chest within 24 hours and were stored at -5°C in a Haier Thermocool freezer prior to further analysis. Heavy metals analysis was carried out with a Buck Scientific WGP 210 Atomic Absorption Spectrometer using element specific hollow cathode lamps in difficult condition by flame absorption mode. Blank solution was handled as detailed for the samples. All values were expressed in mg/l. The bacteriological analysis was carried out using the spread plate technique and the multiple tube techniques method and the number of colonies on each plate were counted and recorded per 100 ml of sample. The sample sites are presented in Table 4.

Table 4: Sample Sites Codes and their GPS

S/No.	Sample Code	Sample Site	Elevation	Coordinates
1.	S ₁	Uwanse stream	7m	04° 56' 11.7''N 08° 20' 34''E
2.	S ₂	Crutech stream 1	8m	04° 55' 29.8''N 08° 19' 56.2''E
3.	S ₃	Crutech stream 2	8m	04° 55' 29.5''N 08° 19' 56.2''E
4.	S ₄	Ewa Henshaw stream	8m	04° 56' 34.1''N 08° 18' 34.7''E
5.	S ₅	Hawkins stream	2m	04° 57' 00''N 08° 18' 32.5''E

*Crutech – Cross River University of Technology site

4.0 RESULTS AND DISCUSSION

4.1 Results

The concentrations of the investigated parameters varied in water from May, 2011 to September, 2011 respectively as shown from Table 5 to Table 16.

Table 5: P_H Values

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		1	2	3				
S ₁	mg/l	5.32	5.32	5.35	5.35	5.32	5.55	0.02
S ₂	„	4.45	4.43	4.51	4.51	4.43	4.46	0.04

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S ₃	„	3.51	4.15	3.67	4.15	3.51	3.78	0.33
S ₄	„	3.87	3.79	4.19	4.19	3.77	3.94	0.22
S ₅	„	3.83	3.81	3.80	3.83	3.80	3.81	0.01

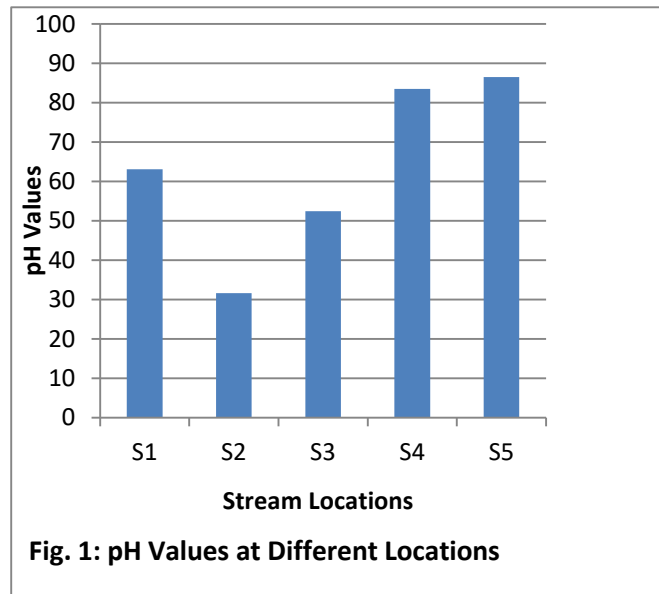
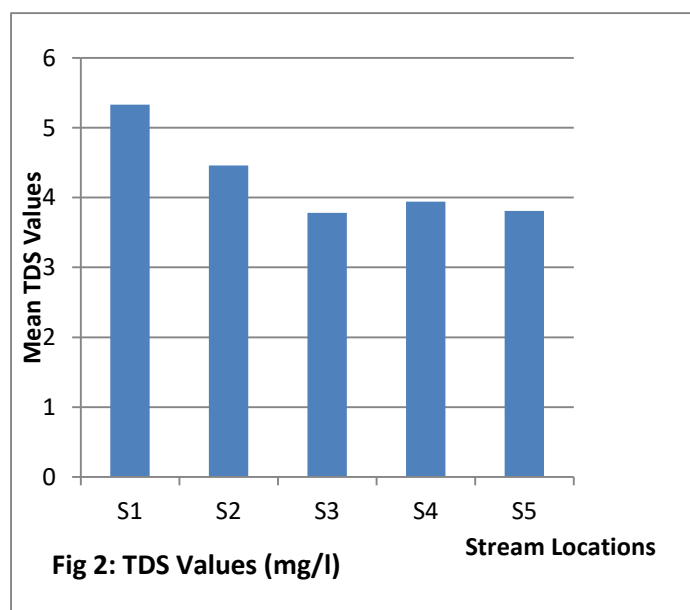


Table 6: Total Dissolved Solids (TDS) mg/l

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		1	2	3				
S ₁	mg/l	84.44	98.61	6.31	98.61	6.31	63.12	49.71
S ₂	„	29.12	47.45	18.33	47.45	18.33	31.63	14.72
S ₃	„	2.28	128.18	26.85	128.18	2.28	52.44	66.74
S ₄	„	2.48	95.16	152.75	152.75	2.48	83.46	75.81
S ₅	„	94.9	76.83	87.69	94.9	76.83	86.47	9.09



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Table 7: Turbidity

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	NTU	0.67	0.60	4.59	4.59	0.60	1.95	2.28
S ₂	„	0.17	0.21	44.07	44.07	0.17	14.80	25.3
S ₃	„	0.12	0.15	25.84	25.84	0.12	8.70	14.8
S ₄	„	0.07	0.07	3.68	3.68	0.07	1.27	2.08
S ₅	„	0.07	0.09	8.63	8.63	0.07	2.93	4.94

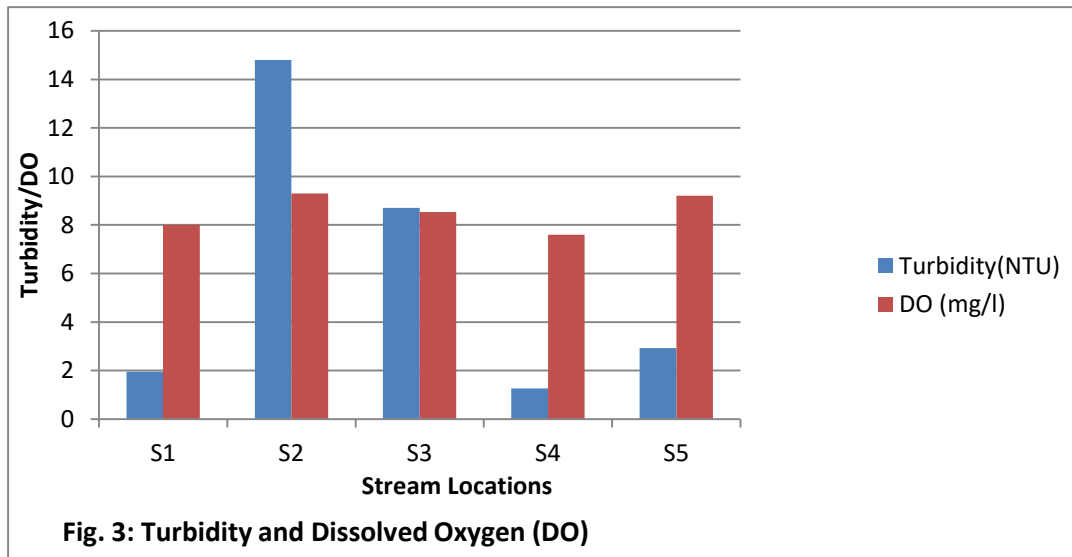


Table 8: Dissolved Oxygen (DO)

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	mg/l	9.90	9.70	9.70	9.90	9.70	9.77	0.46
S ₂	„	7.10	10.40	10.40	10.40	7.10	9.30	1.91
S ₃	„	8.80	8.40	8.40	8.80	8.40	8.53	0.23
S ₄	„	9.60	6.60	6.60	9.60	6.60	7.60	1.73
S ₅	„	10.20	8.80	8.80	10.20	8.80	9.21	0.81

Table 9: Biochemical Oxygen Demand (BOD)

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	mg/l	0.35	0.54	0.22	0.54	0.22	0.37	0.16
S ₂	„	0.47	0.55	0.27	0.55	0.27	0.43	0.14
S ₃	„	0.41	0.46	0.30	0.46	0.30	0.39	0.08
S ₄	„	0.42	0.56	0.25	0.56	0.25	0.41	0.16
S ₅	„	0.56	0.52	0.19	0.56	0.19	0.42	0.20

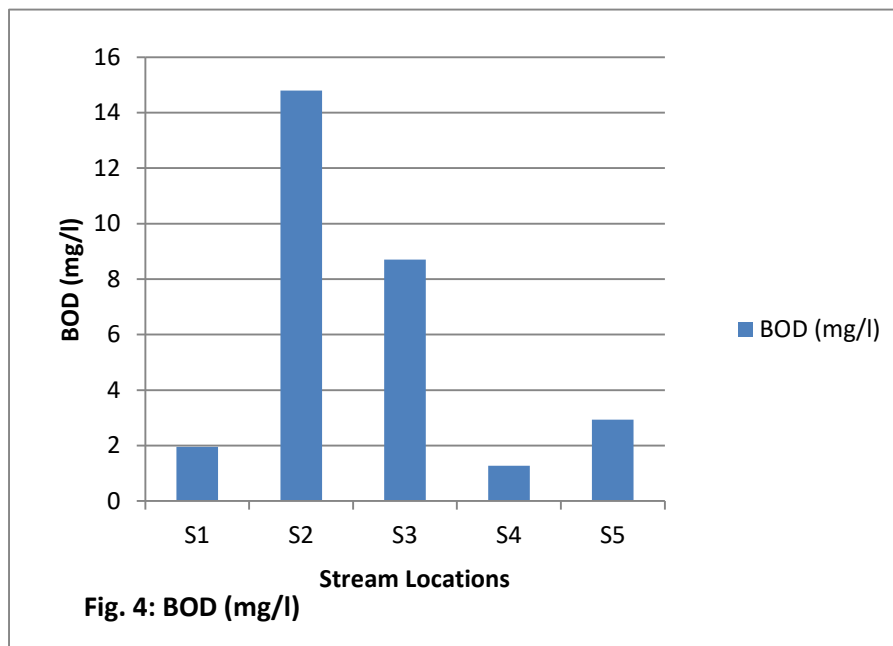


Table 10: Iron (Fe)

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	mg/l	0.14	0.32	0.97	0.97	0.14	0.48	0.43
S ₂	„	0.54	0.91	0.56	0.56	0.91	0.67	0.21
S ₃	„	0.76	0.85	0.58	0.85	0.50	0.73	0.14
S ₄	„	1.02	1.02	0.37	1.02	0.37	0.79	0.37
S ₅	„	0.81	0.51	1.21	1.21	0.51	0.84	0.35

Table 11: Lead (Pb)

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		1	2	3				
S ₁	mg/l	0.03	0.08	0.04	0.08	0.03	0.05	0.03
S ₂	„	0.34	0.05	0.04	0.34	0.04	0.14	0.17
S ₃	„	0.41	0.34	0.02	0.34	0.02	0.32	0.11
S ₄	„	0.36	0.59	0.03	0.59	0.03	0.33	0.28
S ₅	„	0.55	0.40	0.01	0.55	0.01	0.32	0.28

Table12: Zinc (Zn)

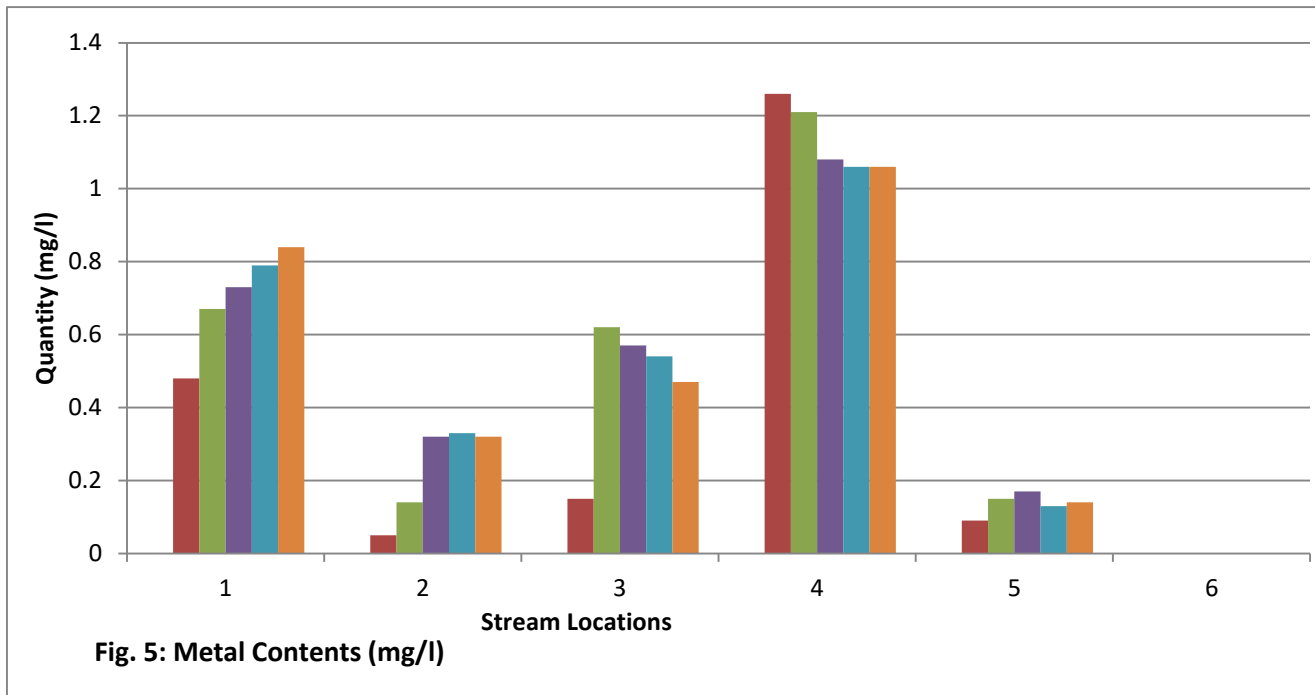
Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	mg/l	0.02	0.02	0.71	0.71	0.02	0.15	0.21
S ₂	„	0.51	0.49	0.87	0.87	0.49	0.62	0.21
S ₃	„	0.47	0.44	0.79	0.79	0.44	0.57	0.19
S ₄	„	0.44	0.28	0.91	0.91	0.28	0.54	0.33
S ₅	„	0.27	0.48	0.66	0.66	0.27	0,47	0.19

Table 13: Manganese (Mn)

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	mg/l	0.76	1.66	1.37	1.66	0.76	1.26	0.46
S ₂	„	1.06	0.83	1.74	1.74	0.83	1.21	0.47

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S ₃	„	0.81	0.61	1.82	1.82	0.61	1.08	0.65
S ₄	„	0.85	0.85	1.48	1.48	0.86	1.06	0.36
S ₅	„	0.86	0.85	1.48	1.48	0.86	1.06	0.36



-Iron, - Lead, - Zinc, Manganese, - Copper

Table 14: Copper (Cu)

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	mg/l	0.02	0.18	0.19	0.19	0.02	0.09	0.09
S ₂	„	0.10	0.18	0.16	0.18	0.10	0.15	0.04
S ₃	„	0.17	0.18	0.17	0.18	0.17	0.17	0.00
S ₄	„	0.18	0.10	0.10	0.18	0.10	0.13	0.05
S ₅	„	0.12	0.12	0.18	0.18	0.12	0.14	0.03

Table 15: Total Heterotrophic Count (THC)

Sample Code	Unit	Sampling Periods			Max.	Min.	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	Per 0.1 ml	166	60	83	83	66	69.7	11.93
S ₂	„	72	78	59	78	59	69.7	9.71
S ₃	„	45	56	76	76	45	59.0	15.72
S ₄	„	36	41	101	101	36	59.3	36.17
S ₅	„	28	32	96	96	28	52.0	38.16

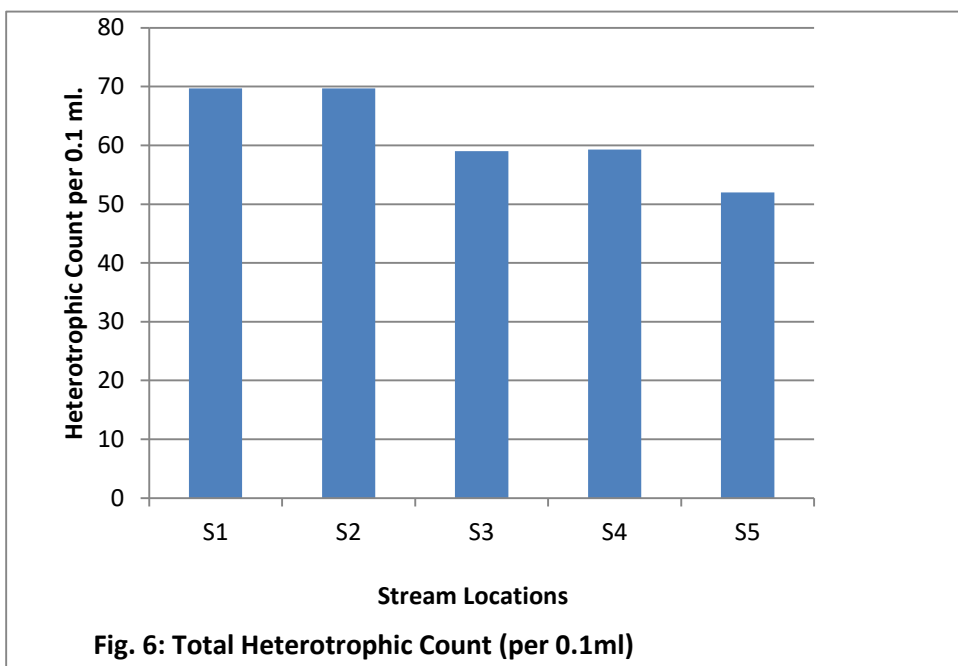
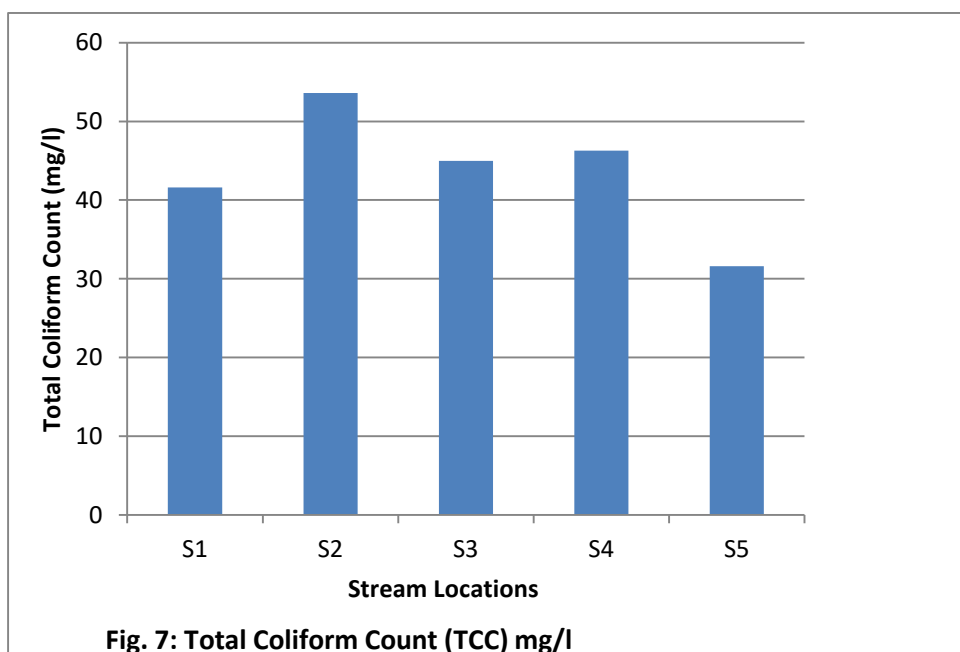


Table 16: Total Coliform Count (TCC)

Sample Code	Unit	Sampling Periods			Max.	Min	Mean	S.D
		May(1)	June(2)	Sept.(3)				
S ₁	mg/l	38	40	47	47	38	41.6	4.72
S ₂	„	55	60	46	60	46	53.6	7.09
S ₃	„	40	42	53	53	40	45.0	7.00
S ₄	„	28	23	88	88	23	46.3	36.10
S ₅	„	24	29	42	42	24	31.6	9.29



4.2 Discussion

The World Health Organization, WHO (2008) Standard is used as the criteria in assessment of the quality of water from each location under investigation. From the results obtained, as shown on Tables 5 to 16, the state of the water is discussed as follows:

The pH value is an important factor in maintaining the bicarbonate and carbonates system, and is also reported to play an important role in formation of algal bloom (Anderson, 1982). For the period of investigation, the mean seasonal pH varied from

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3.78 to 5.33 with the maximum and minimum pH values of 5.35 and 3.83 in stream 1 and 5 respectively. The pH results as shown in Table 5 (and Fig. 1) compared with Table 1 indicate that all the water samples are acidic. The acidic nature of the water may be attributed to high turbid materials and wastes from sub surface runoff water and river discharge characteristics, the high input of acidic waste materials through subsurface runoff from cottage industries in the area as well as free CO₂ from the atmosphere. However, all pH values were not within the WHO permissible limit of 6.5 – 8.5, hence the water sample have acidic tendency and may not be suitable for consumption.

Table 6 and Fig. 2 show the mean seasonal variations in the various streams and the standard deviation of the total dissolved solids obtained during the period of investigation. The mean Total Dissolved Solids (TDS) values for all the samples ranged from 31.63mg/l to 86.47mg/l. These values were found to be far lower than the WHO, 2006 permissible limit of 1000mg/l.

The level of dissolved oxygen in water may serve as an indicator of the microbial activity in the water. As shown in Table 8 and Fig. 3 the maximum concentration of dissolved oxygen ranged from 6.60mg/l to 10.40mg/l with a minimum mean value of 7.60mg/l (SD = 1.73) obtained at stream 4 while the maximum mean value of 9.30mg/l (SD = 1.91) was obtained at stream 2. The results indicate that the oxygen concentration changes monthly.

The mean seasonal variation of turbidity ranged from 0.07NTU to 44.07NTU. The mean values recorded in Table 7 (and Fig. 3) were found to be lower at all locations except S₂, and S₃ than the WHO limit of 5.0 NTU. The high turbidity may be due to high water table within the zone of aeration.

A high BOD signifies the presence of a large amount of organic pollution (Agunwamba, 2000). Table 9 (and Fig. 4) shows the mean value of BOD concentration obtained during the period of investigation. The range was from 0.19mg/l to 0.56mg/l. The maximum mean value of 0.43mg/l occurred in stream S₂ while the minimum mean value of 0.37mg/l value occurred in stream S₁. These values were lower than the WHO permissible limit; this shows that the strength of waste in the area is low.

The mean value and standard deviation of iron concentration in the water from the study area is shown in Table 10 (Fig. 5). The mean minimum and maximum values were 0.48mg/l and 0.84mg/l in stream S₁ for May and September. The values were above the WHO permissible limit. This may be due to the discharge of waste containing iron into the streams.

Table 11 (and Fig. 5) show the mean lead (Pb) concentration. The mean Pb concentration ranges from 0.05mg/l to 0.33mg/l with SD range of 0.03mg/l to 0.28mg/l respectively. The mean value exceeded the WHO maximum permissible level of < 30µg/l for drinking water.

Heavy metals such as Zinc, Copper, and Manganese are essential for the growth and well being of living organisms including man. However, they can exhibit toxic effects when organisms are exposed to levels higher than normally required. Tables 15 (Fig. 6) and 16 (Fig. 7) show the mean range for the values of total heterotrophic count and total coliform count in the area of study. The mean value ranges from 52.0 per 0.1ml to 69.7 per 0.1 ml for the heterotrophic count and the mean values of total coliform count ranges from 31.6 mg/l to 53.6mg/l. Both parameters were observed to be very high and are causative agents of water based and water borne diseases.

5.0 CONCLUSION

Water is the most vital resources in the world. It is also one of the most essential requirements for life, and as such its quality is of paramount importance to the consumers. Standard methods for water analysis has been implemented throughout all the analysis in this study, and the results obtained are precise and logical enough to give useful information in which the portability of drinking water sources within Calabar South local government area could be assessed. From the results obtained, water sources from some streams within the area are quite unsafe for drinking and for other domestic purposes. They are polluted when compared with the WHO Standards.

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Perceived Social Support and Subjective Well-Being of Breadwinners: A Correlational Study



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ABSTRACT: There are an increasing number of studies regarding subjective wellbeing; however, its association towards perceived social support was still vague depending on how both constructs are used in every study. Therefore, the need to provide further literature among the constructs, bridge the gaps and further analyze its relation to the breadwinners in the community had been the basis to pursue this study. This study aimed to determine the relationship between negative affect and the parameters of perceived social support.

Considering the results of the study, an intervention program was proposed by the researchers, *Keep in Touch (KIT)*, in order to maintain the quality of social relationships of the respondents and promote better well-being for all.

KEYWORDS: Perceived social support, subjective well-being, breadwinners, affect, availability, adequacy

INTRODUCTION

Social relationships and activities have been identified as crucial elements contributing to individual health and well-being across the lifespan. People are social animals; they need one another, and the feeling of being valued, supported, or appreciated is such a rewarding feeling for most people. Social connections like families and friends play a significant role in one's life; they can influence motivation and belonging. Such support directly impacts our health and well-being because it provides us with feelings of predictability, belonging, purpose, and security (Hauken, 2020).

It is crucial that people know how to evaluate their lives and track whether their present situation is aligned with what they have desired. The domains of their life that they deem desirable contribute to their overall well-being, thus making sense of the importance of social relationships. Furthermore, having a good social relationship contributes to one's subjective well-being. People who feel satisfied with their social relationships more often feel happy and feel greater satisfaction with their lives than people who are less satisfied with the quality of their social relations. People feeling satisfied with their social relationships tend to access and obtain support when required.

Perceived social support and subjective well-being are deemed relevant to the context of the breadwinners, as the respondents in the study, since these could give newer knowledge regarding the constructs. While the researchers are aware that subjective well-being has grown enormously through decades of research, we then searched for ideal respondents that could help contribute to the growing number of studies, precisely how the respondents perceive the social support from people around them. Studies regarding breadwinners often revolve around gender identities; male or female breadwinners were compared or assessed, and the decline of male breadwinners is also analyzed. As researchers review studies and literature, little is known regarding their well-being.

The economic havoc and instability wreaked by the COVID-19 pandemic threatened the health and well-being of families across the nation. Breadwinners are already beset with difficulties, and the current situation makes it more challenging for them. As Psychology students who are part of higher education, researchers see how important it is to have people evaluate support and how they think this helps lead to a more satisfactory life. It is beneficial to conduct a study that could contribute to the awareness of something that naturally exists, but people tend to see less. In the pursuit of understanding how the quality of a relationship relates to an individual's well-being, it is necessary to see concrete shreds of evidence. The research could also give way not just for testing the relationship but also for predicting such variables as a factor towards the betterment of an individual.

In light of the foregoing discussion, the primary objective of our study was to determine the level of perceived social support of breadwinners in terms of perceived availability and adequacy of supportive ties, as well as their level of subjective well-

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being in terms of life satisfaction, positive affect, and negative affect. This study also intends to determine the relationship between variables.

METHODOLOGY

Population and Sampling Procedure

The respondents of the study were deliberately chosen through purposive sampling. The researchers included participants in the sample because they believed that these people belong into the inclusion that had been established (Taherdoost, 2016). Upon selection, the respondents must be: 18 years old and above, currently employed in any organization or institution, main provider of the family for at least 1 year, and is single or unmarried. The selected respondents in the study were the 150 breadwinners that reside in the City of Cabuyao, Laguna. Most of the respondents, 108 or 72% age 21 to 25 years old, 32 or 21.3 % are 26 to 30 years old, meanwhile only seven or 4.7% are 20 years old and below. Most of the respondents, about 80% of them, are providing for their families below five years. The remaining 2.7% are providing for 11 to 15 years.

Measurements and Data Gathering Procedure

Subjective Well-being and Perceived Social Support Researcher-Made Questionnaire

Due to restrictions imposed by the effect of the current pandemic, the researchers gathered all information from credible online resources. Once the topic had been approved, the researchers continue to do literature review to ensure the quality of the contents of the study. Also, check the availability of the respondents and the projected household population. The data gathered from the respondents were in the form of an online questionnaire contained on the Google Forms. The questionnaire contains 45 items in total; each parameter under the two variables has nine items. Each item was carefully assessed and reviewed, also, it has been validated by three psychometricians and had also undergone reliability testing performed by a statistician, which was determined to be valid and reliable. The informed consent was reflected on the questionnaire, informing the respondents that their participation is free from coercion, and that their personal information and data were treated with anonymity and confidentiality. Once the responses had been submitted, the debriefing was also reflected on the Google Form. Subsequently, the tabulated data were then treated statistically for interpretation and analysis by the statistician and the researchers.

RESULTS

Table 1. Distribution of the Respondents According to Age

AGE RANGE	FREQUENCY (f)	PERCENT (%)
20 and Below	7	4.7
21-25	108	72.0
26-30	32	21.3
Above 30	3	2.0
Total	150	100.0

Table 1 shows that the majority of the breadwinners, 72% are 21 to 25 years old, with 108 over 150 respondents. On the other hand, only 2% or three out of 150 respondents are above 30 years old.

Table 2. Distribution of the Respondents According to Years of Providing for the Family

YEARS OF PROVIDING FOR FAMILY	FREQUENCY (f)	PERCENT (%)
5 and below	120	80.0
6-10	26	17.3
11-15	4	2.7
Total	150	100.0

Table 2 shows shows that 80% or 120 out of 150 respondents have provided for their families for five years and below. Only 2.7% of them have 11 to 15 years of providing for their family, with four out of 150 respondents.

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Table 3. Level of Perceived Social Support of Breadwinners in Terms of Perceived Availability of Support

INDICATORS	MEAN	VERBAL INTERPRETATION
Q1. My family is one of my source of support in times of difficulty.	3.61	Very high
Q2. When I feel stressed at work, I know that my family will comfort me.	3.31	Very high
Q3. Even if I decided to change my career, I know that my family will support me.	3.47	Very high
Q4. I have friends who always make ways in order for me to have a leisure time.	3.49	Very high
Q5. I have friends who support what I do for my family.	3.49	Very high
Q6. I have friends who can give me a helping hand whenever I feel that I am mishandling my problems.	3.47	Very high
Q7. I have coworkers who are willing to listen to my sentiments.	3.24	High
Q8. My co-workers encourage me to work even harder for my family.	3.25	High
Q9. There is someone at work whom I can ask for advice on how to deal with work-related problems.	3.30	Very high
Over-all Mean	3.44	Very high

Legend: 1.00 – 1.75 Very low, 1.76 – 2.50 Low, 2.51 – 3.25 High, 3.26 – 4.00 Very High

Table 3 shows that the average mean is 3.44 which is interpreted as Very High. Item number 1, *My family is one of my sources of support in times of difficulty* has the highest mean of 3.61 and interpreted as Very High. On the other hand, Item number 7, *I have coworkers who are willing to listen to my sentiments* has the least mean which is 3.24 and interpreted as High.

Table 4. Level of Perceived Social Support of Breadwinners in Terms of Perceived Adequacy of Support

INDICATORS	MEAN	VERBAL INTERPRETATION
Q1. My family takes pride in my accomplishments.	3.59	Very high
Q2. The support coming from my family is enough to motivate me to work harder.	3.55	Very high
Q3. My family loves and accepts me exactly as I am.	3.65	Very high
Q4. My friends offer sufficient help for me to cope up with emotional stress.	3.43	Very high
Q5. I have friends who are a natural source of comfort to me.	3.48	Very high
Q6. My friends know when do I need them even if I do not ask for their help.	3.25	High
Q7. I can receive help from my coworkers that I have helped before.	3.21	High
Q8. When my coworkers get worried about me, I feel that they genuinely care for me.	3.30	Very high
Q9. I respect and have complete faith in the advice my senior colleague gives.	3.47	Very high
Over-all Mean	3.41	Very high

Legend: 1.00 – 1.75 Very low, 1.76 – 2.50 Low, 2.51 – 3.25 High, 3.26 – 4.00 Very High

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Table 4 shows that the average mean is 3.41 which is interpreted as Very High. Item number 3, *My family loves and accepts me exactly as I am* had the highest mean of 3.65 and interpreted as Very High. On the other hand, Item number 7, *I can receive help from my coworkers that I have helped before*, had the least mean of 3.21 and also interpreted as High. mean is 3.30 .

Table 5. Level of Subjective Well-being of Breadwinners in Terms of Life Satisfaction

INDICATORS	MEAN	VERBAL INTERPRETATION
Q1. I am contented with what I have right now.	3.13	High
Q2. I am satisfied with what I can provide for my family.	3.17	High
Q3. I am satisfied with my job.	3.14	High
Q4. I am living a meaningful life.	3.35	Very high
Q5. I have full control of my life.	3.27	Very high
Q6. My life is heading towards my desired goal for my family.	3.35	Very high
Q7. I think I have achieved some of my goals in life.	3.15	High
Q8. Despite of my current situation, I want to live longer in order for me to achieve my goals.	3.65	Very high
Q9. Overall, I think my life is doing good.	3.39	Very high
Over-all Mean	3.30	Very high

Legend: 1.00 – 1.75 Very low, 1.76 – 2.50 Low, 2.51 – 3.25 High, 3.26 – 4.00 Very High

Table 5 shows that the average mean is 3.30 which is interpreted as Very high. Item number 8, *Despite of my current situation, I want to live longer in order for me to achieve my goals* had the highest mean of 3.65 and is interpreted as Very high. On the other hand, Item number 1, *I am contented with what I have right now* has the least mean of 3.13 and is interpreted as High.

Table 6. Level of Subjective Well-being of Breadwinners in Terms of Positive Affect

INDICATORS	MEAN	VERBAL INTERPRETATION
Q1. I am enthusiastic and inspired at doing my job.	3.45	Very high
Q2. I am happy to provide the primary needs of my family.	3.59	Very high
Q3. I am hopeful for better days to come.	3.75	Very high
Q4. When someone commends me for my work, I feel proud of myself.	3.65	Very high
Q5. I can handle a situation even when things don't go as planned.	3.44	Very high
Q6. I feel confident about the things I do.	3.45	Very high
Q7. I acknowledge my weaknesses and use them to define my strengths.	3.58	Very high
Q8. It is a pleasant feeling to be regarded as the family's breadwinner.	3.49	Very high
Q9. I work for my family because I love them.	3.76	Very high
Over-all Mean	3.58	Very high

Legend: 1.00 – 1.75 Very low, 1.76 – 2.50 Low, 2.51 – 3.25 High, 3.26 – 4.00 Very High

Table 6 shows that the average mean which is 3.58 which is interpreted as Very high. Item number 9, *I work for my family because I love them* has the highest mean of 3.76 and is interpreted as Very High. On the other hand, Item number 5, *I can handle a situation even when things don't go as planned* has the least mean of 3.44 and is interpreted as Very High.

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Table 7. Level of Subjective Well-being of Breadwinners in Terms of Negative Affect

INDICATORS	MEAN	VERBAL INTERPRETATION
Q1. I am worried about achieving too little of my goals.	2.97	High
Q2. I worry that I may lose my current job.	2.79	High
Q3. I often feel pressured to provide my family's needs.	3.09	High
Q4. I fear that I am not adequately providing the needs of my family.	3.03	High
Q5. I feel upset when someone is making a negative comment about me.	2.90	High
Q6. I get disappointed when I do not accomplish a goal I have in mind.	3.07	High
Q7. I am not confident about myself because I feel that I lack in abilities.	2.62	High
Q8. I feel guilty when I put myself first.	3.02	High
Q9. There are times when I feel stressed at work.	3.33	Very high
Over-all Mean	2.99	High

Legend: 1.00 – 1.75 Very low, 1.76 – 2.50 Low, 2.51 – 3.25 High, 3.26 – 4.00 Very High

Table 7 shows the level of subjective well-being of breadwinners in terms of negative affect. The average mean is 2.99 which is interpreted as High. Item number 9, *There are times when I feel stressed at work* has the highest mean of 3.33 and is interpreted as Very High. On the other hand, Item number 7, *I am not confident about myself because I feel that I lack in abilities* has the least mean of 2.62 and interpreted as High.

Table 8. Analysis of Variance on Perceived Social Support by Age Range

Variables	N	Mean	Sig.	Decision	Interpretation	
AVAILABILITY MEAN	20 and Below	7	3.57	.281	Failed to Reject Ho	No Significant Difference
	21-25	108	3.40			
	26-30	32	3.50			
	Above 30	3	4.00			
	Total	150	3.44			
ADEQUACY MEAN	20 and Below	7	3.57	.782	Failed to Reject Ho	No Significant Difference
	21-25	108	3.39			
	26-30	32	3.41			
	Above 30	3	3.67			
	Total	150	3.41			

Test used: ANOVA, One-Way; .05 level of significance

Table 8 shows that the computed p-values for perceived availability of .281 and perceived adequacy of .782 are greater than the .05 level of significance, the decision is not to reject the null hypothesis.

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Table 9. Analysis of Variance on Perceived Social Support by Years of Providing for Family

	Variables	N	Mean	Sig.	Decision	Interpretation
AVAILABILITY MEAN	5 and below	120	3.42	.630	Failed to Reject Ho	No Significant Difference
	6-10	26	3.54			
	11-15	4	3.50			
	Total	150	3.44			
ADEQUACY MEAN	5 and below	120	3.42	.856	Failed to Reject Ho	No Significant Difference
	6-10	26	3.38			
	11-15	4	3.25			
	Total	150	3.41			

Test used: ANOVA, One-Way; .05 level of significance

Table 9 shows that the computed p-values for perceived availability of .630 and perceived adequacy of .856 are greater than the .05 level of significance. The decision is not to reject the null hypothesis.

Table 10. Analysis of Variance on Subjective Well-being by Age Range

	Variables	N	Mean	Sig.	Decision	Interpretation
LIFE SATISFACTION MEAN	20 and Below	7	3.29	.970	Failed to Reject Ho	No Significant Difference
	21-25	108	3.31			
	26-30	32	3.25			
	Above 30	3	3.33			
	Total	150	3.30			
POSITIVE AFFECT MEAN	20 and Below	7	3.29	.324	Failed to Reject Ho	No Significant Difference
	21-25	108	3.61			
	26-30	32	3.56			
	Above 30	3	3.33			
	Total	150	3.58			
NEGATIVE AFFECT MEAN	20 and Below	7	3.43	.181	Failed to Reject Ho	No Significant Difference
	21-25	108	2.99			
	26-30	32	2.97			
	Above 30	3	2.33			
	Total	150	2.99			

Test used: ANOVA, One-Way; .05 level of significance

Table 10 show that the computed p-values of .970 for life satisfaction, .324 for positive affect and .181 for negative affect are greater than the .05 level of significance, the decision is to not reject the null hypothesis.

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Table 11. Analysis of Variance on Subjective Well-being by Years of Providing for Family

Variables		N	Mean	Sig.	Decision	Interpretation
LIFE SATISFACTION MEAN	5 and below	120	3.30	.627	Failed to Reject Ho	No Significant Difference
	6-10	26	3.35			
	11-15	4	3.00			
	Total	150	3.30			
POSITIVE AFFECT MEAN	5 and below	120	3.58	.406	Failed to Reject Ho	No Significant Difference
	6-10	26	3.62			
	11-15	4	3.25			
	Total	150	3.58			
NEGATIVE AFFECT MEAN	5 and below	120	3.01	.401	Failed to Reject Ho	No Significant Difference
	6-10	26	3.00			
	11-15	4	2.50			
	Total	150	2.99			

Test used: ANOVA, One-Way; .05 level of significance

Table 11 shows that the computed p-values of .627 for life satisfaction, .406 for positive affect, and .401 for negative affect are greater than the .05 level of significance, the decision is to not reject the null hypothesis.

Table 12. Correlation Matrix between Perceive Social Support and Subjective Wellbeing

VARIABLES		AVAILABILITY MEAN	ADEQUACY MEAN
LIFE SATISFACTION MEAN	Pearson Correlation	.479**	.432**
	Sig. (2-tailed)	.000	.000
	Interpretation	Strong Positive	Strong Positive
POSITIVE AFFECT MEAN	Pearson Correlation	.348**	.414**
	Sig. (2-tailed)	.000	.000
	Interpretation	Moderate Positive	Strong Positive
NEGATIVE AFFECT MEAN	Pearson Correlation	-.100	-.140
	Sig. (2-tailed)	.223	.088
	Interpretation	No Significant Correlation	No Significant Correlation

Test used: Pearson Correlation; .05 level of significance

As shown in the table above, since the computed p-values of .000 between the subjective well-being in terms of life satisfaction and perceived social support of availability and adequacy are lesser than the .05 level of significance, the decision is to reject the null hypothesis.

Also presented on the table, since the computed p-values of .000 between the well-being of positive affect and perceived social support of availability and adequacy are lesser than the .05 level of significance, the decision is to reject the null hypothesis.

However, the results also show that the computed p-values of .223 and .088 respectively between the perceived social support of availability and adequacy versus their subjective well-being in terms of negative affect, are both greater than the .05 level of significance.

ANALYSIS

Results of the data analysis of the study indicate that most of the breadwinners were young adults. In many societies, young adults in their late teens and early twenties face several challenges as they finish school, start working full-time and take on other adult responsibilities. Filipino students graduate from high school at 16 (Philippines - Educational System— an Overview, 2021) and usually graduate college from 20 to 21 since most bachelor's degrees are four years. Studies have shown that the ages between 25 to 40 years are the most productive periods in a person's life (Palabrica, 2019). Generally healthy during those years, he or she can work efficiently, earn respectable wages, and contribute to the national economy.

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In the study of Sacristan (2014), which involves young adult breadwinners ages 18-25, breadwinning is seen as an obligation of an individual to save their families from the curse of poverty. This situation is rampant in the Philippines, especially in families living below the poverty threshold. Gender, age, educational background, physical circumstances, and enthusiasm of the individual may not have compelled them to take on this responsibility, but the instinct to survive because of poverty.

Based on the given data, the results concluded that most breadwinners have been providing for their families for a long time, often five years or less, and they have continued to do so until today. This may indicate that the breadwinner role may persist for a certain time until these individuals become real and full pledge breadwinners (a parent) to support their own family.

The study also indicates that breadwinners may face life challenges, yet they still find ways to provide for their own families. Every day of work and other personal problems may arise; in this case, they definitely need support to cope. As mentioned in the study of Setiasih & Jayanti (2018), people perceive support as the availability of resources they can access in times of need and when they feel required. Concerning times of difficulty, it has been mentioned that these available resources also act as the stress buffer when people are faced with times of life's challenges. Perceiving availability of support is deemed relevant to weaken the negative association of stress and health and quality of life that may have been attributed to certain life conditions.

The study revealed that breadwinning had always been directed towards family; they engage in different work, sidelines, and work extra hours to support their family. The majority of the breadwinners feel that being part of a community and social network that accepts and loves them as they are is important. The main indication that they perceive adequate social support is that they are accepted, loved and there are people who are willing to listen to them. In connection to the analysis from the availability of support, the breadwinners still perceive that their families have a significant role in their social support. The results of this study are in line with those of the study by Diaz and Bui (2017), which stated that perceived social support from the family was one of the most significant factors that made an individual satisfied with his current life.

Breadwinners are fighting to stay afloat within this pandemic.

Continuing to work hard, even their health is at risk to provide for themselves and their families in uncertain times, often accepting double jobs and side hustles. However, the findings indicated that despite these conditions and bearing the burden of family responsibilities, breadwinners are eager to continue their lives to achieve their goals. This feeling of fulfillment reflects that the breadwinners appraised their lives with satisfaction, increasing their evaluation of well-being.

In this study, breadwinners are proved to have positive feelings about providing for their families because they love them. Filipinos are noted for their strong and close family ties. They hold their family in high regard and prioritize them above all else. Breadwinners are honored for their willingness to sacrifice and carry the weight of responsibilities because of how much they care for their loved ones.

The study by Diener E. et al. (2018) supported the results of this study, where he defined positive affect as moods and emotions that individuals find desirable and pleasant.

Others who experience positive emotions persistently are more likely to have good relations with those around them. Breadwinners have this high positive feeling of love for their family, leading them to have quality social relationships, including in their working environment and with colleagues (Diener et al.,2018).

In this study, it was shown that there are times when breadwinners feel stressed at work, and the current working conditions brought on by the pandemic may contribute to the stress they feel. In connection to the analysis, Sultana (2020) stated that the COVID19 procedure could worsen job stress by revealing a wide range of physical, mental, and emotional problems and increasing employees' workload. Employees' efforts and energy to reduce occupational stress while performing their tasks may contribute to emotional exhaustion during this process.

The results of correlation testing between the subscales of perceived social support and subjective wellbeing indicate a significant positive correlation between perceived adequacy of support, perceived availability of support, life satisfaction, and positive affect. This implies that if breadwinners continue to engage in social networks around them, their family, friends, and even co-workers, they are more likely to be satisfied with their lives. In addition, if the breadwinners from their social contacts also perceive available and adequate support, they are more likely to experience positive affect or pleasant emotions. The existence of a positive and significant correlation between perceived social support and positive affects indicates that a person having perceived social support will feel positive emotions.

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The results are in line with those of the study by Ma (2019) and Wang et al. (2019), which stated that social support had been one of the most potent contextual factors contributing to an individual's subjective well-being. As breadwinners perceive social support from those around them, it improves their subjective well-being in life satisfaction and positive affect.

People who face problems and demands in life, yet, have surroundings including other people from whom they get support, that they believe help them overcome these difficulties, tend to be more inclined to think that their life can be at ease (Setiasih & Jayanti, 2018). Thus, in the context of the respondents, as the breadwinners of their families, they tend to have progressive positive emotions and life satisfaction.

On the other hand, the results of the study established no relationship between perceived social support and negative affects. This implies that the breadwinners' negative emotions are not associated with the social support from their social contacts, as these unpleasant emotions may have been linked to other factors. The results are consistent with the study conducted by Setiasih & Jayanti (2018), wherein the respondents' perceived social support also has no relationship with their negative affect. It was concluded that it was because of the existence of other factors that may have affected the negative affect of the individuals, including unpleasant life events, low self-esteem, and other conditions. In addition, the results can also be explained based on the conclusion made by Brajša-Žganec et al. (2018), the differences in the researchers' conceptualizations and operationalization of constructs, and the fact that different facets of social support may have different relationships with different aspects of subjective well-being. Studies attempting to associate social support and subjective well-being vary due to the ambiguity of both constructs.

DISCUSSION

The results of the study indicated that breadwinners have a very high perception of social support in terms of both availability and adequacy of supportive ties. Despite the difficulties that come with being a breadwinner, they can still acknowledge the available and adequate support, primarily from their families, friends, and coworkers. Most of the support was perceived by their family, probably because they are able to provide for their need, and they are the closest social connection to reach. Seeing their family as a source of strength in difficult times and knowing that their family loves and accepts them for who they are, indicates that their family has a significant role in their lives and influences how they respond.

Illustrating from the analysis, results showed that breadwinners want to live longer to achieve their goals and are optimistic about their situation.

They have a very high positive affect, which implies that they work for their family with a positive feeling of love for them. Though feeling content with their lives and feeling positive emotions, breadwinners nevertheless experience unpleasant feelings because they are frequently stressed at work. As breadwinners face different challenges such as perceiving enormous family responsibilities with their situation, they are not immune to experiencing negative emotions. Despite these, they can still perceive available and adequate social support, life satisfaction, and positive affect.

Inferring from the analysis, a significant relationship exists between the respondents' subjective well-being in terms of life satisfaction and perceived social support in terms of availability and adequacy. When breadwinners perceive higher social support in both availability and adequacy, their life satisfaction increases. It has also been assessed that when respondents tend to have a moderate tendency of having social support in terms of availability, it increases their feeling of positive affect, while there is a strong tendency for the breadwinners to have an increased positive affect when they perceive higher levels of adequate social support from those around them. The more the respondents perceive higher available and adequate social support in their life, the more it improves their life satisfaction and positive affect. However, no relationship exists between perceived social support and the negative affect of the respondents.

Based on the research study findings that examined breadwinners' perceptions of social support and their subjective well-being, the researchers proposed ***Keep in Touch (KIT): Maintaining Quality Social Relationships for a Better Wellbeing***. KIT is an intervention program for breadwinners that will strengthen and help maintain the quality of perceived social support from supportive ties, life satisfaction, and positive emotions of the participants. This can help, especially when faced with challenging roles and bigger responsibilities as the family's primary provider of needs. Furthermore, this is also a great way to promote the significance of having social connections in improving and having better well-being.

Interventions/strategies such as seminars, open discussion forums, letter writing, journaling, exchanging positive affirmations, interactive review, and reflection will be implemented and monitored throughout the program. These are for fixing and strengthening relationships, positive self-statements, self-acceptance, and reconceptualizing negative thoughts and feelings related to important relationships in the lives of the participants.

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Given how mentally and physically tiring the breadwinner's role is, researchers suggest that they should acknowledge their emotions and improve how they would perceive surrounding them. Considering breadwinners are primarily at their workplace, providing certain recreational activities to promote and support employees' well-being are also recommended, aiming to lessen the levels of negative affect. The government should adhere to its role in addressing its community's problems and concerns, enforcing policies, and influencing its communities. They should have a network mechanism in place to allocate resources in supporting the well-being of breadwinners. Researchers suggest that breadwinners should be recognized and experience the same privilege as heads of households, such as benefiting from a lower tax rate. Somehow, this would relieve their worries about managing their finances to provide for their family.

In respect of limitations, the current study focused solely on determining the respondents' level of perceived social support and subjective well-being then finding the relationship between the two variables. Moreover, limitations involved using self-analysis and personal interpretation of respondents in questionnaires. Due to the impact of the COVID-19 pandemic, the researchers distributed the questionnaire through Google Forms to avoid the possibility of acquiring the virus. Considering the strict health protocols, the researchers acknowledged minimal rapport among the respondents and researchers. As such, future research could recreate the findings beyond the pandemic period to fully achieve the purpose of the study. A face-to-face collection of data and a wider range of the study's locale can increase the findings' validity and reliability.

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Knowing How It Works: Voices of Secondary School Heads on Local Government Special Education Fund for Technological Support in the New Normal



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ABSTRACT: Structured with qualitative-transcendental phenomenology, the study aimed at understanding the lived experiences of secondary school heads on the local government Special Education Fund for technological support in the new normal in the Division of Santa Rosa, Laguna, Philippines. The researcher utilized the framework of Moustakas (1994), which involved bracketing, horizontalization, theme clustering, textural description, structural description, and essence. From the verbatim transcriptions, 14 themes surfaced, which were intensively analyzed. The participants' lived experiences of receiving local government fund-derived technological support to match the demands of distance learning and implementation of basic education learning continuity were relative to intricate experiences, retorts on transitional education, knowledge of local government fund, perceived support and downsides, realization of fund accessibility and decision-making, meeting the demands of distance learning, and usefulness and impacts on school outcomes. Consequently, the participants' coping mechanisms in facing challenges and issues are manifested through prioritizing health and security, provision of sufficient and equitable technological support, congruency of actual needs, operative management schemes, strategic fund allocation, dynamism in training, workshops, and technical assistance, and collaboration towards positive support. The findings imply that in the new normal, the provision of local government for technological support in schools aided the successful implementation of distance learning via the virtual learning modality. The technological devices, such as laptops for teachers and tablets for students, helped a lot in complying with the required tasks while ensuring health and safety precautions.

KEYWORDS: distance learning, learning continuity, phenomenology, technological support, Special Education Fund.

INTRODUCTION

In many developing countries, the responsibility for improving the quality of basic education services in public schools is accounted for by the local governments and the Department of Education (World Bank, 2016). In the Philippines, the local government units as emphasized in the Local Government Code assist public schools in terms of operations, buildings, technological infrastructure, and others since they have the commitment, capability, and consistent functions in doing so, in addition to their role in addressing the weaknesses in the areas of education (Republic Act. No. 7160). Thus, equipped with adequate and stable funding through allocations from the Special Education Fund (SEF) for carrying out the needs of schools and upgrading the basic educational outcomes (Republic Act No. 5447).

During the outbreak of the COVID-19 pandemic, school principals struggled to ensure continuity of education due to encountered problems like lack of technological infrastructure, lack of access to computers and the internet, technical problems, pedagogical issues, teachers' lack of digital skills, lack of resources, difficulty in identifying the best learning modality, and lack of constant financial and material support (Aytac, 2020; Childhope, 2021). Accordingly, technological support such as digital learning at this time was considered a worldwide concern of schools that needed attention to promote successful compliance with the demands of virtual learning delivery of instructions as well as to provide meaningful learning experiences (Zayabalabadjane, 2020; De Villa and Manalo, 2020; Carstens et al., 2021). As explained by Armstrong-Mensah et al., (2020), lack of equitable access to technological infrastructures, together with a lack of preparedness in public schools in this time of the COVID-19 pandemic, resulted in intensified school complexities, which hindered effective distance learning and, thus, were considered a major reason for the difficulties in attaining successful school outcomes. This conformed to the findings of Cruz, (2021) and Starkey et al., (2021), which identified inadequacy of information and communications technology (ICT) resources as the common issue among students, teachers, and parents, which made it constraining instead of engaging. These general conditions, according to the World Bank

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(2016), resulted in education sector difficulties and interruptions which prevented ensuring successful, equitable quality education that supposedly promoted lifelong opportunities for learners. Furthermore, the complexities and struggles of schools and teachers to adapt to online-based learning instruction solutions resulted in greater learning losses (Engzell et al., 2021). In line with the difficulties in public schools, Lalu (2021) revealed that the survey conducted by the Social Weather Stations showed only 58 percent of the enrolled school-age, 5–20-year old Filipinos used ICT devices for distance learning. Out of the total percentage, 27% of units were owned, 12% bought, 10% borrowed, 9% given, and 0.3% rented. Due to a lack of household financial capacity, 42 percent of them did not use any distance learning device. These statistics demand urgent technological support aimed at resolving the complexities of the students, teachers, school leaders, and guardians in this new normal setup (Dayagbil et al., 2021). Furthermore, in the current situation, digital technology tools were considered critical to matching the shifted educational landscape of schools because activities were moved online (Starkey et al., 2021).

According to Ogunbiyi (2017), with the school alone, it cannot provide all its physical and financial needs. Therefore, the premise of partnering with the local government was the best option (Mallari, 2017) in shaping and molding the educational system of the country (Gipit et al., 2020). Hence, according to Alvarado et al., (2019), the more community stakeholders are strongly engaged in the educational programs and activities, the better the school will become. As stated by Di Pietro et al., (2020), learners who consistently fall behind and come from low-income families are less likely to have access to the necessary learning digital resources (e.g. a laptop/computer, broadband internet connection), are less likely to have a proper home learning environment (e.g. a quiet place to study or their own desk), and have not received direct or indirect support from their parents. In line with the paper of Kebritchi et al., (2017), revealed that challenges related to a lack of technological experience and skills among teachers and learners hindered the successful integration of ICT in the education system. Additionally, lack of funding, technological infrastructure, training, time, vision, and content as external barriers positively affected the internal barriers, such as technological pedagogical self-efficacy and learning-teaching activities (Akram et al., 2021). In addition, the absence of adequate preparation in schools and among teachers and a lack of curriculum guidelines were noted as factors that restrained students from receiving the appropriate learning instructions.

Despite all the complexities and struggles experienced, the use of the local government Special Education Fund was expanded through the power of the Joint Circular No. 2, s. 2020, aiding all public schools, including teachers and students, in their ICT needs for the implementation of distance learning amid the COVID-19 pandemic (Joint Circular No. 2, s. 2020). Moreover, the Philippine President Rodrigo Duterte signed into law Republic Act No. 11494, or the "Bayanihan to Recover as One Act", on September 11, 2020, mandating strengthening the efforts of the Local Government Units (LGUs) in addressing the challenges brought by the pandemic. It was stipulated under this law authorizing the local government units to realign their respective local funds, including, but not limited to, their development fund, Gender and Development Fund, Sangguniang Kabataan Fund, and Special Education Fund, including the unutilized or unreleased subsidies and transfers. It is further stipulated that a portion of the Special Education Fund shall be used for the support of alternative learning modalities, digital education, digital infrastructure, and continuity plans (Republic Act No. 11494). Indeed, several city governments across the country have followed the mandated re-alignment of the said funds by allocating funds for digital tools such as android tablets with sim cards, laptops, and smart TVs, Wi-Fi devices, and other forms of support such as free internet subscriptions and internet allowances, and digital training for teachers, which are very useful in the new learning setups (Magallanes, 2020; DILG, 2020). Meanwhile, Mallari (2017) recommended the possible inclusion of a school incentive program called the Performance-Based Incentive System in the Special Education Fund allocation in order to make the school programs and projects responsive to the demands of the present generation and current situation. This incentive program is aimed at providing recognition to performing schools with a reward relative to the provisions of the Information Technology (IT) learning package and other instructional materials for further school development as well as for a positive response towards 21st-century education. Furthermore, the local government unit was given accountability and initiatives in determining the most appropriate modality of learning in every location to maximize teaching and learning, along with intensifying their support for the provisions of continuous and sustainable ICT materials and equipment to public schools by way of a Deed of Donation to further improve the quality of education across the nation (DILG, 2020; Malipot, 2020).

Being aware of the preceding evidences and bodies of literature, the researcher attempted to understand and describe the lived experiences of secondary school heads on local government Special Education Fund for technological support in the new normal to initiate policy dialogue with the local government and to the local school board representative of the Department of Education (DepEd) for continued technological support in public schools not only during this current situation, but also in the succeeding years to come in order sustain and further develop the 21-st century digital skills in the teaching and learning.

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METHODS

This research study was structured with descriptive phenomenological approach research design of Moustakas, (1994), as cited in the paper of Creswell and Creswell, (2018); Neubauer et al., (2019), and Natividad and Galicia, (2021). This research design focused at describing and understanding the secondary school heads' lived experiences of local government Special Education Fund technological support in the new normal education in the Division of Santa Rosa, Laguna, Philippines. This design illuminates and surfaces deep issues that provided adequate and accurate interpretation of factual findings, and at the same time allowed the participants' voices to be heard.

The participants of the study were composed of 10 public secondary school heads in the Division of Santa Rosa City, Laguna, Philippines. Their positions vary from Principal 1 to Principal IV, respectively. Moreover, they were selected through the purposive criterion sampling technique, which was useful in ascertaining and picking information-rich occurrences relative to the center of the study and phenomenology of interest (Cresswell and Creswell, 2018; Neubaer et al., 2019; Natividad and Galicia, 2021). This technique was also used in ensuring collection and documentation of individual participants' deep knowledge and understanding, along with meaningful responses relative to the research problem and phenomenon. Furthermore, this technique also provides the researcher with the justification to make generalizations from the sample being studied, whether such generalizations are theoretical, analytic, and/or logical in nature. In line with this, according to Polkinghorne, (1989), as cited in the paper by Creswell and Creswell, (2018), and Natividad and Galicia, (2021), suggested that a minimum of five (5) to a maximum of twenty-five (25) individual participants who had already experienced the phenomenon be included in this study. The inclusion criteria in choosing the participants include those who 1) have experienced receiving local government special education fund technological support; 2) are currently active as a school head for at least two (2) years to twenty (20) years in the Division of Santa Rosa City, Laguna; 3) have openness in sharing experiences toward successful school outcomes brought about by allocated or donated funds and materials; and 4) have voluntarily signed the waiver of participation. Additionally, the study utilized a predesigned interview guide containing the research questions to be asked, which are general and open-ended, as cited in the papers by Lopez, (2018) and Natividad and Galicia, (2021). This interview guide was self-made and semi-structured, which followed Creswell and Creswell's (2018) and Natividad and Galicia's (2021) processes in conducting a phenomenological study. This semi-structured interview promoted flexibility in asking questions during the interviews and, hence, enabled the participants to give answers according to their own understanding and insights.

The study applied the systematic approach of analyzing data and procedures (Natividad and Galicia, 2021) as well as in understanding precisely the guidelines for assembling textural and structural descriptions. The approach was directly anchored to transcendental phenomenology which consists of the following steps: a) identifying the phenomenon to study, b) setting aside the experiences, and c) collecting data from the 10 public secondary school heads who have experienced the phenomenon. Moreover, the approach in analyzing data was done by condensing the information into significant statements or quotes and then combining them into clusters of themes. This was followed by developing a textural description of the experiences (e.g., what the participants experienced), and a structural description of their experiences (e.g., how they experienced it in terms of the conditions, situations, or context). And then, immediately followed by combining the textural and structural descriptions conveying overall essence of the participants' experience of local government special education fund technological support in schools. Moreover, providing the essence of the lived experiences of the participants was considered the overall aim of this transcendental phenomenological study (Creswell and Creswell, 2018). This study also applied the establishment of research rigor, verification, validation, and validity (Natividad and Galicia, 2021). Accordingly, research verification was achieved through in-depth literature readings, sticking to the phenomenological method of inquiry, suspending past experiences, keeping research notes and journals, utilizing a sufficient sample of participants (Creswell and Creswell, (2018); Natividad and Galicia, 2021), and conducting multiple interviews, as well as clarifying the responses of the participants, until data was refined. Thus, validation was reached through multiple data collection (e.g., observation, casual interview, in-depth interviews), and data analysis.

RESULTS AND DISCUSSION

This qualitative-phenomenological study looked into the lived experiences of secondary school heads in the Division of Santa Rosa City who experienced receiving local government special education fund-derived technological support in the new normal of education.

1. As to the lived experiences of public secondary school heads on local government Special Education Fund (SEF) for technological support in the new normal education.

Theme 1: Intricate experiences in the new normal. As revealed from the statements, intricacies of the participants' roles were generally relative to their task and position, which adds burden and stress due to the bulk of work they needed to accomplish in

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order to comply with the demands of adapting the distance learning modality. Their challenges doubled and became overwhelming at the same time, which made it very exhausting. They also felt that their roles already exceeded their abilities to manage the situation in fulfilling successful implementation of the basic education continuity plan while adhering to health and safety protocols. The foregoing are evident in the following:

I can say that being a school head was really a difficult job most especially in this new normal setup. It added so much burden and stress for us leaders. Since there was a sudden shift, I and my team were alerted to prepare emergency action plans relative to the pandemic process in order to adjust with the demands of the situation to continue the learning-teaching process. Likewise stressful when I feel that the demands already exceeded my abilities to manage them accordingly (P1).

The findings was supported by Dias-Lacy and Guirguis, (2017), mentioned that lack of support from the department resulted to a higher level of stress and frustrations among school principals and teachers. The stress and anxiety felt were attributed to curriculum challenges, balance between personal and work demands, overloaded responsibilities, and preparation of emergency action plans. Moreover, Rotas and Cahapay, (2020), affirmed that stress and challenges were commonly encountered by school administrators on the implementation of distance learning modality in most developing countries.

Theme 2: Retort on transitional education. As explained by the participants, the abrupt transition in the education system to virtual learning resulted in the disruption of the normal teaching-learning, which brought apprehensions and uncertainties to school leaders because they were emotionally and mentally stressed on what to do in order to respond positively with the challenges of new normal, and how to provide digital tools necessary for virtual education given the unprepared condition of their schools.

Honestly upon knowing, I felt uncertain on what to do due to insufficiency of technological infrastructures in our school that may definitely fail to support the learners and teachers' needs in their virtual classes. Likewise, I don't know how to provide the necessary equipment necessary for distance learning (P 2).

I felt uneasy and sad in the sudden shift from physical to virtual classroom because I know that our school lacks preparedness and sufficient technological infrastructures, teachers and students lack sufficient technological equipment like ICT gadgets, lack of trainings, and poor access to internet connections (P4).

As explained by Downey et al., (2018), sudden shift from offline to online learning greatly affected all public schools with higher difficulties in adapting the new normal set-up, since they lack sufficient number of technological infrastructures in supporting the needs of all their learners. Although schools were determined and trying their best to adapt to ensure continuous education, still, efforts were not enough and on average, students experienced aggravated learning inequalities and learning losses.

Theme 3: Knowledge of local government SEF. As revealed by the participants, this fund comes from the city government allotted for the improvement of schools, operations, and support to quality basic education. During the COVID-19 pandemic period, this fund was aligned for the provision of technological devices or gadgets, which assisted teachers and students in their continuous delivery of education through distant means.

In my understanding, the local government Special Education Fund (SEF) is a fund coming from the city government allotted for the improvement of the schools (P1).

My understanding was that this local government SEF fund is used for the provision of technological devices or gadgets that will aid teachers in the continuous delivery of education through distant means and help students experience instruction using digital media (P2).

As stated in section 272 of RA No. 7160 - stipulated that the Special Education Fund (SEF) was allocated for the operation and maintenance of public schools, construction and repair of school buildings, facilities and equipment, payment of electric and water bills, payment of salaries, allowances and benefits of teaching and non-teaching personnel, establishment and maintenance of extension classes, creation of teacher items, educational research, purchase of books and periodicals, teaching aids, other instructional materials, and sports development in amounts determined by the local school boards (Republic Act No. 7160; Republic Act No. 5447; Mallari, 2017; Joint Circular No. 1, s. 2017). Likewise stated under Joint Circular No. 2, s. 2020, which mentioned that the acquisition of computers, laptops, tablets, printers, scanners, television, and radio peripherals to assist teaching and learning were charged against the local government special education fund.

Theme 4: Perceived support and downsides. With regard to the participants' experiences, local government units through their

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Special Education Fund supplemented a sufficient number of technological resources such as laptops for teachers and tablets for students both in public elementary and secondary schools in the City of Santa Rosa, Laguna, Philippines, in response to the dilemma of accessibility to distance learning in the new normal. With this, all students were able to keep pace with the distance learning modality. Despite this, there were responses relating to downsides, such as the difficulty of their learners in attending their online classes due to no access and/or poor access to internet connection, along with the unstable signal. The realities were associated with a lack of or limited financial resources among their students, since the majority of them belong to low-income family households.

The Local Government Units (LGU) provided laptop and printer for each teacher, tablet for each learner, and laptop for ICT personnel use, SIM card for each learner, digital duplicator or duplo machine for bulk printing of modules (P3).

SEF pursue the acquisition of computers and laptops for teaching and non-teaching personnel, and tablets for students to aid them in their online classes in the new normal situation (P 10).

If everyone uses a minimum bandwidth internet connection during online class, it will be difficult to access the internet connections (P 4).

In the Philippines, schools represented by the school heads, teachers and students afforded access to ICT devices for their distance learning in the new normal since local governments took initiative in allocating these resources from their Special Education (DILG, 2020; Malipot, 2020). According to Magallanes, (2020), the city government of Santa Rosa City, Laguna responded to the demands of blended education by distributing 36,830 android tablets to its public school students and teachers. Out of 36,830 tablets, about 15, 900 units were issued to the elementary pupils, 16,516 units for the junior high school students, and 4,414 units for the senior high school students.

Theme 5: Realization of fund accessibility and decision making. In this theme, the statements of the participants made it clear that accessibility to local government Special Education Fund promoted improvement and maintenance of schools, along with the operations. Indeed, it was also revealed that this fund was aligned to support quality basic education needs in response to the new normal condition. More so, responses also reiterate that when it comes to fund allocation, they lack knowledge of the process since they are not involved in the decision-making, rather, only highly intellectual officials are directly engaged. Decisions were just cascaded to them during their meeting with the Schools Division Office (SDO) head.

We gave request and information as to need and support to the validation of request. But when it comes to the decision on the prioritization of school needs, it was made by the higher officials (P 5).

I would say that we were not consulted in the planning of the fund but we can write a letter anytime address to the city mayor and noted by the Schools Division Superintendent (SDS) for whatever the school is needed but subject to the approval of the SDS and City Mayor based on the urgency and allocations per school (P1).

As reported by World Bank, (2016), individual schools do not know the exact amount of financial support provided to them by the local government from SEF allotments. This made it difficult in assessing the precise amount of local government special education funds that directly benefit the public schools. Findings of Ochada and Gempes, (2018) explained that school principals were used to prepare School Improvement Plans (SIPs) in a hit or miss way as a basis in the preparation and allocation of local school board budget obtained from the special education fund. Besides, all public schools together with their respective school heads are infrequently involved in the local government funding decisions.

Theme 6: Meeting the demands of distance learning. In this theme, it was explained by the participants that their teachers and students learned, and developed competence through acquiring additional knowledge and skills from exploring various platforms and modalities, which they applied in their teaching and learning tasks in the new normal to successfully meet the demands of distance. They have used various applications and features of their ICT devices confidently and critically at full range, which prepared them to deal with the current situation.

I can say that with the provisions of technological support from the local government, both teachers and students developed knowledge and skills through exploring their gadgets, which somehow prepared them in their digital learning tasks. Also, I can say that they are already equipped for distance learning because they were able to use various applications and features of their devices confidently and critically at full range. For instance, the teachers downloaded information and lessons whereas, learners have accessed their digital learning modules (P 4).

As explained by Armstrong-Mensa, (2020) that due to the Covid-19 pandemic, information and communications technology support through internet access emerged as the most recent method used in distance learning. With this, learners

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were able to obtain instructions and enriched their learning experiences through navigating the features of a computer, thus, encouraged them to join and listen live, and asynchronously connect to their teachers, and most likely were able to answer activities and problems without being physically present in the classroom (Klein, 2020; Armstrong-Mensah, 2020). Yet, with the technological resources provided to the teachers such as laptops, websites, and televised resources, they were able to comply with their online professional developments through utilizing and applying various online applications and modalities (Starkey et al., 2021).

Theme 7: Usefulness and impacts on school outcome. The responses of the participants depicted the usefulness of the ICT devices in aiding teachers and students in their teaching and learning. They used the devices for studying, searching for good information, communication, ease of workloads, regular submission of outputs, regular attendance in an online class, and access to teaching and learning materials, along with good source of sustainable activities. All these brought enhancement to teaching and learning, and digital literacy skills that positively contributed toward attainment of successful school outcomes.

My perception regarding local government SEF-derived technological support greatly impacted successful outcomes in terms of improved teaching and learning in the new normal education. Teachers were able to develop digital literacy making them creative and innovative, and engaging. Technological support allowed them to improve further their teaching pedagogies and were able to communicate effectively with their students along with giving extended assistance to students who finds difficulty in understanding the given tasks or activities. Students on the other hand, with the help of the tablets provided have allowed them to develop various learning styles, improved their motivations to learn more, including improvement of their academic performance (P 1).

As reported by the OECD, (2019), teachers' use of digital technologies, along with online digital tools ensured improvement of their pedagogical practices that are coherent to the learners' needs, competencies, and digital literacy. With the tangible technology support, learners were able to obtain instructions and enriched their learning (Klein, 2020; Armstrong-Mensah, 2020). Additionally, successful school outcomes in this time of the Covid-19 pandemic was attributed to the digital technology applications (Starkey et al., 2021; Cabigao, 2019).

2. As to how school head-participants face the issues and challenges of the local government Special Education Fund (SEF) for technological support in the new normal education.

Theme 8: Prioritizing health and security. The statements of the participants made it clear that distance learning allowed them to appreciate the concern of their department. This concern prevented them from being exposed to sickness during delivery and retrieval of students' learning modules. Provisions of special education fund - derived technological support as well as choosing distance learning signified relief and being grateful, since these allowed students to continue learning, teachers continue to teach, and school heads to do their jobs well while staying safe and secured at home.

With the provisions of gadgets by the city government in cooperation with DepEd, it gave us actually a relief and grateful that the Department opted for distance learning. This resulted for students to continue learning, teachers teach, and were able do our jobs well while staying safe at the comfort of our homes. Being exposed to sickness and deaths of friends and loved ones allowed us to appreciate the concern given to us by DepEd (P2).

As explained by Kaul et al., (2020), health and security, and well-being of the teachers, students and families were the top priority concerns. Staff members managed work from home style to manage properly their work without being compromised. Additionally, it was also explained that building a safe and trusting working environment for the personnel reciprocated better and broader responses addressing the needs of the community.

Theme 9: Sufficiency and equity of technological support. Surfacing in this theme are the participants' experiences of receiving sufficient and equitable local government fund-derived technological support that aid in ensuring DepEd's mission of successful implementation of distance learning and basic education learning continuity plan amid COVID-19 pandemic. The technological support allocation was considered sufficient, especially the number of laptops and microphones for teachers who were already in the service before the pandemic happened, along with the number of tablets for students who enrolled early. On the other hand, as explained by the participants, allocation for technological resources in every school was data driven, specifically based on the enrollment data.

Well, in terms of technological infrastructure such as structure and technological services, I can say that it was not sufficient. But when it comes to technological resources like ICT devices with software, all teachers and students have received

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sufficient numbers. Allocation of these technological infrastructures was based on the available data record of the school during enrollment (P 1).

I must say that all schools were given sufficient technological devices for distance learning. Also, supports given by the local government was timely and relevant in the needs of current condition (P 9).

Findings were opposed by Armstrong-Mensah et al., (2020) mentioned that lack of equitable access to technological infrastructures in public schools during this time of the Covid-19 pandemic was considered a major reason for struggling distance learning and failure in school outcomes. Moreover, findings of Cruz, (2021) and Starkey et al., (2021) revealed that inadequacy of information and communications technology (ICT) resources was also identified as a common issue among students, teachers, and parents, which made it constraining instead of engaging.

Theme 10: Congruency of actual needs. As said by the participants, they were provided with actual technological resources they need for the implementation of distance learning modality. They also said that during their management committee meeting, opportunity to voice out their needs were given to them in order to identify the top priority needs of their schools. Likewise, they were asked to submit request for the best and suited modality to be used. Through careful planning and consolidation done by the local school board representative of the Department of Education and the local government chairperson, provisions and budget allocation charged to the Special Education Fund was made.

In terms of infrastructures such as the technological equipment, the actual needs of the teachers and students for distance learning were provided (P 1).

Well, their provision answered our needs of providing technological resources and learning materials in the most economical ways for the school (P 2).

The local government unit through SEF allocation provided the actual technological needs of our school in the new normal education (P 3).

According to Gonzales, (2021), a partnership between the school and the community external stakeholders brought a productive outcome towards actualization of support like provisions of ICT devices, and successful implementation of modular distance learning across the country during the pandemic period. Moreover, purchases of schools in agreement with the priority need to be obtained in the SEF budget were indicated in the approved SIP and Division Education Development Plan (DEDP) with corresponding program, activity, and project (Mallari, 2017).

Theme 11: Operative management schemes. As seen by the participants, this scheme helped prevent lack of preparedness at the school level since their top priority needs to meet the demands of distance learning were supplemented, and addressed through efficient, effective and collaborative efforts. The proactive measures of the Department of Education representative and local government mitigated the challenges and issues brought by the COVID-19 pandemic. More so, with the innovative and ever-evolving plans in the aspect of proper scheduling, adjustment and alignment of needs, and strict compliance allowed participants who are in the fields to adapt and implement the basic education continuity plan.

Through leading the teachers in creating an innovative and ever-evolving plans that will ensure attainment of a successful teaching and learning outcomes amidst new normal situation. Also, proper planning of programs and projects to be allocated in the SEF budget. Increase coordination with the Schools Division Office (SDO) and local governments for efficient and effective handling of the challenges and issues of SEF-derived technological support in the new normal setting (P 1).

According to Arar and Nasra, (2020), explained that School-based management (SBM) was considered a strategy and a movement towards autonomy when it comes to shared-decision making and partnership within the school community ensuring effective school improvements and outcomes. Significantly, as an effective movement, it empowered individual local schools promote greater building decision-making and authority to manage properly their own processes and operations (Arar and Nasra, 2020; Ochada and Gempes, 2018).

Theme 12: Strategic fund allocation. As stressed by the participants, difficulty on direct accessibility and allocation of the local government fund-derived technological support in their schools were strategically resolved through their initiatives in preparing the school improvement plan where in their top priority needs, programs and projects to be budgeted were included. They also submit letter of requests as to their needs directly to the city mayor, noted by the Schools Division Superintendent, and then followed by increasing coordination for approval and provision.

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I always do a pre-assessment of priorities. Since SEF fund is allocated annually, procurement of technological needs and other equipment in school is included in the school Annual Implementation Plan and School Improvement Plan. I also submit request prior to the budget year so that it is included in AIP of Local government. This request is submitted to the division office for proper coordination (P 3).

As explained, the school heads of public elementary and secondary schools in collaboration with the community education stakeholders prepare and submit the DepEd approved three-year School Improvement Plan (SIP), along with some requests for funding, to the local school boards for checking, discussion, and consolidation of all requested budgets indicated by the schools in the city or municipality, and then coordinated to the local government units' municipality or city local school boards for review and approval of the SEF budget through a resolution for possible future translation of school-level allocated programs and projects (Joint Circular No. 1, s. 2017; Mallari, 2017).

Theme 13. Dynamism on trainings, webinars, and technical assistance. Participants' statements regarding experiences with suitable training, webinars, and continuous technical assistance provided by local government and the Department of Education allowed them to maximize the functionality of fund-derived technical resources. Dynamic teachers and students explored features and applications of the gadgets and led them to become digitally skilled. Also, with constant monitoring and assessment, improvements in teachers' pedagogy as well as improvements in students' academic performance in the new normal education were observed.

They provided a lot of trainings and webinars to support the school heads, teachers, parents and students to cope and adjust with the new normal education. These supplemented their needs to maximize the utilization of the SEF-derived technological resources (P 1).

Teachers improved their teaching pedagogies, while students have improved their academic performance (P 7).

According to Peterson et al., (2018), collaborative efforts between the government and school heads necessitate provisions for learners' to achieve proper guidance and motivation that leads toward active learning amidst the pandemic. This was done by supporting the teachers in their endeavor by providing them with digital tools that they incorporated into their pedagogical practices.

Theme 14. Collaboration towards positive support. Surfacing this theme are the experiences of participants in receiving financial, material, and technological support for successful translation of their ICT needs for distance learning, programs and projects for the overall success of school outcomes. Collaboration with community stakeholders by way inviting, welcoming, and allowing them in the school's planning and decision making, as well as in leading them towards alignment of the school's priority needs and educational objectives gave them the direction on what to do, how to help, and how to immediately provide knowing that the end beneficiaries are the learners amid current situation.

We adapt to the challenges and issues at hand. Help from stakeholders are welcomed (P 2).

The school's top priority is our learners, and we keep on finding ways to address and meet their needs especially now that we are adjusting in the new normal education. We strengthen collaboration with the local government through sending them requests for the provision of our technological resources to meet the demands of distance learning (P 6).

According to Hussein et al., (2018) mentioned and identified that community involvement played a big role in the financial commitment of the school, teachers' motivation at work, maintenance of school infrastructures, learning materials for students, salaries of teachers, and rehabilitation of school buildings. Moreover, it was further affirmed by Alcuizar, (2016), that support from stakeholders and good funding promoted effective teaching and learning process. The success of the school system was believed to be the result of shared responsibilities and good communication from the government, parents, school, community, and school administrators (Sumarsono et al., 2016).

Essence. The reality of local government special education fund technological support in the Philippines as shared by the collective accounts of the selected participants from the public secondary schools in the Division of Santa Rosa City, Laguna was an affirmation of their committed and devoted community experiences to the presence of local government fund allotment for technological support in the new normal. Although struggling in the early stages of the phenomenon, the participating school heads were confident, ready, and firm to stand for their mission through widening their roles in establishing active and strengthened collaboration with the community stakeholders through increased coordination and follow-ups to the higher ups, and sourcing for technical assistance from the department itself and to private organizations to provide training and workshops,

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and additional technological support for the enhancement of digital literacy skills and competence to match the demands of distance learning. Undeniably, provisions for technological devices in schools have allowed school heads, teachers, and students to comply with the demands of distance learning from the sudden transition. It brought relief since it promoted continuity of learning without compromising the health and safety of school community members. Conversely, there were downsides identified, like no access and/or poor access to internet connections and a lack of financial capacity for the majority of the students since their families belong to low-income households, which meant relying only on mobile data connections. These downsides generally cause major struggles for the current education system. But with the determination, dedication, and proactive responses of school leaders and the local government, these struggles have been mitigated.

CONCLUSION AND IMPLICATIONS

The lived experiences of the participants of the local government special education fund for technological support in the new normal were intricate experiences as to their roles, retort on transitional education, knowledge of local government fund, perceived support and downsides in distance learning, realization of fund accessibility and decision making, meeting the demands of distance learning, and usefulness and impacts on school outcome. The coping mechanisms of the participants to deal with the challenges and issues of the local government fund for technological support in the new normal of education were prioritizing health and security, sufficiency and equity of technological support, congruency of actual needs, operative management schemes, strategic fund allocation, dynamism in trainings, workshops, and technical assistance, and active collaboration towards positive support for successful school outcomes. The findings imply that in the new normal, the provision of a local government special education fund for technological support in schools aided in the successful implementation of distance learning via virtual learning modality. The technological devices, such as laptops for teachers and tablets for students, helped a lot in complying with the required tasks while ensuring health and safety precautions. Successful school outcomes, in terms of improvement in the teaching and learning process, were achieved amid the new normal conditions.

RECOMMENDATIONS

The complex experiences of school leaders as a result of their critical roles in confronting the new normal should be addressed properly by accepting the current situation bravely and employing low- and no-tech modalities to reach the most marginalized students. The Department of Education and the local government should support the emergency distance learning systems in public schools, such as online learning, radio, and blended learning, which require full accessibility of resources and are considered a long-term solution. Both should also focus on funding flexibility for necessary alignment in terms of purpose, priority needs, and condition in order to support future greater needs of schools and solve existing weaknesses in the area of education. Additionally, a One-Stop Portal for Teaching and Learning Resources should be provided in all public schools to ensure students without access can fully participate. They should also provide an innovative digital school model that offers a framework for schools to examine their own practices with digital technologies. On the other hand, the local government units' decision-making should be directed to schools so that drafted policies become more responsive to their local needs. The local school board authority of the Department of Education must communicate accurate information to the school heads regarding local governments' plans and assistance for public schools, including the amount of financial support from the Special Education Fund for the school heads to ensure precise budget allocation for programs and projects and for the fulfillment of the school's commitments and obligations. Lastly, school heads, local school boards, and local governments should strengthen adherence to and practice of transparency and accountability.

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A Call for Commitment: The Lived Experiences of Public Junior High School Teachers in School Learning Action Cell (SLAC) For a Responsible Management Education



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ABSTRACT: Designed with qualitative-transcendental phenomenology, this study aimed at understanding the lived experience in the School Learning Action Cell (SLAC), a K to 12 Basic Education Program School-Based Continuing Professional Development Strategy for the Improvement of Teaching and Learning for a Responsible Management Education of selected public junior high school teachers in the division of Santa Rosa City, Laguna, Philippines. The researchers utilized the framework of Moustakas (1994) which consisted of bracketing, horizontalization, theme clustering, textural description, structural description, and essence. The verbatim transcriptions revealed sixteen (16) themes. An in-depth investigation of teachers' lived experiences addressed two specific issues: their experiences in the SLAC and their responses to challenges and demands to improve their performance as teachers. Among the lived experience that surfaced included teacher empowerment through collaboration, transforming impediments into strengths, an instrument for competency enhancement, and the essence of project management. The participating teachers face the challenges and demands of the SLAC through the necessity of monitoring and evaluation, viewing challenges as triggers of change, determination fuels pedagogical enrichment, and commitment as a moral imperative. The findings indicate that collaboration among teachers is critical in executing the SLAC for Responsible Management Education. To reach and actualize the school's goals, teachers should be imbued with dedication, a sustained grasp of policy/program principles, character strength, community participation, and innovation. It requires greater commitment and leadership from teachers as well as school administrators and managers.

KEYWORDS: School Learning Action Cell, Phenomenology, Responsible Management Education, Lived Experience, Call for Commitment.

INTRODUCTION

Professional development and growth have always been the primary goals of teachers as they embark on the journey of self-discovery and self-improvement. In so doing, they place a premium on policies that, in some way or another, assist them in achieving the desired improvement, particularly in the instructional process. Professional learning communities (PLC), a group of teachers that meet regularly to share expertise and promote student learning have become a widely acknowledged approach to school improvement and student achievement. It has become a standard framework for professional learning and development for teachers (Watson, 2014; Turner et al., 2018) as cited in Antinluoma et. al. (2021).

In Eastern European countries, studies have indicated that the presence of PLC practices was perceived more highly by teachers. As the focal point of education, educational leaders can highlight the relevance of teaching and learning through professional learning communities by addressing issues such as a lack of administrative support (Roberts & Pruitt, 2009), the strength of learning communities, students' economic situations, types of learning experiences among teachers (Hargreaves, 2003; Reeves, 2000), school system resources, and a lack of financial support (Aguerreberre, 2008), as cited in Higgins (2016).

In the Philippines, there is a mismatch between school curricula and corporate demands which has been going on for years (IMD World Competitiveness Center, 2019). While the state of education has improved in terms of accessibility, it still has a long way to go in terms of providing quality education for all students. To address this issue, the Department of Education implemented the Learning Action Cell (LAC) policy, which is akin to the professional learning community, as a K-12 Basic Education

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Program School-Based Continuing Professional Development Strategy for Improving Teaching and Learning (DepEd Order # 35 s. 2016).

Considered crucial for teachers' professional growth, the SLAC can also be utilized as a tool for responsible management education. As such, it focuses on building educational frameworks, resources, processes, and environments that enable effective learning experiences for responsible leadership (United Nations PRME Principle 3, 2007). With it, teachers can develop and achieve their institutional goals, such as acquiring pedagogical knowledge and expertise in the new normal context of education.

Desta (2018) said most teachers define success by student behavior and activities. Correspondingly, recognizing that teaching quality influences student learning, the Department of Education supports teachers' professional development through a Learning Action Cell (LAC), a healthy, caring, and safe school-based community (DepEd Order 35, 2016).

Many scholars have previously underscored the significance of Professional Learning Communities (PLCs), and according to Antinluoma et. al. (2021), it is a widely acknowledged approach for school improvement and student achievement by using a structured process of analysis to focus on a certain area of their teaching to enhance student outcomes and thereby school standards. Similarly, PLCs bring together educators committed to working collaboratively in a continuous cycle of collective inquiry and action research to improve student outcomes (Eyanagho 2019). Meanwhile, Lawani (2018) emphasized that academic qualifications, relevant professional training, and work experience are the most significant determinants of students' academic performance.

There have been a significant number of studies undertaken on the SLAC and its implication for teachers' performance and students' achievement. LAC sessions, according to Cabral et al. (2019), help teachers improve as well as develop ethics and professionalism. Suarez (2017), noted that after LAC sessions, teachers used less teacher-centered strategies and more group and laboratory activities, videos, PowerPoint presentations, and hands-on activities, all of which benefit the teaching-learning process. Similarly, most implementers agreed that LAC implementation impacted teacher development, student achievement, school leaders' practice, and school climate positively (Binauhan 2019).

Meanwhile, a framework based on responsible management education was presented for creating and deploying CPD, a lifetime learning process that strives to improve a professional's knowledge and abilities through modernization, scientific and technical advancements in the profession. Other factors that can be considered in this framework include learner and teacher characteristics, instructional goals, and resources. As Waddock et al. (2009) and Gadelshina et al. (2021) described, aside from student learning outcomes and school performance, responsible management education asserts the school's most important role in addressing social issues.

METHODS

Research Design

The study specifically utilized Psychological Phenomenology (also termed Transcendental or Empirical Phenomenology) by Moustakas (1994) as cited in Creswell (2017) because SLAC is a phenomenon. This research design involved in-depth interviews and observations with public junior high school teachers to determine their lived experiences in facing the challenges and demands of the aforementioned phenomenon.

Participants of The Study

The researcher selected ten (10) public junior high school teachers in Santa Rosa City, Laguna, the Philippines who utilized the SLAC for Responsible Management Education. This number of participants was recommended by Polkinghorne (1989) as cited in Creswell (2017) suggesting that researchers need to interview 5 to 25 individuals who have all experienced the phenomenon. Specifically, they were teachers handling different subjects, who were chosen based on the following inclusion criteria: 1) minimum teaching experience of three years; 2) have no negative records as to mishandling responsibilities in their respective learning areas or departments, and 3) those who signed the waiver/consent of participation. Similarly, the researcher utilized purposive or judgmental sampling which intentionally selects the individuals and sites for study because they could purposefully inform an understanding of the research problem and central phenomenon in the study thus providing quality assurance (Huberman & Miles) as cited in Creswell (2017).

Data Analysis

The data were analyzed using the phenomenological framework of Moustakas (1994) as detailed in Creswell (2017). First, the researchers went through bracketing, the first step to consider, in which they set aside all preconceived thoughts and experiences they had to best understand the experiences of the participating public junior high school teachers. After conducting in-depth

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interviews, the researchers performed horizontalization, by which they built data considering the central questions as well as probing questions in the interview guide. This was done by going through the data, i.e., interview transcriptions, highlighting significant statements which are sentences or quotes that provided an understanding of how the participants experienced and faced the challenges and demands of the SLAC for a Responsible Management Education. Then, the researchers developed clusters of meaning from these significant statements into themes which were used to write a textural description of the participants' lived experiences. They also used these significant statements to write a description, called imaginative variation or structural description, of the context or setting that influences how the participants experienced the phenomenon under study. From the structural and textural descriptions, the researchers wrote the composite description that presents the "essence" of facing the challenges and demands of the SLAC for Responsible Management Education. Verification and validation were used to establish the research rigor of this study in terms of its qualitative feature (Meadows & Morse, 2001). The researchers obtained verification by conducting in-depth interviews, adhering to the phenomenological method of inquiry, suspending previous experiences, keeping research notes and journals, utilizing a sufficient sample of participants (Polkinghorne, 1989 as cited by Creswell, 2017), and conducting in-depth interviews until data were refined. Validation was achieved through data collection (in-depth interviews, observation), and data analysis using Moustakas' approach.

RESULTS AND DISCUSSION

This qualitative phenomenological study examined the lived experience of public junior high school teachers in facing the challenges and demands of the SLAC for Responsible Management Education as an instrument for teachers' acquisition of pedagogical knowledge and expertise being a prerequisite to their professional growth and development.

1) What is the lived experience of selected public junior high school teachers in the School Learning Action Cell (SLAC) for Responsible Management Education?

Theme 1: Empowerment through Collaboration. As revealed by the participants, differences, ideas, expertise, and perspectives are harnessed in new ways as they pave the way for the acquisition of teamwork in the workplace. Collaboration has become instrumental in streamlining diversity among teachers. It is integral in addressing school challenges. Also, it does not only promote active involvement but more importantly fosters the establishment of a culture of shared responsibility in the institution. Similarly, it can be a cornerstone for benchmarking and best practices sharing among members of the school community as expressed in the following statement:

It can be a way wherein the needs of the teachers can be addressed when it comes to the teaching-learning process. Through SLAC, we can foster collaboration with stakeholders in improving teachers' pedagogical knowledge and in promoting activities that integrate principles of social responsibility (P1).

The findings support the viewpoint of Vega (2020) affirming that the SLAC is vital for professional growth as it enhanced teachers' educational philosophy and views on teaching as a profession and vocation. Additionally, De Jong et. al (2016) highlighted the significance of teacher collaboration in implementing educational reform. Teachers' self-efficacy and dedication to the organization and students increase when they share knowledge and resources on social networks.

Theme 2: Transforming Impediments into Strengths. Underscored in this theme is the participants' consistency in their comments that professional development helps employees not only stay competitive but also flourish in their occupations. It should be a lifelong process. It requires overcoming failures and challenges to improve teachers. As stated by the participants:

It was difficult at first, but after the teachers got used to this and they would prefer this type of modality, the same goes well with invited resource speakers from outside the school. We also used Google Classroom as a repository of reflections and outputs of teachers (P3).

It is a challenge and something new to us since we only discuss and participate virtually. But as teachers, we need to adjust and adapt to the new set-up to deliver quality education to the students (P7).

Supporting these statements, to effectively develop teachers, DepEd Order 35, s. 2016 posited that continuing school-based learning is key to effective teacher development. They need direction on professional development and must be willing to learn new concepts and techniques to improve their performance. Despite the obstacles, SLACs allow teachers to collaborate and

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learn while implementing classroom changes. Bantugan (2019) argued that teaching strategy training would be beneficial in the hands of effective teachers who can alter students' lives. Teachers learn and train to optimize students' physical, mental, and moral growth (Miller, 2020). This is vital information for schools to promote teacher development.

Theme 3: An Instrument for Competency Enhancement. Prevailing in this cluster of statements is the participants sharing that teachers need to be aware of the different types of students they teach and how to deal with them. Mentoring and coaching help teachers learn from best practices and analyze and reflect on their teaching. Continuing education, peer support, and job guidance can all help improve teaching skills. Developing the teaching staff's competence and commitment is critical to achieving real change. The quality of learning depends on teachers' competency. Teachers' competency will benefit students' academic growth and help teachers improve their teaching approaches.

School Learning Action Cell opens opportunities for professional growth including reskilling and upskilling of the teachers. (P7).

Utilizing SLAC as a strategy for developing priority improvement areas for teachers is one of the highlights of the program. It is merely focused on what the teachers' development needs and not on other matters (P5).

Consequently, Serviss (2021) concurred, adding that PLCs empower teachers to improve teaching and learning directly. It helps teachers share best practices and develop creative ideas to improve student learning and accomplishment. Weekly meetings improve team member relationships and form a school, cluster, or district leadership team. Along with these findings, Brown et al. (2018) underscored that professional learning communities (PLCs) have been shown to improve student achievement and teacher perception. Teachers can easily implement PLCs with a clear understanding of their principles and influencing variables.

Theme 4: Program Management as an Essential Component. The participants revealed in this theme that program management must balance resources amongst projects since they usually compete for human and financial resources. It directly supports, prioritizes, optimizes resource capacity, and manages interdependencies and conflicts. SLAC helps project managers and strategic planners uncover new difficulties and challenges, leading to stronger strategies, products, and processes.

Some of the challenges I encountered in conducting the sessions are the availability of teachers, sometimes some teachers have prior professional engagement in the given schedule, and others are looking for the best fit learning facilitator for a certain topic which is based on the priority improvement areas of teachers and scheduling (P5).

This echoed the findings of Dehaloo (2018) that strong leadership ensures the school delivers excellent services to its community by providing desired and meaningful policies and programs to boost teachers' competence and performance. Team collaboration improves with reliable program management and well-organized plans. Clear roles and goals promote team effectiveness by eliminating confusion. Binauhan (2019) claims that Learning Action Cells assist school leaders to improve practices. It also helps teachers learn more and overcome instructional challenges.

Theme 5: Pursuit in Navigating Online Technology for Quality Engagement amongst Teachers. Peers, supervisors, LAC leaders, and coaches must help teachers navigate online technology or platforms to give a quality education that supports professional development. This is crucial for motivating and empowering change in a school. Similarly, the involvement of stakeholders is fundamental to the school community's dedication and advocacy for development, such as the provision of ICT-related training that improves teachers' online technology abilities to boost the school's overall performance.

SLAC as conducted online has its pros and cons. It is accessible in place and time and provides opportunities for us to explore online apps, in contrast, it has technical issues in terms of connection and navigation. Moreover, it is more fun to conduct face-to-face sessions for we can direct the questions to the learning facilitator and can interact live with our colleagues (P5).

This theme contends that schools must optimize student results due to strict accountability policies. De Jong et al. (2016) emphasized the value of teacher collaboration in implementing educational reforms. Despite new hurdles, technology is a crucial tool for efficient training. According to Paul et al. (2019) online and traditional learning both have advantages. Despite these fundamental similarities, online learning is often student-centered and involves active learning. Students expect technology integration and see it as an important part of their learning experience because it makes learning more enjoyable and engaging

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(Alipour, 2020). Similarly, DepEd Order 35, s. 2016 highlighted the utilization of 21st Century Skills and ICT Integration in Instruction and Assessment.

2. How do the selected public junior high school teachers face the challenges and demands in the School Learning Action Cell (SLAC) for Responsible Management Education?

Theme 6: Means to Bolster Professional Growth. As revealed by the participants, education never ends. Career-minded people can constantly improve their skills and job proficiency by continuing their education. To ensure the best learning outcomes for students, school administrators must encourage teacher professional development to improve student learning. Technology, school policies, and curriculum requirements are always changing, making it hard for instructors to keep up. Professional development helps teachers design relevant, student-centered lessons.

The SLAC is one of DepEd's professional development programs for all public-school teachers. This will assist teachers in improving their weaknesses with the assistance of a resource person. A well-improved teaching and learning process will be possible through SLAC to give students a quality education (P6).

The study of Cabral et al. (2019) indicated that LAC sessions helped teachers modify and improve their teaching practices. It helped teachers develop ethics and professionalism. Furthermore, Suarez (2017) asserted that following LAC sessions, the number of teachers using the teacher-centered approach decreased while teachers using other teaching approaches such as group and laboratory activities, films, PowerPoint, and hands-on activities increased.

Theme 7: Instructional Expertise in Retrospect. The participants revealed in this theme that instructional expertise encompasses all of the teacher dispositions and skills. It is significant in that it fosters a passion for learning. This means that having good instructional skills will make the student enjoy what they are learning, understand it, love the subject, and always want to learn more about it.

The key indicators for the effectiveness of the SLAC are that there are clear pieces of evidence of critical reflection among teachers leading to changes in classroom practice, and an increased understanding and knowledge of the curriculum (P4).

The findings presented above are consistent with Rincón-Gallardo et al. (2016), a teacher community or network can enhance student and adult learning and engagement. It also improves the system as a whole and strengthens teachers' and leaders' capital. Professional Learning Networks and Communities believe educator networks are key to increasing teachers' knowledge and abilities and impacting the classroom. The quality of dialogue among teachers involved in the process of building a good environment is important to its effectiveness (Jones, 2018).

Theme 8: The Necessity of Monitoring and Evaluation. As disclosed by the participants, monitoring and evaluation assess how well a program or intervention meets its objectives. They collect data on a project's progress. It is necessary because it allows the school to monitor a project and identify issues. A school's PPA's (Programs, Projects, and Activities) monitoring, and evaluation help plan and craft interventions.

I had realized that SLAC as a policy for the promotion of a responsible management education approach amplifies the central role of teachers which is to establish learning environments that are responsive to learner diversity. However, there must be standardized guidelines to determine its efficiency (P4).

Gadelshina et al. (2021) supported these findings by emphasizing that if the school administrator is consistent and behaves logically, s/he will gain the trust and commitment of school staff, and as a result, the decisions s/he makes will radiate credibility and integrity. With the implementation of the SLAC, it is critical that the school's monitoring and evaluation mechanisms are defined, organized, and functional. Following that, Glanz (2018) emphasized the importance of effective leadership in the organizational structure of schools. Superiors must be mindful of legislated values such as democracy, transparency, accountability, and mutual respect when dealing with subordinates to ensure a shared culture of excellence and competence in carrying out school policies.

Theme 9: Commitment as Moral Imperative. In this theme, the participants revealed that an organization's commitment to its goals and vision is one of the most important factors for improving school performance. Commitment is defined as the non-financial values of employment. That is, the psychosocial value of paid work determines a person's level of employee commitment.

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Committed employees add value to the organization through determination, proactive support, high productivity, and quality awareness.

LAC sessions can be a way to encourage teachers to write project proposals and mobilize school resources with the help of school partners and stakeholders in advancing the aims of the institution not only in terms of their teaching pedagogy but to encourage them to be actively involved in endeavors that tackle issues in the society (P3).

Employees that feel linked to the organization are more productive and dedicated to their work. According to McDougale (2018), it is generally expected that leaders meet many of the prototypical and idealized expectations of those they represent. Effective and ethical leadership influences and directs the performance of others in the direction of achieving collective goals. Correspondingly, Schminke (2018) presented that the educational leader's moral and ethical development influenced employee commitment to the institution's mission. Moral leadership encourages commitment among subordinates, peers, and fellow educational leaders.

Theme 10: Determination Fuels Pedagogical Enhancement. Basically, as to the context of the participant's responses on how they face the challenges and demands related to the SLAC for a Responsible Management Education, they viewed determination as fundamental to enhancing their pedagogical knowledge. They considered SLAC as an instrument and opportunity for self-empowerment in terms of developing their pedagogical skills.

My understanding of the SLAC is that this is a school-based continuing professional development strategy for teachers. Its implementation made me determined to adopt novel techniques that improved how I execute the teaching and learning process for my students (P4).

This is evident in the literature as it showed that Guskey as cited in Desta (2018) argued that regardless of teaching level, most teachers define their success in terms of their student's behavior and activities. This entails the utmost significance they placed on their endeavors exerted in improving themselves for the benefit of their students. Vega (2020) affirmed that Learning Action Cell is essential for professional growth. Similarly, the LAC policy enhanced teachers' educational philosophy and views on teaching as a profession and vocation.

Theme 11: Sustained Understanding Strengthens Pedagogical Prowess. Another theme disclosed is the participants' ability to foster long-term understanding, which strengthens their resolve in dealing with the SLAC for Responsible Management Education's challenges and demands. A better understanding of the policy and guidelines of the programs leads to more effective implementation. It paves the way for teachers' pedagogical knowledge to be strengthened, which is critical in the classroom because teachers need pedagogical content knowledge to teach conceptual understanding, relational understanding, and adaptive reasoning. SLAC helps teachers understand the instructional process while also promoting their professional growth.

As an educator, SLAC helps me to have a deeper understanding of the curriculum and learning pedagogies. It serves as a strategy for learning new skills and creating a thinking community in school and provides a venue for us teachers to share best practices to be able to solve challenges in the teaching-learning process (P5).

Affirming these results Rotherham and Willingham (2017) asserted that students will need to develop certain skills and knowledge to work and contribute to a globalized information society. Thus, teachers' understanding of SLAC's core principles is critical to their personal and professional growth, as well as their students' achievement. Such understanding and awareness will determine how teachers can integrate 21st-century competencies into the classroom context so that the knowledge students learn will be relevant to their future (Lobo, 2016).

Theme 12: Securing Technical Assistance as an Anchor of Development. The participants revealed in this theme how they underscored the importance of technical assistance, mentorship, and coaching for teachers' professional growth. Effective educators are guided by relevant strategies and approaches. Teachers and students engage in teaching-learning through effective mentoring and coaching. Colleagues believed it was vital to seek assistance as they embarked on their educational journey to better engage students.

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I addressed the challenges of SLAC by requesting technical assistance from my headteacher and school head. Dealing with challenges in SLAC can be also addressed through seeking advice from my colleagues and sometimes through professional readings on the internet (Participant 5).

Effective teacher development requires continuing school-based learning (DepEd Order 35, s. 2016). Teachers should try different methods. This helps them reflect and learn. LACs help teachers learn and collaborate while making classroom changes. Along with this policy, the provision of technical assistance fosters a crucial role in nurturing teachers' performance. Teaching and learning are the focus of effective coaching. This focus promotes leadership, professional development, and teacher support aimed at improving student outcomes.

Theme 13: Viewing Challenges as Mobilizers of Change. As revealed in this theme, confronting challenges and demands is an important facet of one's personal growth and development. The more we can put our limits and capabilities to the test, the more we will discover about ourselves. New challenges present us with new opportunities. As teachers face work-related challenges and demands, they grow better. Challenges and demands provide an excellent opportunity for development. As teachers see challenges as opportunities, they begin to think creatively, breaking down the barriers of limited thinking.

I think the challenges affect my teaching competencies and pedagogy in terms of readiness to adopt the new challenges of the New Normal brought by the pandemic, SLAC helps me become more adaptive and flexible in my teaching pedagogy and competencies. (P10).

Reflecting on the findings of Canterino et al. (2020) concluded that leading change is an ongoing managerial challenge requiring individual and collective efforts. Mobilizing activities is important for educational managers who want to promote change because they permit leaders to activate the resources and processes needed for change to occur. Teachers perceived challenges as opportunities to grow and learn in the SLAC. It taught them that overcoming hurdles required adaptability and learning new instructional practices to benefit the organization and students.

Theme 14: Strength of Character is an Empowering Asset. This theme encompasses teachers' strength of character as an instrument of empowerment in an organizational setting. It teaches them the habits of thought and deed that help people live and work collaboratively in a particular community such as in school. The means available to teachers empower them to provide the educational tools required by all students. This allows them to be creative and adaptable in their classrooms. Teachers extend this mindset in their classroom if they are given the freedom to express their thoughts and ideas in a safe and positive environment.

There are hesitations at first when it comes to incorporating the learnings gained from SLAC, but I always try its application in my class. I apply, evaluate its effectiveness, and modify it if needed (P5).

Teachers are entrusted with educating students, so they must be supportive and accommodating of their needs while nurturing their intra and interpersonal skills (Majid, et al. 2014). Positive psychological factors that influence how people think, feel, and act are referred to as character strengths. Teaching is only part of education. Teachers' character strengths influence students' thinking, feeling, and behavior, and are critical elements in modelling positive or negative behavior. Students identified teachers' knowledge, humanity, and transcendence as common character strengths that had a positive impact on them.

Theme 15: School Community Engagement as a Tool of Progress. The participants revealed in this theme that stakeholders' participation in school engagement manifested increased accountability for both learning outcomes and school resources; participation in curriculum development leads to a broader embrace of the educational process. With school community engagement, stakeholders have access to valued social settings and activities, feel that they can contribute meaningfully to those activities, and develop functional capabilities that enable them to participate entirely. Likewise, it galvanizes connections within the school community and promotes shared learning goals and collaboration. It also increases learning opportunities for students and supports personalized student learning journeys. As a result, an inclusive learning community is established that leads to a culture of shared responsibility.

I think SLAC utilization helps in raising awareness concerning the sustainable development goals in advancing the principles of responsible management education. It paves the way for the realization of the significant impact of stakeholders' participation in every school's endeavor (P4.)

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Well-implemented school community engagement according to Maier et. al. (2017) leads to the improvement in student and school outcomes and contributes to meeting the educational needs of low-achieving students. It encouraged stakeholders, both internal and external, to become actively involved in the delivery of equitable and high-quality education to the young people in the community. Further, their participation in the operation of schools has helped increase access, retention, and attendance rates of children at school (UNESCO Institute for Educational Planning 2021). Education is a social activity in which society helps facilitate and takes part. Schools should understand the value of good community relations.

Theme 16: Strategic Innovation of the Learning Process. As disclosed by the participants, educational innovation encourages teachers and students to explore, research and use all the tools available to uncover novel things or ideas. It involves a different way of looking at problems and solving them. It improves education because it compels students to use a higher level of thinking to solve complex problems. Successful instructional innovation allows teachers to add value to their instructional expertise to augment students' performance. It helps teachers stay ahead of the competition and create interventions to address the difficulties they are facing. With globalization and a rapidly changing educational landscape, it is imperative that teachers must innovate when it comes to the teaching-learning process.

It challenges me how to apply the significant learnings taken from the SLAC because of time constraints brought about by other ancillary works. The newness of the strategies or approaches hinders us from fully applying them to the educational process since we have to get familiar with and master them first (P1).

Innovation in learning occurs in a specific teaching and learning context, improving upon the implementation of the standard practice, or introducing a new practice, thus achieving greater learning outcomes (Vesisenaho 2017). It implies that teachers need to consider the personal learning paths of students and contextualize and sustain them for local contexts. Online technologies that allow individual or collaborative processes to occur across many contexts provide opportunities for supporting localization, contextualization, and personalization of learning. Additionally, creatively improvised, collaboratively elaborated, learning processes are a challenge, but they offer great opportunities for unexpected new beginnings for the enhancement of the instructional process.

Essence. Taken collectively, the narratives of the participants' experiences reveal their struggles to bring out the best in themselves and their students. Teachers learned the importance of teamwork for self-improvement and professional growth as they faced SLAC for Responsible Management Education issues and challenges. Correspondingly, they recognized these obstacles and problems as opportunities to improve their teaching to the students. They used adversity for motivation and strength. These experiences show how SLAC promotes teaching and reflection. As long as teachers delivered quality instruction to students, they could make the most of any SLAC situation. Participants show determination, sustained policy/program comprehension, character strength, community participation, and ingenuity in coping with problems and expectations. Leaders and administrators must inspire and motivate teachers. School development requires consistent technical assistance. Teachers need to be inspired and motivated by school leaders. To entirely implement the SLACs policies in the context of responsible management education, consistency, and dedication must be at the forefront. Finally, stakeholders' involvement and engagement are critical to upholding the goals of the school community, which is to realize the potential of teachers in the fullest sense of the word and have them radiate this knowledge to students, the end-users, and the society that will benefit the most.

CONCLUSION AND IMPLICATIONS

Professional Learning Communities (PLCs) served as powerful tools that help educators improve themselves and at the same time were used to reassess their students' learning needs and rethink their practice (Eyanagho (2019). Similarly, the participating public junior high school teachers lived experience in the SLAC for Responsible Management Education consisted of teacher empowerment through collaboration, overcoming setbacks and challenges, ensuring policy implementation to improve teacher competence, program management effectiveness, and functionality, and difficulty navigating online technology to establish quality engagement. The participating public junior high school teachers deal with the challenges and demands through determination, introspection, unwavering commitment, a sense of continued pursuit for excellence, sustained understanding of the policy, securing mentoring and coaching sessions, monitoring, and evaluation, viewing challenges as agents of change, acquiring character strength, increased school community engagement, and innovation. The findings suggest that teachers always bring out the best in themselves and remain steadfast when implementing SLAC despite seemingly insurmountable problems.

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RECOMMENDATIONS

Teachers are reminded to foster a collaborative culture to empower learning communities through benchmarking and sharing best practices among school community members. Likewise, they must remain competitive and utilize the knowledge obtained from the SLAC to improve their pedagogical practice. In terms of strategic planning, school leaders and administrators must establish a functional project management team and consistently provide technical assistance to manage online technology, such as digital literacy training. To motivate students to learn new skills, teachers must assess, and redesign instruction based on students' learning progress while putting in place an effective monitoring and evaluation system when implementing a policy or program. Moreover, teachers must commit to promoting workplace principles of integrity, responsibility, and accountability and demonstrate determination and dedication as drivers of pedagogical enhancement. Similarly, teachers should ensure that they foster sustained comprehension of the policy's primary components to align their activities and successfully enforce its standards and principles. The importance of mentoring and coaching should be emphasized by school leaders and managers as well to improve teachers' pedagogical knowledge in engaging students effectively in the instructional process. On one hand, teachers should view problems as opportunities to test their limits and talents and as a form of self-discovery and must integrate character strength to be adaptable in their respective classroom contexts. More significantly, school leaders and administrators must prioritize school community engagement as it promotes the school's integrity and reputation and encourages stakeholders to know and see that it provides great service to the community. And finally, place high regard on teachers' ability to innovate in the teaching-learning process because it allows them to help students employ higher-level thinking to tackle complicated problems and eventually become holistically well-developed members of society. Future researchers may conduct another inquiry on the topic considering the profile of participants. They may undertake a follow-up study using different research methods or elements to explore deeper into the challenging life situations of educators.

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An Intelligent Ubiquitous Online Application for Mentoring System



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ABSTRACT: Mentoring is a way of transferring skills and knowledge from a knowledgeable person to a person who is in need of guidance. In today's world mentoring has become one of the prominent ways of learning. Usually traditional mentoring programs will involve one person guiding a group of students (mentees). Our system is designed to connect Mentor and Mentee where there will be one to one interaction. Rather than learning without proper guidance, mentee can learn from mentor as he will share information about his career path, provide guidance and also helps with exploring career and setting goals. The responsibility of a mentor is to showcase the possibilities to the students and to guide them on respective possible outcomes. Mentor Connector is a web based application which is developed to improve the performance of the students by assisting mentors to understand mentees problems. This application connects more people compared to traditional face-to-face mentoring system. If a person wants guidance from any mentor he can search through this web application and select the mentor of his choice present in any corner of the world. This system mainly enables the mentors to concentrate effectively on each and every student assigned to them. Scheduling future meetings is also easier.

KEYWORDS: Mentoring, Mentor, Mentee, Guidance, counsel, Performance, Track Progress, Feedback.

I. INTRODUCTION

Mentoring has always existed, for example, in the Dronacharya of Mahabharata, who led Arjuna to the best warriors. A mentor is a person who guides, assists, and supports who is in need. A mentee is someone who benefits from guidance and support by learning from people who have followed similar paths before him/her. A faculty member, graduate, or industrialist acts as a student mentor. This can be one of the most important relationships for students, as it is important in the learning phase of every student's life. Interactions between them include skill development training, education, and leadership feedback, career counseling, bridging professional networks for mentees, and tracking mentee progress. While mentors provide support and career guidance, there is some evidence that mentors play an important role in providing psychosocial support to students and that mentors' primary function tends to be career development. Instead of spoon-feeding, the focus should be on how young students can effectively solve their problems. Mentors manage a record of all mentees assigned to them. All activities performed by the mentee are known to the mentor such as information about their progress and activities. The documentation containing this information also includes complete details about the mentee and its history. Mentors can play a variety of roles in their study and work life. Mentors become more important when you are studying in college and trying to develop a career path. The role of the mentor is needed here as he showcases the right path for a mentee. With the right guidance, a mentor can guide you to become a passionate person. Mentors can also provide a reliable support system. With the help of a mentor, you can connect with world-class industry and academic professionals. Expanding your network of professionals can help you in the future. Mentoring not only grows professionally but also promotes self-development as much as possible. Mentors first understand the goals and needs of a mentee and then guide accordingly. This web app help students prosper beyond their professional lives and provide guidance whenever they need it. Since this is a one-on-one interaction, the mentor asks the mentee a question and encourages them to clear the confusion. Cross-age peer mentoring is a type of mentoring program used by many schools and educators in the classroom. Older children have always guided younger children. Similarly, at Mentor Connector, people with a wealth of experience and knowledge will guide those who need it.

Benefits of Mentor Connector - Apart from benefiting only mentees, a mentor himself has a lot of advantages. Enhancing communication skills: Providing mentorship to mentees helps mentor effectively increase his conveying and listening skills.

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Promoting connection and coordination: While mentoring mentee or newbie professionals, mentor continue to expand his social circle and meet new resources as time passes. Identifying one-self: Mentoring someone not only enables mentor to be prepared for answering any questions but also highlights mentors experience in life. Similarly even mentees benefit a lot from this Mentor Connector Have a clear-cut vision: Mentees will have clear cut vision of their career aspiration. Can follow ones dream with proper guidance Establishes a sound network: With the help of this Mentor Connector application Mentee can establish a very sound network. Empowers the young generation by having mentor it will empower the younger generation by giving proper guidance to young mentees.

The major goal of this system is to create one-on-one interactions between mentors and mentees present in any corner of the world, as well as to provide appropriate resources for mentees when there is a need for guidance at the right time and to lead them to choose a proper career according to his passion and choice. Students can use this approach to improve their educational, social, and personal development learning from mentors' experiences, which aids in the selection of appropriate mentors career. Also, motivate him whenever he feels low until he reaches his goal. The objective is to make a career-oriented and successful person.

II. LITERATURE SURVEY

Dr. Sunanda Dixit and Javeriya Farheen wrote a study on E-Mentoring System Application in which they described faculty guiding a student of a specific organization using an electronic application. The E-Mentoring system was built on a client-server approach. Worked as a point of contact for mentors and mentees it was an Android device. As well as a desktop application for undergraduate initiatives 18 to 20 pupils, referred to as mentees, were assigned to each faculty member. Mentors are people who help others. The mentor kept track of things in some way. They are assigned to each mentee. A mentee's activities include everything he or she does. The mentor is aware of these. Mentors gather data on their mentees. In a meeting, they will discuss their progress and curriculum activities. The document in question had kept track of this information, which contained the full specifics as well as their sources. History of the mentees. This was employed in the educational sector for mentorship purposes [1]. Kimberly Nicole Rowland, University College, University of Maryland Traditional customs were explained. Many organizations have formed and participated in a mentorship program. Traditional mentorship initiatives have been established. Both qualitative and quantitative Successful mentorship has been discovered in quantitative research investigations. Programs increase productivity and job happiness, and they may even lead to a promotion. Lead to the advancement of the mentee Mentoring used to be done in a certain way. Developed through a method in which one person supervised a group of people Students forms a bond with their mentors and mentees. By way of e-mail new type of mentorship is asynchronous computer-mediated communication.

A method for developing virtual mentor-mentee interactions teams. Traditional mentorship is compared and contrasted in this work. Regarding e-mentoring and suggested new applications for e-mentoring Setting up an organization [2]. Celayne Heaton Shrestha, Steve May, Palitha Edirisingha, Linda Burke, Tim Linsey, Celayne Heaton Shrestha, Steve May, Palitha Edirisingha, Celayne Heaton Shrestha, Celayne Heaton Shrest The International Journal of Teaching and Learning in Higher Education describes how senior students might improve their academic performance. This will provide face-to-face peer mentoring to junior students over many years, and was as a part of the learning assistance supplied to first-year university students in the United Kingdom. As a result of their achievement, a plan was devised at institutions in the United Kingdom where first-year students Second and third-year students tutor first-year undergraduates. This can also be done through a range of face-to-face and electronic media [3].

Mentor Kart is an app that allows you to book a mentor and create a plan. The mentor will also assign and track the task. This has aided the mentee in achieving his or her goal in a more efficient and effective manner [4]. IDreamCareer is a platform for undergraduates to design their ideal careers, as well as a career counselling service to help them find the proper path [5]. PushFar is an app that contains features such as appointment scheduling, task management, and a built-in video call management. This enables businesses to connect with mentors and create a scalable mentoring programme for them [6].

Importance of having Mentor - Mentors can serve as a source of knowledge, and mentors can provide specific insights and information that enable mentee success. For example, it provides instructions on how to perform specific tasks and develop useful skills. Career starters can benefit from such advice because they feel their role more quickly and comfortably. For example, a mentor can help a person starting a business learn their initial business plan and how to budget. Mentors help mentees take responsibility for their goals. By tracking progress, the mentor helps the mentee stay focused and on track towards completing them. It can also ensure that the mentee does not forget about the goals they have set. Knowing that someone else is watching can serve as motivation, as the mentee likely does not want to let the mentor down by failing to meet goals. If a mentee is having difficulty in getting the job done or achieving their goals, the mentee can ask mentor for help. This encouragement can motivate them to continue despite the challenges. Mentors can also identify and clarify the strengths of a mentee and instill confidence. With strong self-confidence, mentees are less likely to give up on their goals. When people have ideas, they can use mentors as a

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resource to discuss and try them out. Mentors can use relevant knowledge and experience to provide impartial advice and opinions. These insights give the mentee a better understanding of the steps to take and whether to pursue or leave the idea. Similarly, mentors can listen to them and guide them through everyday problems such as Conflicts at work. Trust is a core element of mentoring. Mentors need to trust that mentees have the best interests in mind and provide accurate and honest guidance. The business world can also be highly competitive, so we need to be able to rely on each other to keep sensitive information private as needed. Keeping in touch and keeping promises on a regular basis shows two ways to build trust in these relationships. Reliable mentoring allows for honest feedback. By building trust, Mentee understands that constructive criticism is not aimed at making them feel guilty, but about building their professional growth. Mentors can identify weaknesses and make suggestions for improvement. Since this is a professional relationship, the mentor plays an objective role. Friends, on the other hand, don't want to look critical, so they hesitate to name Mentee's weaknesses. The mentor will provide the guidelines. For those who are just starting their career, mentors can help set guidelines for work expectations. For example, you can clarify role priorities and appropriate actions in the workplace. These guidelines will help mentees develop proper work habits to focus and succeed in their work. These effective work habits help them become more productive and impress their bosses. Mentors Have Appropriate Experience If possible, individuals should choose mentors who have experience related to their profession and goals. When mentors communicate their success, mentees can use them as role models to aspire and imitate the steps they have taken. Mentors can also share the mistakes they make along the way. She will benefit from this because Mentee learns from the negative effects of her mistakes, but she doesn't have to suffer the consequences herself. Learning about these experiences can help prepare for the challenges faced by mentees and can also provide empirical advice on how to overcome those challenges.

We have implemented similar features and developed web-based application called mentor connector, instead of guiding 18 to 20 students' mentor will guide only one particular student at a time. In this system junior students is mentored by the senior students by means of mentoring them face to face interacting using web application program. If a person wants guidance from any mentor, he can search through this web application and select the mentor of his choice present in any corner of the world.

III. DESIGN

A. USE CASE DIAGRAM

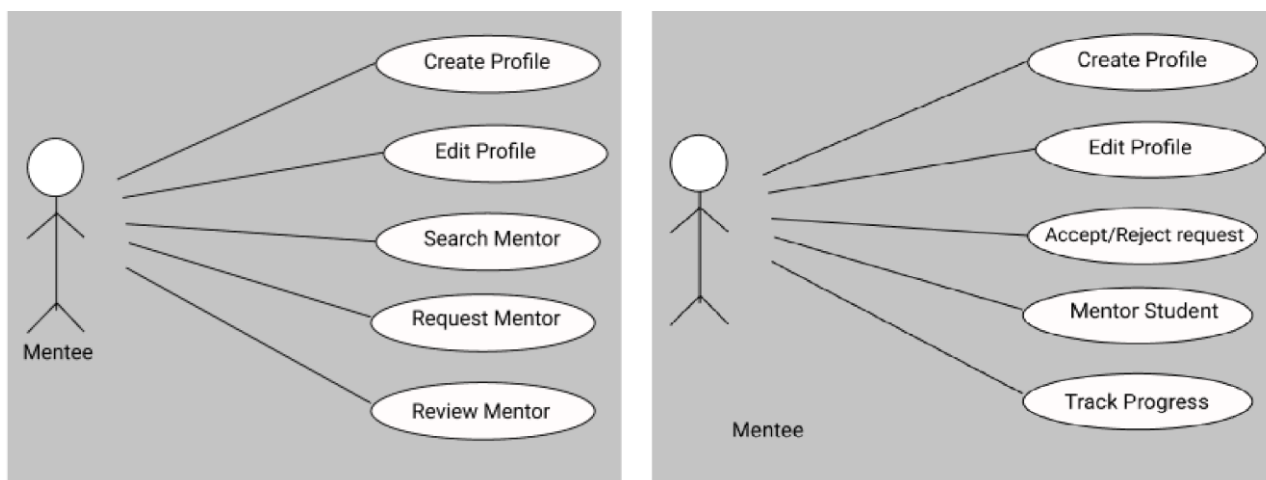


Figure 1: a. Use case diagram for mentee (b) Mentor

In order to get guidance from the mentor, mentee has to subscribe the Mentor Connector web application. They have to log-in by their respective usernames and passwords to have an access to the application. Mentee can search for Mentor present in any corner of the world and select him to guide throughout. Firstly he has to request mentor for mentoring him and then take guidance after mentor accept request. Based on mentoring mentee can review a mentor. The mentor starts mentoring the students after login in the application. Mentor accepts or rejects request and start guiding once he accepts any mentee request. All the information, activities & histories about the mentees, are always available on this application and visible to both the respective mentors and mentees. Mentor always keeps track of mentee progress.

B. SEQUENCE DIAGRAM

A sequence diagram will be made up of a group of diagrams. Lifelines and the items they represent, as well as the signals they convey during their various interactions, they exchange over time. Figure (3) and (4) are the sequence diagram for mentor and

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mentee. Where in figure (3) tells about sequence diagram of mentee. Mentee after providing credential the database will check if the given credential is valid if the credentials are valid then the mentee can search for a mentor of his choice by sending him request. Mentor can accept or reject request, once mentor accepts request mentee can take guidance from him. Whereas in figure (4) it tells about the sequence diagram of mentor. Similarly as above, Mentor has to provide credential, once the database validate the user he can view student request, accept it or reject it, also give solutions or advice to mentee problems. Mentee Progress has to be marked and should always keep track of it. The progress of mentee will be stored in database and mentor can have access to it any time he needed to view it.

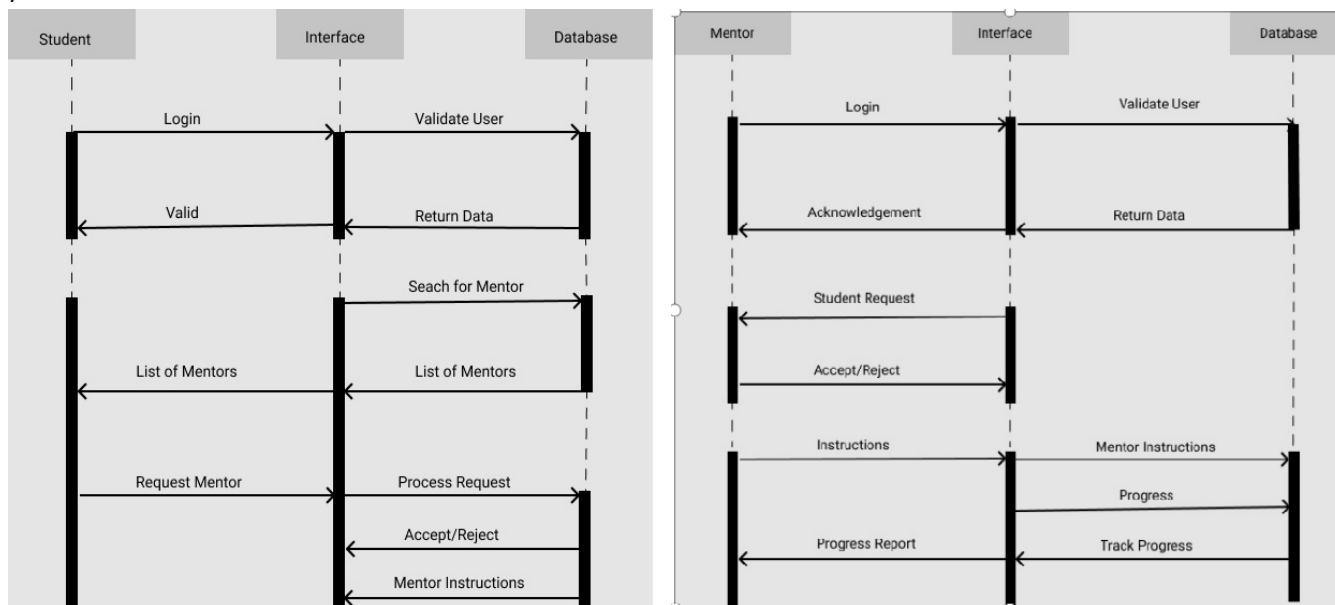


Figure 2: a. Sequence diagram for Metee b. Mentor

C. E-R DIAGRAM

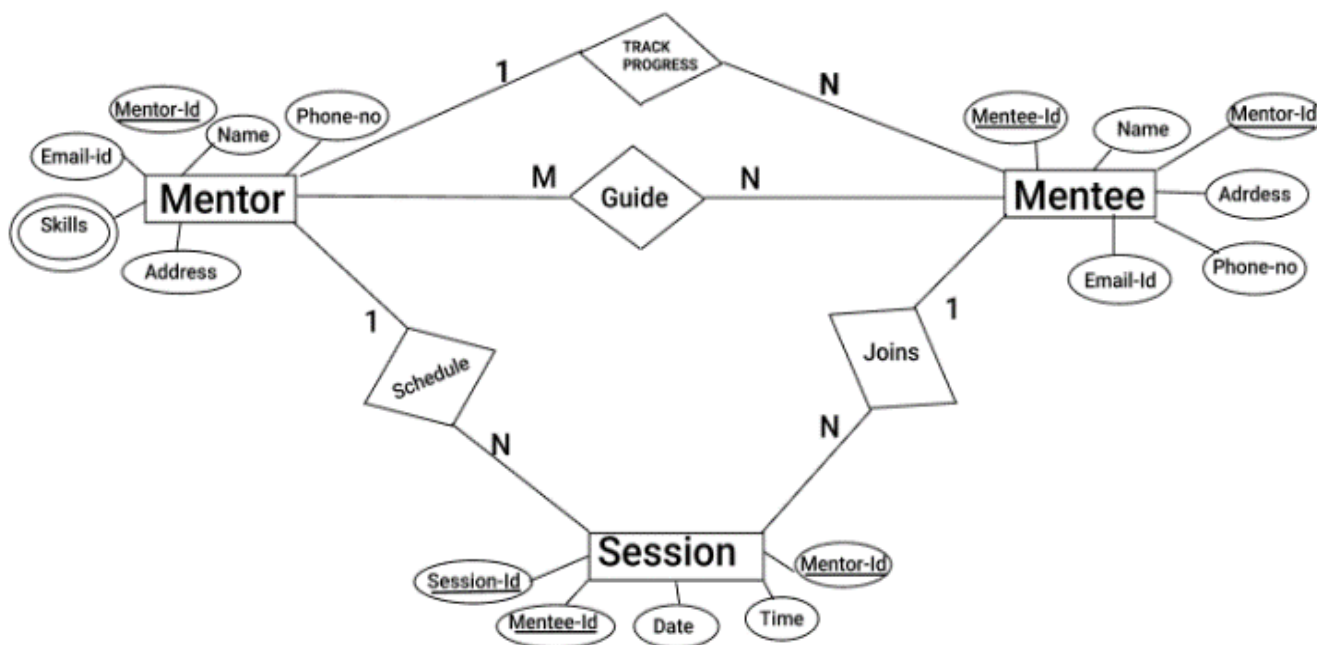


Figure (3): E-R Diagram

IV. METHODOLOGY

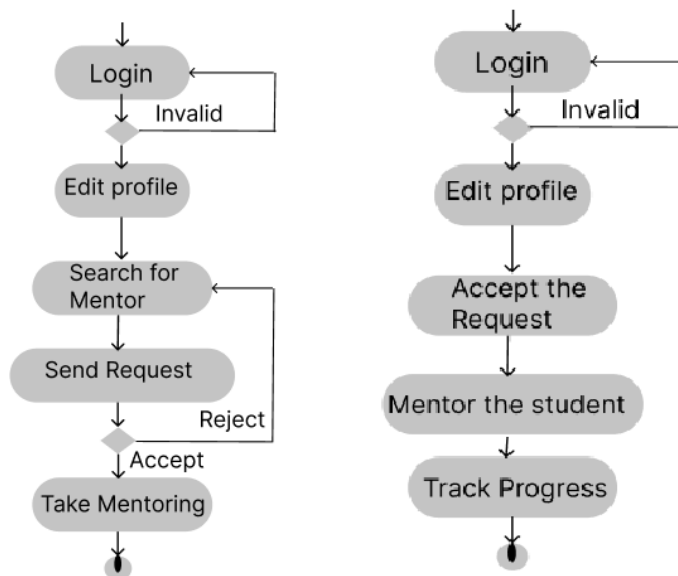


Figure 4: a. Activiy Diagram for Mentee b. Mentor

The system contains two users' mentor and mentee who has to login with their respective username and password to access this web application. Mentee to access this web application first he has to subscribe it and then login. Once the mentee logs in to this web application the list of mentors will be shown. In order to get guidance from any mentor he has to first send request along with description. Mentor can either accept or reject mentee's request. If the mentor accept request he can start guiding and he can keep track of mentee's progress as each and every activity of mentee that is discussed will be recorded and stored. After each interactions the mentor has to update whatever that is being discussed, this will be helpful for future interaction with mentee.

V. CONCLUSIONS

Mentor Connector is a user-friendly and easy-to-use software because it is based on the client-server model. The mentor's responsibility is to show the potential to the students and lead to possible results. This system provides a state-of-the-art approach to facilitate learning and mentoring. However, for mentoring to work, you need to build a trusting relationship between the mentor and the mentee. Mentor Connector has proven to be a mutually beneficial learning situation where mentors provide advice, share knowledge and experience, and teach with a self-discovery approach. Mentoring or virtual mentoring over the Internet is becoming increasingly important in many organizations. If the project is carefully planned, mentoring is as effective as traditional mentoring. The prospect of virtual mentoring has a bright future for education. Mentees can improve their academic excellence under the guidance of knowledgeable mentors. Mentoring is about caring for learning and knowledge growth. The relationship between mentoring and learning is simple. Psychological and social factors such as feedback, guidance, advice, motivation, support, counseling, empathy, friendship, socialization, acceptance and verification all have an impact on the mentoring process that supports proper learning.

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"Catching Errors in Cyclic Codes"
"Detection of Errors in Cyclic Codes"
« Error - Trapping in Cyclic Codes »



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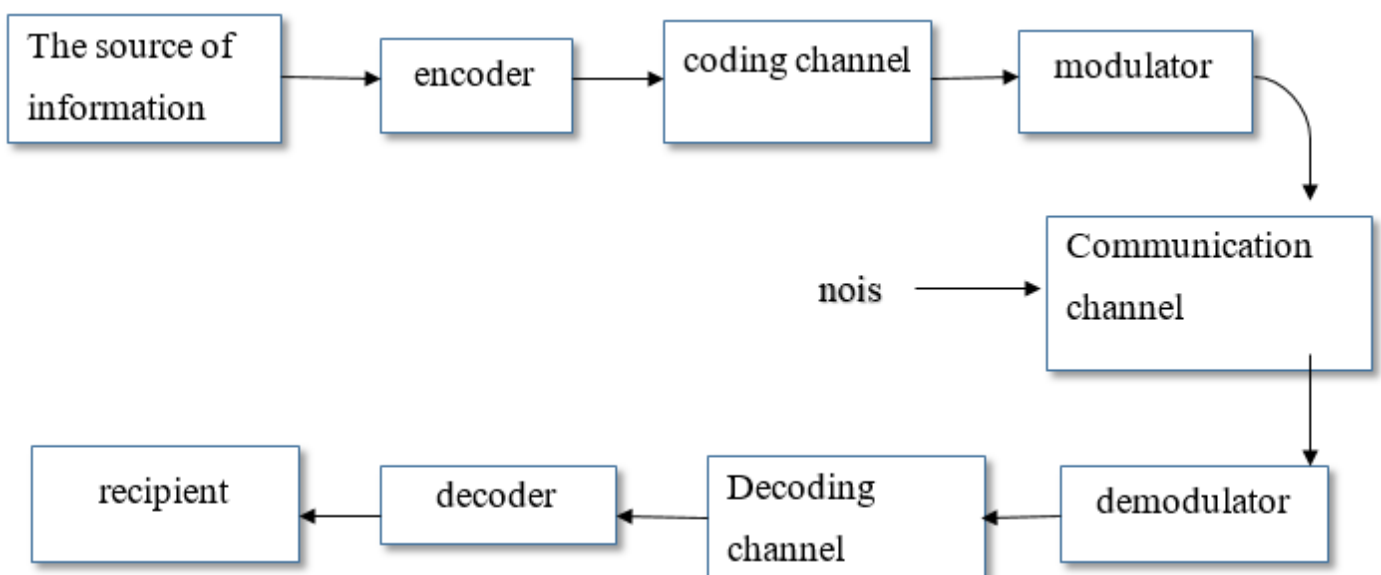
ABSTRACT: Coding theory (English: coding theory) is a branch of mathematics (mathematics) and computer science (computer science) that deals with error-prone situations in the process of transmitting data over communication channels. noise channels), using sophisticated methods that make the majority of errors that occur can be corrected. It also deals with the characteristics of the codes (codes), and thus makes them suitable for specific applications.

One of the most important scientific and technical problems at the present stage is the creation of automated control and monitoring systems for performing various tasks. In the process of automated control and monitoring, there is an intensive exchange of information between the individual parts of the systems, while the volume of information, as well as the speed of processing and transmitting it, are constantly growing. Increasingly high requirements are imposed on the reliability of transmitted messages, which leads to the need to apply special measures that reduce the frequency of errors to a certain acceptable level.

1. INTRODUCTION

One of the most effective measures is the use of error-correcting coding. The purpose of my work was to describe the properties of linear and cyclic codes, solve the problems of encoding and decoding linear (including cyclic) codes using syndromes (syndromic polynomials), which allow detecting and correcting errors. The term catching errors arose from the fact that we described a procedure (algorithm) by which we find and correct errors in received messages (n, k) - code, if these errors are located on the section of length $\leq m$, where $m = n - k$.

The beginnings of mathematical coding theory go back to the seminal paper by Claude Shannon (1948) and the invention of Hamming codes (1950). Thus began the history of error-correcting coding. The source and recipient of information are interconnected by the following scheme of the canonical infra communication system.



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In the encoder, the input message is written into a digital sequence a (information word) in alphabetical F_q order (most often in bits). In the encoder channel, the information word is converted (encoded) into a code word c , written in the same alphabet F_q . This is the most important part of coding. Since discrete symbols are not suitable for transmission over physical communication channels, a modulator is used (recording of alphabet units), through which the converted message enters the communication channel, which can be affected by noise, and then this physical message (generally speaking, distorted) enters demodulator, where it is converted into a digital sequence \bar{v} . Errors are corrected in the decoder channel (if it can be done) and a digital sequence is obtained \hat{c} (usually $\hat{c} = \bar{c}$). In the decoder \hat{c} , it is converted into an information word \hat{a} and sent to the recipient. Ideally $\hat{a} = a$, otherwise a decoding error occurs.

2. LITERATURE REVIEW HISTORY

2.1 Block Line Codes

Data entering the communication system from the source of information is first of all processed by the source encoder, which represents this data in some digital alphabet (for example, as a sequence of characters from the final field F_q). Thus, the input signal from the information source is written as an **information word** \bar{a} (this is the final sequence of characters in the chosen alphabet $F_q = \{0, 1, \dots, q - 1\}$). The channel encoder converts the information word a into a longer word c (usually written in the same alphabet F_q), called a **codeword**. The modulator then converts each codeword symbol into a corresponding analog symbol from a finite set of valid analog symbols. A sequence of analog symbols is transmitted over a channel, which can be subject to various noise, distortion, and interference. Therefore, the output of the channel, generally speaking, differs from the input. The demodulator converts each symbol received at the input of the channel into a sequence of symbols of the selected digital alphabet. The demodulated sequence is called **the received word**, we will denote it by the symbol \bar{v} . Due to potential errors, generally speaking, $\bar{v} \neq \bar{c}$. The task of the decoder, using the redundant record \bar{v} for the information word \bar{a} , is to recover the corresponding code word \bar{c} , and then \bar{a} .

Example 1. Let $\bar{a} = (110)$ in the alphabet $F_2 = \{0, 1\}$. Let's denote $\bar{c} = (11111111100000)$.

The word \bar{c} is obtained from \bar{a} repeating each character \bar{a} five times. As a result of channel noise, the word $\bar{v} = (110110011100011)$. We see that in each consecutive five characters

$$11011'00111'00011$$

more often, respectively, symbols 1, 1, 0, and therefore we conclude that the code word

$$\bar{c} = (11111111100000).$$

The code used is called a **repeat code**. It is reliable but very slow.

Example 2. Each information word \bar{a} of length k ,

$\bar{a} = (a_1, \dots, a_k)$ in the alphabet F_2 match the code word c of length

$$k + 1, \bar{c} = (c_1, \dots, c_k, c_{k+1}),$$

where $c_i = a_i$, if $1 \leq i \leq k$, and $c_{k+1} = a_1 + \dots + a_k$. Such a code is called a **parity-check code**. If no more than one error was made in the code word during the passage of the communication channel, then it can be found out from the received word v , although the distorted symbol cannot be determined.

It can be seen from the above examples that an increase in the length of code words, generally speaking, increases the ability of the code to recover the code word after the distortion of its symbols in the communication channel.

In the future, we will study the so-called block codes. This means that we consider informational words in the alphabet F_q of the same length k . It is clear that the set of informational words is the space $F_q^k = \{(a_1, \dots, a_k) \mid a_i \in F_q, i = 1, \dots, k\}$. The power of this set is q^k . Each information word a is associated with the word $\bar{c} \in F_q^n$. Since different information words must correspond to different code words, the cardinality of the set of C code words is also equal to q^k , and therefore for we have $|C| = q^k < q^n$, and hence C is a proper subset in F_q^n .

Thus, to specify the encoding of information words of length k into code words of length n , it is sufficient to specify a one-to-one mapping $F_q^k \rightarrow F_q^n$. Since the most natural (and easily implemented) mappings of a linear space F_q^k to F_q^n are linear mappings, the images of such mappings are called **linear codes**. Therefore, a linear code for information words from F_q^k is any subspace of $C \subset F_q^n$ dimension k . We denote $C(n, k)$ the linear length code n with the length of information words as k -code.

So, to construct a linear (n, k) -code in the alphabet F_q and describe the encoding procedure in this code, we proceed as follows:

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We choose k linearly independent vectors in the space \mathbf{F}_q^n : g_1, g_2, \dots, g_k . Their linear span

$$L(\bar{g}_1, \bar{g}_2, \dots, \bar{g}_k) := \left\{ \sum_{i=1}^k \alpha_i g_i \mid \alpha_1, \dots, \alpha_k \in \mathbf{F}_q \right\}$$

forms a linear (n, k) -code.

Now the (n, k) -code itself as a set of code words is defined. But the coding procedure, that is, the rule for the transition of information words into code words, is determined by a specific isomorphic mapping

$$\mathbf{F}_q^k \xrightarrow{\varphi} L(\bar{g}_1, \dots, \bar{g}_k).$$

Since the isomorphism of linear spaces is completely determined by the rule for comparing the basis vectors of these spaces, we fix a \mathbf{F}_q^k standard basis in the space of information words

$$\begin{aligned} \bar{f}_1 &= (1, 0, 0, \dots, 0), \\ \bar{f}_2 &= (0, 1, 0, \dots, 0), \\ &\dots \dots \dots \\ \bar{f}_k &= (0, 0, 0, \dots, 1). \end{aligned}$$

vectors \bar{g}_1 in coordinate form for the standard space basis \mathbf{F}_q^n :

$$\begin{aligned} \bar{g}_1 &= (g_{11}, g_{12}, \dots, g_{1n}), \\ \bar{g}_2 &= (g_{21}, g_{22}, \dots, g_{2n}), \\ &\dots \dots \dots \\ \bar{g}_k &= (g_{k1}, g_{k2}, \dots, g_{kn}). \end{aligned}$$

The mapping $\bar{f}_j \mapsto \bar{g}_j, j = 1, \dots, k$, gives the encoding procedure for the linear (n, k) -code.

Choosing in $L(g_1, \dots, g_k)$ another basis $\bar{g}'_1, \dots, \bar{g}'_k$, we get the same code C , but with a different rule for converting information words into code words.

Denote by the G matrix composed of the coordinate rows of the basis vectors $\bar{g}_1, \dots, \bar{g}_k$. Then the comparison $\bar{a} \rightarrow \bar{c}$ given by the equality

$$\bar{c} = \bar{a}G,$$

defines the rule for constructing code words of a linear (n, k) -code C . The matrix G is called **the generator matrix of the** linear (n, k) -code C .

The matrix G has rank equal to k , and therefore among its columns there are k linearly independent.

Let, for definiteness, these be the first k columns. It follows from the linear algebra course that by elementary transformations over rows, a matrix G can be reduced to the form

$$G_0 = \begin{pmatrix} g_{11} & \dots & g_{1n-k} & 1 & 0 & \dots & 0 \\ g_{21} & \dots & g_{2n-k} & 0 & 1 & \dots & 0 \\ \vdots & \dots & \vdots & \vdots & \vdots & \dots & \vdots \\ g_{k1} & \dots & g_{kn-k} & 0 & 0 & \dots & 1 \end{pmatrix}$$

and therefore the rows of this matrix determine the coordinate rows of the new basis of the subspace of the same code C , and the coding rule

$$\bar{a} \rightarrow \bar{c} = \bar{a}G_0$$

we will call the systematic (or canonical) form of the C code.

With systematic coding, the last k symbols of the code word \bar{c} corresponding to the information word \bar{a} coincide with the coordinates of the vector \bar{a} . We will write the $G = (A I_k)$ matrix in the form G_0 , where I_k is the unit matrix of order k , and A is the matrix of size $k \times (n - k)$, notation $(A I_k)$, means the concatenation of matrices A and I_k .

For a linear (n, k) -code C with a generating matrix G , denote by the H matrix whose rows form the basis of the solution space of the system of linear homogeneous equations over the field \mathbf{F}_q with the matrix G :

$$GX = 0, X = \begin{pmatrix} x_1 \\ \vdots \\ x_n \end{pmatrix}, 0 = \begin{pmatrix} 0 \\ \vdots \\ 0 \end{pmatrix}.$$

Obviously, $GH^T = 0$ where the sign " T " means the transposition of the corresponding matrix, 0 is a zero matrix of size $k \times (n - k)$. We have: rank $H = n - k$. Let's denote $m = n - k$. Obviously, it m characterizes the number of redundant (check) code symbols C .

follows $HG^T = 0$ from equality $GH^T = 0$.

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The matrix H is called the code C **check matrix**.

It is easy to check that if $G = (I_k | A)$, then

$$H = (I_m | -A^T).$$

From the above reasoning, it can be seen that with each linear (n, k) - code C with a generator matrix G and a check matrix H , it is possible to associate a linear (n, m) - code C_g with a generator matrix H and a check matrix G . Codes C and C_g are called **dual** to each other, and any code vector from C is orthogonal (in the sense of the standard scalar product) to each vector from C_g , and vice versa.

Example 3 . Build Linear $(7,4)$ - code C above F_2 . We choose a 4×7 matrix of rank 4:

$$G = \begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \end{pmatrix}$$

Display $\bar{a} \rightarrow \bar{a}G = \bar{c}$ sets code

$$\begin{aligned} (0000) &\rightarrow (0000000) \\ (1000) &\rightarrow (1101000) \\ (0100) &\rightarrow (0110100) \\ (0010) &\rightarrow (0011010) \\ (0001) &\rightarrow (0001101) \\ (1100) &\rightarrow (1011100) \\ (0110) &\rightarrow (0101110) \\ (0011) &\rightarrow (0010101) \\ (1010) &\rightarrow (1110010) \\ (0101) &\rightarrow (0111001) \\ (1001) &\rightarrow (1100101) \\ (1110) &\rightarrow (1000110) \\ (0111) &\rightarrow (0100011) \\ (1101) &\rightarrow (1010001) \\ (1011) &\rightarrow (1111111) \\ (1111) &\rightarrow (1001011) \end{aligned}$$

We find the check matrix H . To do this, consider a system of linear homogeneous equations with a matrix G :

$$\begin{cases} x_1 + x_2 + x_4 = 0 \\ x_2 + x_3 + x_5 = 0 \\ x_3 + x_4 + x_6 = 0 \\ x_4 + x_5 + x_7 = 0 \end{cases}$$

It has a trapezoidal form (see matrix G), therefore x_5, x_6, x_7 its free unknowns.

	x_1	x_2	x_3	x_4	x_5	x_6	x_7
f_1	one	0	one	one	one	0	0
f_2	one	one	one	0	0	one	0
f_3	0	one	one	one	0	0	one

Consequently,

$$H = \begin{pmatrix} 1 & 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 0 & 1 \end{pmatrix}.$$

This code is not systematic. However, from the matrix, by G elementary row transformations, we arrive at the matrix

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$$G = \begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \end{pmatrix} \sim \begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \end{pmatrix} \sim$$

$$\sim \begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & 0 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 & 1 & 0 & 1 \end{pmatrix} =$$

$$= G_0 = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}, \text{ where } A = \begin{pmatrix} 1 & 1 & 0 \\ 1 & 1 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{pmatrix}$$

That's why

$$H_0 = ((-A)^T I_{n-k}) = \begin{pmatrix} 1 & 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 \end{pmatrix}$$

Consider the information word $\bar{a} = (0110)$. When encoding with a matrix G , we have:

$$\bar{a} \rightarrow \bar{c} = \bar{a}G = (0101110),$$

and when encoding with matrix G_0 :

$$\bar{a} \rightarrow \bar{c} = \bar{a}G_0 = (0110100).$$

Example 4. Construct a systematic (7,3) -code in the alphabet F_3 . To solve the problem, you need to find a matrix of size 3×7 and rank 3 over the field

$F_3 = \{0,1,2\}$. We choose two non-proportional vectors of length 7:

$$g_1 = (1021100), \quad g_2 = (2110210).$$

It is clear that any vector g_3 with a nonzero last coordinate forms, together with \bar{g}_1, \bar{g}_2 , a system of three linearly independent vectors.

Let $g_3 = (0121201)$. Then matrices

$$G = \begin{pmatrix} \bar{g}_1 \\ \bar{g}_2 \\ \bar{g}_3 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 2 & 1 & 1 & 0 & 0 \\ 2 & 1 & 1 & 0 & 2 & 1 & 0 \\ 0 & 1 & 2 & 1 & 2 & 0 & 1 \end{pmatrix}.$$

Since over the field the F_3 determinant

$$\begin{vmatrix} 1 & 0 & 2 \\ 2 & 1 & 1 \\ 0 & 1 & 2 \end{vmatrix} = 2 \neq 0,$$

then we bring the matrix G to a systematic form:

$$G = \begin{pmatrix} 1 & 0 & 2 & 1 & 1 & 0 & 0 \\ 2 & 1 & 1 & 0 & 2 & 1 & 0 \\ 0 & 1 & 2 & 1 & 2 & 0 & 1 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & 2 & 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 2 & 1 & 2 & 0 & 1 \end{pmatrix} \sim$$

$$\sim \begin{pmatrix} 1 & 0 & 2 & 1 & 1 & 0 & 0 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 2 & 0 & 2 & 2 & 1 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & 0 & 1 & 2 & 1 & 2 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 2 & 0 & 2 & 2 & 1 \end{pmatrix} \sim$$

$$= \begin{pmatrix} 1 & 0 & 0 & 1 & 2 & 1 & 2 \\ 0 & 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 1 & 2 \end{pmatrix}, \quad G_0 = (I_3 \ A)$$

Where

$$A = \begin{pmatrix} 1 & 2 & 1 & 2 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 \end{pmatrix}.$$

From here,

$$H_0 = ((-A)^T I_4) = \begin{pmatrix} 2 & 2 & 0 & 1 & 0 & 0 & 0 \\ 1 & 0 & 2 & 0 & 1 & 0 & 0 \\ 2 & 2 & 2 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{pmatrix}$$

We are now able to encode the information word $a=(210)$ in a systematic code form. We have

$$\bar{a} \rightarrow \bar{a}G_0 = (2100101).$$

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Consider a block linear (n, k) -code C in the alphabet F_q . Let G be the generating matrix of this code. Let us fix the check matrix H of this code. Then $H \cdot G^T = 0$, where $k \times n$, $(m \times n)$, $(m \times k)$ are the dimensions of the matrices, respectively G, H, O . Fixing the matrix H means that only codewords \bar{c} (i.e., vectors from the space of C codewords) satisfy the equality $H\bar{c}^T = 0$. Therefore, if for the received word \bar{v} we have $H\bar{v}^T = 0$, we conclude that the code word has been distorted in the channel c , and therefore $\bar{v} = \bar{c} + \bar{e}$.

Since $H\bar{v}^T = H\bar{c}^T + H\bar{e}^T = H\bar{e}^T$, then the vector $H\bar{e}^T$ indicates the presence of errors in the received message and it is called the error sector **syndrome**. However, if the error vector coincides with some code vector, then we will get that $H\bar{e}^T = 0$, and therefore we will not know about errors in the communication channel, and therefore we will perform incorrect decoding.

Definition 1. An arbitrary vector syndrome with $\bar{y} \in F_q^n$ respect to a linear (n, k) code C (or its check matrix H) is a vector $H\bar{y}^T \in F_q^m$. Designated $S(\bar{y}) = (s_0, s_1, \dots, s_{m-1})$.

Assuming that the communication channel is sufficiently "good, i.e., the number of distortions in one code word" is small, we can exclude the situation $S(\bar{e}) = 0$ if code vectors are chosen knowingly different from possible error vectors.

Definition 2. Let $\bar{y} = (y_0, y_1, \dots, y_{n-1})$ an arbitrary vector from F_q^n . **The Hamming weight of a vector \bar{y}** is the number of non-zero coordinates of this vector.

Definition 3 . Hamming distance between vectors

\bar{x} и $\bar{y} \in F_q^n$ is the number of non-zero coordinates of the vector $\bar{x} - \bar{y}$.

If $w(\bar{x})$ means the Hamming weight for \bar{x} , and $d(\bar{x}, \bar{y})$ is the Hamming distance between \bar{x} and \bar{y} , then we have

$$d(\bar{x}, \bar{y}) = w(\bar{x} - \bar{y}).$$

It is easy to check that the Hamming distance on F_q^n defines a metric on the space F_q^n , and the triangle inequality holds

$$d(\bar{x}, \bar{z}) + d(\bar{y}, \bar{z}) \geq d(\bar{x}, \bar{y})$$

for any $x, y, z \in F_q^n$.

Definition 4 . Let a linear (n, k) -code over F_q be given. The minimum code distance for C (denoted by d_c) is the minimum weight of non-zero code words; $d_c = \min_{(0 \neq c \in C)} w(c)$.

Since the difference of code words is a code word (since is a C subspace of F_q^n), we have

$$d_c = \min_{(c_1, c_2 \in C, c_1 \neq c_2)} (d(c_1, c_2)).$$

For example, let $\bar{c}_1 = (101011)$, $\bar{c}_2 = (111001) \in F_2^6$. Then $w(\bar{c}_1) = 4$, $w(\bar{c}_2) = 4$, $d(\bar{c}_1, \bar{c}_2) = w(\bar{c}_1 - \bar{c}_2) = 2$. This shows that if $d_c \geq 5$, and the communication channel is such that no more 3^x errors can be made in each word passing through the channel, then for the received word v its syndrome (and hence the syndrome of the error vector) will be different from the zero vector.

In coding theory, the following principle of decoding in channels with noise is confessed: "the received word is \bar{v} decoded into the nearest (in the sense of the Hamming distance) code word. If for a given v there are at least two code words for which $d(v, \bar{c}_1) = d(v, \bar{c}_2) \geq d(v, \bar{c})$ for all code words $\bar{c} \in C, c \neq \bar{c}_1, \bar{c} \neq \bar{c}_2$, then a collision occurs, leading to decoding failure".

Definition 5 . A sphere of radius $t, t \in N$ centered at a point $\bar{y}_0 \in F_q^n$ is a set of vectors $\bar{y} \in F_q^n$ for which $d(\bar{y}_0, \bar{y}) \leq t$. (Designation: $B_t(\bar{y}_0)$).

Definition 6 . A code is said C to correct t errors and less if each $y \in F_q^n$ sphere $B_t(y)$ contains no more than one codeword.

Theorem 1 . Linear (n, k) -code C corrects t errors and less if and only if $d_c \geq 2t + 1$.

Proof . If the code C corrects t errors, then for any codewords $\bar{c}_1, \bar{c}_2, \bar{c}_1 \neq \bar{c}_2$ the assumption $d(\bar{c}_1, \bar{c}_2) \leq 2t$ follows $w(\bar{c}_2 - \bar{c}_1) \leq 2t$. Take as y a vector whose first t non-zero coordinates are the same as those of the vector $\bar{c}_2 - \bar{c}_1$, and the remaining coordinates are equal to 0. For such a vector y we have $d(y, \bar{c}_2 - \bar{c}_1) = t, d(y, 0) \leq t$, and therefore the sphere radius t centered at the point y contains two code words $\bar{0}$ and $\bar{c}_2 - \bar{c}_1$, which is contradictory.

And vice versa, if $d_c \geq 2t + 1$, then for each $y \in F_q^n$ we have

$$d(\bar{y}, \bar{c}_1) + d(\bar{y}, \bar{c}_2) \geq d(\bar{c}_1, \bar{c}_2) \geq 2t + 1$$

for any $\bar{c}_1, \bar{c}_2 \in C, \bar{c}_1 \neq \bar{c}_2$, which means that at least one of the inequalities

$$d(\bar{y}, \bar{c}_1) > t, d(\bar{y}, \bar{c}_2) > t$$

is performed, i.e. sphere $B_t(\bar{y})$ contains at most one vector

$$\bar{c}_1, \bar{c}_1 \in C, \bar{c}_1 \neq \bar{c}_2.$$

Theorem 2 . Let a C -linear (n, k) -code over F_q . For each code word \bar{c} with Hamming weight $l, l \neq 0$, there are l columns of the check matrix H of this code, such that the linear combination of these columns, whose coefficients are non-zero coordinates

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of the vector \bar{c} , is equal to zero. And vice versa, if there are l matrix columns H and non-zero, l field F_q elements a_1, \dots, a_l so that the linear combination of these columns with coefficients a_1, \dots, a_l is equal to zero, then there is a code vector whose non-zero components are equal a_1, \dots, a_l and located on the numbers of the selected columns of the matrix H .

Proof. Indeed, for any vector $v = (v_1, \dots, v_n)$ the product $\bar{v}H^T = v_1\bar{h}_1 + \dots + v_n\bar{h}_n$, where \bar{h}_i is the i -th column of the matrix H . Hence, the validity of the theorem is easily verified in both directions.

Corollary 1 . If the check matrix of a H linear (n, k) -code is such that any of its s columns are linearly independent over F_q , then the (n, k) -code C in the alphabet F_q has a minimum code distance $\geq s + 1$.

Consequence 5 . Let C -linear (n, k) -code over F_2 . Then d_C it is equal to the least number of columns of the check matrix H whose sum is equal to $\bar{0}$.

Example 5 . Let $C = (7, 4)$ -code over F_2 . with check matrix

$$H = \begin{pmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 & 1 & 1 & 0 \end{pmatrix}$$

The matrix H has no proportional columns (hence any two columns are linearly independent). But the sum of the second, third and fourth columns is zero. Therefore, $d_C = 3$, and, by virtue of Theorem 1, this code corrects single errors.

From now until the end of this section, we will consider linear (n, k) codes in the alphabet F_2 , although the theory presented is also valid over an arbitrary alphabet F_q .

If a code vector was sent over the communication channel \bar{c} AND there were l symbol distortions in the channel, then for the received word v we have $d(c, v) = l$, which means that at v , the $l < d_C$ word \bar{v} will not coincide with any code word. For such a code, a corruption of $1 \leq d_C - 1$ or fewer symbols will not result in a codeword. This means that a linear (n, k) -code C with a minimum code distance d_C is able to detect the occurrence of errors in the amount $d_C - 1$ or less (but not necessarily correct them).

We will assume that the number of distortions in code words after passing through a noisy channel is less than d_C , i.e. the probability of the opposite event is quite small. Only under these assumptions does it make sense to use this code.

Let be C a given linear (n, k) -code in the alphabet F_2 . The code C contains 2^k words, and in space F_2^n there are 2^n vectors. We divide the set of vectors F_2^n into classes as follows:

the class K_1 consists of 2^k code words;

the class K_2 consists of vectors of the form $\bar{e}_2 + \bar{c}$, where the \bar{c} entire set runs C , and the vector \bar{e}_2 has the least weight among the vectors from $F_q \setminus C$;

the class K_3 consists of vectors of the form $\bar{e}_3 + \bar{c}$, $\bar{c} \in C$, \bar{e}_3 the vector of the smallest Hamming weight from $F_q \setminus (C \cup K_2)$, and so on.

Each class K_i contains exactly 2^k vectors, these vectors are different, and the classes K_i and K_j do not intersect at $i \neq j$ (Indeed, from $K_i \cap K_j \neq \emptyset$ it follows that there are vectors \bar{c}_i and \bar{c}_m from C such that

$$\bar{e}_i + \bar{c}_i = \bar{e}_j + \bar{c}_m.$$

Let for definiteness $j > i$. Then we have

$$\bar{e}_j = \bar{e}_i + (\bar{c}_i + \bar{c}_m) = \bar{e}_i + \bar{c}, \text{ где } \bar{c} \in C,$$

but this contradicts the choice \bar{e}_j as the vector with the least weight and not lying in any of the previous classes.

The classes K_i will be called the cosets of the space F_2 by the code C . It is clear that we will have a total of six $2^{n-k} = 2^m$ classes. Selected vectors $\bar{e}_i \in K_i$, ($\bar{e}_i = 0$), have the smallest Hamming weight in the class K_i , but in this class, in addition to the vector \bar{e}_i , there \bar{e}_i may be other vectors with a weight equal to the weight \bar{e}_i .

results F_2^n of splitting the set of space vectors into classes using the table

The allocated vectors $\bar{e}_i, i = 2, 3, \dots, 2^m$, are called class leaders K_i . The leader of the class $K_1 = C$ is the null vector $\bar{e}_1 = (0, \dots, 0)$.

Leader	Class elements $K_j \{ \bar{e}_j \}$					leader syndrome
$\bar{c}_1 = \bar{0}$	\bar{c}_2	...	\bar{c}_j	...	\bar{c}_{2^k}	$S(\bar{0} = 0)$
\bar{e}_2	$\bar{c}_2 + \bar{e}_2$...	$\bar{c}_1 + \bar{e}_2$...	$\bar{c}_{2^k} + \bar{e}_2$	$s(\bar{e}_2)$
\bar{e}_3	$\bar{c}_2 + \bar{e}_3$...	$\bar{c}_j + \bar{e}_3$...	$\bar{c}_{2^k} + \bar{e}_3$	$s(\bar{e}_3)$
.....
\bar{e}_{2^m}	$\bar{c}_2 + \bar{e}_{2^m}$...	$\bar{c}_1 + \bar{e}_{2^m}$...	$\bar{c}_{2^k} + \bar{e}_{2^m}$	$s(\bar{e}_{2^m})$

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Example 6 . Let C -linear $(6,3)$ -code cby generating matrix

$$G = \begin{pmatrix} 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 \end{pmatrix}$$

The generating matrix allows you to write all code words as all possible linear combinations of matrix rows G with coefficients from F_2 . We have

$$\begin{aligned} \bar{c}_1 &= (000000), \bar{c}_2 = (101010), \bar{c}_3 = (010110), \bar{c}_4 = (110001) \\ \bar{c}_5 &= (111100), \bar{c}_6 = (011011), \bar{c}_7 = (100111), \bar{c}_8 = (001101) \end{aligned}$$

Therefore, we have such a class table

(000000)	(101010)	(010110)	(110001)	(111100)	(011011)	(100111)	(001101)
(100000)	(001010)	(110110)	(010001)	(011100)	(111001)	(000111)	(101101)
(010000)	(111010)	(000110)	(100001)	(101100)	(001011)	(110111)	(011101)
(001000)	(100010)	(011110)	(111001)	(110100)	(010011)	(101111)	(000101)
(000100)	(101110)	(010010)	(110101)	(111000)	(011111)	(100011)	(001001)
(000010)	(101000)	(010100)	(110011)	(111110)	(011001)	(100101)	(001111)
(000001)	(101011)	(010111)	(110000)	(111101)	(011010)	(100110)	(001100)
(100100)	(001110)	(110010)	(010101)	(011000)	(111111)	(000011)	(101001)

Consider an arbitrary class

$$K_j = \{ \bar{e}_j + \bar{c}_j \mid \bar{c}_j \in C, i = 1, 1, \dots, 2^k \}.$$

Then we have

$$S(\bar{e}_j + \bar{c}_j) = S(\bar{e}_j) + S(\bar{c}_j) = S(\bar{e}_j), i = 1, \dots, 2^k.$$

This means that elements of the same class have equal syndromes. Using the principle of choosing the coset leader, we, by virtue of the decoding method to the nearest code number, obtain the decoding algorithm by the coset leader:

Step I Calculate the received vector syndrome \bar{v} : $S(\bar{v}) = H\bar{v}^T$.

Step II In the table of syndromes, we find the line for which $S(\bar{v}) = S(\bar{e}_j)$.

Step III Decode the received word \bar{v} for word $\bar{c} = \bar{v} + \bar{e}_j$.

This decoding method minimizes the decoding error, since, according to our agreement, the probability of the word v appearing at the channel input decreases with an increase in the number of distorted symbols. This encoding method is also supported by the fact that the Hamming distance between the received word \bar{v} and the code word \bar{c} (see step III) is not greater than the distance between \bar{v} and another (other than \bar{c}) code word. Really,

$$d(\bar{v}, \bar{c}') = w(\bar{v} + \bar{c}') = w(\bar{e}_j + \bar{c} + \bar{c}') = w(\bar{e}_j + \bar{c}''), c'' = \bar{c} + \bar{c}'$$

And since the leader \bar{e}_j and the vector $\bar{e}_j + \bar{c}''$ are in the same adjacent class, then, by virtue of the choice of the leader in the adjacent class, we conclude

$$w(\bar{e}_j) \leq w(\bar{e}_j + \bar{c}''), \text{ and therefore } d(\bar{v}, \bar{c}) \leq d(\bar{v}, \bar{c}').$$

The above reasoning also shows that in cases where the coset leader can be chosen in a unique way, then decoding by the coset leader has a minimum decoding error. | indent Denote by the A number of coset leaders with weight j . The numbers A_0, A_1, \dots, A_n will be called **the weight distribution of leaders**.

In some cases, the weight distribution makes it possible to estimate the probability of a decoding error. Let us consider a binary symmetric channel (BSC) with the probability p of one symbol distortion, i.e.

$$P(0 \mid 1) = P(1 \mid 0) = p$$

(here $P(0 \mid 1)$ means the probability that the sent character 1 will go to the character 0).

Since a decoding error occurs if and only if the error vector is not the leader of an adjacent class, we get that the probability of incorrect decoding in such a channel is equal to

$$P(E) = 1 - \sum_{i=0}^n A_i p^i (1-p)^{n-i}.$$

In Example 15 considered above, for a linear $(6,3)$ -code with generator matrix G , we have the following weight distribution:

$$A_0 = 1, A_1 = 6, A_2 = 1, A_3 = A_4 = A_5 = A_6 = 1.$$

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That's why

$$P(E) = 1 - (1 - p)^6 - 6p(1 - p)^5 - p^2(1 - p)^4.$$

For $p = 10^{-2}$ we get $P(E) \approx 1.4 \cdot 10^{-3}$.

Theorem 3 . Let a C –linear (n, k) -code be the minimum code distance d_c . Then all weight vectors $t = \frac{d_c - 1}{2}$ and less can be examined as coset leaders, but at least one weight vector $t + 1$ cannot be a coset leader.

The assertion of the theorem follows from the definition of an error-correcting t code; a the considered example 16 illustrates what was said for $t = 1$. (For example, a vector (010001) cannot be a leader).

Example 7 . Consider the $(7,4)$ -code c by the generating matrix

$$G = \begin{pmatrix} 1 & 0 & 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 & 0 & 1 & 1 \end{pmatrix}$$

The check matrix H has size $(7,3)$ so the number of cosets is $2^3=8$ and it looks like

$$H = \begin{pmatrix} 0 & 1 & 1 & 1 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{pmatrix}$$

In a matrix H , no two columns are equal, but the first column is equal to the sum of the last two. Therefore, $d_c = 3$. Therefore, the code C corrects single errors. This is also evidenced by the fact that any two vectors with weight 1 cannot be in the same coset. There are only 7 such vectors, which, together with the zero row, give eight different leaders, i.e. each coset has a weight vector ≤ 1 as its leader, which makes it possible to uniquely correct single errors.

For example, if a message $v=(0010010)$ is received, we compute

$$S\bar{v} = H\bar{v}^T = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix} \text{ and compare with the}$$

weight vector syndromes of 1:

$$S(1000000) = \begin{pmatrix} 0 \\ 1 \\ 1 \end{pmatrix}, \quad S(0100000) = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$$

$$S(0010000) = \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix}, \quad S(0001000) = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}$$

$$S(0000100) = \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, \quad S(0000010) = \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$$

$$S(0000001) = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix},$$

Where do we conclude that the error is in the fourth position, and therefore

$$\bar{c} = (0011010).$$

If there was a double error, for example, $\bar{e} = (0010010)$, and we got $\bar{v} = (1001110)$, then the calculations give $S(\bar{v}) =$

$$S(\bar{e}) = \begin{pmatrix} 0 \\ 0 \\ 1 \end{pmatrix}. \text{ Now, when decoding by the method of adjacent classes, we would have an erroneous result } \bar{e} = (0000001), \bar{c} =$$

(1001111) instead of a sent message $\bar{c}_0 = (1011100)$.

Thus, exaggerating the possibilities of decoding using the coset method, we can come to an erroneous result.

2.2 Hamming Codes

The Hamming code was the first example of a linear (n, k) -code to detect and correct single errors. We fix a natural number $m \geq 3$ and consider a matrix whose columns are the m -valued notation of numbers from 1 to $2^m - 1$. We will get a matrix H of size $2^m - 1 \times m$, which we will consider as a check matrix of a linear (n, k) -code, where $n = 2^m - 1, k = n - m = 2^m - m - 1$. This code is called the Hamming code. Obviously, the columns of the matrix H are different, but there is a column equal to the sum of the other two. Therefore, this code corrects single errors. There are $2^{n-k} = 2^m$ cosets, and vectors

$$(000 \dots 00), (100 \dots 00), (010 \dots 00), \dots, (000 \dots 10), (000 \dots 01)$$

belong to different cosets.

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Each sphere of radius 1 contains $n + 1$ points from F_2^n , and therefore non-intersecting spheres with centers in code words contain $(n + 1)2^k = 2^m \cdot 2^k = 2^n$ points from F_2^n , i.e. these spheres cover the entire space without intersections F_2^n .

Definition 7 . A code correcting t -errors and less is called **a perfect code** if all vectors with Hamming weight $\leq t$ are coset leaders and there are no other leaders.

Therefore, the Hamming code is a perfect code that corrects single errors. In addition to the Hamming code, there is another binary perfect (23,12) Galey code. The (7,4)-code considered in Example 17 is a binary Hamming code. There are also perfect codes in the alphabet F_q

Let us construct a generalized Hamming code. Let $m \geq 3$. We put $n = \frac{q^m - 1}{q - 1}$ and denote by α the primitive element of the field F_{q^m} . Then the order of α in the group $F_{q^m}^*$ is $q^m - 1$. Recall that each element of the field F_{q^m} is uniquely represented by a linear combination of elements $1, \alpha, \dots, \alpha^{m-1}$ with coefficients from F_q :

$$\alpha^j = \sum_{i=0}^{m-1} a_{ij} \alpha^i, j = 0, 1, \dots, n - 1.$$

We form a matrix H , whose columns are $\bar{h}_j = \begin{pmatrix} a_{0j} \\ \vdots \\ a_{m-1,j} \end{pmatrix}$, i.e.

$$H = \begin{pmatrix} a_{00} & a_{01} & \dots & a_{0,n-1} \\ a_{10} & a_{11} & \dots & a_{1,n-1} \\ \vdots & \vdots & \ddots & \vdots \\ a_{m-1,0} & a_{m-1,1} & \dots & a_{m-1,n-1} \end{pmatrix}$$

A generalized Hamming code is a linear (n, k) -code in the alphabet F_q , whose check matrix is equal to H (here $k = n - m$).

Theorem 4 . *The generalized Hamming code is a perfect single error correcting code .*

Proof . The different columns of the matrix represent different powers of α , and therefore their proportionality implies that $\alpha^i = a\alpha^j, a \in F_q, 0 \leq j < i \leq n - 1$. But then $a = \alpha^{i-j}$, but because $1 = \alpha^{q-1} = \alpha^{(i-j)(q-1)}$, which is impossible, since $0 < (i - j)(q - 1) < n(q - 1) = q^m - 1$, and the order of α is equal to $q^m - 1$. Thus, for the considered code: $d_c \geq 3$, i.e. the code corrects single errors. Each sphere $B_1(\bar{y}), \bar{y} \in F_q$ contains a point y and more $n(q - 1)$ points at a distance of 1 from y , i.e. $|B_1(\bar{y})| = 1 + n(q - 1) = q^m$. When the set of all \bar{y} code words runs through, then the set $\bigcup_{\bar{c} \in C} B_1(\bar{c})$ will contain $q^k \cdot |B_1(\bar{y})| = q^{k+m} = q^n$ vectors. Hence, these spheres cover the entire space F_q^n . Therefore, the generalized Hamming code is a perfect code.

2.3 Decoding algorithms based on algebraic features of cyclic codes.

We considered decoding methods based mainly on the property of linear cyclic codes that these codes are subspaces of a linear n -dimensional space over a field $GF(q)$. The cyclicity of the code is only a circumstance that allows the most simple implementation of these algorithms. In this section, we consider another class of decoding algorithms based on the finer algebraic structure of cyclic codes. This class is based on a simple algebraic technique for finding the erroneous components of the received sequence, which was first used by Peterson to decode binary codes and by Zierler and Hornstein to decode non-binary Bose-Chowdhury-Hokvinhem codes. For ease of reference, we will call the method of Peterson and Gornstein-Zierler the direct decoding method.

Empty K is the finite extension of the field $GF(q)$ containing all the roots of the polynomial $g(x)$, with coefficient $GF(q)$ and m -degree over $GF(q)$. Let $\text{deg}(g(x)) = n$, then n divides $q^m - 1$. It is known that in $K = GF(q^m)$ there is an element μ of order n , in the form of powers of which it is possible to represent all elements of the cyclic subgroup of the order of the n -multiplicative group of the field K , including all the roots of the polynomial $g(x)$. Let's pretend that $g(x)$ generates a cyclic code A . Denote the set of roots of the polynomial $g(x)$ across $\{\theta_1 = \mu^{l_1}, \theta_2 = \mu^{l_2}, \dots, \theta_r = \mu^{l_r}\}$.

Since each code word $a(x)$ from the cyclic code A is divided without remainder by the generating polynomial $g(x)$, then the roots listed above must also be the roots of any polynomial $a(x) \in A$.

Let us assume that the errors in the communication channel have been translated $a(x) \oplus b(x) = a(x) + e(x)$.

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If errors can in principle be corrected, then the syndrome $S(x) = b(x) \bmod g(x)$ carries all the information about the errors that have occurred. Knowing this information is enough for correction, for example, using a filter and a selector. On the other hand, all information about errors is contained in the set of the following elements of the field K : $s_{11} = b(\theta_1), s_{12} = b(\theta_2), \dots, s_{1r} = b(\theta_r)$, which can also be calculated using multi-cycle linear filters. Indeed, by supplying quantities instead of in comparison.

$$S(x) = c_0 + c_1x + \dots + c_{r-1}x^{r-1} \equiv b(x) \bmod g(x)$$

We get a system of equations

$$c_0 + c_1\theta_j + \dots + c_{r-1}\theta_j^{r-1} = s_{rj}, j = 1, 2, \dots, r$$

Relatively c_0, c_1, \dots, c_{r-1} . The coefficient matrix of this system

$$\begin{bmatrix} 1 & \theta_1 & \theta_1^2 & \dots & \theta_1^{r-1} \\ 1 & \theta_2 & \theta_2^2 & \dots & \theta_2^{r-1} \\ \dots & \dots & \dots & \dots & \dots \\ 1 & \theta_r & \theta_r^2 & \dots & \theta_r^{r-1} \end{bmatrix}$$

Has a non-zero determinant since the latter is a Vandermonde determinant and θ_j , different roots of the polynomial $g(x)$.

Therefore, the system of linear equations given above has exactly one solution and the elements $S_{1j} = b(\theta_j)$, где $j = 1, 2, \dots, r$, completely define the syndrome.

From $S_{1j} = b(\theta_j)$ it follows that $S_{1j} = e(\theta_j)$, since $a(\theta_j) = 0$. Since $e(x) = \sum_{i=0}^{n-1} \varepsilon_i x^i$, then the equalities $s_{1j} = \sum_{i=0}^{n-1} \varepsilon_i (\theta_j^i)^j, j = 1, 2, \dots, r$ (3.0)

It can be considered as a system of equations with respect to n variables, $\varepsilon_0, \varepsilon_1, \dots, \varepsilon_{n-1}$ and any way to solve this system as a method that can be the basis of some decoding algorithm.

Each error vector is completely specified by listing the values of non-zero components and indicating the places where these non-zero components are located. Since $e(\mu) = \sum_{i=1}^{n-1} \varepsilon_i \mu^i$, the position of non-zero components can be specified using elements $\mu^{i1}, \mu^{i2}, \dots, \mu^{it}$ and the value of these components using elements $\varepsilon_{i1}, \varepsilon_{i2}, \dots, \varepsilon_{it}$.

Such a representation of the error vector in terms of pairs of values is convenient for decoding purposes, since it is possible to reduce $\mu^{iu}, \varepsilon_{iu}$ the problem of error correction to first determining the position of the erroneous components, and then calculating the values of these components.

2.3 Direct method for decoding cyclic codes

Let us introduce the notation $\mu^{i1} = \mu_1, \mu^{i2} = \mu_2, \dots, \mu^{it} = \mu_t$ and construct a polynomial $I(x) = x^t + \sigma_1 x^{t-1} + \dots + \sigma_t$ whose roots are the quantities $\mu_u, u = 1, 2, \dots, t$.

We will assume that the degree of this polynomial is t , even if the true number of errors is $v < t$, i.e. let's put $\varepsilon_{iu} = \mu_u = 0$ at $v < u \leq t$. The coefficients of $\sigma_1, \sigma_2, \dots, \sigma_t$ the polynomial $I(x)$ are determined by the relation.

$$x^t + \sigma_1 x^{t-1} + \dots + \sigma_t = \prod_{u=1}^t (x - \mu_u)$$

Substituting into this relation μ_u instead of x , multiplying the left and right sides of the resulting expressions by ε_{iu} and summing over u , we obtain

$$\sum_{u=1}^t \varepsilon_{iu} \mu_u^{(1+p)} + \sigma_1 \sum_{u=1}^t \varepsilon_{iu} \mu_u^{(1+p-1)} + \dots + \sigma_t \sum_{u=1}^t \varepsilon_{iu} \mu_u^p$$

Introducing the notation

$$\sum_{u=1}^t \varepsilon_{iu} \mu_u^j = S_j \quad (3.1)$$

We get a system of equations

$$S_{t+p} = \sigma_1 S_{t+p-1} + \dots + \sigma_t S_p, p = 0, 1, 2, \dots, \quad (3.2)$$

which must be fulfilled for all values of p . If now it is equal to one of the numbers $\{l_1, l_2, \dots, l_r\}$, then from expressions (3.0) and (3.1) we get

$$S_j = s_l, j \in \{l_1, l_2, \dots, l_r\}.$$

This circumstance can be used to determine those coefficients of system (3.2) for which $j \in \{l_1, l_2, \dots, l_r\}$.

Let us assume that in this way it was possible to determine all the coefficients of v linearly independent equations from the system (3.2). Then, by solving the system of these equations, we can find the quantities $\sigma_1, \sigma_2, \dots, \sigma_v$. Now the position of

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erroneous characters (ie numbers i_1, i_2, \dots, i_v) will be determined by substituting all the elements $\mu^i, i = 0, 1, \dots, n - 1$ one by one into the polynomial $l(x)$.

If, when setting the element μ_u , the equality $I(\mu_u) = 0$ is fulfilled, then the corresponding component of the error vector is different from zero. This follows from the fact that, by construction, the polynomial $l(x)$ vanishes for all $\mu_u \in \delta\{\mu_1, \mu_2, \dots, \mu_v\}$ and is nonzero for all the others μ_u . Therefore, in this way, the position numbers of the vector that contain non-zero components can be found. To find the components themselves, $\varepsilon_{i_1}, \varepsilon_{i_2}, \dots, \varepsilon_{i_u}$ it suffices to solve the system of linear equations (3.0), in which $\varepsilon_i, i = i_1, i_2, \dots, i_v$, are set equal to zero.

In the case of decoding binary codes, there is no need to determine the values of the erroneous components, since all non-zero components of the error vector are equal to one. The problem of finding the error vector with the help of elements $S_j = b(\theta_j), j = 1, 2, \dots, r$, will be completely solved if we establish the possibility of a unique solution to systems (3.0) and (3.2).

Consider the decoding of Bose-Chowdhury-Hokvinhem codes. Recall that cyclic BCH codes that correct independent errors whose multiplicity does not exceed t are specified using $2t$ nonzero elements

$$\mu^{m_0}, \mu^{m_0+1}, \dots, \mu^{m_0+2t-1}$$

Which by definition are the roots of all code words. As before, $\mu \in k$ and has order n . The code generator is a polynomial.

$$g(x) = HOK[f_0(x), f_1(x), \dots, f_{2t-1}(x)].$$

Where $f_i(x), i = 1, 2, \dots, 2t - 1$, are irreducible over $GF(q)$ polynomials whose roots are μ^{m_0+i} . In this case (3.0) becomes

$$s_j = \sum_{i=0}^{n-1} \varepsilon_i (\mu^i)^j, m_0 \leq j \leq m_0 + 2t - 1. (3.0')$$

And S_j can be calculated using appropriate linear filters. Thus, equations (3.0') determine $2t$ the coefficients in t the equations of system (3.2) for $p = m_0, m_0 + 1, \dots, m_0 + t - 1$. System (3.2) is a linear inhomogeneous system with a matrix of coefficients.

$$M_t = \begin{bmatrix} S_{m_0+t-1} & S_{m_0+t-2} & \dots & S_{m_0} \\ S_{m_0+t} & S_{m_0+t-1} & \dots & S_{m_0+1} \\ \dots & \dots & \dots & \dots \\ S_{m_0+2t} & S_{m_0+2t-1} & \dots & S_{m_0+t-1} \end{bmatrix}$$

Where $S_j = s_j = b(\mu^j), j = m_0, m_0 + 1, \dots, m_0 + t - 1$. The conditions under which this system is solvable with respect to $\sigma_1, \sigma_2, \dots, \sigma_t$ are given by the following theorem.

Theorem 1. The matrix determinant is M_t non-zero if the values are S_j [см. формулу (3.1)] formed from exactly t different non-zero pairs ε_{i_u}, μ_u and u is equal to zero if S_j , are formed less than from t non-zero pairs $(\varepsilon_{i_u}, \mu_u)$.

Since the actual number of errors by assumption is equal to v , then the largest order of the matrix (3.3), for which its determinant is still nonzero, is equal to v . This means that in system (3.2) there are only v linearly independent equations obtained for $p = m_0, m_0 + 1, \dots, m_0 + v - 1$, which can be solved with respect to $\sigma_1, \sigma_2, \dots, \sigma_v$. This, in turn, implies that all non-zero roots of the polynomial can be found $l(x)$, i.e. the positions of all components of the error vector are determined. The values of the non-zero error vector can be found from the first v equations of the system (3.0'). The existence of a unique solution simply follows from the fact that the limiter of the coefficient matrix is the Vandermonde determinant. This determinant is different from zero, since $\mu^{i_u}, u = 1, 2, \dots, v$, are different values.

So, the direct decoding algorithm can be formulated as follows:

1. Calculate the values of the quantities $S_j = b(\mu^j), j = m_0, m_0 + 1, \dots, m_0 + 2t - 1$. This operation can be carried out using linear multicycle filters.
2. Determine the largest number v of linearly independent equations in the system (3.2), looking for the largest v for which the determinant $|M_v|$ is still different from zero. This number is equal to the number of errors that occurred.
3. Solve system (3.2) relatively $\sigma_1, \sigma_2, \dots, \sigma_v$ assuming that $\sigma_{v+1} = \dots = \sigma_t = 0$.
4. Alternately substitute the values $\mu^i, i = 0, 1, \dots, n - 1$, into the equation $x^v + \sigma_1 x^{v+1} + \dots + \sigma_v = 0$, looking for those that turn it into an identity. If μ^u there is one of these values, then in the received sequence of characters at the position u is erroneous.
5. The found values $\mu_u, u = 1, 2, \dots, v$, put into the equation (3.0') and solve them with respect to ε_{i_u} . This operation is not needed in case of decoding binary codes.
6. Make corrections of errors by scaling

$$b(x)u - c(x) = -\sum_{u=1}^v \varepsilon_{i_u} x^{i_u}$$

Some control can be obtained by restricting to decoding only binary codes and $m_0 = 1$. In this case, all are equal to one

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$$S_j = \sum_{u=1}^v (\mu^i)^{iu}, j = 1, 2, \dots, 2t, v \leq t.$$

Therefore, S_j are the power-law noises of the quantities v^{iu} .

In a polynomial $l(x)$ whose roots are the $\mu^{iu}, u = 1, 2, \dots, v$ coefficients σ_u associated with c S_j Newton's formulas. Considering the coefficients in Newton's formulas as a_u variables, we can compose a system of equations

$$N = \begin{bmatrix} \sigma_1 \\ \sigma_2 \\ \vdots \\ \sigma_v \end{bmatrix} = \begin{bmatrix} S_1 \\ S_2 \\ \vdots \\ S_{2v-1} \end{bmatrix} \quad (3.4)$$

Where

$$N = \begin{bmatrix} 1 & 0 & 0 & \dots & 0 \\ S_2 & S_1 & 1 & \dots & 0 \\ S_4 & S_3 & S_2 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots \\ S_{2v-2} & S_{2v-3} & S_{2v-4} & \dots & S_{v-1} \end{bmatrix} \quad (3.5)$$

The conditions under which the system of equations (3.4) is solvable are given by the following theorem.

Theorem 2. The determinant of a matrix N_v is non-zero if the quantities $S_j, j = 1, 2, \dots, 2t$, are formed by power sums v or $v - 1$ different elements n^u is equal to zero if the quantities are S_j formed by power sums of fewer than $v - 1$ elements.

The direct algorithm for decoding binary BCH codes almost does not differ from the general algorithm given above, although the practical implementation of the decoding method is simplified due to the simpler calculation of the determinant of the matrix (3.5) compared to the determinant of the matrix (3.3). In addition, when finding the largest number v for which the determinant N_v is still different from zero, one can use the solvability of the system of equation (3.4), even if the desired number v is equal to or one more than the actual number of errors that have occurred. This allows us to construct a calculation scheme as follows. First, it is assumed that $v = 2$, then $v = 4$, etc., are increased by two units. For each value, the determinant is calculated N_v and choose for v the largest value at which $|N_v| \neq 0$. Thereafter, decoding is continued in the manner described. If it turns out that the found value of v exceeds the number of errors by one, then one of the solutions (3.4) is zero.

The complexity of the described direct decoding method depends to a large extent on how easy it is to calculate the determinant of the matrix N_v and solve the system of equations (3.4). One of the possible methods for calculating the determinant and solving the system of equations is such a linear transformation of the system, in which the matrix N_v takes a triangular shape. However, a more efficient transformation can be proposed, which is based on the special structure of the matrix N_v and on the properties of the elements of finite fields. Such a transformation was described by E. Berlekamp.

Let us write the system of equations (3.4) again:

Recall that S_j are the power sums of the roots of the polynomial

$$l(x) = \prod_{u=1}^t (x - \mu^{i_u}), \text{ где } i_1, i_2 \dots i_t$$

- numbers of erroneous characters.

Let us transform this system by introducing new variables R_u , which are related to the quantities by S_j the relation

$$R_u = \sum_i A_j S_{u-2j}.$$

Where $A_0 = S_0 = 1, A_{-1} = S_{-1} = 0$ for everyone $i > 0$ и $A_j \in K, i > 0$. Let us now add to each i th equation of the system (3.4) $(i - 1)$ - e equation multiplied by A_1 , $(i - 1)$ - e equation multiplied by A_2 , etc. As a result, we obtain a new system of equations

$$\begin{bmatrix} 1 & 0 & 0 & \dots & 0 \\ R_2 & R_1 & 0 & \dots & 0 \\ R_4 & R_3 & R_2 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots \\ R_{2v-2} & R_{2v-3} & R_{2v-4} & \dots & R_{v-1} \end{bmatrix} = \begin{bmatrix} \sigma_1 \\ \sigma_2 \\ \sigma_3 \\ \vdots \\ \sigma_v \end{bmatrix} = \begin{bmatrix} R_1 \\ R_3 \\ R_5 \\ \vdots \\ R_{2v-1} \end{bmatrix} \quad (3.6)$$

Let us choose the coefficients A_j in such a way that $R_{2i} = 0, i \neq 0$ i.e.

$$0 = \sum_{j=0}^i A_j S_{2(i-j)}$$

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From here $A = \sum_{j=0}^{i-1} A_j S_{2(i-j)}$ and under the initial condition $A_0 = 1$, all other A can be determined. It can be proved that $A_{2i} = 0$.

Using the fact that $R_{2i} = 0$, we rewrite system (3.6) in the form of two systems of linear equations (for convenience, we assume that $v = 5$).

The first system consists of $[v/2]$ ($[x]$ is the integer part of x ; for $v = 5$ we have $[5/2] = 2$) the last equations in system (3.6):

$$\begin{bmatrix} R_5 & R_3 \\ R_7 & R_9 \end{bmatrix} \begin{bmatrix} \sigma_2 \\ \sigma_4 \end{bmatrix} = \begin{bmatrix} R_7 \\ R_9 \end{bmatrix} \quad (3.7a)$$

The second system consists of the remaining $v - [v/2]$ equations, which can be transformed as follows:

$$\begin{bmatrix} \sigma_2 \\ \sigma_3 \\ \sigma_5 \end{bmatrix} = \begin{bmatrix} R_1 & 0 & 0 \\ R_3 & R_1 & 0 \\ R_5 & R_3 & R_1 \end{bmatrix} \begin{bmatrix} 1 \\ \sigma_2 \\ \sigma_4 \end{bmatrix} \quad (3.7b)$$

Therefore, instead of solving the system of v equations (3.4), it $\sigma_1, \sigma_2, \dots, \sigma_v$ suffices to solve the system $[v/2]$ of equations (3.7 a) and find the rest σ_i using equality (3.7 b). The advantages of such a transformation can be explained by the following rough argument.

The number of operations required to perform the transformation and solve equation (3.7 b) is proportional to v^2 . At the same time, the number of operations required to solve the system of equations (3.4) or (3.7 a) is proportional to the cube of the number of equations. By halving the number of equations, we have reduced the number of operations by about 8 times, which is quite large v . The external memory required to perform the transformation and solve equations (3.4) and (3.7 a) depends on the square of the number of equations.

Therefore, the introduction of a transformation reduces the external memory by about 4 times.

2.4 Incremental decoding of cyclic codes

Let us consider a simple modification of the direct decoding method, which leads to a significant reduction in the decoding algorithm. Note that attempts to simplify decoding in some particular cases were found in the works of R. Banerji, E.L., not yet fully disclosed by the possibilities of the approach described above. It is as the implementation of one of these possibilities that one should consider phased decadence, which was described in a general form by R.T. Jiang.

The considered decoding method directly follows from the property of the matrix M_v и N_v . It is most convenient to start with a matrix M_v . Its properties are formulated in Theorem 1. It allows detecting a change in the number of errors in the received sequence and, consequently, performing step-by-step decoding at $t \leq (d_0 - 1)/2$. Indeed, if v there is the largest number for which $|M_v| \neq 0$, then by successively changing the symbols of the received sequence $b = (\beta_1, \beta_1, \dots, \beta_{n-1})$ and calculating the matrix determinant.

$$M'_v = \begin{bmatrix} S'_{m_0+v-1} & S'_{m_0+v-2} & \dots & S'_{m_0} \\ S'_{m_0+v} & S'_{m_0+v-1} & \dots & S'_{m_0+1} \\ \dots & \dots & \dots & \dots \\ S'_{m_0+2v-2} & S'_{m_0+v-3} & \dots & S'_{m_0+v-1} \end{bmatrix}$$

Where

$$S'_j = b'(\mu^j), j = m_0, m_0 + 1, \dots, m_0 + 2t - 1, v \leq t, b'(x) = b(x) - \varepsilon_i x^i,$$

you can set the moment when changing some character of the sequence b leads to the correction of the error. Since the values S'_j when correcting the error turn out to be formed from $v - 1$ non-zero pairs $(\varepsilon_{iu}, \mu^{iu})$, the determinant of the matrix M'_v vanishes. A value of zero $|M'_v|$ indicates that the error has been fixed.

Let us assume that cyclic shifts of the received sequence are performed and after each i -th shift the values $S_j^i = b^{(i)}(\mu^j), j = m_0, m_0 + 1, \dots, m_0 + 2t - 1$, where are calculated $b^{(i)}(x) \equiv x^{-i} b(x) \text{ mod } x^n - 1, i = 0, 1, \dots, n - 1$. The symbol at the zero position of the vector $b^{(i)} = (\beta_i, \beta_{i+1}, \dots, \beta_0, \dots, \beta_{i-1})$ is erroneous and the error value is ε , if the determinant of the matrix.

$$M_v^i = \begin{bmatrix} S_{m_0+v-1}^{(i)} - \varepsilon & S_{m_0+v-2}^{(i)} - \varepsilon & \dots & S_{m_0}^{(i)} - \varepsilon \\ S_{m_0+v}^{(i)} - \varepsilon & S_{m_0+v-1}^{(i)} - \varepsilon & \dots & S_{m_0+1}^{(i)} - \varepsilon \\ \dots & \dots & \dots & \dots \\ S_{m_0+2v-2}^{(i)} - \varepsilon & S_{m_0+2v-3}^{(i)} - \varepsilon & \dots & S_{m_0+v-1}^{(i)} - \varepsilon \end{bmatrix}$$

Equal to zero. Ratio

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$$|M_v^{(i)} = 0| \quad (3.8)$$

can be considered as a control condition, the fulfillment of which indicates the need for correction of the corresponding character.

When decoding binary codes, the control condition can be simplified by passing to a matrix N_v , whose determinant is easier to calculate. The property of the matrix N_v , formulated in Theorem 2, also admits stepwise decoding. Let v there be the largest number for which the determinant of the matrix N_v is still different from zero. Then the number of errors is exactly $v - 1$. Indeed, according to Theorem 2 for , the $|N_v| \neq 0$ number of errors is v or $v - 1$. But the number of errors cannot be equal v , because in this case $|N_{v+1}| \neq 0$, which would contradict the assumption of maximality v . Therefore, it is clear that the matrix determinant N_v becomes equal to zero if a change in some symbol in the received sequence leads to an error correction. This fact can serve as a starting point for obtaining a control condition similar to (3.8) in the case of binary codes.

Let, as before, cyclic shifts of the received sequence are performed and b after i each i -th shift the values are calculated $S_j^i = b^{(i)}(\mu^j), j = 1, 2, \dots, 2t$, where $b^{(i)}(x) \equiv x^{-i}b(x) \bmod x^n - 1, t = 0, 1, \dots, n - 1$

$$N_v^i = \begin{bmatrix} 1 & 0 & 0 & \dots & 0 \\ S_2^{(i)} + 1 & S_1^{(i)} + 1 & 1 & \dots & 0 \\ S_4^{(i)} + 1 & S_3^{(i)} + 1 & S_2^{(i)} + 1 & \dots & 0 \\ \dots & \dots & \dots & \dots & \dots \\ S_{2v-2}^{(i)} + 1 & S_{2v-3}^{(i)} + 1 & \dots & \dots & S_{v-t}^{(i)} + 1 \end{bmatrix}$$

Will be equal to zero. Ratio

$$|N_v^{(i)}| = 0 \quad (3.9)$$

It can again be considered as a control condition, the fulfillment of which indicates the need to invert the i - i th symbol in the received sequence.

Let us now formulate an algorithm for step-by-step decoding, limiting ourselves only to binary codes and test relations in the form (3.9). The general case will differ in minor details, which the reader can recover for himself. For decoding, you must perform the following operations:

1. Calculate the value of the quantities $S_j^0 = b^0(\mu^j), j = 1, 2, \dots, 2t$. Index (0) indicates that the sequence b has not yet undergone cyclic shifts.
2. Find the largest value v for which the determinant of the matrix N_v^0 is still different from zero. Then the actual number of errors in the sequence is $b = v - 1$.
3. Perform cyclic shifts, each time calculating the values S_j^i . If the first K symbols of code words are informational, then $i = 0, 1, \dots, k - 1$. Otherwise $i = 0, 1, \dots, n - 1$. For each i , which varies within the limits indicated above, calculate the determinant $|N_v^{(i)}|$. Form a noise sequence e by writing at the position with the number i of the noise sequence one if $|N_v^{(i)}| = 0$ and zero if $|N_v^{(i)}| \neq 0$.
4. Restore the given sequence by adding b n character by character.

Thus, when switching to step-by-step decoding, we managed to get rid of such time-consuming operations as solving a system of equations over a finite field and finding the roots of the polynomial $l(x)$. Now the complexity of decoding is determined only by the complexity of calculating the determinant of the size matrix $v * v$, whose elements are the values of the final field K .

Example.

Let us illustrate the above algorithm with an example of decoding with a binary BCH code with binary independent error correction. Note that step-by-step decoding provides the simplest implementation of decoding for k cycles of binary error-correcting codes compared to all other algorithms already described. This simplification is possible due to the simplicity of the single control condition.

Consider two situations

1. Two errors occurred during transmission. In this case, the largest v for which the determinant of the matrix n is still non-zero is $v=3$. Therefore, omitting the index, but bearing in mind that the values change at each cycle, we get

$$N_3^i = \begin{bmatrix} 1 & 0 & 0 \\ S_2 + 1 & S_2 + 1 & 1 \\ S_4 + 1 & S_3 + 1 & S_2 + 1 \end{bmatrix}$$

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Calculating the determinant N_3^i and equating it to zero, we obtain the control condition,

$$0 \quad (3.10)$$

$$S_1 + S_1^2 + S_1^3 + S_3 =$$

which must be executed whenever one of the two errors occupies the zero position during the shifts of the received message.

2. A single error occurred during transmission. Then the largest $v = 2$.

Revealing the Determinant of a Matrix $N_2^{(i)}$ and equating it to zero, we obtain the second control condition

$$S_1 = 1 \quad (3.11)$$

which must be executed when the erroneous symbol occupies the zero position during shifts. Since in the case of single errors $S_i = S_1^i$, it can be easily seen that the fulfillment of condition (3.11) also entails the fulfillment of (3.10). Therefore, to make a decision about correcting a certain symbol, it suffices to check the fulfillment of only one condition (3.10) for both single and double errors.

The absence of transmission errors must be checked in a special way. Such a check can be based on the fact that with error-free transmission $S_j = 0$ for all $j = 1, 2, \dots, 2t$.

Such decoding itself is simpler than direct decoding. However, it allows even greater simplifications of the decoding device by eliminating the operation of multiplying field elements k and calculating the sum $S_1 + S_1^2$ on a single shift register with feedback.

Let us consider the ways of obtaining each of the terms of the control condition (3.10), remembering that the $m_0 = 1$ code is also given by the elements μ, μ^2, μ^3, μ^4 , which, by definition, must be the roots of all code words.

1. Calculation $S_1 + S_1^2$. Equations (3.0) and (3.1) imply that $S_1 = b(\mu)$, where $b(x)$ is a polynomial corresponding to the accepted sequence $b = (\beta_0, \beta_1, \dots, \beta_{n-1})$. Let $g(x)$ there be that irreducible over $GF(2)$ factor of the generator polynomial $g(x)$ whose root is μ . It was noted that the μ -element of the field K , which has the order n . We assume everywhere that μ does not belong to any smaller subfield in K and, therefore, the degree of the polynomial $g_1(x)$ is equal to m [m is the degree of the field k over $GF(2)$]

Each field element K can be represented as a linear combination of basic elements. As such basic elements can be chosen $1, \mu, \mu^2, \dots, \mu^{m-1}$. Then, introducing the notation for representing the element $r \in K$ in the basis $1, \mu, \mu^2, \dots, \mu^{m-1}$, we can write

$$r(\mu) = r_0 + r_1\mu + \dots + r_{m-1}\mu^{m-1}$$

Where $r_i \in GF(2), i = 0, 1, \dots, m-1$.

On the other hand, $r(\mu)$ is the element of the field k that is obtained by substituting into the polynomial $r(x)$ instead x of the element μ . Hence the conclusion follows: in order to find the element of the field, which is obtained by setting instead in an arbitrary polynomial $f(x)$ over the field $GF(2)$, it is necessary to find the remainder $r(x)$ after dividing $f(x)$ by $g_1(x)$ and write $f(\mu)$ it as a vector, the components of which are the coefficients of the polynomial $r(x)$. This also applies to the case when the main field contains elements.

Thus, to find S_1 it is necessary to determine the remainder of the division $b(x)$ by $g_1(x)$. The remainder can be computed using the multi-cycle linear filters described in Section 3. In offline mode, a linear filter with an initial state corresponding to the polynomial $r(x) \bmod g_1(x)$ will produce remainders from dividing the polynomials $b^i(x) \bmod x^n - 1, i = 0, 1, \dots, n-1$, by the polynomial $g_1(x)$, i.e. Will comb out S_1^i . To find it S_1^i is enough to calculate the remainder of the division $[r(x)]^2 = r(x^2) \bmod g_1(x)$.

This operation could also be done with a linear filter. However, it is possible to construct a code filter that directly computes $r(x) + r(x^2) \bmod g_1(x)$, and hence also $S_1 + S_1^2$. In offline mode, the sequence of states of such a filter will correspond to $S_1^{(i)} + (S_1^{(i)})^2, i = 0, 1, \dots, n-1$.

2. Calculation S_3 . By definition $S_1^3 = b(\mu)$, therefore, it follows from the above that to find it S_3 is enough to find the remainder after dividing the polynomial $b(x)^3$ by the polynomial $g_1(x)$. For this, in turn, it is sufficient to have a code filter, the transition matrix of which is given by the generating element $c(x) \equiv x^{-3} \bmod g_1(x)$. It is easy to verify that such a filter will produce $S_3^i, i = 0, 1, \dots, n-1$.

3. Calculation S_1^3 . Since $S_1^3 = [r(\mu)]^3$, where $r(x) \equiv b(x) \bmod g_1(x)$, then S_1^3 it could be found using a special combinatorial scheme, calculating the representation coefficients $[r(\mu)]^3$ in the basis $\{1, \mu, \dots, \mu^{m-1}\}$ through the corresponding coefficients $r(\mu)$.

The combinatorial circuit is essentially an arithmetic device that performs addition and multiplication of elements of the Galois field in one cycle. In our case, the arithmetic device designed to calculate S_1^3 , can be greatly simplified if we use the recurrence relation introduced below.

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It was said above that S_1 can be found using the remainder calculator $b(x) \bmod g_1(x)$, where $b(x)$ - corresponds to the input filter sequence. Then the subsequent state of $B_{i+l}(x)$ such a filter can be determined in terms of the previous state $B_i(x)$ using the comparison

$$B_{i+1}(x) \equiv [B_i(x) + B_{i+1}(x)]^{-1} \bmod g_1(x) \quad (3.13)$$

Where β_{i+1} is the value of the output signal at the moment $i + 1$. From this it follows that

$$B_{i+1}^3(x) \equiv [B_i^3(x) + B_{i+1}[B_i^2(x) + B_i(x) + 1]]x^{-3} \bmod g_1(x) \quad (3.14)$$

Comparison (3.144) is a recursive relation that allows one to calculate $B_{i+1}^3(x) \bmod g_1(x)$ through $B_i^3(x), B_i^2(x) + B_i(x) \bmod g_1(x)$ and the current value of the input symbol β_{i+1} . Now noticing that

$$\begin{aligned} B_{n-1}(x) &\equiv b(x) \bmod g_1(x) \\ B_{n-1+i}(x) &\equiv b(x)x^{i-1} \equiv b(x)x^{i-1} \bmod g_1(x). \end{aligned}$$

Moreover, the latter takes place, since $\beta_{n-1+i} = 0$ for all $i > 0$, we obtain $B_{n-1+i}(\mu) = S_1^{(i)}$, and therefore

$$B_{n-1+i}(\mu) + [B_{n-1+i}(x)]^2 = S_1^{(i)} + (S_1^{(i)})^2. \quad (3.15)$$

$$\text{i.e. } B_{n-1+i}^3(\mu) = [S_1^{(i)}]^3$$

From (3.14) and (3.15) follows the recursive relation for $[S_1^{(i+1)}]^3$:

$$[S_1^{(i+1)}]^3 = [S_1^{(i)}]^3 \mu^{-3}$$

The operation of multiplication by μ^{-3} is performed by the code filter. Thus, for decoding, it is necessary to have two code filters that calculate $S_1^{(i)}$ и $S_1^{(i)} + [S_1^{(i)}]^2$. The calculation $[S_1^{(i)}]^3$ is carried out in two stages. The first stage, as a result of which the value is found $[B_{n-1}(\mu)]^3 = S_1^3$, ends after receiving the message $b = (\beta_1, \beta_2, \dots, \beta_{n-1})$ in full. At this stage, the recursive relation (3.14) is used. At the second stage $[S_1^{(i)}]^3$, is calculated using relation (3.16). To perform the operation of multiplication by $x^{-3} \bmod g_1(x)$, or, what is the same, by μ^{-3} , a special code filter is used.

After receiving the message b , the states of these three filters will correspond to the values $S_1 + S_1^2, S_3$ и S_1^3 . Starting from this moment, the decoding device switches to autonomous mode and, using the control condition (3.10), generates a noise sequence.

On fig. 9 shows a decoder for a binary BCH code (15, 7) that corrects double independent errors. In this example, the polynomial, which belongs to the exponent 15, is $GF(2)$ selected as a generator polynomial, with non-reducible over $g(x) = g_1(x), g_2(x)$ factors and $g_1(x) = x^4 + x + 1$. One can check that the first of these polynomials is primitive, and the root of the second is the cube of the root of the first polynomial.

The filter that calculates $S_1 + S_1^2$ can be constructed in accordance with the results of paragraph 3. The transition matrix M and F the linear transformation matrix of the outputs are, respectively.

$$M = \begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 \end{bmatrix} \text{ и } F = \begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 1 & 0 & 1 \\ 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 \end{bmatrix}.$$

The transition matrix of filters that calculate S_3 and S_1^3 is

The complexity of the decoding device, designed to correct single and double errors, with increasing code length increases in proportion to the binary logarithm n . This is explained by the fact that the block diagram of the decoding device does not change with increasing code length (the control condition is preserved), but the number of memory elements in the code filters changes.

If the number of errors that can be corrected by a given code exceeds two, then the structure of the decoder becomes more complicated due to the need to use several control conditions. Consider a BCH code that corrects triple errors. In the presence of three errors, this condition, in accordance with (3.8) and (3.9), will be

$$\begin{aligned} |N_4^{(i)}| &= \begin{vmatrix} 0 & 1 & 0 & 0 \\ S_2 + 1 & S_2 + 1 & 1 & 0 \\ S_4 + 1 & S_3 + 1 & S_2 + 1 & S_1 + 1 \\ S_3 + 1 & S_5 + 1 & S_4 + 1 & S_3 + 1 \end{vmatrix} \\ &= S_1^3(1 + S_1 + S_1^3 + S_3(1 + S_1 + S_1^2 + S_1^3 + S_3) + S_5(1 + S_1) = 0) \quad (3.17) \end{aligned}$$

For two or one errors, the control condition coincides with condition (3.10). However, a simplification is possible here, which follows from the fact that the determinant (3.17) remains non-zero even if the actual number of errors is equal to two. But not one of the errors did not take the zero position as a result of the shifts. Therefore, condition (3.17) can serve as a control for correcting double and triple errors. Only when the number of errors in the codeword is equal to one should the second condition be checked.

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$$S_1 = 1 \quad (3.18)$$

The transition from one condition to another should be carried out on the basis of knowledge of the actual number of errors that have occurred. To do this, you can use the following approach. It is easy to verify that, as $S_1 = 1$, equality (3.17) holds. Therefore, with single errors, condition (3.17) will be satisfied at each cycle and the appearance of more than three corrective signals will be sufficient reason to go to condition (3.18).

The stepwise decoding algorithm was derived from the assumption that only BCH codes are considered. However, a similar decoding procedure can be found for other codes from the cyclic class. Such codes are, for example, Melas and Megpit codes. These codes correct double independent errors and are given by the elements μ, μ^{-1} поля $GF(2^m)$.

$$M = \begin{bmatrix} 1 & 0 & 0 & 1 \\ 1 & 1 & 0 & 0 \\ 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$$

Before receiving a message, the position of the key corresponds to $D = 0$. This opens up free access to information in the buffer register and in all code filters.

Of the features of the filters, only the originality of the change of states in the filter should be noted S_1^3 . Each state is set in two half cycles. From the first half cycle, the contents of all memory cells are rewritten to the adders C , while the filter memory cells are S_1^3 brought to the zero state at the same time. During the second half cycle, the summation result is rewritten into this filter and a shift is made. Shifting multiplies by μ^{-3} .

After receiving the message completely, the keys are set to the position $D = 1$. The checksum value (3.10) appears at the outputs of the adders at each cycle. C If the checksum is zero, then the character currently leaving the buffer register must be corrected. To disable the correction circuits in the case when the transmission is carried out without errors [in this case, condition (3.10) is also satisfied], the signal is used $E = 1$. The specified signal is formed after receiving the message in full and corresponds to $S_1 = 0$. It is clear that if only single or double errors are allowed, $S_1 = 0$ it can only be possible with error-free transmission.

2.5 Catching Errors in Cyclic Codes

In this section, we consider a method for detecting and correcting errors in cyclic codes using shift registers.

Consider a cyclic (n, k) code with a generating polynomial $g(x)$. Suppose that the code polynomial $c(x)$ acquired an error during transmission over the communication channel $e(x)$, so that we will receive a message in the form of a polynomial $v(x)$. We know that the syndromic polynomial $s(x)$ is the remainder of division $v(x)$ by $g(x)$. It is clear that if the acquisition of the error is in the first m positions (here, the m degree $g(x)$ of), then this sum is equal to the error polynomial $e(x)$. But in general this is not the case. Actually $e(x) = a(x) (g(x) + s(x))$.

Let us assume that the errors are concentrated in the last m positions, where m is the degree of $g(x)$, i.e. $e(x) = e_k x^k + e_{k+1} x^{k+1} + \dots + e_{n-1} x^{n-1}$. If $v(x)$ cyclically shifted by m steps, then the errors will go to the first m positions of x^0, x^1, \dots, x^{m-1} the polynomial $v^{(m)}(x)$ ($v^{(m)}(x)$ means a cyclic shift by m positions of the vector of coefficients of the polynomial $v(x)$). The corresponding error vector for $\bar{v}^{(m)}$ has the form

$$\bar{v}^{(m)} = (e_k, e_{k+1}, \dots, e_{n-1}, 0, \dots, 0)$$

now the syndromic polynomial $s^{(m)}(x)$ for $v^{(m)}(x)$ is equal to the remainder of division $v^{(m)}(x)$ by $g(x)$, i.e. equals $s^{(m)}(x) = e_k + e_{k+1} x + \dots + e_{n-1} x^{m-1}$

Multiplying $s^{(m)}(x)$ by x^k , we will have

$$x^k s^{(m)}(x) = e(x) = e_k x^k + \dots + e_{n-1} x^{n-1}$$

Therefore, it is said that if the errors are concentrated on the last m positions, then the error vector coincides with $x^k s^{(m)}(x) \pmod{(x^n - 1)}$, here $s^{(m)}(x)$ there is a syndromic polynomial for $v^{(m)}(x)$. In this case, we calculate $s^{(m)}(x)$ and then $e(x) = v(x) + x^k s^{(m)}(x) \pmod{(x^n - 1)}$.

Suppose that the errors are contained in the section of length m , then not necessarily in the last places, for example, starting from x^i the place to x^{m+i-1} . If we $v(x)$ shift to the right by $n - i$ positions, then the errors will be concentrated in the conditions of the previous case, and therefore the error polynomial can be identified with $c x^i s^{(n-i)}(x)$. But i we don't know the meaning. Therefore, we do a right shift operation until we catch (i.e. until we find the value i and the corresponding error vector). This procedure is called error trapping.

Let's assume that the code corrects t errors and less. To determine the event that errors are caught in the syndrome register, we can simply test the syndrome weight after each syndromic register shift. As soon as the weight in the syndromic register becomes

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less than t or equal t , we consider that the errors are caught in the syndromic mode. So, if the number of errors in $v(x)$ does not exceed t and if they are concentrated in m consecutive positions, then they are caught in the syndromic register.

If during successive testing of shifts we get the weight of the syndrome $\leq t$, then we find the places of errors in the shifted message, which means that by giving the reverse shift, we correct the errors in the message.

If, for all successive shifts, we never get weights in the syndrome message register $\leq t$, then this means that either there are more than t errors, or they do not form a packet with length $\leq t$.

3. CONCLUSION AND SOLUTIONS

In today's Internet environment, there are many potential dangers and risks. Therefore, data encryption is necessary to protect user information well. Almost all applications support the full range of encryption methods. However, many users still use the normal (non-encrypted) protocol, which is easy to leak information. Hopefully through this article you will understand more about encryption and encryption methods. For businesses, data encryption should only be a backup solution when data is stolen. The more important thing to do is to manage network security in the enterprise. This prevents hackers from getting data, especially sensitive data, from businesses. If the hacker cannot access the data, they have no chance to decrypt it. Then businesses only need to encrypt the sent information or important information. The linear decoding methods described above are based on knowledge of error syndromes with numbers not exceeding the capacity of the selected linear code. These methods are completely possible with modern computers.

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Modeling Covid-19 Deaths in Nigeria Using Exponential-Gamma Distribution



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ABSTRACT: This work examines the performance of Exponential-Gamma distribution and the existing Exponential and Gamma in relative to the distribution that will best fit the data on Covid-19 death in Nigeria from March 2020 to April 2021. The parameters of the distribution were estimated using the method of maximum likelihood estimates. The newly developed Exponential-Gamma distribution was compared with the existing Exponential and Gamma distributions using the log-likelihood function, Akaike information criterion (AIC), and Bayesian information criterion (BIC) as the criteria for selecting the best fit model. The results show that the newly developed Exponential-Gamma distribution performed better than the existing Exponential and Gamma distributions in contrast in terms of model fit, this showed that the newly developed Exponential-Gamma distribution is more flexible and precise in analyzing the Covid-19 data other than the existing Exponential and Gamma distributions.

KEYWORDS: Exponential-Gamma Distribution, Maximum likelihood Estimate, AIC, BIC, log-likelihood function, Covid19

I. INTRODUCTION

Statistical distributions are applicable majorly in describing real-world events. With respect to the suitability of these statistical distributions, their theory is largely studied and applied to many situations in real life. One of the many difficulties statisticians encounter when modelling natural life events is to be able to find an appropriate and efficient statistical distribution that will fit and model such events conveniently and more precisely. These statistical distributions posed substantial usefulness in modelling and analysing natural life phenomena that encompass uncertainty and riskiness.

Researchers in various fields of study have made use of probability distributions in modelling and analysing health data while numerous studies and research are constantly in progress while various attempts are being made to analyze and predict future trends of various diseases in refining plans for prevention and treatment of such disease occurrence. Below are brief literature reviews on the application of the statistical distribution on health data and other facets of life by different scholars such as Hisham et al (2021), Ayeni et al (2019) Ayeni et al(2020), Ayeni et al(2020), Hui et al (2011), Najm and Dhelal (2014) and Janus and Erik (2006). Therefore this study aimed to examine the performance of the newly developed Exponential-Gamma distribution by Ogunwale et al(2019) and the traditionally existing exponential and gamma distribution on Covid-19 data in Nigeria using the model selection criteria like the Akaike information criterion (AIC), Bayesian information criterion (BIC), and the log-likelihood function (l)

II. METHODS

The major concern of researchers in the modeling and analysis of health data is the interpretation of past health data regarding future probabilities of occurrences. Numerous probability distributions have been applied to various health data and have proved beneficial for health studies and surveys.

Analysis of most health data is largely determined by its distribution pattern. It has long been a recurrent topic of interest in the field of health in establishing a probability distribution that provides a suitable fit to most health data. In this study, we, therefore, aim to examine and fit the newly developed exponential-gamma distribution to Covid-19 death in Nigeria from March 2020 to April 2021. The method of maximum likelihood will be used to estimate their parameters, while the log-likelihood, Bayesian information criterion (BIC) and Akaike information criterion (AIC) goodness of fit test will be employed to determine their goodness of fit, and Python software would be used for data analysis.

The new Exponential-Gamma distribution was developed by Ogunwale *et al* (2019) and its pdf is defined as

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$$f(x; \alpha, \lambda) = \frac{\lambda^{\alpha+1} x^{\alpha-1} e^{-2\lambda x}}{\Gamma(\alpha)}, x, \lambda, \alpha > 0 \quad (1)$$

They defined its mean and variance as;

$$\mu = \frac{\alpha}{2^{\alpha+1}} \quad (2)$$

$$\text{and } V(x) = \frac{\alpha(\alpha 2^\alpha - \lambda \alpha + 2^\alpha)}{\lambda(2^{2(\alpha+1)})} \quad (3)$$

The cumulative distribution function is defined as

$$F(x) = \frac{\lambda \gamma(\alpha, x)}{2^\alpha \Gamma(\alpha)} \quad (4)$$

The survival function for the distribution defined by $S(x) = 1 - F(x)$ was obtained as;

$$S(x) = 1 - \frac{\lambda \gamma(\alpha, x)}{2^\alpha \Gamma(\alpha)} \quad (5)$$

While the corresponding hazard function defined by $h(x) = \frac{f(x)}{S(x)}$ was obtained as;

$$h(x) = \frac{\lambda^{\alpha+1} x^{\alpha-1} e^{-2\lambda x} 2^\alpha}{2^\alpha \Gamma(\alpha) - \lambda \gamma(\alpha, x)} \quad (6)$$

The cumulative hazard function for distribution is defined by

$$H(x) = W(F(x)) = -\log(1 - F(x)) \equiv \int_0^x h(x) dx \text{ and was obtained as;}$$

$$H(x) = \frac{\lambda \gamma(\alpha, x)}{2^\alpha \Gamma(\alpha) - \lambda \gamma(\alpha, x)} \quad (7)$$

A. Maximum Likelihood Estimator (MLE)

Let X_1, X_2, \dots, X_n be a random sample of size n drawn from a probability density function $f(x; \theta)$, the likelihood function is defined as;

$$f(x_1, x_2, \dots, x_n; \theta) = \prod_{i=1}^n f(x_i; \theta) \quad (8)$$

Now, we estimate the parameters of both the exponential-gamma distributions using maximum likelihood estimation as follows,

If X_1, X_2, \dots, X_n be a random sample of size n from Exponential-Gamma distribution. Then the likelihood function is given by;

$$L(\alpha, \lambda; x) = \left(\frac{\lambda^{\alpha+1}}{\Gamma(\alpha)} \right)^n \prod_{i=1}^n x_i^{\alpha-1} \exp\left(-2\lambda \sum_{i=1}^n x_i\right) \quad (9)$$

by taking the logarithm of (9), we find the log-likelihood function as;

$$\log(L) = \alpha n \log \lambda + n \log \lambda - n \log \Gamma(\alpha) + (\alpha - 1) \sum_{i=1}^n \log x_i - 2\lambda \sum_{i=1}^n x_i \quad (10)$$

Therefore, the MLE which maximizes (10) must satisfy the following normal equations;

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$$\frac{\partial \log L}{\partial \alpha} = n \log \lambda - \frac{n\Gamma'(\alpha)}{\Gamma(\alpha)} + \sum_{i=1}^n \log x_i \quad (11)$$

$$\frac{\partial \log L}{\partial \lambda} = \frac{\alpha n}{\lambda} + \frac{n}{\lambda} - 2 \sum_{i=1}^n x_i \quad (12)$$

The solution of the non-linear system of equations is obtained by differentiating (10) with respect to (α, λ) gives the maximum likelihood estimates of the model parameters. The estimates of the parameters can be obtained by solving (11) and (12) numerically as it cannot be done analytically. The numerical solution can also be obtained directly by using python software using the data sets.

III. RESULTS AND DISCUSSION

This work used secondary data collected based on the total monthly amount of deaths of covid-19 patients in Nigeria from the period of March 2020 to April 2021. The data was collected from the website of the Nigeria Disease Control (NDC).

The newly developed Exponential-Gamma distribution was applied to the data to determine its flexibility in modeling such data. The data were analyzed using the Python software package. The flexibility and the measures of goodness fit were determined by using selection criteria such as the Akaike information criterion (AIC), Bayesian information criterion (BIC), and the log-likelihood function (l). The probability distribution with the least Akaike information criterion (AIC), Bayesian information criterion (BIC), or the highest log-likelihood function (l) value will be considered the most flexible and best fit model, and the results are obtained as follows;

TABLE 1: SUMMARY OF THE DATA

STATISTIC	ESTIMATE
n	428
mean	275.0667
skewness	1.484541
kurtosis	2.249087

Interpretation

The results from table 1 above indicated that the distribution of the data is skewed to the right with skewness of 1.484541. Also, it was observed that the kurtosis is 2.249087 which is lesser than 3. This implies that the distribution of the data has a shorter and lighter tail with a light peakedness when compared to that of the Normal distribution.

TABLE 2: THE MAXIMUM LIKELIHOOD ESTIMATES FOR THE DISTRIBUTIONS

Distribution	Exponential-Gamma		Exponential	Gamma	
Parameters	Shape(α)	Scale(λ)	rate(λ)	Shape (α)	Scale(λ)
Values	1.830997	1.0064	1.31417	1.02403	148.5737
Standard Error	0.021411	0.02312	0.1756164	0.2343093	40.4559698

TABLE 3: THE LOG-LIKELIHOOD VALUE FOR THE DISTRIBUTIONS

Goodness of Fit	Exponential-Gamma	Exponential	Gamma
Log-Likelihood	-18.09301	-25.03405	-83.89466

Interpretation

The log-likelihood value for the data is presented in Table 3. It was observed that the Exponential-Gamma distribution provides a better fit as compared to the existing Exponential and Gamma distributions since it has the highest value of log-likelihood (l). Hence, the Exponential-Gamma distribution performed better than the existing Exponential and Gamma distribution.

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TABLE 4: THE AIC AND BIC VALUE FOR THE DISTRIBUTIONS

Goodness of Fit	Exponential-Gamma	Exponential	Gamma
AIC	52.3014	172.0681	151.7893
BIC	58.25578	178.70716	153.067

Interpretation

The AIC value for the data is presented in Table 4. It was observed that the Exponential-Gamma distribution provides a better fit as compared to the existing Exponential and Gamma distributions since it has a smaller value of AIC while the BIC value for the data also presented in Table 4 showed that the Exponential-Gamma distribution provides a better fit as compared to the existing Exponential and Gamma distributions since it has a smaller value of BIC. Hence, the Exponential-Gamma distribution performed better than the exiting Exponential and Gamma distributions.

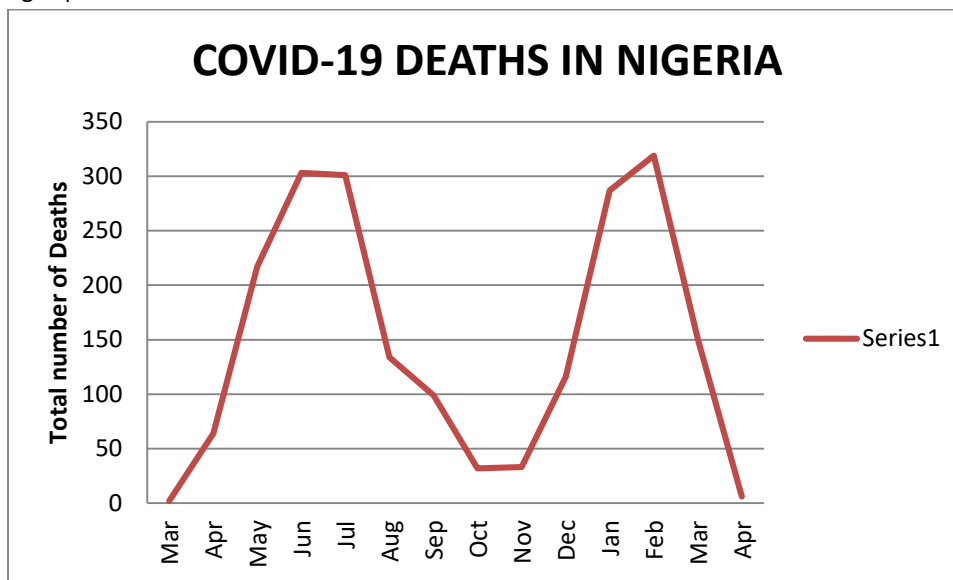


FIG 1: The Graph Showing the Total Number of Covid-19 Deaths

Figure 1 above shows the trend of Covid-19 from March 2020 to April 2021. It was observed from the graph that the virus rises to its peak between June and July 2020 but dropped to a lower rate from August to November 2020. The virus again from December 2020 to March 2021 experienced a higher rate while it flattens to the lowest in April 2021.

V. CONCLUSIONS

Having completed all the required analysis and tests, it becomes crucial to make the following inferences; The model with the lowest AIC and BIC value and also the model with the highest log-likelihood value respectively was selected; it was discovered that the newly developed Exponential-Gamma distribution is noticeably low and high in values in term of the AIC, BIC and log-likelihood values respectively. Thus, the quality of fit of the Exponential-Gamma distribution was confirmed without differentiating superiority. Equally, the appropriateness of the Exponential-Gamma distribution for life data analysis has been shown in advanced studies. Therefore, for flexibility and greater precision in analyzing Covid-19 death data, the use of Exponential-Gamma distribution is greatly suggested and also persistently useful in various fields where analysis of health data is essential.

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Unseen Pictures: Plight of the Parents of Learners with Special Educational Needs (LSEs) In Distance Learning



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ABSTRACT: This study utilized the phenomenological research design which aimed to understand the lived experiences of the parents of the learners with special educational needs in distance learning at Pulo National High School- Special Education (SPED) Center. The researcher utilized the framework of Moustakas (1994) which involves bracketing, horizontalization, theme clustering, textural description, structural description, and essence. With the in-depth analysis of the significant statements from the verbatim transcriptions, nine (9) themes emerged. The parents of learners with special educational needs in the implementation of distance learning experienced challenges that include, the pros and cons of distance learning, the need for professional teachers' intervention, implications on learners' behavior, competing demands of being a parent and a learning facilitator and learning loss and social gaps. To be able to cope with their experiences for having children with special needs in distance learning, parents must have strong parental involvement and family support system, positive mindset, emotional stability, and strong faith as well as teachers who possessed commitment and compassion. The findings implied that experiences in distance learning of the parents of the learners with educational needs were truly challenging which entails the difficulties and opportunities of distance learning, the need to have professional experts, social and behavioral implications of distance learning to their children, different roles they played in the education of their children and the trouble of thought of the development of the students. Given the challenges that parents experienced in distance learning, the chance of overcoming the struggles is possible through the help and support of the family members, and teachers, by being optimistic, strong, and by being faithful to God.

KEYWORDS: phenomenology, special education, learners, special educational needs, parents

INTRODUCTION

Distance learning is not a new concept; it has been utilized by universities in the country and in other parts of the world. With the global outbreak of the COVID-19 pandemic and school closures, educational institutions resorted to this type of learning in all year levels. It is the first time that the Philippine educational system has implemented distance learning for the security and safety of teachers, learners, and parents. Distance learning and blended learning are the most common learning modalities that are being implemented from the beginning of the school year 2020–2021 and up to this point. Distance learning, as defined in the Basic Education-Learning Continuity Plan (BE-LCP) refers to the learning delivery modality where learning takes place between the teacher and learners who are geographically remote from each other during instruction. Distance learning provides unique opportunities for diverse learners' access to high quality instruction across all grade levels through the help of digital technologies. Compared to face-to-face teaching, distance learning requires students to be highly motivated, focus-driven and disciplined (Herburger, 2021). Teachers in distance learning need to provide learning experiences that will keep the students engaged in the learning process and keep them from being distracted by external stimuli. In the last two years, numerous studies have examined the experiences of teachers, parents, and learners in learning delivery modalities amid the pandemic. Teachers' resilience was challenged by the pandemic. Among the challenges they experienced were related to establishing communication with parents and students and difficulty in monitoring and assessing learning. The pandemic brought out the strengths of the teachers in applying their 21st century skills, their capacity to collaborate, their commitment and competence, which are essential skills in the delivery of the lesson during pandemic (Jamon et al., 2021). The teachers turned challenges they experienced into opportunities to be better than before. Studies that considered the perspective of parents in distance learning showed the numerous challenges from the transition to a new mode of learning in the virtual setting were those of Agaton and

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Cueto (2021). The study cited numerous challenges for learners and parents, which included pedagogical, economic, social, and technological problems.

Parents of learners with special educational needs felt greater stress than parents whose children were normal. They were not only worried about the learning loss, but also about the established routine activities and social skills developed by their children during face-to-face classes. Another concern was that special education requires specialized training, which parents do not have idea about, and the need for individualized learning plans because each learner has different educational needs. Some identified challenges experienced by parents in homeschooling in times of pandemic were struggling to make things work, balancing in meeting the special needs of their children, work from home arrangement, household chores, insufficient support from school, lack of social interaction and unstructured normal routine that have behavioral implications and inability to adopt to the changes (Ludgate, Mears & Blackburn, 2021). Furthermore, several problems identified in the continuity of education for learners with special needs during the pandemic in the digital classroom were lack of access to computers and other electronic gadgets, internet connectivity, lack of coordination between and among teachers, students, and parents, and lack of cooperation (Yazcayir & Gurgur, 2020). However, limited research has been conducted on the experiences of parents, with a greater emphasis on teachers and students with disabilities.

The purpose of this study is to shed light on how COVID-19 challenged the delivery of education for parents of learners with special educational needs. This also aimed to present an in-depth understanding of the experiences, challenges, and aspirations of the parents of these learners in the distance learning amidst the pandemic. Hence, the researcher explored the challenges experienced by the parents and their coping mechanisms in dealing with the needs of their children in the distance learning amid the global pandemic.

METHODS

Research Design

This study utilized the phenomenological research design. The goal of the phenomenological design is to describe a "lived experience" of a phenomenon. Through this research design, this study allowed researcher to gain rich and in depth understanding of the lived experiences of the parents whose children have special educational needs in the distance learning.

Participants of the Study

The participants of the study were fifteen (15) parents of learners with special educational needs (LSEs) in the SPED Center of Pulo National High School whose children have been enrolled to distance learning. Purposive sampling was used to select participants who can share rich data on the phenomenon being studied. Participants were selected on the following inclusion criteria: (1) parents whose child/children was diagnosed by medical expert with disability; (2) parents whose child/children exposed to distance learning since 2020 up to present; (3) the age of the child/children range from 12-30 years old; and (4) the diagnosis is either of the following, autism spectrum disorder, intellectual disability, and emotional-behavioral disability.

The number of participants as cited by Creswell (2018) as cited by Natividad & Galicia (2021) suggesting that researchers need to interview five (5) to twenty-five (25) individuals who have all experienced the phenomena, which in this study centered on the parents of learners with special educational needs. Specifically, there were fourteen (14) parents who were females and one (1) parent who was male. There were three (3) parents whose age ranged from thirty-five to forty (35-40); two (2) aged from forty-one to forty-five; five (5) aged were between forty-six to fifty (46-50); four (4) from fifty-one to fifty-five and one (1) from fifty-six to sixty (56-60). For the number of children with special needs; thirteen (13) parents have one (1) child and two (2) parents have two (2) children; For the diagnosis, nine (9) learners were diagnosed with autism spectrum disorder (ASD); three (3) have Intellectual Disability (ID); two (2) with Down Syndrome and one (1) with Attention Deficit Hyperactive Disorder (ADHD).

Data Analysis

The process of data analysis followed the methods of Moustakas' (1994) as cited by Creswell (2018) since it was systematic in terms of the data analysis, procedures, and guidelines for assembling the textural and structural descriptions. Similar processes occurred in other types of qualitative research. The researcher followed the steps of transcendental phenomenology which includes identifying the phenomenon to study, setting aside her experiences, and collecting data from fifteen LSEs' parents who experienced the phenomenon. Furthermore, analyzing the data by reducing the information into significant statements or quotes and then combining them into themes were performed. Next, a textural description of the experiences (what the participants experienced) and a structural description of their experiences (how they experienced it in terms of the conditions, situations, or context) were developed. Finally, the textural and structural descriptions were combined which conveyed the

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overall essence of the participants' experiences of being parents of the learners with special educational needs in the distance learning. Providing the essence of the lived experience is the overall aim of transcendental phenomenology (Creswell, 2018).

To establish research rigor, verification, validation, and validity were applied (Meadows & Morse, 2001). The researcher achieved verification through in-depth literature readings, sticking to the phenomenological method of inquiry, suspending past experiences, keeping research notes and journals, utilizing a sufficient sample of participants (Polkinghorne, 1989 as cited by Creswell, 2018), and conducting multiple interviews, as well as clarifying the responses of the participants, until data were refined. Validation was reached through multiple data collection (observation, casual interview, in-depth interviews), and data analysis utilizing Moustakas' approach. To attain validity, the researcher presented the findings of the study to competent researchers (qualitative analyst) for external review to establish trustworthiness of the research work.

RESULTS AND DISCUSSION

This qualitative-phenomenological study investigated parents of learners with special educational needs terms of their (1) experiences and (2) coping mechanisms in dealing with the challenges and issues of distance learning.

1. What are the lived experiences in distance learning of the parents of learners with special educational needs?

Theme 1: Challenges to the Parents of Learners with Special Educational Needs. As revealed by the participants, this new normal-distance learning in education is hard for them, because of their children's special needs. Most of them agreed that teaching was hard because their children don't have definite time to study, it depends on their mood. They cannot be forced to study that is why they need to be conditioned first. They don't listen to their parents and cannot focus on their studies. They needed constant assistance and guidance. This was evident on the following responses:

Everything is hard in distance learning. I find it hard to teach him. I told his teacher that distance learning is not only hard for them but also to us parents. Distance learning is not only their battle, but also ours. It is challenging for us parents to make them follow our instructions. They like their teachers. I will tell him, "Let's study". He would reply, "I don't like, I want teacher. You're not a teacher, you are mommy" (P4).

Aside from the above-mentioned aspects of distance learning that is hard for the parents, some have issues in terms of internet connectivity and use of technology as evident in these responses:

Technology is challenging for older person like me. You need patience to be able to teach it to him, and yet you, yourself is having a hard time learning it (P3).

Another challenge is the internet connectivity. There were times that we have slow connection and was not able to join the online classes (P 4).

The responses of the participants in terms of technical aspects of distance learning were also experienced by the parents in the study of Magsambol (2020), Jaga (2020), Bordeos (2021) and Parmigiani et al. (2021). The studies cited that one of the problems in the implementation of distance learning was the access of technology and connectivity. Sedia (2020) accounted that the problem of SPED parents goes beyond the weak internet connection but on the sacrifices, they must make for their kids to not left behind.

Theme 2: The Pros and Cons of Distance Learning. This theme refers to the advantages and disadvantages of the implementation of distance learning as experienced by the parents of the learners with educational needs. During this time that threat in health is prevalent, parents agreed to the implementation of distance learning. Most of them cited that the health and safety of their children are more important than anything else. Aside from that, another advantage of distance learning is that it is less expensive because students do not need to go to school to attend classes. The following responses strengthen that claim:

One of the advantages, less expenses and time. Before I used to spend the same time as him in the school. I left my household chores because I was with him in the school. In the distance learning, it is less expensive (P2).

The good thing about distance learning is that I can monitor him because he's at home. I'm not worried about his whereabouts or if he's pinching other kid in school. That is the advantage and less expenses (P3).

Distance learning safeguards the right to education of the learners with special needs. However, the downfall of distance learning includes loss of interest in studies, manifested laziness in doing the activities in the modules, and distraction at home and lack of focus. These learners learned differently from the regular learners that SPED teachers knew that probably the parents didn't. The following responses were shared by the participants:

My daughter does not have interest (P2).

One of the disadvantages is that I cannot teach the way he should be learn. I am not teaching him the right way. Another thing is time, he is not focus and cannot learn (3)

Sometimes she did not want to answer the modules, she's lazy. In the online class, she's not focus and can't seem to understand what teacher is saying (6).

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Above findings about the disadvantages of distance learning were similar to the finding of Jaga (2020) and Averett (2021) wherein difficulty in the understanding of materials, feeling lazy and distracted were cited as the cons. Davis (2021), Sadeghi (2019), Shade (2020) and Bhamani, et al (2020) explored the advantage of distance learning. However, in the study of Sadeghi (2019) the pros outweigh the cons in the implementation of distance learning. Some of the mentioned advantages, safety of these children, they were not at-risk of contracting the virus, not commuting, and being flexible in terms of time and place to study.

Theme 3: Need for Professional Teachers' Intervention. Special Education Teachers have specialized training specifically to handle learners with physical, mental, emotional, and other learning disabilities. They developed individual plans suited to the educational needs of the special learners. SPED teachers adapted their teaching styles with the strengths and weaknesses of the learners for a greater chance to succeed in school. Even regular teachers need training before they handle SPED classes. That's the battle cry of the participants. They may have known the behavior of their children, but the approaches and pedagogies seemed hard for them knowing that majority of the parents are high school graduates. Nevertheless, they have tried their best to assist and guide their children. The following participants responses on the need of having a SPED teacher:

The limitation is that we cannot apply the curriculum that DepED or teachers wants to implement. Even if I reached college level, I did not study how to handle special children, unlike the teachers who had education and professional training to do so. In terms of education, the teachers have the sole authority to educate them (P7).

Distance learning is hard for my son who has special needs. First, I'm not a SPED teacher, I have no idea how to teach (P12).

Everything is hard, teaching him is hard because I don't know what I'm going to teach. It is also hard to teach him. Unlike before, teachers are the one teaching. Now I appreciate their work as a teacher (P14).

With these responses about the need to have a professional teacher, Mongelli (2020) expressed that virtual learning is not for learners with special needs because the parents can't fill in the role of the professionals. To provide support to the parents, it may take it into consideration the recommendation in the study of Paco, et al (2021) to train parents and community. Parents being parents know the behavior of their children but does not the capacity to deliver teaching since they were not trained properly. They lack knowledge and training on how to assist their children (Garbe et al, 2020 and Thwala et al, 2015)). Assessment should be done as basis on the refresher training to properly implement distance learning (Alipasa et al., 2021) This can be done since implementation of limited face to face to SPED learners is not yet considered.

Theme 4: Implications on Learners' Behavior. This theme refers to the noticeable changes in the behavior of the learners with special educational needs as observed by their parents. They compared the behavior that learners manifested before pandemic up to these days. Noticeable changes in their behavior includes having frequent tantrums that brought about by not able to go out of the house, other changes the participants noticed being stubborn and not listening to them. According to them, they may have tantrums in school but when the teacher talks to them, they stopped. This was affirmed by the participants.

He has no routine at home and has nothing to do. That is why he's bored and has the tendency to have tantrums and meltdown (P3).

There were times that I want to give up because he did not want to study. He's throwing tantrums on us; he does not want to attend online class, or he crumpled his module. It is really hard to handle him (P4).

Other noticeable changes which were brought about by the distance learning are the frequent use of gadgets and increased in their screen time. Even after their online classes, they still used it. These participants expressed it:

His frequent use of gadgets (P15).

Her use of gadget becomes frequent. Maybe because she has nothing to do. She's looking for someone to talk to (P9).

Disadvantage includes, since he's at home he spends more time on his cellphone (P13).

Misirli and Ergulec (2021) also expressed that the increased in the learners' screen time in the use of gadgets, watching TV and using computers got parents worried in the distance learning. However, acquiring skills like turning on and off, saving files, using the internet and other digital skills have been beneficial. With regards to behavioral changes, Kim (2020) "74 % of the parents surveyed reported regressive behaviors while learning from home". Pachner and Aranyi (2021) also mentioned that parents having difficulty in adjusting to distance learning because the children manifested behavioral problems. Bhamani et al. (2020) concerned about the discipline learned by the students disintegrated in the distance learning that can be attributed to the behavioral changes that these learners manifested that parent noticed.

Theme 5: Competing Demand of Being a Parent and a Learning facilitator. As parent, you provide for the basic needs of your children. You provide them food, shelter, clothes, and education. With the outbreak of pandemic and the implementation of distance learning, added to the list of roles being placed to the parents is being a learning facilitator. With the closure of the schools and home schooling prevailed, the success of the learner's education lies in the hands of the parents who will serve as

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learning facilitators. At first, there is a power struggle between the child and the parent because learners with special needs requires conditioning and adaptation to the new set up. The following responses of the participants validated the power struggles they experienced at the beginning of distance learning:

At first, his only authority and only acknowledged the teacher. He's not listening to us, not following (P 4).

She's not following my instructions because she's used to a real teacher. At first it was hard, until she gets used to it (P10).

In quest of the parents to perform their roles as parent and learning facilitator, stress, frustration, sadness, and disappointment are some of the emotions they experienced. Some of the participants expressed this:

It is frustrating and sometimes you ask yourself where you fail as a mother. But you cannot blame yourself because you cannot divide your body. You cannot focus on him because you still have other children, other things to do (P3).

When you're at home, you are a mother and a teacher. It is hard on the part of the parents. It is stressful. You are already stress at home, stress as a teacher. You will going to teach your child who has tantrums, it is hard. I cannot teach him the same way the teacher taught him especially when it comes to technology (P3).

Parents who have children with special needs experienced emotional stress because taking care of them requires and demands time. Learners with special educational needs have short attention span and easily get bored. For parents, playing different roles for their children in the distance learning caused stress (Thwala et al., 2015; Whitley, 2020; Savoie and Dickson, 2020; Nelson, 2020; Garbe et al., 2020; O' Hagan & Kingdom, 2020) frustrations (Mongelli ,2020 & Nadworny 2020) and disappointments. They were stressed during pandemic because they need to balance work, being parents, full time caregivers and teachers to their children with special needs. The good part is, they were able to spend more time together and bond. For the learners to be conditioned and to continue studying, intrinsic and extrinsic motivation should be developed and given.

Theme 6: Learning Loss and Social Gaps. This theme explained the downside of the distance learning as experienced and observed by the parents of the learners with special needs. For the past two years that distance learning has been implemented, some of the learned behaviors, knowledge, and skills that they have learned in school had been disintegrated. Some of the basic skills like reading, writing, and counting seemed to be forgotten by the learners, The routine established was gone and social skills weakened.

She forgot how to count from 1-100 which she used to know when she was still in school (P1).

Actual and hands on activities like arts and crafts to develop their motor skills. Or the cooking that was used to be taught to them in SPED Center (Pt 3).

Aside from the motor skills, social skills are one of the most important skills that learners with special needs should developed to be able to become independent. However, because they were not able to interact with their classmates personally, it became disintegrated. The responses of the participants validated this:

The limitations of distance learning are having no social interaction with classmates, no school activities that they are used to have. No therapy sessions and unable to go out. I have to condition her before she will do the activities in the module (P6).

There's no socialization. The established routine disintegrates. Her routine was waking up early, preparation to go to school. Her study time was gone, she will study when she's in the mood (P11).

Quality education can be measured by the learning loss experienced in the distance learning. Learning loss means that learners' academic ability and skills that were taught during face-to-face classes were loss. Learning loss was also experienced when the knowledge and skills that should be shared to the learners can no longer happen due limitations of distance learning (Safira & Ifadah,2021). Evidently from the responses of the participants, learning loss occurred and some of the functional skills (life skills, social skills and community-based skills) were not taught effectively under the distance learning (Padillo et al, 2021).

2. How do participants cope with the issues and challenges of having children with special educational needs in distance learning?

Theme 7: Strong Parental Involvement and Family Support System. The theme refers to the active participation and commitment of parents when it comes to the schooling of his/her children. It is said that the amount of parental involvement determines the achievement of the students. Family support on the other hand refers to the assistance provided by immediate family for the achievement set for the child/children. Family plays an important role in the success of the implementation of distance learning. Parents and other family members assist the child with specials needs in their studies as expressed by the participants:

My time is divided to earn a living and at the same time focus on the needs of my special child. When you tell him to write, he won't do it right away. I should be in his side. I spend a lot of time in my child with special need (P 4).

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With regards to technology, I ask for help with my other children. I left him with his siblings. They are the one helping him in his studies when I am not around (P3).

Learners with special needs must have the family's full support and attention. To be successful in their studies in this time of pandemic, parent's reinforcement, and guidance are needed and should be strengthened (Diana et al, 2021, Burdette & Greer, 2014, Young & Donovan, 2020). Increased in the time spend with family and strengthen family bonding were some of the good things which came out of distance learning (Bhamani et al., 2020).

Theme 8: Positive Mindset, Emotional Stability and Strong Faith. This theme represents the coping mechanism of the parents in dealing with the hardship they have experienced in distance learning. They kept a positive mind; they were hopeful that pandemic will be over soon, and things will be back to normal. Their children will be able to enjoy the joy of having a teacher. Some of them even mentioned their aspirations and dreams for their children. They will be supporting their children's education even if they must study all throughout their lives. They also showed strong personality and faith in God which indicates that no matter how hard the situation may be, they will be strong, and they will keep on fighting for the future of their children. The following responses showed their strong faith to God:

It may seem hopeless, but I am still hopeful, I have God to hold on to. I will not lose hope for my child (P2).

Sometimes, I think about her future when we're gone. I pray that God will give me long life to be with her. Our situation is hard, but it is even harder to other parents. I feel that I am still blessed (P2).

I just pray and hold on to my faith. I have to be strong until they finish their studies (P5).

Parents showed positive mindset and resiliency in managing the challenges brought by pandemic in the education of their children. They may have experienced hardship, but they were able to bounce back. The theoretical framework, Resiliency Theory best described this theme (Li,2021 & Moore, 2021). Being optimistic is one good thing that emerged out of the experience of the parents despite the challenges they faced in distance learning (Alipasa et al., 2021 & Moran & Kulkarni, 2018).

Theme 9: Teachers' Commitment and Compassion. There must have been role shift in the pandemic wherein the parents were the one teaching their children at home. This cannot be done without the help, guidance, and support of the SPED teachers. Participants recognized and acknowledged the commitment and compassion of the teachers as their education partners in this pandemic. They appreciated the time spend by the teachers in communicating with them, in delivering the learning materials and just being there when they need them. This was expressed by the participants.

When it comes to modules, sir delivered it to us (P 1).

During their online class, the teachers discussed what they need to do. (P 1).

Through constant encouragement...continuously assisting and guiding us.. They are always there for us (P10).

SPED teachers were challenged by the implementation of distance learning. Nevertheless, these challenges in distance learning have turned into opportunities. They were given opportunities to work with the parents in delivering education while at home. Most important among the opportunities is the connection established by the teachers with the parents. (Glessner et al, 2020 & Torquero, 2021). Averett (2021) emphasized that among the positive experiences of the parents was the teacher going an extra mile for their students.

Essence. The outbreak of pandemic changed the course of our lives. One of the predominant changes was felt in the system of education. Paradigm shift in education was mostly experienced by the parents. It was evident in the shared collective accounts of the selected parents of the learners with special needs in the Pulo National High School-SPED Center. In the news, we often heard the voices of the parents having a hard time in the distance learning. More struggles were uncovered like difficulties with motivating their children to be engaged in distance learning, struggling in balancing their responsibilities, providing the needs of their special children, implications of distance learning to social and behavior of the learners and the needs of the children were not addressed. The unseen pictures of the experiences the parents whose children have special needs brought clear pictures of their real life behind those smiles and accommodating faces. The "unseen pictures" just like a camera film when developed was the coping mechanisms of the parents in dealing with the challenges brought about by the distance learning amidst pandemic. They may experience hardship, but they can win the battle by being optimistic, by showing that they can surpass anything for the hopes and dreams they have for their children, the small accomplishment for us parents with regular learners but big triumphs for them, their leap of faith, the support of family members and the teachers' passion and compassion to bring quality education. These what keep the parents going, moving, and fighting for the future of their children. What struck to the researcher was the unconditional love and understanding of these parents for their children. Raising them was difficult enough, what's make it harder is to think about their children's future, what lies ahead of them, what future holds for them. For the parents, education is the answer. No matter how hard distance education is for both, education will continue.

CONCLUSION

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The parents of learners with special educational needs in the implementation of distance learning experience challenges that include, the pros and cons of distance learning, the need for professional teachers' intervention, implications on learners' behavior, competing demands of being a parent and a learning facilitator and learning loss and social gaps. To be able to cope with their experiences for having children with special needs in distance learning, parents must have strong parental involvement and family support system, positive mindset, emotional stability, and strong faith as well as teachers who possessed commitment and compassion. The findings implied that experiences in distance learning of the parents of the learners with educational needs were truly challenging which entails the difficulties and opportunities of distance learning, the need to have professional experts, social and behavioral implications of distance learning to their children, different roles they played in the education of their children and the trouble of thought of the development of the students. Given the challenges that parents experienced in distance learning, the chance of overcoming the struggles is possible through the help and support of the family members, and teachers, by being optimistic, strong, and by having a faith to God.

RECOMMENDATIONS

Considering the findings and conclusion of this study, the researcher elicited the following recommendations for expected actions and future direction. Parents of learners with special educational needs should not focus on the negative side of distance learning. They should bear in mind that it is for the safety of their children that is considered one of the vulnerable groups in virus. Also, parents who observed behavioral changes in their children should examine the possible causes of that behavior. They should examine their parental practices that may be contribute to those changes. Seeking professional assistance is recommended if they cannot handle anymore the observed behavioral changes of their children. For the SPED Center, they should conduct training and seminars for the parents to help them on how to deal with the challenges their experiences. They should capacitate the parents since they are their educational partners. Topics of the training/seminars may include Parenting Children with Special Needs and Disabilities in the New Normal, Behavioral Management of Children with Special Needs, Bridging the Learning Gaps and Loss of the Learners in the Distance Learning and other related topics. SPED Center should conduct individual assessments on the special needs of the learners and provide feedback to the parents. The conduct of quarterly one on one meeting with the parents should be done to appease their minds that their children are improving even the changes may appear unnoticeable. SPED Center should solicit the help of the Local Government Unit (LGU) on the possible partnership for the employment and other opportunities for the LSEs. For the SPED Coordinator and its School Parent Teacher Association (SPTA) President and officers should initiate the creation of support group for all the parents. By doing this, they can have an avenue where they can share their experiences and will feel that they are not alone in this battle. SPED teachers on the other hand, should conduct frequent online classes to condition the LSEs in preparation for the possibility of opening of the SPED Center for face-to-face classes since they require conditioning and have problem with adaptation. Also, they should prepare individualized learning plan specific to address the educational needs of the learners. SPED Teachers may initiate activities involving family members to strengthen their bond and ties. Activities like "SPEDlympics", SPED Family Day, Family Talent Shows, Familialympics and others that can be done virtually or face to face depends on the AITF guidelines. The Department of Education (DepEd) should allot more budget for the other services (speech-language services, psychological services, occupational and physical therapy and others) that these LSEs should be receiving. DepEd should hire more SPED teachers and experts like speech therapists and occupational therapists for the improvement of the services they provided. Lastly, Future researchers should conduct another study to further explore challenging life experiences of the parents utilizing other research methods or variables.

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The Role of the Virtual Facilitator's Supervisory Style on Virtual Internship Learning: A Phenomenological Inquiry



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ABSTRACT: The aim of this study is to assess the influence of virtual facilitators' supervisory styles in the virtual intern contingencies, environmental contingencies, and the intern's motivation, satisfaction and learning, particularly in the hospitality management program. In this phenomenological study, twenty students who completed their internship remotely and met with their supervisor once a week for synchronous sessions, as well as five virtual internship facilitators who all had a lot of experience with interns but none had ever had to supervise interns remotely, were interviewed one-on-one via the digital platform Zoom. The recordings were then transcribed and analyzed. The key findings of the study agreed well with literature as to how virtual internships benefit student interns (Aarons, 2019; Seyitolu & Yirik, 2015). The experience allowed learners to achieve work experience while developing basic and specific skills. Even though study's findings are restricted in their comprehensiveness given the small sample size, they did reveal some insights into virtual internships and their significance to stakeholders.

KEYWORDS: *virtual internship, supervisory style, leadership style, hospitality management, phenomenological inquiry, qualitative research*

I. INTRODUCTION

A virtual internship is a type of differentiated instruction that uses technology to integrate the application of knowledge concepts gained in educational settings into practical experience. In agreement with Cornelius, S. et al. (2008), this rise of virtual internships implies that in some specialties and businesses where remote working is common, a virtual internship might be a suitable option to an actual internship. As stated by Koopman, K. et al. (2021), the pandemic has a substantial influence on internship implementation due to a drop in the number of internship placements provided by industries. Companies might even convert their offices to a virtual business environment. According to Briant, S. & Crowther, P. (2020) and Teng, C. et al. (2021), success necessitates higher learning institutions adopting required reforms and giving virtual internships greater attention. Notwithstanding this acknowledgement, several higher education institutions are still hesitant to implement virtual internships leading to uncertainty about the supervision processes that take place. Congruent with the findings of Stirling, C. et al. (2017), among the most significant issues for internship programs is to ensure that they are beneficial for students. While Moore, D. (2017), stated that many individuals believe that almost all experiences are useful, however it is not necessarily true. The media has documented multiple incidents wherein the students were victimized either unpaid job experiences or participation in irrelevant duties. Internship programs must provide high-quality learning programs for participants to take advantage of the benefits of enrolling in internships. Meanwhile, the findings from the study of Shariff, N. & Abidin, A. (2022), confirmed that the most pressing challenges in tourism and hospitality education during the pandemic, aside from pedagogical practices delivery, is the effects on internships.

Internship programs in the hospitality and tourism industries are vital in developing students' working skills, which are required for employability. Bayerlein, L. & Jeske, D. (2018), reported that this skill-based student learning enables the trainee in combining theory with real-world experience in the industry. Additionally, through monitoring, engagement, and delivery of hospitality role-related duties, students can acquire the characteristics and values of industry experts as interns. Thus, according to Baltescu, C. (2016), students don't really recognize the kinds of job or work realities with in hospitality industry. While McKnight, K. (2013) discovered gaps among students' experiential learning with academic learning, and Singh, A. and Dutta, K. (2010) confirm the gap,

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indicating that both training and supervisory engagement are crucial to achieving a favorable experience for the student. Baltescu, C. (2016) discovered a number of particular flaws mentioned by dissatisfied students, including unpredictable experiences, the monotony of acquired knowledge, assignments that are excessively demanding and stressful, and interns who are regarded as workers although without compensation or privileges. Studies of Singh, A. and Dutta, K. (2010), Lee, C. et al. (2015), McKnight, K. (2013), and Malik, M. (2015) that examine at interns' unfavorable evaluations of their internship training confirmed these findings. While there could still be several difficulties for trainees in a remote workplace, Jena, A. et al. (2020) concluded that this experiences contribute in the development of competence, assertiveness, expertise, and communication skills.

In the study of Jena, A. et al. (2020), being asked what the most difficult aspect of a virtual internship is, it suggested the majority of students felt that there is a lack of socializing and networking possibilities, as well as a lack of guidance from supervisors. Indeed, the literature has a plethora of data concerning the use and progression of internship programs; unfortunately, according to Sawyer, K. (2017), it falls short of demonstrating what the critical elements of an effective virtual internship experience consist as well as how supervisors play a huge part in this experience. In essence, the aim of this study is to assess the influence of virtual facilitators' supervisory styles in the virtual intern contingencies, environmental contingencies, and the intern's motivation, satisfaction and learning, particularly in the hospitality management program.

Research Questions:

1. What supervisory style is prevalent during virtual internship?
2. How does the supervisory style affect the interns' skill and experience?
3. How does the supervisory style affect the task structure and teamwork?
4. How does the supervisory style affect the interns' motivation, satisfaction and learning?
5. How would you describe an effective virtual internship facilitator in terms of supervisory style?

II. LITERATURE REVIEW

The focus of this study is to find out how the supervisory style of the virtual facilitators affects virtual internship learning in the Hospitality Management Program. In this section, similar research focusing on student virtual internship program, importance of virtual internship in work-readiness of students, internship facilitator's supervisory styles, and leadership practices that might help with supervisory procedures are discussed. The framework used was adopted from the study of Adadi, E. (2018). The survey questions were created using the adopted framework as a reference. The hypotheses were presented following the framework to illustrate how supervisory styles influence the learning that occurs as a result of participating in a virtual internship particularly in the hospitality management program. These aspects are fully examined throughout the chapter with the aid of associated literature, since they will be the foundation for achieving the study's objectives.

Student Virtual Internship Program

Internships are seen as a means for students to get experience in the hospitality industry. It gives several possibilities for a student to develop under the supervision of qualified experts. Such assistance tried to clear gaps within academic and industry requirements, that most beginners lack. This even allows the interns to become accustomed with the company's workplace culture, and that it qualifies him as a possible new worker. Besides that, this offers an interactive environment for socializing, that may be quite beneficial for interns who can benefit much from the guidance of their supervisors.

Internships are usually dependent on placement. In order to participate, students must be situated near an approved internship location or connect with the internship coordinator to identify a suitable internship venue close to their home. Students in remote areas are left with a slew of insufficient options: move transiently close to an endorsed internship venue, commute long distances to and from the internship venue, spend significant time and effort finding an appropriate internship closer to their homes, or voluntarily give up their desire to participate in an internship program entirely (Franks & Oliver, 2011). Students gain from traditional internship programs by strengthening their classroom knowledge, developing overall self-confidence (Callanan & Benzing, 2004), and establishing professional relationships (Mayernik et al., 2015). Traditional internship experiences, on the other hand, come with their own set of problems, such as the points outlined previously. Virtual internships provide similar benefits like traditional internships, but they also alleviate necessity relocation or needless traveling thus allowing the student to acquire experience working in a virtual setting. Virtual internships, in fact, bring significant value to both traditional and distant education (Jeske & Axtell, 2014).

The virtual workplace became a possibility, thanks to technological advancements such as increased internet connections as well as economical portable gadgets. Virtual internships according to Jeske, D. & Axtell, C. (2014), are one-of-a-kind transitory and brief training opportunities that include technology. In order to foster meaningful learning experience, supervisory participation and dedication to the interns are essential. Similarly, the program's efficacy is determined by the specialized usage technology to

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communicate, evaluate, and motivate interns. Virtual internships necessitate the use of specific leadership theories to assist supervisors in adhering with their interns. The theoretical lenses of path-goal leadership theory are used to study on the effectiveness of supervisors including their monitoring system in training interns (Adadi, 2018).

Internship Learning Outcome and Assessment

According to Nyanjo, J. m et al. (2020), while granting academic credit to internships, higher education institutions have been interested in assessing the learning outcomes received from the internship experience. It has also posed a significant issue to academics and industry in creating and developing competency-based delivery and evaluation methodologies which are relevant to the industry. This concentrate on learning objectives and their objective evaluation is necessary for creating meaningful linkages between academics and industry, as this relationship relies on precise recognition and alignment of skills to the demand of the hospitality industry. Experiential education, according to Eyer, J. (2009), could also help students to develop academic skills and scholarly objectives frequently associated to liberal educational performance including rational thought and utilization of ideas, participating in life - long learning, as well as a deep insight of specific topic, in addition to enhancing interpersonal skills, work ethic, and also practical experience. Pittenger, K. (2018) also said that employer evaluations have been used to measure students' interpersonal, leadership, and collaboration abilities, as well as their application of industry knowledge, integrity, logical, and technical skills. Internship program performance has already been evaluated in a number of ways. The most prevalent approaches are evaluation surveys by internship trainees and internship supervisors (Kurthakoti & Good, 2019). While according to Pittenger, J. (2018), verbal communication skills, daily journals and otherwise progress report, students' intern portfolios, and internship supervisor's evaluation of students' area subject knowledge, abilities, and behaviors are some additional particular instruments being used evaluate internship learning outcomes. Many researchers has addressed the need of evaluation in making internships academically valuable (Zopiatis & Constanti, 2012). The purposeful design of the process of evaluation, according to Ash, S.& Clayton, P. (2009), is essential in creating overall targeted learning goals and incorporating evaluation further into process of evaluation. The internship program for an industry is not just developed and produced by academic institutions. The academic institution and partner industries must collaborate to create an internship plan to make sure student learning outcomes are academically inclined and fitted to the industry demands (Anderson & Sanga, 2019).

Supervisory Style in the Hospitality Industry

Leadership is described as the skill of persuading, leading, and encouraging subordinates to perform their tasks cheerfully and competently in order to achieve the organization's goals. As stated by Karunathilake, L. (2016), leadership is defined as a person's capacity to persuade others to help a team meet its goals. Leaders inspire and motivate subordinates to put forth more effort in order to achieve desired outputs as part of a process. Leadership is viewed as persuading others to behave in line with one's aim or a common objective, either explicitly or implicitly, through authority or individual factors (Hillier, 2005). As cited by Kouzes & Posner (2002), both supervisor as well as the subordinate both have an amount of control under leadership theories. It is a commanding leadership approach where the manager is in charge. The technique grows more empowering as the intern grows increasingly compelling, providing the intern greater control (Clark, Hartline & Jones, 2009). Leadership is pivotal to the survival of the hospitality industry. One of most significant problem that supervisors encounter is motivating individuals to achieve organizational goal. Supervisors must have the skills and attributes of leadership and management in needed to motivate and engage their subordinates (Karunathilake 2016). The functions of leaders and managers were well defined by Woods, R. & King, J. (2010). Managers place a greater emphasis on managing personnel, establishing rules, and maintaining stability, whereas leaders place a greater emphasis on establishing visions and driving individuals toward realizing them. Leaders assist followers to connect their own needs with the organization's goals by providing guidance and support. Leaders must guarantee that both subordinates' motivations and the company's goals are met.

Autocratic, democratic, and laissez-faire leadership styles can be defined based on the authority and behavior of the leaders. More particularly, according to Kavanaugh, R.R., & Ninemeier J.D. (2001), autocratic (dictatorial or directive) style of leadership entails leaders holding high level of organizational power and decision-making authority in their hands without delegating it to their subordinates, whereas democratic (participative) style of leadership entails leaders having to share their employees' decision-making responsibility, and lastly laissez-faire or free-rein style of leadership entails leaders giving their employees a great deal of decision-making authority. Different style of leadership may well be implemented by leaders based on the expectations of their subordinates' style liking, and thus the impact of style of leadership may differ depending on what type of authority that a leader exercises control over his or her subordinates, making the leader's authority pivotal role for attaining organizational objectives.

According to Northouse, P.G. (2010) and Bass, B. (2008), transactional leadership is a classic leadership style that focuses on the leader-follower interaction in order to achieve company goals and maintain employee dynamic stability. The interaction

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suggests that leaders would compensate subordinates for great results or penalize them for poor performance. This leadership style, as affirmed by Thompson, G. et al. (2021), highlights the need of leaders supervising subordinates, discovering inefficiencies, and taking proper action to resolve issues. While according to (Sadeghi & Pihie, 2012), these interactions enable leaders to meet their performance targets, accomplish necessary duties, keep the existing communication plan, inspire subordinates through legal arrangements, clear subordinates' behavior toward the accomplishment of set targets, exemplify reward schemes, eliminate unwanted threats, and concentrate on developing competitiveness. As a result, transactional leadership empowers subordinates to pursue their own goals, eliminate workplace stress, and focus on distinct organizational goals including better productivity, customer care, reduction in costs, and enhanced output. Today, scholars are investigating into transactional leadership as part of a larger spectrum of leadership models (Bass & Riggio, 2006) and transactional leadership has been criticized by certain scholars. It has been criticized for taking a universal, one-size-fits-all framework for effective theory development that ignores contextual and situational aspects that affect organizational difficulties (Yukl & Mahsud, 2010). Transactional and transformative characteristics are frequently included in evident proof for transactional leadership (Gundersen et al., 2012). The connection between transactional leadership and team innovativeness was investigated by Liu, J. et al. (2011). The researchers looked at the mediating variables influence of occupational stress as well as the impact of performance as measured as a moderating mechanism. With the provision of occupational stress and team productivity as necessary elements in the established relationship between transactional leadership and organizational uniqueness, the researchers hoped to add towards the area of leadership by filling a gap in the literature. Transactional leadership and teamwork, according to some researchers, have a considerable negative association. Transactional leadership, according to other researchers, might improve team collaboration in various circumstances (Betz, 2021).

Intellectual stimulation, inspiring motivation, mental stimulation, and idealized influence are the four major components of transformational leadership (Bass, 2008). As expressed by Bigharaz, B. et al. (2010), leaders with idealized influence can serve as powerful role models for their subordinates. The subordinates admire, respect, and trust their leaders. It promotes ethical, moral, and spiritual behavior at a high degree. Inspirational motivation suggests that leaders must be able to contribute positively above their ideals. It entails encouraging subordinates to complete tasks and instilling passions in them. It also demonstrates a leader's capacity to promote subordinates' reason, intellect, and problem-solving abilities (Bass, 2008). Leaders create opportunities for learning and foster a positive environment (Bass & Riggio, 2006). The four factors mentioned previously work together to produce leaders' transformative personalities. Despite strong scientific evidence, transformational leadership theory is subject to a variety of challenges. The style of transformational leaders is focused on involving subordinates in organizational goals and encouraging them to succeed above and beyond expectations. Transformational leaders reward workers that go above and beyond to get greater job results.

Walls, E. (2019), explained that the interplay between task behavior, such that, offering guidance, instruction, and supervision, and interpersonal behavior like listening, encouragement, and respect may be defined as situational leadership. As claimed by Bass, B. 2008, situational leadership prioritized leadership practices that spanned a spectrum from task-oriented to relationship - based. Situational leadership likewise highlights the followers' level of maturity or preparedness as a factor or situation that leaders must consider in order to develop the perfect match between the leader and subordinate. This approach provides the advantages of a combination of techniques that take into account both social and environmental requirements. Within practical situations, this can promote students' experiential learning and fulfillment. Leaders that are able to adapt to issues in the workplace while also considering their subordinates learning requirements are attributed with enhancing skill, competitiveness, and engagement. Situational leadership embraces a flexible mentality, acknowledging that trends and emerging demands arise. As a result, it employs a variety of techniques and methods which are appropriate for various scenarios that emerge.

When theoretical knowledge is complemented with competence in experience, expertise, and self-development, internships enhance the students' prospects of obtaining career (Busby, 2003). Jenkin (2001) claimed, however, that poor internship experiences drive many graduates away out from industry. Poor internship experiences can harm students' reputations inside the organization and deter them from working in the field after graduation (Busby, 2003).

Impact of Supervisory Styles in Student Learning

Internships are important for increasing students' learning performance by allowing them to actively participate in a variety of ways, such as seeing and doing. Internships help students improve analytical reasoning, problem-solving, and leadership abilities, all of which are regarded key elements of a successful learning, by giving them real-world experience (Seyitolu & Yirik, 2015). Collins, A. (2002), stated that due to an unpleasant workplace environment and unfavorable mindsets from supervisors, a student intern's desire and willingness to continue in the hospitality industry may be affected.

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Leadership style, according to Luthans, F. (2011), may have a beneficial or detrimental impact. Setting a clear goal, finding your workers' intrinsic skills, and encouraging them to maximize those gifts are all elements of excellent leadership, according to Jamal, A. (2012). Supervisors are encouraging the interns to work to their full capacity by doing so. When an intern is happy with his or her work, he or she is most likely to enable other interns by their self efficacy. While interns who are dissatisfied with their work are less inclined to take on more responsibilities, promote, encourage, or promote the organization's objectives (Pablos & Tennyson, 2014).

Synthesis

Virtual internships are hands-on learning experiences that may enable a wide spectrum of students get more involved with the people and environment they work with, resulting in a more meaningful learning experience. Unfortunately, an analysis of the literature reveals that there is very limited research on Internship supervisory interactions with virtual interns and how certain interactions educate the readers more about the Internship supervisor's contributions towards student interns' learning. In a virtual internship, recognizing and employing specific leadership characteristics might help determine what types of learning will take place. As a result, the virtual facilitator's supervisory approach may have a positive or negative influence on the student intern's learning.

III. CONCEPTUAL FRAMEWORK

In order to create a conceptual framework for the research, this study gathered concepts and theories. This study seeks to assess the influence of virtual facilitators' supervisory styles in the virtual intern contingencies, environmental contingencies, and the intern's motivation, satisfaction and learning, particularly in the hospitality management program. The following is the study's hypothesis:

H1: Virtual facilitator supervisory style has a direct impact with the virtual facilitator effectiveness.

H2: Virtual intern contingencies is positively affected by the virtual facilitator supervisory style.

H3: Virtual environmental contingencies is positively affected by the virtual facilitator supervisory style.

Based on past research and empirical findings, a conceptual framework was established to guide this investigation. The focus of this research is to assess the learning that occurs as a result of participating in a virtual internship and how virtual facilitators' supervisory styles influence that learning, particularly in the hospitality management program (see figure 1).

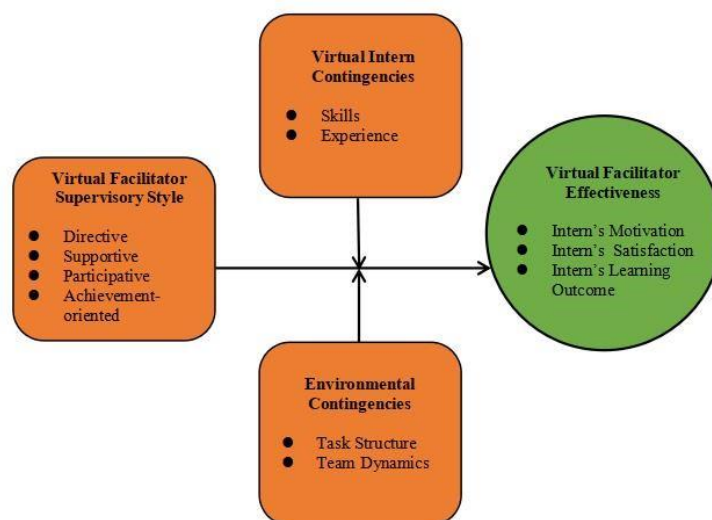


Figure 1. Path-Goal Theory

In terms of the virtual facilitator supervisory style, the directive style demonstrates that the virtual internship facilitator establishes rules, informs virtual interns of what is expected of them, establishes performance criteria for them, and reins in conduct when those standards are not reached. virtual internship facilitator uses incentives and disciplinary measures sparingly. In the supportive style, the virtual internship facilitator is friendly with the virtual interns and shows genuine care for their concerns, well-being, and safety. In the participative style, the virtual internship facilitator believes in making decisions as a group and communicates with the virtual interns regarding crucial work decisions, task goals, and approaches to target completion. Lastly, in the achievement-oriented style, the virtual internship facilitator sets tough goals for virtual interns and motivates them to achieve their best. The virtual internship facilitator feels that the virtual interns are capable of achieving performance targets.

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According to the concept, these supervisory styles are not always restrictive, and virtual internship facilitators can choose from a variety of styles depending on the circumstances. In the contingencies illustrated, virtual intern contingencies regard their needs, proactive personality, experiences, performance expectancy, engagement, motivation to quit, and anxiety. While environmental contingencies consider elements outside the virtual internship facilitators control, such as task structure and teamwork.

The concept has been tested and validated in a number of studies and has gained a lot of scientific support. This concept enforces virtual internship facilitators that their primary responsibility as a supervisor is to help virtual interns in identifying their targets and then assisting them in meeting its objectives in perhaps the most efficient and productive way possible. This concept provides virtual internship facilitators with a road map for increasing virtual interns' motivation, satisfaction and learning outcomes.

IV. METHODS

Data Gathering

By questioning and interviewing a small sample of hospitality management virtual interns and virtual internship facilitators from chosen hotels, the study aimed to investigate the role of the virtual facilitator's supervisory style on virtual internship learning in hospitality management program. In-depth interviews with the respondents was done one-on-one by the researchers. Semi-structured interviews have included series of important questions that help outlined the topics that was investigated, it also enabled the researchers and respondents to deviate in attempt to delve deeper into a response. The interview was done through the digital platform, Zoom. After which, recordings were transcribed and analyzed. Criterion sampling was used in this study, wherein participants were able to conform to the requirements. The participant's experience with the topic under investigation had been the most important factor of the data collection. The researchers have looked for participants who have had a similar encounter but differ in their traits and experiences. According to McCullough II, P. (2022), identification of important criterion, formulation of those same criterion, and systematic evaluation and research of examples that match the criterion are all part of criterion sampling. The goal of criterion sampling is to discover serious system vulnerabilities that may be addressed.

The data obtained were analyzed by looking into the personal views of every group of virtual interns and virtual internship facilitators, and then compared and contrasted the two groups' viewpoints to see if there were any commonalities or discrepancies.

Profile of Participants

The internship program is a final year subject which only seniors can take during the final semester in their college, so all of the students who took part in the study are graduating students. The majority of student respondents completed their internship remotely and met with their supervisor once a week for synchronous sessions. Neither of the students that took part had ever done a virtual internship previously nor personal internships. The internship supervisors that participated in the in-depth interviews ranged in ages from 30 to 50. They all had a lot of experience with interns, but none of them had ever had to supervise interns remotely. While the internship locations of the research participants varied, practically all internship responsibilities were activities. A total of 25 respondents, 20 student interns and 5 virtual internship facilitator took part in the survey. The hospitality-related virtual internships are already accessible at the time of the study. The participants were contacted through email and messenger and only 20 student interns, and 5 virtual internship facilitator responded and agreed to be a part of the study.

V. RESULTS

In this phenomenological study, twenty students who completed their internship remotely and met with their supervisor once a week for synchronous sessions, as well as five virtual internship facilitators who all had a lot of experience with interns but none had ever had to supervise interns remotely, were interviewed one-on-one via the digital platform Zoom. The recordings were then transcribed and analyzed.

Demographics

Participants were identified by the researchers through the Hospitality Management interns completing online internships and hotel internship supervisors. The combined range of the different channels was greater than 200 prospective respondents. The researchers initially got a response from 32 prospective respondents, who were numbered SI 1 to S1 25 (student interns), and VIF 1 to VIF7 (virtual internship facilitator). With these participants, the researchers conducted requests for consent letter and experience questions. Following receipt of consent, participants completed one-on-one interviews via Zoom to answer experience questions. These questions were:

1. What supervisory style is prevalent during virtual internship?
2. How does the supervisory style affect the interns' skill and experience?
3. How does the supervisory style affect the task structure and teamwork?

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4. How does the supervisory style affect the interns' motivation, satisfaction and learning?
5. How would you describe an effective virtual internship facilitator in terms of supervisory style?

In February, the researchers had find out that five of the 32 candidates (SI 3, SI 6, S1 19, S1 23, S1 24) and two virtual internship facilitators (VIF 2, VIF 5) were unqualified or non-responsive after numerous attempts, having left with 25 potential participants.

The table below summarizes the respondent's participation and the reason for non-participation.

Table 1. Respondent's Participation and Reason for Non-Participation

Respondents Designation	Consent (Y - yes / N - no)	Interview (Y - yes / N - no)	Participation (Y - yes / N - no)	Reason for Nonparticipation
SI 1	Y	Y	Y	Non-responsive
SI 2	Y	Y	Y	Non-responsive
SI 3	N	N	N	Non-responsive
SI 4	Y	Y	Y	Non-responsive
SI 5	Y	Y	Y	Non-responsive
SI 6	N	N	N	Non-responsive
SI 7	Y	Y	Y	Non-responsive
SI 8	Y	Y	Y	
SI 9	Y	Y	Y	
SI 10	Y	Y	Y	
SI 11	Y	Y	Y	
SI 12	Y	Y	Y	
SI 13	Y	Y	Y	
SI 14	Y	Y	Y	
SI 15	Y	Y	Y	
SI 16	Y	Y	Y	
SI 17	Y	Y	Y	
SI 18	Y	Y	Y	
SI 19	N	N	N	
SI 20	Y	Y	Y	
SI 21	Y	Y	Y	
SI 22	Y	Y	Y	
SI 23	N	N	N	
SI 24	N	N	N	
SI 25	Y	Y	Y	
VIF 1	Y	Y	Y	
VIF 2	N	N	N	
VIF 3	Y	Y	Y	
VIF4	Y	Y	Y	
VIF5	N	N	N	
VIF6	Y	Y	Y	
VIF7	Y	Y	Y	

Data Gathering

From February to April 2022, the researchers conducted Zoom interviews with 25 respondents. Respondents were interviewed over through the duration of 11 weeks, relying on the respondent's availability and schedule. Every interview was held between 20 and 30 minutes, with a 25-minute average. The interviews were recorded and transcribed later. The data collection procedure was carried out exactly as planned and described in the research methods. All respondents appeared to be remarkably willing and eager to discuss their experiences with the virtual facilitator's supervisory style on virtual internship learning in the Hospitality Management program.

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Narrative of experiences

The researchers utilized open-ended questions to obtain experiential responses from respondents about their experiences with the virtual facilitator's supervisory style on virtual internship learning. To continue investigating the participants' experiences, the researchers ask similar open-ended questions.

For the first research question, "What supervisory style is prevalent during virtual internship?", the following theme emerged in the responses of both the student intern and virtual internship supervisor:

1. Democratic: The experience where everyone is welcome to contribute, opinions are openly shared, and conversation is promoted.
2. Coaching: The experience of acknowledging the skills, limitations, and motivations of student interns in order to help them grow.
3. Visionary: The experience of encouraging student interns to develop a long-term vision through encouraging participation, interaction, and goal setting.
4. Consultative: The experience where the supervisors seek student interns' feedback and opinions.

The supervisory style of the virtual facilitator during the virtual internship was described as democratic or participative, coaching or supportive, visionary or achievement-oriented, and consultative or participative. Since a directive supervisory style did not evolve, it was not widely employed during virtual internship training. The most common supervisory style among virtual facilitator was participative.

For the second research question, "How does the supervisory style affect the interns' skill and experience?", the following were the most common responses:

SI 1; SI 14; SI 20: "Open discussion makes us desire to learn more".

SI 2; SI 4; SI 7; SI 8; SI 15; SI 21: "Encouraging participation and interaction helps us discover more of our skills."

SI 5; SI 9; SI 10; SI 17: "Welcoming everyone to contribute and share opinions aided in maintaining good relationships and boosting each other's confidence."

SI 11; SI 12; SI 13; SI 18: "Increases our motivation and we feel engaged and motivated to contribute."

SI 16; SI 22; SI 25: "Allowed us to demonstrate our capabilities even in difficult times."

VIF 1; VI 3: "Giving the student interns the freedom to complete a task in their own creative way resulted in a successful outcome."

VIF 4; VIF 6; VIF 7: Letting all student interns participate in the discussion and role-playing had developed their self-confidence.

Most common responses revealed that a participative supervisory style affect the intern's skill and experience during a virtual internship training.

For the third research question, "How does the supervisory style affect the task structure and teamwork?", most common responses are the following:

SI 1; SI 11; SI 20; SI 25: "We were able to complete assigned tasks successfully and meet deadlines since supervisors are open to questions, inquiries, and suggestions."

SI 2; SI 4; SI 7; SI 11; SI 12; SI 15; SI 16; SI 18: "Because our supervisor is always encouraging, the supervisor does not let anyone fall behind and ensures that everyone participates in the activity."

SI 5; SI 8; SI 9; SI 10; SI 13: "Allowing us to choose our group mates during virtual activities made our tasks easier."

SI 14; SI 17; SI 21; SI 22: "The supervisor's coaching style assists the student interns' strengths and limitations in a specific task, giving them the opportunity to improve their areas of weakness."

VIF 1, VIF 4, VIF 7: "The democratic style of allowing interns to proceed with some activities at their own pace enabled them to successfully complete required tasks, and allowing them to choose their own group boosted their confidence, resulting in a better teamwork."

VIF 3; VIF 6: "Allowing a student intern to complete tasks on their own without every now and then assisting them is the key to developing their efficiency in a specific task, and designating them to work with different interns, and giving rewards for best group also improved their teamwork."

From the student intern responses, the most common supervisory style that affected the task structure and teamwork of student interns is participative. For the virtual facilitator/supervisor's responses, all of them agreed that a democratic supervisory style helped the student interns with successfully completing their tasks. However, there have been a disagreement between the two groups wherein the first group of virtual facilitator/supervisor responded that democratic style of allowing student interns to choose their own group boosted their confidence resulting to better teamwork. While the second group of virtual facilitator/supervisor responded that directive supervisory style of directing student interns

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to work with different interns and giving them rewards in return for being the best team improved their teamwork. This is in agreement with Betz, M. (2021) that transactional leadership, might improve team collaboration in various circumstances.

For the fourth research question, "How does the supervisory style affect the interns' motivation, satisfaction and learning?", the most common response from the student interns were summarized and were transcribed as: "Being able to freely express our thoughts and opinions aided us in gaining more knowledge and improving our ability to deal with tasks. It boosted our confidence and motivated us to become better versions of ourselves. And helping us in various aspects so that we could learn more, as well as providing the best learning experience, is what made us satisfied with the virtual training." While for the virtual internship facilitator/supervisor, they all agreed that providing task checklists to student interns, such as having to meet with their team, establishing specific goals for the internship, and scheduling a one-on-one with the virtual internship supervisor for consultation or progress evaluation, influenced the interns' motivation, satisfaction, and learning.

For the fifth research question, "How would you describe an effective virtual internship facilitator in terms of supervisory style?", the most common responses are the following:

SI 1; SI 4 ; SI 5; SI 12; SI 15: "An effective virtual internship facilitator is someone who is not strict and make sure that everyone is motivated before starting the lesson. All of the activities they will give have less complexity and focus on the learning that they will provide. Learners today do not want a very dull lesson, much more in a virtual internship training. However, we do not wish for an autocratic supervisor who intentionally intimidates their trainees."

SI 2: "Maybe I can describe an effective virtual facilitator through the style on how he/she help the students as well influence them to become better intern and serve as motivation in achieving the goals in life, good decisions making, proper handling of task, also learning for the experience of the interns."

SI 4; SI 14; SI 18; SI 20; SI 21; SI 25: "First and foremost, he understands our desire to achieve our goals and dreams, which is why he pushes us to be the best versions of ourselves. The way he gives us hope, the way he tells us his experiences, motivated us even more."

SI 5; SI 8, SI 9; SI 11; SI 13: "The virtual internship facilitator should be goal-focused and inspirational because it helps the trainees a lot to make their internship relevant and fun at the same time."

SI 7; SI 17; SI 22: "The most effective supervisory style is a democratic approach style especially in this virtual internship that it could help everyone to be engage in the discussion and help them to be actively participate. In this kind of supervisory style they share the ideas that they have because of that we can learn more but it's not just their idea they want to follow. They considered our own suggestions and opinions in every task that they give us."

VIF1: "If your supervisory style satisfies the virtual student intern's learning, then you could be considered an effective virtual internship facilitator."

VIF 3: "I think an effective supervisor is someone who can inspire interns to push their limits, and you can see that through their output." VIF 4: "I believe that the effectiveness of a virtual internship facilitator is determined by the supervisory style, which can be democratic, autocratic, or laissez-faire, and must be tailored to the learners' abilities. To be effective, we may combine different supervisory styles so that all learners can be motivated and learn even if they have different characteristics and learning capacities."

VIF 6: "For me, to become effective, student interns need to be motivated even if they are not in the actual work scenario, you can still motivate them to perform the given task enthusiastically."

VIF 7: "An effective virtual internship facilitator know how to handle the training without compromising learning outcome of the virtual student interns. What I mean is that, even if the training is just virtually, the same degree of involvement, same level of training should be provided."

VI. DISCUSSION

The key findings of the study agreed well with literature as to how virtual internships benefit student interns (Aarons, 2019; Seyitolu & Yirik, 2015). The experience allowed learners to achieve work experience while developing basic and specific skills. Even though study's findings are restricted in their comprehensiveness given the small sample size, they did reveal some insights into virtual internships and their significance to stakeholders.

First, the most common supervisory style among virtual facilitator was participative. Second, it was discovered that the intern's skill and experience during a virtual internship training were most impacted by a participative supervising style. Third, according to student interns, the most usual supervisory style that affects task structure and teamwork is participative. In terms of teamwork, however, there was considerable disagreement among virtual internship facilitators, with both participative and authoritarian supervising styles revealing to be beneficial. Fourth, the virtual internship facilitators' participative supervising style

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influenced virtual student interns' motivation, satisfaction, and learning. The capacity of the virtual student interns to openly share their views and opinions assisted them in learning more knowledge and enhancing their task-handling abilities. It also improved their confidence and inspired them to be better versions of themselves, aiding them in a number of ways to help them learn more and giving them with the optimal learning experience possible, all of which satisfied them. Lastly, the supervising style of an effective virtual internship facilitator was discovered to be participative. As a result, all hypotheses can be regarded valid.

The data obtained, which were analyzed by looking into the personal views of every group of virtual student interns and virtual internship facilitators, and then compared and contrasted the two groups' viewpoints revealed that there were large commonalities in the responses and only one discrepancy, which is in terms of teamwork.

VII. CONCLUSIONS AND RECOMMENDATIONS

By questioning and interviewing a small sample of hospitality management student virtual interns and site supervisors from chosen hotels, the study aimed to investigate the role of the virtual facilitator's supervisory style on virtual internship learning in hospitality management program. The study added to the current body of knowledge on experiential learning in a variety of ways.

Although virtual internships have existed for some time, in the Philippines, they were only widely used during the pandemic. As a result, participative leadership or supervisory style emerged as a prominent type of supervisory style, because virtual internship facilitators are also new to the type of experience and wanted to make it a success through involving everyone by accepting suggestions and engaging in decision-making, especially when it came to activity execution. Participative supervisory style of the virtual internship facilitator had also greatly affected the virtual student intern's contingencies, environmental contingencies, and virtual internship facilitator's effectiveness. Because they are both fresh to the experience, virtual internship facilitators have a tendency to listen to their virtual student interns in order to do all tasks effectively and efficiently. To make this first time experience a success, majority of the virtual internship facilitators displayed trust, respect, inclusivity, and open discussions. In this way, they were also able to become a successful virtual internship facilitator.

Although participants may confront several difficulties in a remote environment, this experience contributes in the development of competence, technological expertise, critical - thinking, and improvement of self-confidence.

This study may pave the way for future investigations. One recommendation would be to conduct additional study into other industries that may offer virtual internship programs in order to help other virtual internship facilitators understand the best practices of virtual internship facilitators in terms of supervision. Another recommendation is that educational institutions should prioritize offering a quality internship program with clear criteria for students. It is necessary to do proper planning and preparation of the internship program, which is aligned with the industry's virtual internship program. Although the effectiveness of the virtual internship facilitator was demonstrated in this study, educational institutions should also play a role in making the experience more relevant and successful.

VIII. LIMITATIONS

The size and scope of this research were limited by a number of factors. When evaluating the study, keep the following considerations in mind.

1. Since the sampling size only included hospitality sectors that offer virtual internships, other industries that offer virtual internships may encounter different issues, and internship facilitators may require distinct sets of abilities for effective supervisory style.
2. Since the majority of student respondents who completed their internship remotely and participated in this study, met their supervisor only once a week for synchronous sessions, bias may exist because virtual student interns rarely meet their virtual facilitator.
3. The study's other limitation is that it did not involve all stakeholders. Only virtual student interns and virtual internship facilitators were included in the study. Although virtual student interns and virtual internship facilitators are the most important stakeholders, understanding virtual internship practices from the standpoint of the student internship coordinators is also important.

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Understanding the Teachers' Lived Experience in Teaching Technology and Livelihood Education (TLE) Using Modular Distance Learning in Now Normal



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ABSTRACT: This qualitative study examined the lived experiences of teachers of teaching Technology and Livelihood Education (TLE) using modular distance learning in now normal utilizing daily. A review of literature was completed concerning the areas of teachers and the history of modular distance learning. The research question for the study was, what are the participants' lived experience in teaching and assessing students in modular distance learning class of TLE in the now normal? And how do they cope up with the challenges of teaching and assessing students in modular distance learning class of TLE in the now normal? The research design for the study was Phenomenological qualitative research in interpretive design. Interviews were completed. The data were disaggregated according to themes and patterns. The participants of the study consisted of eight (8) participants' experiences of TLE teachers on modular distance learning in the Department of Education in the Division of the City of Biñan. After data collection, the researcher found seven (6) common themes. Each of these themes was discussed in terms of supporting or not supporting the review of literature. The majority of the findings of the study supported by participants served as authentic guidelines of the study. A major contradiction in the findings was the fact that none of the teachers in the study felt a need for more professional development and community involvement.

KEYWORDS: Teachers, Modular Distance Learning, Technology and Livelihood Education, and Lived experiences

INTRODUCTION

Education is a continuous process where an individual acquires and imparts knowledge and skills to another. The former is a process basically undergone by students while the latter is played by teachers. In this process individuals acquire knowledge to discern what is right from wrong, learns social norms, and acquire sound judgment and reasoning, as foundations to develop skills essential to daily living. The ultimate goal of education then could be inferred as to help individuals navigate life and contribute to society. In developing, low-income countries, there is a projected 10 percent increase in a person's future income for every additional year of education (World Vision, 2021). Education helps eradicate and break the cycle of poverty and hunger, giving people the chance at better lives. Typically, traditional formal education dictates the way success of a country is measured. Individuals who attended school and attained a higher level of education are considered more employable and most likely to earn more. This is one big reason why parents make their children attend school as long as possible.

The Republic Act No.10533 known as "Enhanced Basic Education Act of 2013" The K to 12 Program is an act enhancing the Philippines Basic Education System by strengthening its curriculum and increasing the number of years for basic education. The K to 12 Basic Education Program is designed to reform the system of education in the Philippines. It aims to empower every individual to improve his quality of life, to provide sufficient time for mastery of concepts, develop life-long learners, prepares graduates for tertiary education, mid-level skills development, employers and entrepreneurship and to avoid child exploitation and other related problems. The enhanced curriculum allows students to gain work experience while studying. Every graduate will be equipped with information, media and technology skills, learning and innovation skills, effective communication skills and life and career skills. Technology and Livelihood Education subject plays a vital role in attaining the goals and objectives of the new enhanced curriculum (Alsong, 2019). It is composed of four (4) major livelihood component areas, namely Home Economics (HE), Agriculture and Fishery Arts (AFA), Industrial Arts (IA) and Information and Communication Technology (ICT). Entrepreneurship is integrated in all areas in TLE and its components. CP-TLE is focused on either HE, AFA, IA or ICT from Year I to Year IV and students choose the path they want to follow. Moreover, CP-TLE builds the capacity of the high school students

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for self-employment and provides pathways for further education and training in a chosen career. The practical and relevant course offerings are responsive to individual and community needs and will provide students with opportunities to become economically productive even if they decide to leave the formal school system at any given time (Valencia, 2015).

The Covid 19 pandemic practically changed both the local and global arena of educational systems. Countries continuously looking for and developing different strategies on how to deliver quality education. Lockdowns and staying home became main strategies to flatten the curve and control the transmission of the disease (Sintema, 2020). Reviews of existing Department of Education (DepEd) policies has led the researcher to believe that the CoVid-19 health crisis has exacerbated the delivery of education to learners in terms of quality educational access. This health issue has profoundly affected every identifiable sector – education, health, public service, industry, among others. The impact is felt more acutely in education particularly as children and adolescents (WHO, 2020) have fewer resources for well-being, mental health, and coping strategies than adults.

The current COVID-19 crisis has obliged most education systems to adopt alternatives to face-to-face teaching and learning. Many education systems moved activities online, to allow instruction to continue despite school closures (OECD, 2020). The shift of the teaching learning delivery in schools to modular distance learning made more challenging, on the part of the school personnel, the delivery of basic quality education. That is why DepEd leaders are always finding avenues to solve the problems and capacitating its teachers and school heads to become more effective in the field of modular distance learning (Bagood, 2020).

The Philippines' Department of Education (DepEd) in order to pursue its mandate of delivering quality education while coping up with the demands of health protocols implemented by the Inter-Agency Task Force on emerging disease (IATF) adopted the Modular Distance Learning (MDL) approach across all programs. This MDL approach puts the programs of vocational education especially on teaching Technology Livelihood Education (TLE) as provided for on Republic Act 10647 at a disadvantage. TLE contributes meaningfully to the solutions of the problems of the society such as unemployment, poverty, malnutrition (Doucet et al., 2020). The TLE learning process whose terminal objective is to instill skills among learners requires a traditional teaching or the face-to-face method. The MDL approach created two main problems among TLE teachers, primarily on how to teach skills among learners through Modular Distance Learning and secondly, how to evaluate objectively the growth and performance of learners. Malipot (2020) stressed that teachers also air their problems on modular distance learning. The issues in teaching TLE specialization courses through Modular Distance Learning has been huge and debilitating. Distance learning poses a challenge for accessing teaching-learning resources that usually found in a classroom setting (Pedragoza, 2021).

Modular Distance Learning poses challenges for TLE teachers and learners in teaching and in the conduct of assessment, including limitations on giving immediate feedback, and the need to account for different contexts in designing, implementing and grading assessment tasks. The grading system, which is divided into two, written work is thirty percent (30%) and the performance task is seventy percent (70%) (DepEd, 2021). It is used to keep track of the progress of the students in achieving the learning standards and in the development of 21st century skills, to promote self-reflection and personal accountability among students, and provide basis for the profiling of student performance.

In this study therefore, where in-depth experiences of TLE teachers were qualitatively gathered and interpreted, the researcher hopes that this research would shed empirical light on the current Modular Distance Learning (MDL) of the Department of Education (DepEd) specifically in teaching TLE and its assessment and grading policies. The researcher further hopes that through the lived experiences that were shared by seasoned TLE teachers, new teaching strategies and evaluation methods will emerge particularly in the DepEd division in the City of Binan, province of Laguna.

METHODS

Research Design

This paper drew inspirations from a qualitative inquiry that was conducted during the implementation of modular distance learning by DepEd. This study used a Psychological Phenomenology approach in Interpretive Qualitative analysis. Interpretivism seeks to build knowledge from understanding individuals' unique viewpoints and the meaning attached to those viewpoints (Creswell & Poth, 2017). The interest of the research are the phenomenon on modular distance learning and the lived-experiences of TLE teachers on this phenomenon. There were 8 teachers from the secondary schools in the Division of Binan Laguna that participated in the study and shared their experiences in modular distance learning during now normal.

This veered into their experiences through the lens of examining human lived-experiences as source of critical knowledge and understanding.

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Participants of the Study

This study was situated within the indigenous context of the 8 participants' experiences of TLE teachers on modular distance learning in the Department of Education in the Division of the City of Biñan. Targeted 8 teacher-informants were from Jacobo Z. Gonzales Memorial National High School, Biñan Integrated National High School, Dela Paz National High School, St. Francis Integrated National High School, Biñan City Science and Technology National High School, Biñan Secondary School of Applied Academics, Southville 5A Integrated National High School, and Mamplasan National High School are targeted participants in this study.

The inclusion criteria in choosing the participants include (1) experience in teaching TLE in modular distance learning class; (2) More than 5 years in teaching TLE; (3) openness in sharing experiences towards teaching modular distance Learning in TLE ; and 4) voluntarily signs the waiver of participation.

Data Analysis

The gathered qualitative and empirical data conducted through from the TLE teachers of the eight (8) identified school were analyzed using interpretivist lens guided by constructivist philosophy. Using thematic analysis the researcher strived to identify patterns of themes in the interview data following the framework of Moustakas as cited in Creswell (2017). It is generally considered to be an effective data analysis tool as a systematic approach to organizing interview data. This lessens the possibility for personal biases clouding the interpretation of data. It also makes it easier to explain and convincingly assure the reliability of findings and conclusions from the study.

Since the nature of the data are highly qualitative, the researcher considered a data analysis strategy that can appropriately effect in the forwarding some knowledge claims as building blocks for policy crafting. These knowledge emanating from the participants served as guides for educational policy-makers for the new or next 'now normal'. These textual analysis were gathered information about how TLE education teachers make sense of the phenomenon on TLE modular distance learning. By means of representation of TLE teachers' narratives of lived-experiences through which the meanings of the conversation can be deduced by the researcher to understand the challenges they faced and understand the challenges for just and accurate evaluative assessments of the work-skills acquired by the students. The researcher chose the three representation theory by Hall (as cited in Leve, 2012) in analyzing the gathered qualitative data: (a) reflective, in which language reflects an already existing meaning in the world; (b) intentional, in which language expresses the producer's intended meaning; and (c) constructionist, in which meaning is constructed in and through language.

RESULTS AND DISCUSSION

This qualitative-phenomenological study looked into the lived experience of TLE teachers in (1) teaching and assessing and (2) challenges of teaching and assessing students in modular distance learning class of TLE in the now normal

1. What are the participants' lived experiences in teaching and assessing students in modular distance learning class of TLE in the now normal?

Theme 1: Teaching and learning as key concept. Based on this theme, the participants mentioned about utilizing modular distance learning approach to teaching technology and Livelihood Education (TLE) increased learner's motivation and interest in teaching and learning as key concept, students are provided with huge opportunities through modular instruction that make TLE lessons more interactive, educational, and fun as an instrument of learning. The teachers also shared that through this approach, they are able to emphasize inquiry-based learning where students investigate, explore, and find through traditional and modern learning platforms. This in turn develops the higher order thinking skills especially for TLE where students need to very curious, inquisitive, and investigative. As the teachers recalled:

Participant #2 Modular Distance Learning modality is a way of learning with this new normal to cater the education in this time of pandemic wherein school provide the self-learning modules for learners to study at home and continue the education. It can be modular print or digital print; it depends upon the available resources of the school as well as the learners.

Participant #4 Modular distance learning is an alternative mode of learning delivery designed for the teaching and learning continuity during the pandemic. The students are learning on their own pace remotely. They are answering their learning tasks at the comfort of their homes without the physical presence of their fellow students and their subject teachers. They are free to ask assistance from their guardian and parents or surf the web for other learning resources but with certain limitations. They can also ask the help of their teachers via messenger, texts, and other platforms.

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Modular distance learning advocates argue further those additional reasons for embracing this medium of instruction include current technology's support of a degree of interactivity, social networking, collaboration, and reflection that can enhance learning relative to normal classroom conditions (Doucet et al., (2020) and (Basilaia & Kvavadze, 2020).

Modular distance learning also enables the students to become more motivated and more involved in the learning process as key concept, thereby enhancing their commitment and perseverance, Sumitra Pokhrel, and Roshan Chhetri (2021). Students have both reported that the online components of modular distance learning encourage the development of critical thinking skills. Student satisfaction has also been reported to be higher in blended learning courses compared with purely face-to-face courses, (Adedoyin and Soykan, 2020 ; Ali, 2020; Bao, 2020).

Theme 2: Learning during Pandemic. In this theme the students nowadays who are declared as advance knowledge in terms of technology are constantly exposed to various learning platforms, many of which exist in the Internet, the participating Technology and Livelihood Education (TLE) teachers shared that through modular distance learning style, it becomes more of a facilitator of learning because modular instruction becomes more dynamic, participative and active since students maximize learning platforms in using the internet which results in the ease of their understanding. This allows teachers to think more in terms of better lesson: *Participant #7 This is the learning modality that enables to continue the education as mandated by DepEd Secretary, Leonor Magtulis Briones to continue the education amidst pandemic eras. In this modality, the learners will be given activities for which their parents will pick it and deliver to the school.*

Participant #8 Modular Distance Learning is a type of learning modality in which learning happens without physical interaction between teachers and students. In this form of learning modality, the students can learn at home using printed modules and other learning resources. They are provided with the learning materials like worksheets/activity sheets and Learning Packet (Leap) containing different activities based from the Most Essential Learning Competencies (MELCs). They are also given with printed weekly home learning plan as their guide in answering the learning tasks given in the module and worksheets. To facilitate the learning process, the students are allowed to ask assistance from their parent/guardian and/or from the teacher via phone call, text message, private message, etc. during his/her office hours. The teacher takes responsibility of monitoring the progress of the students by checking the output submitted every end of the week.

Modular distance learning benefits students and institutions. It facilitates improved learning outcomes, access flexibility, a sense of community, the effective use of resources, and student satisfaction. Several research studies have demonstrated that courses as a delivery method contribute to improved learning outcomes for students (Oselumese, et al., (2016).

Nessipbayeva, (2018) reports on an evaluation of the use of modular distance learning identifies positive aspects of virtual learning environments and critical issues for those considering the use of those environments as part of a lecturing module. It is the positive aspects of TLE that includes and enhances participation, increased enjoyment of learning, ability to facilitate group work in an efficient manner, and the provision of a standardized, user-friendly interface across courses

Theme 3: Teachers' clash of emotion. This theme refers to the participants' experience when it comes to teaching Technology and Livelihood Education leading to their clash of emotions. For some, their second and random thoughts made them question their ability whether they could perform the job because of emotion. For others, what they felt in emotionally was being challenged but somehow disappointed because this is not what they prepared for when they were studying. For the rest, although nervous, they felt a sense of happiness because at least they could make a difference in the students' lives by teaching and inspiring them. As can be considerably noted, the emotion of the participants did not matter much because what truly counted is their ability to accomplish things which are expected of them by the school administration, much more by their students This theme stresses that by means of modular distance learning approach to teaching TLE, the teachers emotionally observed better learning engagement among their students. This is because of modular instruction and interfaces results in a developed focus on deeper learning. Additionally, this approach paved the way for the avenue of modular distance learning space where students can enjoy interactive contents like codified texts, videos, relevant articles, archival documents, news, pictures, as well as documentaries that make their students more inquisitive and practical to learning since accessibility to these materials can be made available at their fingertips. The participants noted that:

Participant #4 Honestly, at first it didn't bother me and thought it's the best for everyone. It's a relief at first knowing that I'll be safe from Covid, and I will not face the everyday face to face setting/scenario. But along the way I realized that it's much harder to everyone especially in terms of assessing the students learning/skills emotionally. Weeks before the school opening, I got anxious, scared of the sudden changes, imagining the possible worst-case scenarios during modular classes. Thinking how I can reach out my students and provide learning materials that cater their different needs.

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Participant #5 When the DepEd decided to use MDL in the classroom to teach TLE, I had some concerns. For example, how will I teach the lesson effectively if the students will use the self-learning modules? How will I assist students emotionally who are academically challenged that need someone to explain the lesson clearly in order for them to learn? How will I monitor students learning, check and evaluate their outputs, and provide feedback on my student's performance?

Research has also shown that modular distance learning can foster a decrease in student attrition and facilitate an increase in the passing rate for student examinations emotionally, Dangle and Sumaoang (2020). However, other studies point to the need for a more nuanced understanding of how modular distance learning delivery affects student learning. Elcano, Day et al., (2021) explored the relationships between students' perceptions of the e-learning environment, their approaches to study, and their academic performance. They found that students differed widely in their perceptions, resulting in variations in study approaches and grades students with positive perceptions of the e-learning environment tended to obtain better grades, and vice versa.

2. As to how do they cope up with the challenges of teaching and assessing students in modular distance learning class of TLE in the now normal?

Theme 4: The perks of collaboration. Surfacing in this theme is the participants' receiving administration support in order for them to improve their working knowledge of what they teach. Although not all participants have sought and received school management support, they see to it that they had consultation with seasoned teachers in the field like TLE teaching Modular Distance Learning as well as those who are experts in teaching methodologies by asking for their best practices to maximize student learning that emphasizes learner centered approaches. In so doing, they were able to compensate for their knowledge and practice gap by embracing the pieces of advice shared with them by the experienced in-field educators. Continuously coping with the challenges of modular distance learning in terms of technology integration, the participating teachers always strive for meaningful, and competency based TLE classroom where standards and performance-based considerations are constantly applied to make sure that combination of face-to-face classroom instruction and modular distance learning is successfully carried out to meet desired learning outcomes. One participant disclosed:

Participant #5 By means of collaboration and constant communication with the school head, co-workers, parents and to our students are the factors needed in facing the new normal set up in TLE. The school head will always give us the information of the DepEd policies as to what to do in implementing it. The co-workers will work as a team for the students' progress in this new normal. The role of the parent is to guide them at home during study hours, a difficult task for the parent to act as a teacher in this new set up in education. Moreover, adapting to new teaching strategies fitting for the new normal, learning new applications and skills by attending various seminars and trainings

Participant #6 In the traditional teaching TLE, there is a direct interaction of collaboration with the teacher and students. The learners are able to understand the lesson by doing tasks guided by the teacher (through demos, etc.). In the "now normal" setting, students rely mostly on the LMs so most of the time, they cannot comprehend the lessons as effectively as those on the traditional setting.

Participant #7 In the now normal, still there is possibility of collaboration of learning though they are not physically together. It can be self-paced depending on their capabilities. There are different apps to use to reinforce learning. The teachers were able to produce 21st century learners as they themselves are making changes in the education process.

Teacher collaboration, when practiced with a focus on instructional strategies, curriculum, and assessment particularly, has benefits for both teachers and students. Results are even more promising when the collaboration is extensive and perceived by teachers as helpful. Collaboration among teachers even influences the results of teachers who do not experience directly the same high-quality collaboration, Pedragoza, (2021).

Theme 5: Students' evaluation. As teachers it is a must to have an evaluation in order to come up with the best result when it comes to finalization of the final result of the grades. This evaluation further pushes teachers to always determine whether what they do in education system the cognitive, affective and psychomotor as part of the evaluation process This is so because some learners may easily absorb what they teach using modular distance learning but there are also those who are also challenged in terms of technology use, added to the availability and accessibility of online materials and other digital contents that are supposed to maximize their learning encounters in TLE. Some participants mentioned that:

Participant #4 The evaluation of students' performance in the now normal is very challenging and controversial along with the issue of academic integrity of the students. I am not confident enough to say that I am effectively evaluating my students' performance during these times, because we all know that there are possibility that it is not them who answered all the

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learning tasks especially in MDL. It somehow lacks in authenticity. We are not also able to give them skill test or actual practical tasks and immediate feedbacks.

Participant #5 The evaluation is done through watching and grading the return demonstration videos submitted by the students. The students were also given quizzes and summative test for the written works.

Participant #6 The use of the bricks as a way of evaluating students' performance likable and then "now normal" setting the only challenge is something to do with whether the student with the activities by himself or herself or someone did it for them (guardian, friend, etc.).

Darsih, (2018) proposes a framework using a modular distance learning approach for higher education institutions faced with challenges of developing and deploying continuing professional development in the construction industry. The framework can be used by continuing education providers to determine the most suitable combination of media for a modular distance learning intervention, taking into consideration learner and instructor characteristics, the desired instructional goals and strategies, the nature of the learning environment, and the availability of resources. Research has also been published, Tumbali, Aaron Jed (2021) in which the key factors for successful implementation of modular distance learning are discussed. Among these key factors are the availability of financial resources, support from senior management, and access to personnel with the requisite technological capabilities and skills.

Theme 6: Resiliency, flexibility make things possible. The last theme speaks of resiliency and flexibility that make things possible. Enclosing the reality that once a teacher, forever a student, the participants clearly communicated their resiliency and flexibility to teaching TLE using modular distance learning by going an extra mile in what they do in order to make certain that their teaching competence translates to quality learning. This said, they have a strong conviction that even though they have a productive experience that tells and can be beneficial if handles correctly provided that the starting point of resiliency and flexibility turns to positive influence on the students' learning. As being testified by some participants that

Participant #8 We came up with Project TOOLS (Technical Online Orientation and Learning System) as our resiliency and flexibility to help and assist our students on their modular distance learning journey. We are conducting FGD to discuss issues and concerns with our subject area and to address the needs/problems during MDL and appropriate interventions for non and low performing students. We have our online class once a week to discuss the lessons and at the same time assist them in answering the activities in the module. We are giving our students a feedback form for their submitted output. We have practiced the reward system to encourage them to perform the tasks given weekly. We usually give the rewards to those students who did an excellent performance on the task.

Participant #4 As a teacher we are expected to be flexible, resilient, and agile. Though I am not fully successful in coping up with challenges and issues in the evaluation of performance of my students, I acknowledge the fact that those webinars and trainings are helpful. Also the comfort that I'm getting from my colleagues knowing that I am not alone in facing difficulties help me a lot in enduring, bearing and accepting these challenges. Checking of the output is also one of the issues that we're getting in these kind of setting, to protect my credibility I am checking all those outputs and keep all the records that I have, just like what we're doing during pre-pandemic. I think creating harmonious relationship and open communication with everyone including the parents and students is also one of the factors that can help us cope with the challenges.

Participant #5 Because of the pandemic, I always demonstrate my flexibility, open-mindedness and reliance when evaluating my students. I did this because my daughter experiences anxiety or depression when answering the learning tasks that have been assigned to her. This experience in my family has given me a better understanding of the situation of students. Furthermore, by being more adaptable, students can be exposed to new methods of assessing their performance.

Teachers' resiliency and flexibility shows their students interest especially in Modular Distance learning. It is a pedagogical approach that denotes the effectiveness of the e-classroom with the technological enhancements Ajzen (2019). Contained within is a paradigm change in which the emphasis shifts from teaching to learning, Elcano, Day et al. (2021). A modular distance learning course should also increase the interaction between the instructor and students. It should furthermore enhance the mechanism for integrating formative and summative feedback in order to boost students' learning experiences (Pedragoza, 2021). Therefore, modular distance learning is a fundamental redesign using their resiliency and flexibility where students become active and interactive learners.

Essence. The reality of teachers teaching TLE using modular distance learning in the Philippines as shared by the collective accounts of the selected participants in the public high schools Laguna, is an affirmation of a committed and devoted community of teachers who can confidently confront and embrace a fact which they successfully dealt with through experience in welcoming various reactions, setting their mind right and coming face to face with the students. Although struggling in the early stages of the phenomenon, the participating teachers were resolute and ready to stand their ground by clinging to the power of

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composure and conviction, perks of active collaboration, students' evaluation and resiliency and flexibility to make things possible. Irrefutably, teachers which seem to be a disadvantage at one glance, can turn into a solution to a considerable extent since in the country, lack of qualified and competent teachers teaching TLE using modular distance learning is still a rampant issue in the educational system, provided that teachers who have the guidepost of right attitude, display willingness to learn, relearn, and unlearn and to expand their knowledge horizons in order not to compromise the successful learning process of today's highly diverse learners' strata.

CONCLUSION AND IMPLICATIONS

The lived experience of the participants when it comes to teachers teaching TLE using the modular distance learning approach, included confronting the reality of others teachers in different subjects should be given an attention and enthusiasm to teach even with an emotion and setting the mind right, and coming face to face with challenging learners or students. As regards with the coping mechanisms of the participants that dealt with the challenges and demands of teachers with their students' evaluation, perk of collaboration and their flexibility and resiliency are the composure and conviction, active collaboration with the school principals' which make things possible.

RECOMMENDATION

As hiring of qualified TLE teachers in modular distance learning is still a problem, DepEd should strictly implement the policy and guidelines in hiring teachers such as: review the applicant's credential thoroughly, assigning teaching assignment based on their field of specialization. School administrators or principals should assign teachers especially for TLE subjects who are qualified or specialized in that area whether in modular distance learning or face to face mode to ensure quality education. The administrators or principals should encourage teachers to attend seminars. The school may conduct in-service seminar to further enhance teachers' capabilities, skills and for professional growth on areas like: pedagogical skills, communication skills, instructional competencies and the like. Senior teachers should lend hands to new teachers in facilitating the teaching of TLE subjects especially when there is no available qualified teacher. Teachers teaching TLE using the modular distance learning should extend their hands in guiding their students. This can be achieved by conducting team teaching, peer critiquing, and pair organizing of classroom tasks where they actively collaborate by sharing best practices that will help teachers understand the varying complexity of the subject/s they handle through firsthand guide. Future qualitative researchers are encouraged to replicate this study in different locale and with higher number of participants for better generalizability. On the other hand, future quantitative researchers are advised to conduct similar inquiry on the phenomenon utilizing a much higher number of participants from various education institutions.

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The Influence of Liquidity, Solvency, Activity, Profitability, And Sales Growth on Company Value



Iwan Firdaus¹, Juita Tanjung²

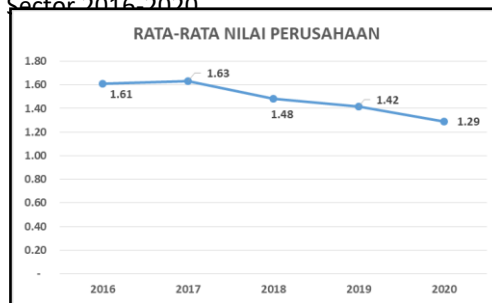
ABSTRACT: This study aims to determine the effect of liquidity, solvency, activity, profitability, and sales growth on firm value. The object of research is the infrastructure sector which is listed on the Indonesia Stock Exchange in 2016-2020. The problem in the Infrastructure Sector in Indonesia is the decline in stock prices in the Infrastructure Sector from 2016 to 2020 which has an impact on the decline in company value in the Infrastructure Sector. The population of this study amounted to 10 companies according to the characteristics determined by the researcher by selecting the sample using the saturated sample method. Data analysis in this study uses panel data regression analysis which is processed with eviews. The results of this study are liquidity has a negative and significant effect on firm value. Profitability has a positive and significant effect on firm value, while solvency, activity and sales growth have no effect on firm value.

KEYWORDS: liquidity, solvency, activity, profitability, sales growth, firm value.

INTRODUCTION

The Infrastructure Sector includes companies that play a role in the construction and procurement of infrastructure such as transportation infrastructure operators, civil building construction companies, telecommunications companies, and utility companies. From 2017 to 2020, the stock price movement of the infrastructure sector in Indonesia decreased.

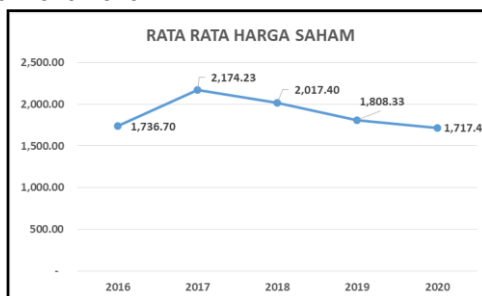
Average Stock Price of Infrastructure Sector 2016-2020



Sumber: IDX processed data, 2021

The decline in share prices resulted in a decrease in the value of the company (figure 1.2). This phenomenon is interesting because until now infrastructure has been driven by growth, with the hope of increasing competitiveness, growth and equity of the national economy. (akseleran.co.id).

Average Value of Infrastructure Sector 2016-2020



Sumber: IDX processed data, 2021

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The picture above provides information that the average value of companies in the infrastructure sector is considered overvalued and there has been a decline in 2017-2020. The value of the company is at least able to provide an overview of the fundamental aspects of the company and the market view of the company (the extent to which outside parties including investors give an assessment of the company). Firm value can also represent a number of important variables, especially when measuring company performance (Edusaham Team, 2019). In this study, the value of the company is proxied by the Tobin's Q ratio. Tobin's Q in the infrastructure sector on the Indonesia Stock Exchange in 2016-2020 experienced a decline from 2018 to 2020 and this is an interesting phenomenon to study. In this study, the independent variables used were liquidity, solvency, activity, profitability and sales growth, each of which was measured using the current ratio (CR), Debt to Equity Ratio (DER), Return on Assets (ROA), Total Assets Turnover (TATO) and sales growth (SG). This is in accordance with the factors that affect firm value and is also reinforced by several research gaps with inconsistent results from each research variable.

The effect of liquidity on Tobin's Q has been carried out by several previous researchers, and obtained inconsistent results, as follows: Liquidity has a significant positive effect on Tobin's Q, carried out by; Indrastuti (2021), Kurniasari (2021), Hanafiyah (2020), Margali, Mangantar and Saerang (2020), Wilson (2020), Rostanti and Effendi (2019), Putri, Susyanti, and Salim (2019). Furthermore, liquidity has a significant negative effect on Tobin's Q studied by; Hidayah and Rahmawati (2019), Kombih, and Suhardianto (2017). Lastly, liquidity has no effect on Tobin's Q studied by; Hilal and Samono (2019), Murni, Oktaviarni and Suprayitno (2019), Chairunnisa (2019), Mandjar and Triyani (2019).

The effect of solvency on firm value has been carried out by several previous researchers and obtained inconsistent results, following solvency has a significant positive effect on firm value, carried out by; Septyanto and Nugraha (2021), Al-Nsour (2019), Simorangkir (2019), Hilal and Samono (2019), Putra and Sulasmiyati (2019), Wahyuningsih (2019), Oktarina (2019), Savitri (2017), Kombih and Suhardianto (2017). Furthermore, solvency has a significant negative effect on firm value studied by; Diyani and Rahayu (2019), Rostanti and Effendi (2019), Kahfi, Pratomo and Aminah (2018), Andayani, Wiksuana and Sedana (2017). Finally, solvency has no effect on firm value studied by; Kanata, Hermanto and Surasni (2021), Andiyani and Sugiyono (2020), Dwiastuti and Dillak (2019).

The influence of activities on firm value has been carried out by several previous researchers, and obtained inconsistent results, along with activities that have a significant positive effect on firm value, carried out by; Simorangkir (2019), Marcella and Mungniyati (2019), Kahfi, Pratomo, and Aminah (2018), Sugiarto and Santosa (2017). Furthermore, activity has no effect on firm value. Savitri (2017), Andayani, Wiksuana and Sedana (2017).

The influence of profitability on firm value has been carried out by several previous researchers, and obtained inconsistent results, following profitability has a significant positive effect on firm value, carried out by; Prena and Muliawan (2020), Andiyani and Sugiyono (2020), Al-Nsour (2019), Dwiastuti and Dillak (2019), Hilal and Samono (2019), Murni, Oktaviarni and Suprayitno (2019). Furthermore, profitability has no effect on firm value studied by; Septyanto and Nugraha (2021), Wahyuningsih (2019), Harsiatun and Hidayat (2019), Rahmantio, Saifi and Nurlaily (2018), Andayani, Wiksuana and Sedana (2017).

Pengaruh pertumbuhan penjualan terhadap *Tobin's Q* telah dilakukan oleh beberapa peneliti sebelumnya, dan mendapatkan hasil yang tidak konsisten, berikut pertumbuhan penjualan berpengaruh positif signifikan terhadap *Tobin's Q*, dilakukan; Suryana (2019), selanjutnya pertumbuhan penjualan tidak berpengaruh terhadap *Tobin's Q* diteliti; Marcella dan Mungniyati (2019), serta Adang (2019).

Many researches on firm value have been carried out with inconsistent research results as described above. Furthermore, researchers want to conduct research by filling research gaps with the research title The influence of solvency, activity, profitability and sales growth on firm value. Based on the background that has been described, the formulation of the problem in this research is whether partially liquidity, solvency, activity, profitability and sales growth have a significant effect on firm value in infrastructure sector companies listed on the Indonesia Stock Exchange in 2016-2020? In accordance with the formulation of the problem above, the purpose of this study is to determine and partially analyze the effect of liquidity, solvency, activity, profitability and sales growth on firm value in infrastructure sector companies listed on the Indonesia Stock Exchange in 2016-2020. This research is expected to be able to make a practical contribution to company management as a consideration in increasing company value. As well as contributing to investors so that they can be used in making further investment decisions with better results in the infrastructure sector. The theoretical contribution of this research can be used as a research reference.

LITERATURE REVIEW

According to Spence (1973) in Brigham and Houston (2019), signaling theory is an action taken by company management that provides signals or instructions for investors about how management views the company's performance and prospects. If

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related to this research, signaling theory plays an important role for companies because it has the urge to signal information about the company's financial statements to external parties (investors), which can later be used as consideration by investors to make investment decisions.

In this study, the value of the company is proxied by the ratio of Tobin's Q. According to James Tobin in 1967 in Naqsyabandi in Dzahabiyya, Jhoansyah and Danial (2020) said that Tobin's Q is the ratio of the company's value to the value of its assets. If the number obtained is greater than before, it is possible for the company to manage its assets better and increase the company's profit. According to Dzahabiyya et.al (2020) mentioning the suspension from Tobin's Q ratio is if the results of Tobin's Q > 1 mean that the company's management is successful in managing the company's assets or assets, Overvalued. If the results of Tobin's Q < 1 means that the company's management has failed in managing the company's assets or assets. Undervalued. If the results of Tobin's Q = 1, it means that the company's management is stagnant in managing company assets.

Factors Affecting Company Value

According to Indriyani (2020) the factors that influence the value of the company include: insider ownership, Debt to Equity Ratio, Profitability, Growth, dividend policy. Insider ownership is the percentage of shares owned by insiders, such as managers or directors. Debt to Equity Ratio is one of the initial external financing used by companies to finance their funding needs. Profitability is the ratio of profitability or profitability is also considered to describe the company's ability to earn profits. Growth is the company's growth in financial management as measured by changes in sales. Dividend policy is a policy that is associated with determining whether the profits earned by the company will be distributed to shareholders as dividends or will be retained in the form of retained earnings.

Hypothesis Development and Conceptual Framework

The hypothesis is a provisional assumption of the case that will be tested for truth through analysis of relevant data and the truth will be known after the research is carried out, then the hypothesis in the study is as follows:

1) The effect of the liquidity variable on firm value.

According to Bodie et al (2018), the greater the liquidity of the company, the more capable the company is in paying short-term debt, this is considered good so that it can increase the value of the company in the eyes of investors. This discussion is strengthened by previous research from; Indrastuti (2021)., Kurniasari (2021)., Hanafiyah (2020) which states that liquidity has a positive effect on firm value. From the explanation above, the first hypothesis raised in this study is:

H1: Liquidity has a significant positive effect on firm value.

2) The Effect of Solvency on Firm Value

According to Horne and Wachowicz (2018), the solvency ratio is a ratio that shows the extent to which a company's activities are financed by debt. In the infrastructure sector, the higher the solvency, the better the value of the company in the eyes of investors because the level of debt owned by the company will be a source of company capital in increasing the company's productivity to get greater profits. This increase in profits will have a positive impact on increasing the value of the company. This discussion is strengthened by research; Septyanto and Nugraha (2021)., Al-Nsour (2019)., Simorangkir (2019) which stated that solvency had a positive effect on firm value. From the explanation above, the two hypotheses raised in this study are:

H2: Solvency has a significant positive effect on firm value.

3) The Effect of Activities on Firm Value

According to Horne and Wachowicz (2018), the higher the value of the company's activities, the better the company is in managing its assets to obtain maximum sales. Investors assume that with the increase in the value of the company's activities, the company's sales will increase which in turn increases the company's profits. This increase in profits will have a positive impact on increasing the value of the company. This discussion is strengthened by research; Prena and Muliyan (2020)., Andiyani and Sugiyono (2020)., Al-Nsour (2019) which stated that activity had a positive effect on firm value. From the explanation above, the three hypotheses raised in this study are:

H3: Activities have a significant positive effect on firm value.

4) The Effect of Profitability on Firm Value

According to Horne and Wachowicz (2018), the higher the profitability value, the better the company in managing its assets to obtain maximum net profit. Investors assume that by increasing the profitability of the company, the company is believed to be able to increase greater profits. This increase in profits will have a positive impact on increasing the value of the company. This discussion is strengthened by research; Prena and Muliyan (2020)., Andiyani and Sugiyono (2020)., Al-Nsour (2019)., Dwiastuti and Dillak (2019) which stated that profitability had a positive effect on firm value. From the explanation above, the four hypotheses raised in this study are:

H4: Profitability has a significant positive effect on firm value.

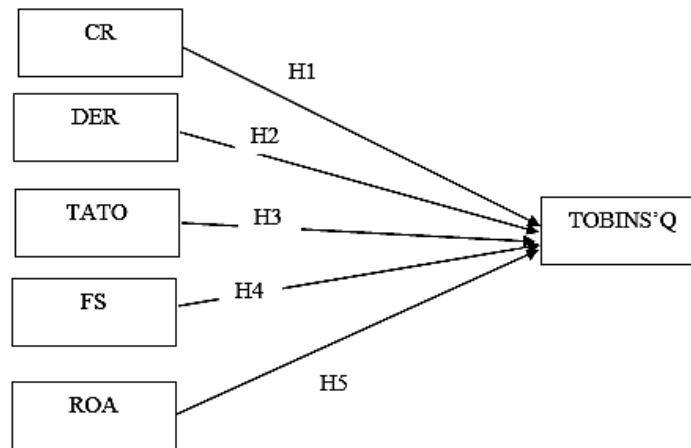
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5) Effect of sales growth on firm value

According to Subramanyam (2014), sales growth is one of the important factors that determine the survival of the company. If the company's sales level increases, it will increase profits, so that it has a positive impact on the value of the company. This discussion is strengthened by Suryana's research (2019) which states that sales growth has a positive effect on firm value. From the explanation above, the five hypotheses raised in this study are:

H5: sales growth has a significant positive effect on firm value.

Conceptual Framework



RESEARCH METHODOLOGY

This study uses a causality research method that aims to examine the effect of liquidity, solvency, activity, profitability and sales growth on firm value in infrastructure sector companies listed on the Indonesia Stock Exchange in 2016-2020. The dependent variable in this study is the firm value proxied by the Tobin's Q ratio. According to James Tobin in 1967 in Dzahabiyya et.al (2020) Tobin's Q is the firm value ratio seen from the value of its assets. Tobin's Q ratio is calculated by $(EMV+Debt)$ divided by total assets.

The first independent variable in this study is liquidity which is proxied by the current ratio (CR). According to Bodie, et al., (2018) it is used to measure the company's ability to pay short-term obligations with the company's current assets. Current Ratio in this study is calculated by total current assets divided by current liabilities. The second is solvency which is proxied by debt to equity ratio (DER). According to Horne and Wachowicz (2018), it is a ratio that shows the extent to which the company is financed by debt. Debt to equity ratio (DER) in this study is calculated by total debt divided by total equity. The third is activity that is proxied by total asset turn over (TATO). According to Horne and Wachowicz (2018), as an efficiency or turnover ratio, it measures how effectively a company uses its various assets. Total asset turnover (TATO) in this study is calculated by sales divided by total assets. Fourth is profitability which is proxied by Return On Assets (ROA). According to Horne and Wachowicz (2018), it is a ratio that relates profit to sales and investment. In this study, the profitability of Return On Assets (ROA) is calculated by dividing net income by total assets. The fifth sales growth (sales growth), according to Subramanyam (2014), is one of the important factors that determine the survival of the company. If the company's sales level experiences growth, it will increase profits, so it will have a positive impact on the value of the company. sales growth (SG) in this study is calculated by $(S(t)-S(t-1))$ divided by $S(t-1)$, where S is sales.

Population and Research Sample

According to Sugiyono (2016), the population is a generalization area consisting of subjects or objects that have certain characteristics and qualities that are determined by a researcher to be studied which then draws a conclusion. The population in this study are companies in the Infrastructure sector listed on the Indonesia Stock Exchange (IDX) for the 2016-2020 period, which meet the population criteria; the first is a company with an IPO before 2016 and is still actively listed on the Indonesia Stock Exchange until 2021 (there are 22 companies excluded from the population). The second is that the company did not experience a loss during the year of observation (there were 19 companies excluded from the population). The third is that company data is not outlier data (there are 5 companies excluded from the population). Based on these criteria, the population in this study amounted to 10 companies in the Infrastructure sector listed on the Indonesia Stock Exchange. Furthermore, the sample selection was carried out using the saturated sample method, where the sample took the entire research population totaling 10 companies in the Infrastructure sector listed on the Indonesia Stock Exchange. The following 10 companies are used as research samples, namely; PT. Citra Marga Nusaphala Persada Tbk (CMNP), PT. Nusantara Infrastructure Tbk (META), PT. PP

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Construction & Investment Tbk (PTPP), PT. Total Bangun Persada Tbk (TOTL), PT. Wijaya Karya Tbk (WIKA), PT. Telkom Indonesia Tbk (TLKM), PT Bali Towerindo Sentra. Tbk (BALI), PT. Inti Bangun Sejahtera Tbk (IBST), PT. Sarana Menara Nusantara Tbk (TOWR), PT. Adhi Karya Tbk (ADHI)

Data analysis method

In this study, the data analysis method used was panel data regression analysis with data processing using Eviews 10 software. From the data processing, descriptive statistical analysis was carried out on the research data. Then the results of data processing with Eviews 10 gave rise to a research model consisting of a common effect model, a fixed effect model and a random effect model, which were then selected using the Chow test, Hausman or the LM test. From the selected model, the accuracy of the research model is seen by looking at the results of the F test and the quality of the data using the R2 adj determination test. To test the hypothesis, it is done through the results of the t-test of the selected model.

RESULTS AND DISCUSSION

Descriptive statistical analysis of research data can be seen from table below:

Table Descriptive Statistics

	TOBIN'S-Q Y	CR X1	DER X2	TATO X3	ROA X4	SG X5
Mean	1.399933	1.407342	1.678964	0.380728	4.921629	0.136853
Median	1.136530	1.342437	1.447587	0.287749	3.743134	0.116498
Maximum	2.826385	3.113232	5.833217	0.905423	16.47538	1.012987
Minimum	0.820646	0.325914	0.445223	0.107778	0.062222	-0.392333
Std. Dev.	0.584588	0.695471	1.112920	0.227855	4.126053	0.265182
Observations	50	50	50	50	50	50

Sumber: data IDX processed *eviews* (2022)

Based on table descriptive statistics there are 50 research observations from each variable, this is in accordance with the number of companies that were sampled as many as 10 companies with 5 years of observation. The mean value of the Y variable (Tobins'Q Ratio) is 1.399, which means that the mean value above the number 1 indicates that the value of the company in this research sample is seen by investors as having good performance. The higher the Tobins'Q Ratio value, the better. The mean value of the X1 variable (CR_current ratio) is 1,407, which means that the average company's liquidity capability in this research sample is 1,407 times in paying its current debt. The higher the CR value, the better for the company, but a CR value that is too high can provide information that a lot of the company's liquidity has settled or fallen asleep, this is not good for the company. The mean value of the X3 variable (DER_debt to equity ratio) is 1,678, which means that the average source of company capital in this research sample is more from debt than equity. The higher the DER value, the greater the company's debt, this can have a good or bad impact on the company. The mean value of the variable X3 (TATO_total assets turnover) is 0.380, which means that the average company in this research sample can only rotate its total assets by 0.3807 times to increase the company's sales. This figure is considered still very small, where the good is more than 1 time. The higher the value of the TATO, the better for the company and the more preferred by investors. The mean value of the X4 variable (ROA_return on assets) is 4.921 percent, which means that the average company profit in this research sample from assets managed is 4.921 percent. This figure is still considered very small. The higher the ROA value, the better for the company and the more preferred by investors. The mean value of the X5 variable (SG_sales growth) is 0.136, which means that the average SG of the companies in this research sample is 13.6% and is still considered small. The higher the SG value, the better for the company and the more preferred by investors.

Berdasarkan kepada hasil uji Hausman berikut ini

Table Uji Hausman

Correlated Random Effects - Hausman Test			
Equation: REM			
Test cross-section random effects			
	Chi-Sq.		
Test Summary	Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.805656	5	0.0112

Sumber: data IDX processed *eviews* (2022)

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Where the probability value of a random cross-section of 0.0112 is less than 0.05, the model chosen is the fixed effect model, as shown in the following table.

Tabel Fixed Effect Model

Dependent Variable: TOBINSQ_VAR_Y				
Method: Panel Least Squares				
Date: 04/24/22 Time: 22:29				
Sample: 2016 2020				
Periods included: 5				
Cross-sections included: 10				
Total panel (balanced) observations: 50				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.981266	0.796167	2.488505	0.0177
CR_X1	-0.324704	0.133391	-2.434230	0.0202
DER_X2	-0.077897	0.165646	-0.470265	0.6411
TATO_X3	-1.953449	1.550398	-1.259966	0.2160
ROA_X4	0.149435	0.046431	3.218458	0.0028
SG_X5	0.107345	0.311545	0.344556	0.7325
Sumber: data IDX processed <i>eviews</i> (2022)				

Based on the results of the fixed effect model in the fixed effect model table, the panel data regression equation is obtained as follows:

The value of the company = $-0.324704CR - 0.077897DER - 1.953449TATO + 0.149435ROA + 0.107345SG$

The liquidity variable (CR) has a negative and significant effect on firm value (Tobin's Q), as can be seen from table 4.3 where the prob value of 0.0202 is smaller than 0.05, and the coefficient value is -0.324704. With the results of a significant negative effect, this rejects the proposed hypothesis 1 (H1), where the proposed hypothesis 1 (H1) is that liquidity has a positive and significant effect on firm value. The solvency variable (DER) has no effect on firm value (Tobin's Q), it can be seen from table 4.3 where the prob value of 0.6411 is greater than 0.05. With no effect, this rejects the proposed hypothesis 2 (H2), where hypothesis 2 (H2) is proposed is that solvency has a positive and significant effect on firm value. The activity variable (TATO) has no effect on firm value (Tobin's Q), as can be seen from table 4.3 where the prob value of 0.2160 is greater than 0.05. With no effect, this rejects the proposed hypothesis 3 (H3), where the proposed hypothesis 3 (H3) is an activity that has a positive and significant effect on firm value. The profitability variable (ROA) has a positive and significant effect on firm value (Tobin's Q), as seen from table 4.3 where the prob value of 0.0028 is greater than 0.05 with a coefficient value of 0.149435. With the results of a significant positive effect, the proposed hypothesis 4 (H4) is accepted, where the proposed hypothesis 4 (H4) is that profitability has a positive and significant effect on firm value. The SG variable has a negative effect on firm value (Tobin's Q), it can be seen from table 4.3 where the prob value of 0.7325 is greater than 0.05. With no effect, this rejects the proposed hypothesis 5 (H5), where the proposed hypothesis 5 (H5) is that sales growth has a positive and significant effect on firm value.

Table Uji F

F-statistic	8.164404
Prob(F-statistic)	0.000000

Sumber: data IDX processed *eviews* (2022)

Based on the results of the F-test in the F-test table above, it can be seen that the F-statistic probability value of 0.000000 is smaller than 0.05, meaning that the model in this study is appropriate and feasible to continue.

Table Uji R²

R-squared	0.765575
Adjusted R-squared	0.671805

Sumber: data IDX process *eviews* (2022)

Based on the results of the coefficient of determination (R²) in the R-test table above, the results of the fixed effect model test that the Adjusted R-squared coefficient (R²) is 0.671805, indicating that there is an influence of 67.1805% on firm

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value (Tobin's Q). This shows that the variables of liquidity, solvency, activity, profitability and sales growth of 67.1805% have an effect on firm value (Tobin's Q), while the remaining 32.8195% is explained by other factors not examined in this study.

DISCUSSION

The liquidity variable (CR) has a negative and significant effect on firm value (Tobin's Q) in infrastructure sector companies listed on the Indonesia Stock Exchange for the 2016-2020 period, from this result, the higher the CR value, the smaller the firm value (Tobin's Q) in the company. in the sample of this study. In this research, liquidity (CR) has no effect on firm value, because the liquidity value (CR) of infrastructure sector companies is low, which means that the company's ability to pay its short-term debts is also not good. Currently, the Indonesian state is actively building infrastructure, which means it is still in the development stage which actually still requires finance in its operations, so that in this study the amount of debt is still quite large for the companies in this research sample in the infrastructure sector so that the liquidity value (CR) has no effect. to the value of the company. investors in infrastructure sector companies in making investment decisions do not even consider the value of liquidity (CR), so that the value of liquidity (CR) does not affect the value of the company (Tobin's Q) in this study. This is not in line with the signal theory, even though the company has the ability to manage current assets to be able to increase its ability to pay its short-term debt, but this is not fully seen as a good signal by investors. The results of this study are in line with Hidayah and Rahmawati (2019)., Kombih, and Suhardianto (2017).

Solvency variable (DER) has no effect on firm value (Tobin's Q) in infrastructure sector companies listed on the Indonesia Stock Exchange for the 2016-2020 period, which means that any increase in solvency (DER) will not be followed by an increase in firm value (Tobin's Q) in the company. in the sample of this study. In this research solvency (DER) has no effect on firm value, this shows that solvency (DER) is not one of the main factors that can affect firm value, given that there are many other factors that can affect firm value. This is in line with the theory of MM without taxes which states that the size of the level of use of corporate debt does not affect the value of the company. Investors tend to be more interested in the company's earnings than the ratio of the use of company debt. Because investors believe that with high profits, the company is able to pay off the company's debts and is also able to provide returns to investors in the form of dividends. The results of this study are in line with the results of research by Kanata, Hermanto and Surasni (2021), Andiyani and Sugiyono (2020), Dwiastuti and Dillak (2019).

The activity variable (TATO) has no effect on firm value (Tobin's Q) in infrastructure sector companies listed on the Indonesia Stock Exchange for the 2015-2020 period, which means that any increase in activity (TATO) will not be followed by an increase in firm value (Tobin's Q) in the company. in the sample of this study. In this study, the activity (TATO) has no effect on the value of the company, because the value of the activity (TATO) of the infrastructure sector company is low, which means that the sales made by the company are smaller than its total assets or in other words, the total assets owned by the company are greater than the company's ability. sell it. The infrastructure sector companies that are sampled in this study show a small comparison between sales and total assets. This causes investors to pay less attention to and consider the value of the activity (TATO) so that it does not affect the value of the company (Tobin's Q). This is not in line with the signal theory, although the company has the ability to manage assets to create high sales, it is not yet considered a good signal for investors. The results of this study are in line with the results of research by Jumiarti and Julianto (2020)., Anggraini and Widhiastuti (2020)., Leonardi and Khairunnisa (2019)., Savitri (2017)., Andayani, Wiksuana and Sedana (2017).

The profitability variable (ROA) has a positive and significant effect on firm value (Tobin's Q) in infrastructure sector companies listed on the Indonesia Stock Exchange for the 2015-2020 period, which means that any increase in profitability (ROA) will be followed by an increase in firm value (Tobin's Q).) in the companies in this research sample. In this research, profitability (ROA) affects the value of the company, this can be interpreted that in making investments investors really see a high rate of return from the management of company assets. If the take-up rate is high, and the investment climate improves, investors will also consider increasing their investment. This is in line with the theory of signals, information or signals on the company's profitability (ROA) performance, attracting full attention from investors in increasing the value of the company. The results of this study are in line with the research of Prena and Muliawan (2020)., Andiyani and Sugiyono (2020)., Al-Nsour (2019)., Dwiastuti and Dillak (2019)., Hilal and Samono (2019)., Murni, Oktaviarni and Suprayitno (2019).

Sales growth variable (SG) has no effect on firm value (Tobin's Q) in infrastructure sector companies listed on the Indonesia Stock Exchange for the 2016-2020 period, which means that any increase in sales growth (SG) will not be followed by an increase in firm value (Tobin's Q). the companies in the sample of this study. In this research, sales growth (SG) has no effect on firm value, because the value of sales growth (SG) of infrastructure sector companies is low, which means that the sales or income earned by the company is smaller than its total assets, this is possible because the company is in the infrastructure sector. is a company with a type of long-term operational investment. Currently, the Indonesian state is actively developing

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infrastructure, which means that it is still in the development stage and has not yet entered the stage of sustainable sales or income, perhaps the events will be different for the next 20 to 30 years when many infrastructure developments have been completed. sales or income will be better, so that in this study sales or company revenues in the infrastructure sector look small and have no effect on company value. Investors in the infrastructure sector do not consider the value of sales growth (SG) in making investment decisions in the infrastructure sector, so that sales growth (SG) does not affect firm value (Tobin's Q) in this study. This is not in line with the signal theory, although the company has the ability to manage assets to create high sales, it is not yet considered a good signal for investors. The results of this study are in line with the results of research by Jumiarti and Julianto (2020)., Anggraini and Widhiastuti (2020)., Leonardi and Khairunnisa (2019)., Savitri (2017)., Andayani, Wiksuana and Sedana (2017).

CONCLUSIONS AND RECOMMENDATIONS

The conclusion in this study of the research sample on infrastructure sector companies listed on the Indonesia Stock Exchange for the 2016-2020 period is that the liquidity variable (CR) has a negative and significant effect on firm value (Tobin's Q). The solvency variable (DER) has no effect on firm value (Tobin's Q). The activity variable (TATO) has no effect on firm value (Tobin's Q). The profitability variable (ROA) has a positive and significant effect on firm value (Tobin's Q). The SG variable has a negative effect on firm value (Tobin's Q).

The contribution that can be given to companies in the infrastructure sector is in managing the company's short-term debt, it must be followed by good governance of the company's current asset management, so that when the company increases the value of liquidity by reducing short-term debt, it does not reduce the value of the company. In addition, when the company decreases the value of the company's current liquidity by increasing the amount of the company's short-term debt, the company must be able to compensate for this condition by increasing the value of the company's current assets in order to increase the company's income, especially from inventory management and company cashflow which must be managed properly. well by the company.

Another contribution for the company is to be able to increase the company's income from the use or operation of the company's total assets in order to increase the company's net profit. With the increase in the company's net profit, the value of the company's return on assets will increase and can increase the value of the company. This condition is very favored by investors. The increase in the value of the company will be directly proportional to the return that will be obtained by investors. The results of this study there are 3 independent variables that have no effect on firm value (Tobin's Q), so the researcher suggests that further researchers can try to add a mediating variable in future research. Another thing that can be done by further researchers is that the object of research in the infrastructure sector must be sorted by type of business in order to get better research results.

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The Effect of Investment Opportunity Set and Corporate Social Responsibility on Company Value with the Growth of Companies as Variables



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ABSTRACT: This study is a proof-of-concept of important analytical and experimental functions and / or characteristics. Firm value is very important because it reflects the company's performance which can affect investors' perceptions of the company. For companies that have gone public, the value of the company can be determined by the share price listed on the Stock Exchange. Investment Opportunity Set (IOS) is a choice of future investment opportunities that can affect the growth of company assets or projects that have a positive net present value.

This study aims to examine and examine the effect of Corporate Social Responsibility and Investment Opportunity Set on Company Value which is moderated by company growth. The data used in this study are secondary data in the form of financial statements of each sample Property and Real Estate company reported to the IDX from 2016 - 2018 which are sourced from the Indonesia Stock Exchange (IDX) website, namely www.idx.co.id Analysis of the data used in this study is multiple regression analysis.

In this study, the results of CSR and IOS have a significant effect on firm value, company growth moderates CSR on firm value, and company growth cannot moderate IOS on firm value.

KEYWORDS: Corporate Social Responsibility, Investment Opportunity Set, Company Growth, Company Value

PRELIMINARY

Research Background

Investment Opportunity Set (IOS) is a choice of future investment opportunities that can affect the growth of company assets or projects that have a positive net present value. According to Hidayah (2015), IOS is a company value whose amount depends on the expenses determined by management in the future, which at this time are investment choices that are expected to produce greater returns. Research by Suidani and Darmayanti (2016) which analyzes the effect of profitability, liquidity, growth and investment opportunity set on firm value, the results of their research prove that IOS has a significant positive effect on firm value.

Based on the news quoted from liputan6.com (2018), Vice President Jusuf Kalla or JK teased DKI Governor Anies Baswedan. Sentilan JK regarding the portion of mosque construction in Jakarta. He said that in DKI Jakarta there are many good real estate developments, but unfortunately there is not a single mosque there. He also hopes that there should not be a large and magnificent mosque, while the surrounding environment is poor and miserable. If that happens, according to JK, the mosque will fail to make the congregation prosperous. He wants the construction of mosques to also coincide with the prosperity of the community.

From the above phenomenon, the large number of real estate developments is not balanced with worship facilities such as mosques. The company not only views profit as the only goal of the company, but there are other goals, namely the company's concern for the environment because the company has a broader responsibility than just seeking profit for shareholders (Putri, et al. 2016). Companies need to get support from the surrounding environment and society so that the company can continue to be a going concern. The efforts made by the company must be able to create a positive image in the eyes of the community, in this case the company can carry out forms of social responsibility activities such as educational assistance programs, community empowerment programs, construction of public facilities, religious affairs and other social forms.

The Effect of Investment Opportunity Set and Corporate Social Responsibility on Company Value with the Growth of Companies As Variables

Corporate social responsibility (CSR) is seen as a strategic corporate action in order to obtain a good image in the eyes of the community. Disclosure of Corporate Social Responsibility is a process of communicating the social and environmental impacts of an organization's economic activities to special interest groups and to society as a whole. This extends the responsibilities of organizations (particularly companies) beyond their traditional role of providing financial reports to owners of capital, particularly shareholders. This expansion is made with the assumption that the company has broader responsibilities than just seeking profit for shareholders (Putri, et al. 2016).

Previous research on the effect of corporate social responsibility and profitability on firm value was conducted by Zaria and Salim (2014). The results of this study indicate that CSR has an effect on firm value. Rahardjo and Murdani (2016) found that CSR has a significant effect on firm value, while Putri et al. (2016) show that firm value is not influenced by corporate social responsibility.

Many researches on the effect of investment opportunity set on firm value have been conducted. Research by Syardiana, et al. (2015) found that the investment opportunity set has a significant positive effect on firm value. This is the same as the results of research conducted by Hidayah (2015) showing that the investment opportunity set (IOS) has a positive and significant effect on firm value.

This study replicates previous studies, however, development is carried out by expanding observations and developing proxies for the research variables. The development of research variables was carried out using the Corporate Social Responsibility and Investment Opportunity Set as independent variables, while the dependent variable was Firm Value and Company Growth as moderating variables.

Formulation of the problem

Based on the background that has been described, the problem formulations in this study are:

1. Investment Opportunity Set affects Company Value?
2. Corporate Social Responsibility affects Company Value
3. Company growth strengthens the influence of IOS on firm value?
4. Company growth weakens the influence of CSR on firm value?

Research purposes

1. Does the Investment Opportunity Set affect Company Value?
2. Does Corporate Social Responsibility affect Company Value?
3. Does company growth strengthen the influence of IOS on company value?
4. Does company growth weaken CSR towards company value?

LITERATURE REVIEW, FRAMEWORK AND HYPOTHESES

Signaling Theory, Company Value, Corporate Social Responsibility, Investment Opportunity Set, Sales Growth

Signaling Theory

Signal theory suggests that the actions taken by a company provide clues to investors about how management assesses a company's prospects. Signal theory assumes two elements, namely symmetric information and asymmetric information. Symmetric information is a situation where investors and managers have identical information about the company's prospects, while asymmetric information is a condition where managers have better information than investors (Putri, 2013). To reduce the occurrence of information asymmetry, companies must disclose the information they have, both from a financial and non-financial side. One of them is a report on CSR activities that must be disclosed by the company.

Submission of information that can be conveyed through the company's capital structure is a signal that investors receive from managers. Arrangement of the company's capital structure can be done through issuing new shares or obtaining funds through debt. However, the sale of new shares will raise two assumptions from the market. First, the sale of new shares shows that the company is having financial difficulties and that its capital structure is not good. Second, the market suspects that investors or company owners want to get out of business, diversify other businesses. The issuance of new shares can also cause a negative reaction from the market because new investors will suspect that old investors and company owners want to share risks with others so that it can reduce the value of the company. Realizing this, the issuance of debt is considered good news for investors. The increase in leverage contains a higher probability of bankruptcy, the increased risk of bankruptcy will encourage investors to pressure managers to work more efficiently so that a bankruptcy does not occur. This condition has led investors to conclude that the company's condition is indeed much better than what is reflected by its share price. The increase in leverage is a positive signal (Putri, 2013).

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The value of the company

According to Rahardjo and Murdani (2016), company value is the value or market price applicable to the company's general shares. A high company value will make the market believe not only in the company's current performance but also in the company's future prospects. The normative objective of the company is to maximize shareholder wealth. Maximizing the prosperity of shareholders can be realized by maximizing company value (Mindra and Erawati, 2014). According to Sari and Priyadi (2016), company value is the investor's perception of a company in relation to its share price. The share price used generally refers to the closing price, and is the price that occurs when the stock is traded on the market.

According to Hidayah (2015), several concepts that explain the value of a company include: (1) Nominal value, namely the value that is formally stated in the company's articles of association, is stated explicitly in the company's balance sheet, and is also clearly written in the collective share certificate. (2) The intrinsic value is a value that refers to an estimate of the real value of a company. Firm value in the concept of intrinsic value is not just the price of a set of assets, but the value of the company as a business entity that has the ability to generate profits at a later date. (3) The liquidity value can be calculated based on the performance balance prepared when a company is going to be liquidated. (4) Book value is the company value calculated on the basis of accounting concepts, liquidity value is the selling value of all company assets after deducting all obligations that must be fulfilled. The residual value is the share of the shareholders. (5) Market value is the price that occurs from the bargaining process on the stock market. This value can only be determined if the company's shares are sold on the stock market.

A company is said to have a good value if the company's performance is also good. The value of a company can be reflected in its share price. The value of the company that generates a number close to the ratio of 100% means that it has high company value where the company is considered to have good performance and prospects that can increase investor confidence. This is because investors believe that the higher the stock price of a company, the higher the rate of return that investors will receive. In other words, a company with a high share price has a good value because it is considered capable of prospering its shareholders.

Corporate Social Responsibility

CSR Disclosure is the disclosure of information related to the environment in the company's annual report. In measuring the CSR Disclosure, a CSR index is used which is the relative disclosure area of each sample company for its social disclosure, where the measurement instrument in the checklist to be used in this study refers to the instrument used by Sembiring (2005), which classifies CSR information into 7 categories. namely: environment, energy, workforce health and safety, labor, products, community involvement, and the general public. This category was adopted from the research of Hackston and Milne (1996)

The seven categories are divided into 90 disclosure items. Based on Bapepam regulation No. VIII.G.2 regarding the annual report, there are 12 items out of 90 disclosure items which are not suitable to be applied to the conditions in Indonesia. Further adjustments were made by eliminating the 12 disclosure items, so that a total of 78 disclosure items remained.

Investment Opportunity Set

To achieve company goals, managers make investment decisions that produce positive net present value. The investment opportunity set is a combination of assets owned by the company (assets in place) and the selection of future investments with a positive net present value (Syardiana et al., 2015). Both will determine future funding decisions.

In general, it can be said that IOS describes the extent of investment opportunities or opportunities for a company, but it is very dependent on company expenditure for the benefit of the future. IOS provides a positive signal about the company's future growth, thus increasing the stock price as an indicator of company value, if the stock price rises, the company value will be high (Astriani, 2014). Investment Opportunity Set proxies can be classified into several proxies.

One of them is price-based proxies. This proxy is based on the difference between an asset and the market value of the stock. So this proxy is strongly influenced by market prices, a price-based proxy states the company's growth is partially expressed by share prices, then companies that have high growth will have a higher market value than their assets (Putri, 2013). IOS which produces numbers close to a ratio of 100% means that the company has a high investment opportunity to manage the company so that it produces a large return to increase the value of the company.

Company Growth

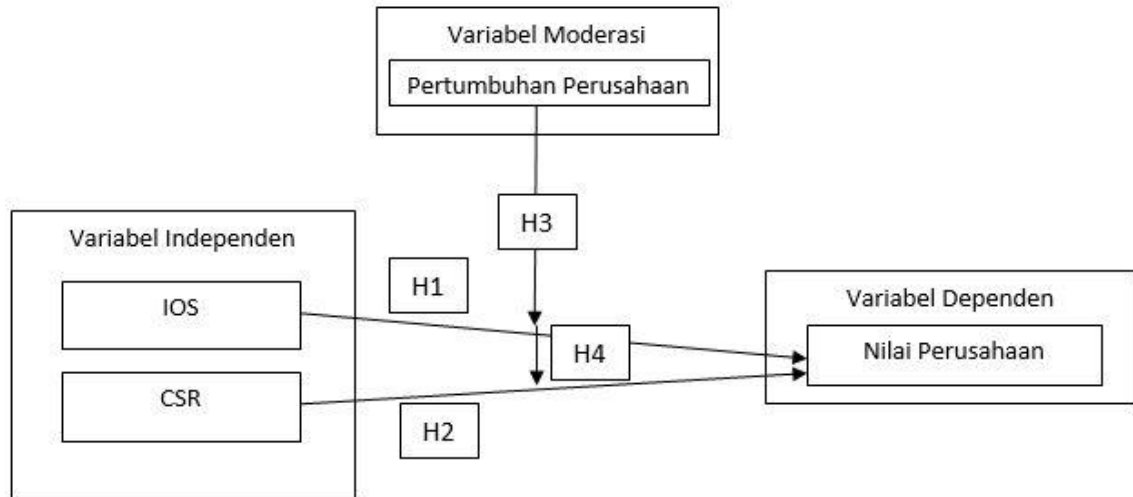
Company growth is the difference between total assets in the current period and the previous period's total assets in the previous period. In addition, company growth is the growth of a total asset, where the growth of total assets in the past will

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illustrate how its future profitability and future growth will be. Company growth can be proxied using changes in total assets.

Framework

Pengaruh IOS dan CSR Terhadap Nilai Perusahaan Dengan Pertumbuhan Perusahaan Sebagai Variabel Moderating



Gambar 3.1

Rerangka Pemikiran

RESEARCH METHOD

Types of research

This research is a causal research, namely research that aims to test the hypothesis about the influence of one or more variables on other variables. Researchers use this research design to provide empirical evidence about IOS and CSR as independent variables, Firm Value as the dependent variable and Company Growth as a moderating variable.

Operational Definition of Research Variables

Corporate Social Responsibility is an idea that makes the company not only responsible in terms of finances, but also for social and environmental problems around the company so that the company can grow in a sustainable manner (Rosiana, et al., 2013).

The CSRI calculation formula is as follows:

Rumus perhitungan CSRI sebagai berikut:

$$CSRI_j = \frac{\sum X_{ij}}{n}$$

Information:

CSRI j: Corporate Social Responsibility Disclosure Index perusahaan j

n j : Number of items for firm j, n_j = 78 (maximum score)

Σ X ij: The total number of CSR disclosures by the company.

The investment opportunity set (IOS) is a combination of assets in place and the selection of future investments with a positive net present value. Measurement of the Investment Opportunity Set using the market to book value of equity (MBVE) proxy. MBVE is a price-based IOS proxy that sees the company's growth from the company's ability to acquire and manage capital. In

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research (Syardiana, et al., 2015) the market to book value of equity is formulated as follows: MBVE ratio:

$$\frac{\text{Jumlah saham beredar} \times \text{Closing price}}{\text{Total ekuitas}}$$

The value of the company. Price to book value (PBV) is used as a proxy for firm value because its existence is very important for investors in determining investment strategies in the capital market. A well-managed company generally has a PBV ratio above one. This illustrates that the company's stock value is greater than the company's book value. A high company value will make the market believe not only in the company's current performance but also in the company's future prospects. A high price to book value (PBV) will make the market trust the company's prospects (Rakasiwi, 2017).

Formula :

$$\text{Price to Book Value} = \frac{\text{Harga Saham}}{\text{Nilai Buku Per Lembar Saham}}$$

Company growth is the difference between total assets in the current period and the previous period's total assets in the previous period. In addition, company growth is the growth of a total asset, where the growth of total assets in the past will illustrate how its future profitability and future growth will be. Company growth can be proxied using changes in total assets. Changes in total assets can be damaged as follows:

$$\text{Perubahan total aktiva} = \frac{\text{Total aktiva} - \text{total aktiva t-1}}{\text{Total aktiva t-1}} \times 100\%$$

Population and Research Sample

The population in this study were property and real estate companies. Sampling was done by purposive sampling which is part of the non-probability sampling method. The sample is the part that is observed to be used for research purposes on a part of the whole. The sample used in this research is Property and Real Estate companies that have been listed on the Indonesia Stock Exchange (IDX) during the period 2016-2018 using purposive technique..

Data collection technique

The type of data obtained in this study is documentary data, namely data obtained by researchers indirectly through intermediary media (obtained and recorded by other parties), generally in the form of evidence of records or historical reports that have been compiled in published archives (documentary data). and unpublished. Sources of data used in this study are secondary data, namely data that has been processed by primary data collectors and through literature studies related to the problems faced and analyzed, presented in the form of information.

The method used in data collection in this research is documentation data. Collecting documentation data is carried out by category and classification of written data related to research problems, both from document sources, books, and other sources.

Data analysis method

Descriptive statistics

Descriptive statistics are used to describe the variables in this study. The analytical tool used is the average (mean), maximum and minimum (Ghozali, 2013). This analysis tool is used to describe the variables of managerial ownership, institutional ownership, and liquidity.

Classic assumption test

Normality test

The normality test aims to test whether in the regression model confounding or residual variables have a normal distribution. As it is known that the t and F tests assume that the residual value follows a normal distribution, if this assumption is violated then the statistical test will be invalid for a small sample size (Ghozali: 2013). In this study, the statistical test used to test the

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residual normality was the Kolmogorov-Smirnov non-parametric statistical test. K-S test is done by making a hypothesis.

H₀ : residual data are normally distributed

H_a : residual data are not normally distributed

Multicollinearity Test

Multicollinearity test aims to determine whether the regression model found a correlation between independent variables (independent). A good regression model should not have a correlation between independent variables (Ghozali: 2013).

Heteroscedasticity Test

The Heteroscedasticity test was performed using the Glejser test. Using the Glejser test, the absolute value of the residuals was regressed on each independent variable. Heteroscedasticity problems occur if there are variables that are statistically significant. The hypothesis for testing is as follows:

H₀: no heteroscedasticity H₁: no heteroscedasticity Decision:

If significant <0.05, then H₀ is rejected (there is heteroscedasticity)

If significant > 0.05, then H₀ failed to be rejected (no heteroscedasticity)

Autocorrelation Test

The results of data processing are often biased or inefficient due to misleading between adjacent data due to the influence of the data itself or what is called autocorrelation. This will cause the error in the previous period to affect the current error so that the error terms will be lower, resulting in higher R² and Adjusted R². The autocorrelation test can be done by calculating the Durbin-Watson d statistic, serial correlation in the residuals does not occur if the d value is between the d_u and 4-d_u boundary values. The hypothesis used is as follows:

H₀ : There is no autocorrelation.

H₁ : There is autocorrelation.

Model Feasibility Test

Analysis of the Coefficient of Determination (R² test)

Analysis of the coefficient of determination (R²) is useful for measuring how far the model's ability to explain the variation in the dependent variable. The coefficient of determination is 0 and 1. A small R² value means that the ability of the independent variables to explain the independent variables is very limited. A value close to 1 means that the independent variables provide almost all the information needed to predict the dependent variable.

Test Together (Test F)

The F statistical test basically shows whether all the independent variables included in the method have a joint influence on the dependent variable. Through the F test, it can be seen that the simultaneous regression relationship between all independent variables and the dependent variable. Based on the significance of the basis for decision making are:

If the significance > 0.05 then H is rejected

If the significance < 0.05 then H is accepted

Partial Test (t test)

This test is conducted to determine whether the independent / independent variables partially have a significant effect on the dependent / dependent variable. Based on the significance of the basis for decision making are:

If the significance > 0.05 then H is rejected

If the significance < 0.05 then H is accepted

Hypothesis testing

Hypothesis testing aims to predict the influence of the dependent variable using the independent variable. The multiple regression equation is:

$$PBV = \alpha + \beta_1 IOS + \beta_2 CSR + \beta_3 PP + \beta_4 IOS * PP + \beta_5 CSR * PP \epsilon$$

Keterangan :

PBV = The value of the company

a = Constant

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ = Regression Coefficient

IOS = Investment Opportunity Set

CSR = Corporate Social Responsibility

PP = Company growth

ϵ = Error

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RESEARCH RESULTS AND DISCUSSION

Results of Data Analysis

1. Descriptive Statistics

Table . Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
CSR	69	8,97000	33,33333	21,1997436	6,27227127
IOS	69	,14298	3,40995	,8391206	,62583815
Nilai Perusahaan	69	,04507	,61294	,2586866	,15036531
Pertumbuhan Perusahaan	69	-,30605	1,18961	,0852003	,16336466
Valid N (listwise)	69				

In the results of the SPSS output above, you can see descriptive statistics of CSR, IOS, Company Value and Company Growth:

- The number of samples (N) was 69.
- The smallest (minimum) score for CSR (8.97), IOS (0.14298), Company Value (0.04507), and Company Growth (-0.30605).
- The greatest value (maximum) for CSR (33.33333), IOS (3.40995), Company Value (0.61294), and Company Growth (1.18961).
- Middle Value (mean) for CSR (21.1997436), IOS (0.8391206), Firm Value (0.2586866), and Company Growth (0.0852003).
- Standard Deviation for CSR (6.27227127), IOS (0.62583815), Company Value (0.15036531), and Company Growth (0.16336466).

1. Classic Assumption Test of Multiple Regression

a. Data Normality Test

Table 1. Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		69
Normal Parameters ^{a,b}	Mean	,0000000
	Std. Deviation	,13508766
Most Extreme Differences	Absolute	,049
	Positive	,049
	Negative	-,033
Test Statistic		,049
Asymp. Sig. (2-tailed)		,200 ^{c,d}

- Test distribution is Normal.
- Calculated from data.
- Lilliefors Significance Correction.
- This is a lower bound of the true significance.

From the results above we look at Asymp. Sig. (2-tailed) and it can be seen that the unstandardized residual value is 0.200. Because this value is greater than 5% or 0.05, it can be concluded that the data is normally distributed.

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b. Multicollinearity Test

Table 2. Multicollinearity Test

Model		Collinearity Statistics ^a	
		Tolerance	VIF
1	(Constant)		
	CSR	,997	1,003
	IOS	,999	1,001
	Pertumbuhan		
	Perusahaan	,998	1,002

a. Dependent Variable: Nilai Perusahaan

From the results above, it can be seen that the value of the variance inflation factor (VIF) of the three variables, namely CSR, IOS, and Company Growth is smaller than 5, so it can be assumed that between the independent variables there is no multicollinearity problem.

c. Autocorrelation Test

Table 3. Autocorrelation Test

Model Summary ^b						
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate	Durbin-Watson
1	,439 ^a	,193	,156		,13816990	,736

a. Predictors: (Constant), Pertumbuhan Perusahaan, IOS, CSR

b. Dependent Variable: Nilai Perusahaan

From the output results above, the DW value generated from the regression model is 0.738. While from the DW table with a significance of 0.05 and the amount of data (n) = 69, and k = 3, the dL value is 1.5205 and dU is 1.7028. Since the value $4-DW (4-0,738) > dU (1.7028)$, it can be concluded that there is no autocorrelation.

d. Heteroscedasticity Test

Table 4. Heteroscedasticity Test

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,007	,027		,256	,799
	Ln_CSR	-,001	,009	-,011	-,088	,930
	Ln_IOS	-,007	,004	-,259	-1,968	,054
	LN_PertumbuhanPerusahaan	-,004	,003	-,170	-1,285	,204

a. Dependent Variable: LN_NilaiPerusahaan

From the results of the output above, it can be seen that the T count values are -0.088, -1.968, and -1.285. While the T table value is 1.66724 on a 2-sided test. Because the value of T count (-0.088, -1.968, and -1.285) is in $-T \text{ Table} < T \text{ Count} < T \text{ Table}$, then H_0 is accepted, meaning that the test between $\ln e_{i2}$ and $\ln X_1$, $\ln e_{i2}$ with $\ln X_2$, and $\ln e_{i2}$ with $\ln X_3$ is not there are symptoms of heteroscedasticity. With this it can be concluded that the problem of heteroscedasticity was not found in the regression model.

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1. Multiple Regression Analysis

a. Determination Coefficient Test

Table 5. Determination Coefficient Test

Model Summary					
Model	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	,471 ^a	,222	,174		,13669265

a. Predictors: (Constant), IOS.Pertumbuhan Perusahaan, CSR, IOS, CSR.Pertumbuhan Perusahaan

Based on the table above, the R² (R Square) number is 0.222 or (22.2%). This shows that the percentage of the contribution of the influence of the independent variable on the dependent variable is 22.2%. Or the variation of the independent variables used in the model is able to explain 22.2% of the variation in the dependent variable. While the remaining 77.8% is influenced or explained by other variables not included in this research model.

b. Hypothesis Testing

1. Statistical Reliability of Each Independent Variable (t-test)

Table 6. T Test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,466	,062		7,514	,000
	CSR	-,006	,003	-,242	-2,178	,033
	IOS	-,113	,037	-,471	-3,033	,003
	CSR.Pertumbuhan Perusahaan	-,011	,006	-,297	-1,904	,061
	IOS.Pertumbuhan Perusahaan	,427	,296	,276	1,441	,154

a. Dependent Variable: Nilai Perusahaan

From the table above, it can be seen that t count is -2.178 for csr, -3.033 for ios, -1.904 for company growth to moderate csr and 1.441 for company growth to moderate ios. Then also obtained t table 1.66724 (2-sided test). And it can be concluded:

- 1) For the CSR variable, namely T Count > T Table (-2.178 > 1.66724), it means that partially there is a significant influence between CSR and Firm Value. So from this case it can be concluded that partially CSR has a significant effect on Firm Value in Property and Real Estate companies listed on the Indonesia Stock Exchange (IDX).
- 2) For the IOS variable, namely T Count > T Table (-3.033 < 1.66724), it means that partially there is a significant influence between IOS and Firm Value. So from this case it can be concluded that partially IOS has a significant effect on Firm Value in Property and Real Estate companies listed on the Indonesia Stock Exchange (IDX).
- 3) For the variable of corporate growth moderating CSR, namely T Count > T Table (-1.904 > 1.66724), it means that partially company growth moderates the influence between csr and firm value. So from this case it can be concluded that partially company growth can moderate CSR to the value of Property and Real Estate companies listed on the Indonesia Stock Exchange (IDX).
- 4) The company growth variable moderates IOS, namely T Count < T Table (1.441 < 1.66724), which means that partially the company's growth cannot moderate the influence of IOS and Firm Value. So from this case it can be concluded that partially company growth cannot moderate ios against firm value at Property and Real Estate companies listed on the Indonesia Stock Exchange (IDX).

This model is used to test the effect of CSR and IOS on Firm Value, Sales Growth moderates CSR on firm value, and

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Sales Growth cannot moderate IOS on firm value. The regression model is systematically formulated as follows:

$$Y = 0.466 - 0.006 x_1 - 0.113 x_2 - 0.011 x_1.Z + 0.427 x_2.z + \epsilon$$

Where :

- a. $\beta_0 = 0.466$; meaning that if CSR, IOS, and Sales Growth as moderating variables are worth 0, then the Firm Value is worth 0.466.
- b. $\beta_1 = -0.006$; meaning that if CSR increases by 1, then the Company Value will decrease by 0.006.
- c. $\beta_2 = -0.113$; this means that if the IOS increases by 1, then the Company Value will decrease by 0.113.
- d. $\beta_3 = -0.011$; this means that if the company's growth moderates the leverage to increase by 1, then the firm's value will decrease by 0.011.
- e. $B_4 = 0.427$; this means that if the company's growth moderates ios to increase by 1, then the firm's value will increase by 0.427

2. Simultaneous Statistics Reliability (F-Statistics / ANOVA)

Table 7. F Test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	,342	4	,085	4,571	,003 ^b
	Residual	1,196	64	,019		
	Total	1,537	68			

a. Dependent Variable: Nilai Perusahaan

b. Predictors: (Constant), IOS.Pertumbuhan Perusahaan, CSR, IOS, CSR.Pertumbuhan Perusahaan

Based on the table, it is obtained that the F count is 4,571, using a confidence level of 95%, $\alpha = 5\%$, it is obtained for F Table of 2.51. Value of F Count > F Table ($4.571 > 2.51$), then H_0 is rejected. This means that there is a significant influence between CSR, IOS, and Company Growth as moderating variables simultaneously on Firm Value. So it can be concluded that CSR, IOS, and Company Growth as moderating variables together have an effect on Firm Value.

DISCUSSION

1. The Influence of CSR on Firm Value

From the analysis above, it can be concluded that Sig <0.05 is seen, which means that there is a significant influence between CSR and. The results are the same as the research of Zaria and Salim (2014) by obtaining that CSR results have an effect on firm value.

2. The Influence of IOS on Firm Value

From the analysis above, it can be concluded that Sig <0.05 is seen, which means that there is a significant influence between IOS and Firm Value. The results are the same as the research of Syardiana, et al. (2015) which states that IOS affects firm value.

3. Company Growth moderates CSR towards Company Value

From the above analysis, it can be concluded that Sig <0.05 is seen, which means that growth can moderate CSR to firm value. The results differ from Bella and Suaryana's (2017) research with the title the influence of IOS and CSR disclosure on firm value with company growth as a moderating variable with CSR results not having an effect on firm value.

4. Company Growth Moderates IOS Against Company Value

From the analysis above, it can be concluded that Sig > 0.05 is seen, which means that company growth cannot moderate ios to firm value. The results differ from the research of Bella and Suaryana (2017) with the title the influence of IOS and CSR disclosure on firm value with company growth as a moderating variable with the results of IOS having an effect on firm value.

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CONCLUSION

From the results of this study, the following conclusions can be drawn:

- 1) CSR has a significant effect on Firm Value with a negative regression coefficient in other words it can increase Firm Value. Thus simultaneously, CSR can increase Company Value
- 2) IOS has a significant effect on Firm Value with a negative regression coefficient in other words, it can increase Firm Value. Thus simultaneously, IOS can increase Company Value.
- 3) Company growth moderates CSR affects Firm Value with a negative regression coefficient in other words it can increase Firm Value. Simultaneously, corporate growth moderates CSR affects firm value.
- 4) Company growth cannot moderate. IOS has an effect on Firm Value with the direction of the positive regression coefficient, in other words it can increase Firm Value in the same direction. Simultaneously, Company Growth cannot moderate the IOS effect on Firm Value.

SUGGESTION

Some suggestions that can be put forward in the results of this study are due to the imperfections of the research conducted by the author, so the authors provide suggestions that are expected to be able to add knowledge from this research, namely as follows:

1. Further research is needed to be able to find out more things to influence Company Value.

The research time should be made long, in order to provide a better picture. Because the results are likely to be different when using different periods.

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The Effect of Profitability, Company Size, Liquidity on Tax Aggressiveness During The Covid-19 Pandemic



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ABSTRACT : This research is a proof-of-concept of important analytical and experimental functions and/or characteristics. This study aims to determine, consider, and test whether the variables Profitability, Firm Size and Liquidity are very influential on a company doing a tax aggressiveness or not.

Data - data and information - information held by several companies to be tested can be broadly seen from the annual financial activities or annual financial statements of the company, which reports, data, and information can be obtained from the company itself or the IDX. The population of companies that will be used in this study are companies engaged in mining and listed on the IDX during the 2020 pandemic. In processing and testing the data to be tested, this study uses the SPSS statistical analysis application. After that, the results of the research conducted using SPSS can be considered whether the profitability, company size and liquidity of the company affect tax aggressiveness activities or not.

Based on the results of research that has been carried out, it is stated that profitability has a significant effect on tax aggressiveness and liquidity and firm size does not have a significant effect on tax aggressiveness.

KEYWORDS: Profitability, Company Size, Liquidity and Tax Aggressiveness

PRELIMINARY

Research Background

Tax is one of the reliable state revenues because state revenues from the tax sector can have a significant effect on the size of the state budget (APBN), which is around 80% so that the government pays special attention to the tax sector and carries out various policies regarding taxation.

However, there are differences in interests where according to taxpayers, taxes are a burden which must be kept to a minimum to achieve high profits. As for the government, taxes, which are revenues, of course, also continue to strive to increase tax revenues, which include providing convenience by providing facilities and regulations that make it easier for taxpayers to carry out their tax obligations.

For decades, the mining industry has tended to be favored by the state because of its large contribution to the national economy. However, behind the high economic value, it turns out that the tax contribution is very minimal. Data from the Ministry of Finance shows that the tax ratio contributed by the mineral and coal mining sector in 2016 was only 3.9 percent, the 2016 national tax ratio was 10.4 percent. And noted that until the end of 2019 it fell 20.6 percent.

The Organization for Economic Co-operation and Development (OECD) in the 2019 Revenue Statistics in Asia and Pacific Economies, puts Indonesia's tax ratio in the lowest position. One of the causes of Indonesia's low tax ratio, according to the report, is the high contribution of agriculture, the relatively large informal sector, tax avoidance, and a low tax base (Business.com).

Tax aggressiveness is the actions taken by the company to reduce its tax obligations. Usually companies as corporate taxpayers take advantage of the weaknesses contained in the law (UU) and other tax regulations. This weakness is also commonly referred to as a gray area, which is a gap or leniency in regulation that is between the practice of planning or calculating taxes that are allowed and not allowed. Tax aggressiveness is an activity or action that has the aim of reducing the company's taxable income both actively and illegally in order to reduce the tax burden so that the company's profits are optimal (Novitasari, Ratnawati, & Silfi, 2017).

An example of a case that indicated the existence of tax evasion practices where the DGT sued the coal company PT Multi Sarana Avindo (MSA) for the alleged transfer of Mining Authorization which resulted in the lack of obligation to pay Value Added Tax

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(VAT). Three lawsuits in 2007, 2009 and 2010 with a claim amounting to 7.7 billion, DGT lost in court. Until now, the DGT is still filing the same lawsuit. The allegation of the Directorate General of Taxes (DGT) is materially unproven. The practice carried out by PT MSA is a practice that does not violate the provisions. DGT's suspicions are not entirely wrong because there is a stark difference between the amount of production produced and the amount of tax payments made. However, DGT should be able to reveal more deeply and uncover the things behind the report figures presented by MSA (Katadata.co.id),

Tax aggressiveness can be influenced by several factors, including profitability which is proxied by Return on Assets (ROA), which is a ratio that can describe the company's profitability or profit potential. A high ROA reflects the company's high profitability, and causes a greater tax burden.

Company size can show the company's ability to return actions and tax decisions. Based on the results of research by Tiaras and Henryanto (2015), tax size affects tax aggressiveness behavior and is positive. This means that large-scale companies will definitely take tax aggressive actions. Research conducted by Giawan Nur Fitria (2018). The title is the Effect of Institutional Ownership, Independent Commissioner, Executive Character and Size on Tax Avoidance with the result that Size affects tax aggressiveness.

Furthermore, with liquidity, liquidity difficulties can trigger companies to disobey tax regulations so that it can lead to aggressive actions against corporate taxes to reduce tax expense expenditures and take advantage of savings made to maintain cash flow. Therefore, companies with low liquidity ratios will tend to have a high level of tax aggressiveness.

Based on the description above, the researcher is interested in conducting a study entitled "The Effect of Profitability, Company Size and Liquidity on Tax Aggressiveness During the Covid-19 Pandemic Period"

Formulation of the problem

Based on the background that has been described, the problem formulations in this study are:

1. Does the size of the company have an influence on tax aggressiveness during the covid-19 pandemic?
2. Does profitability have an influence on tax aggressiveness during the covid-19 pandemic?
3. Does liquidity have an influence on tax aggressiveness during the covid-19 pandemic?

Research purposes

The purpose of this study is to determine whether:

1. To find out empirically the effect on tax aggressiveness during the covid-19 pandemic
2. To find out empirically the effect on tax aggressiveness during the covid-19 pandemic
3. To find out empirically the effect on tax aggressiveness during the covid-19 pandemic

LITERATURE REVIEW, FRAMEWORK AND HYPOTHESIS

Tax, Profitability, Company Size, Liquidity

Tax

The definition of tax according to Law Number 16 of 2009 concerning the fourth amendment to Law Number 6 of 1983 concerning General Provisions and Tax Procedures in Article 1 Paragraph 1 reads that tax is a mandatory contribution to the state owed by an individual or entity that are coercive in nature based on the law, without receiving direct compensation and are also used for the purposes of the state for the greatest benefit of the people's prosperity.

The definition of tax according to Prof. Dr. Rochmat Soemitro, SH., taxes are people's contributions to the state treasury based on the law (which can be enforced) without receiving reciprocal services (contra-achievements) that can be directly shown and which are used to pay general expenses (Mardiasmo, 2018).

Tax aggressiveness is a common and frequent action today among large corporations around the world. Tax aggressiveness measures aim to minimize corporate taxes. Tax aggressiveness is an action that does not only come from the non-compliance of taxpayers with tax regulations, but also comes from austerity activities in accordance with applicable regulations (Rusydi and Martani, 2014).

Profitability

Profitability is the end result of a number of company management policies and decisions. Or it can be said that the profitability of a company is the ability of a company to process and generate net profits from activities carried out by the company in the current accounting period. Profitability ratios are a form of assessment of management performance in managing a wealth owned by the company which is indicated by the profits that have been generated.

The higher the company's profitability, the higher the company's net profit will be. So that companies that have a high level of profitability will always comply with tax payments. On the other hand, companies that have a low level of profitability will not comply with corporate tax payments in order to maintain company assets

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Company Size

According to Brigham & Houston (2010) company size is the size of a company that is indicated or assessed by total assets, total sales, total profit, tax expense and others. The size of the company shows the identity of the company whether in large-scale or small-scale conditions. The size of the company assesses the company's worth or not seen from the assets owned by the company, if the assets are large then the company can be said to be a large company.

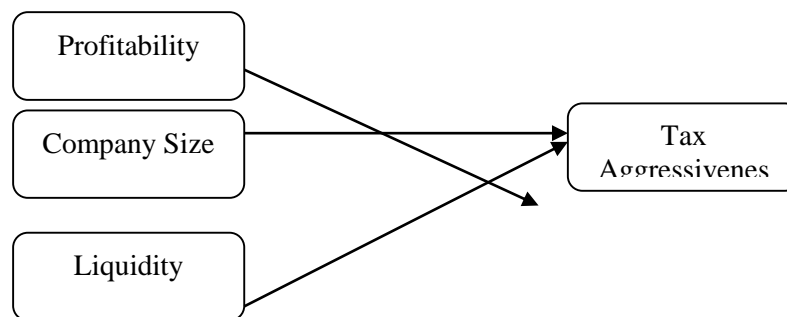
The size of the company can show the stability and ability of the company in carrying out its economic activities (Munandar, Nazar, & Khairunnisa, 2016). If the size of the company is large, the company will be able to attract the attention of the government and managers will tend to be obedient or aggressive in determining policies related to taxes.

Liquidity

Liquidity is the company's ability to meet its short-term obligations. Liquidity can be measured by comparing current assets with current liabilities. Low liquidity can reflect the company is having difficulty meeting its short-term obligations. According to Van Horne and Wachowicz (2012: 205), liquidity is: "The ratio used to measure the company's ability to meet the company's short-term obligations by looking at the amount of current assets relative to its current debt".

Liquidity difficulties can trigger companies to not comply with tax regulations so that it can lead to aggressive actions against corporate taxes. This action is taken by the company to reduce tax expense expenses and take advantage of the savings made to maintain cash flow. Therefore, companies with low liquidity ratios will tend to have a high level of tax aggressiveness.

Thought Framework



RESEARCH METHODS

Types of research

This study uses a causal research method that aims to examine the influence of the behavior of the Fintech use system on online-based payment users. This research requires hypothesis testing with statistical tests. $\frac{\text{Beban Pajak Penghasilan}}{\text{Pendapatan Sebelum Pajak}}$

Operational Definition of Research Variables

The meaning of each variable used in this study are:

- Tax aggressiveness is an act of manipulating planned taxable income through tax planning actions using both legal (tax avoidance) and illegal (tax evasion) methods. In this research, tax aggressiveness is measured by the Effective Tax Rate (ETR), which is the comparison between the real taxes we pay and commercial profits before taxes. The effective tax rate or ETR (Effective Tax Rate) is used to measure the tax paid as a proportion of economic income (Ardyansah and Zulaikha, 2014).

$$\text{ETR} = \frac{\text{Income Tax Expenses}}{\text{Income Before Tax}}$$

- Profitability is the ratio used to assess the company's ability to generate profits. This ratio also provides a measure of the level of effectiveness of a company's management. This is indicated by the profit generated from sales and investment income. Profitability is proxied by the Return On Assets (ROA) formula. Here's the formula for Return On Assets Ratio:

$$\text{ROA} = \frac{\text{Profit Before Tax}}{\text{Total Assets}}$$

- Company size is a size scale in the company that can be seen from the total assets or resources owned by a company. The more assets and resources owned by the company, it can be said that the company has a large size and vice versa. In this study, company size is proxied by Ln total assets. The use of natural log (Ln) is intended to reduce excessive fluctuations in data without changing the proportion of the actual original value (Nurfadilah, et al, 2016). The following formula is used to calculate company size:

$$\text{SIZE} = \text{Log} (\text{Total Assets})$$

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d. Liquidity in the company can be said to be a source of funds for a company to meet obligations and needs that will be measured and calculated and aims to measure a company to buy and sell assets owned by the company. In this study to measure liquidity in the company that will be processed with the Current Ratio. Calculation of this variable is calculated using the formula, as follows:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current liabilities}}$$

Population and Research Sample

The population in this study are mining sector companies listed on the Indonesia Stock Exchange for 4 quarters in 2020. The sampling in this study used a purposive sampling technique, where purposive sampling is a sampling technique for data sources with certain considerations, the research sample obtained was 16 companies. And the amount of data is 64 data

Data collection technique

The type of data obtained in this study is documentary data, namely data obtained by researchers indirectly through intermediary media (obtained and recorded by other parties), generally in the form of evidence of records or historical reports that have been compiled in published archives (documentary data). and unpublished. Sources of data used in this study are secondary data, namely data that has been processed by primary data collectors and through literature studies related to the problems faced and analyzed, presented in the form of information.

Method of Analysis

Descriptive statistical data

Descriptive statistics are used to describe the variables in this study. The analytical tool used is the average (mean), maximum and minimum (Ghozali, 2013). This analysis tool is used to describe the variables of managerial ownership, institutional ownership, and liquidity.

Classic assumption test

Normality test

The normality test aims to test whether in the regression model confounding or residual variables have a normal distribution. As it is known that the t and F tests assume that the residual value follows a normal distribution, if this assumption is violated then the statistical test will be invalid for a small sample size (Ghozali: 2013). In this study, the statistical test used to test the residual normality was the Kolmogorov-Smirnov non-parametric statistical test. K-S test is done by making a hypothesis

H₀ : residual data are normally distributed

H_a : residual data are not normally distributed

Hypothesis testing

Multiple linear regression analysis is used to determine the effect of two or more independent variables with one dependent variable, whether each independent variable is positively or negatively related to the dependent variable.

Research Results and Discussion

Results of Data Analysis

Descriptive Statistics

Table Descriptive Statistics

Descriptive Statistics	N	Minimum	Maximum	Mean	Std. Deviation
PROFITABILITAS	44	-819204254.00	263235287.00	-47617898.6591	246093796.97636
UKURAN PERUSAHAAN	44	105923053.00	9774044064.00	1930918453.2500	2226278370.18587
LIKUIDITAS	44	43574399.00	2993498997.00	1332806496.2500	877259505.71594
AGRESIVITAS PAJAK	44	-7317503195.00	8456536168.00	-872938999.3182	2533884079.48981
Valid N (listwise)	44				

In the results of the SPSSs output above, you can see descriptive statistics of CSR, IOS, Company Value and Company Growth:

- The number of samples (N) was 44.
- The smallest (minimum) score for Profitability (-819.204.254), Company Size (105.923.053), Liquidity (43.574.399), and Tax Aggressiveness -7.317.503.195).
- The greatest value (maximum) for Profitability (263.235.287), Company Size (9.774.044.064), Liquidity (2.993.498.997), and Tax Aggressiveness (8.456.536.168)

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- d. Middle Value (mean) for Profitability (-47.617.898,659), Company Size (1.930.918.453,2), Liquidity (1.332.806.496,25), and Tax Aggressiveness (-872.938.999,3182)
- e. Standard Deviation for Profitability (246.093.796,97636), Company Size (2.226.278.379,18587), Liquidity (877.259.505,71594), and Tax Aggressiveness (2.533.884.079,48981).

Data Normality Test Normality Test

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		44
Normal Parameters ^{a,b}	Mean	.0000001
	Std. Deviation	1338143182.58346630
Most Extreme Differences	Absolute	.097
	Positive	.084
	Negative	-.097
Test Statistic		.097
Asymp. Sig. (2-tailed)		.200 ^{c,d}

- a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

From the results above we look at Asymp. Sig. (2-tailed) and it can be seen that the unstandardized residual value is 0.200. Because this value is greater than 5% or 0.05, it can be concluded that the data is normally distributed.

1. Multiple Regression Analysis

a. Determination Coefficient Test

Determination Coefficient Test

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.437 ^a	.191	.130	1387416381.39987

a. Predictors: (Constant), LIKUIDITAS, UKURAN PERUSAHAAN, PROFITABILITAS

Based on the table above, the R² (R Square) number is 0.191 or (19.1%). This shows that the percentage of the contribution of the influence of the independent variable on the dependent variable is 19.1%. Or the variation of the independent variables used in the model is able to explain 19.1% of the variation in the dependent variable. While the remaining 80.9% is influenced or explained by other variables not included in this research model.

b. Hypothesis Testing

1. Statistical Reliability of Each Independent Variable (t-test)

Table T Test

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1283693594.765	449304718.088		-2.857	.007
	PROFITABILITAS	-1.818	.908	-.301	-2.002	.052
	UKURAN PERUSAHAAN	.141	.095	.212	1.486	.145
	LIKUIDITAS	-.251	.255	-.148	-.987	.329

a. Dependent Variable: AGRESIVITAS PAJAK

From the table above, it can be seen that t count is -2.002 for Profitability, 1.486 for Company Size, -0.987 for likuidity. Then also

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obtained t table 1.68288 (2-sided test). And it can be concluded:

- 1) For the Profitability variable, namely $T_{\text{Count}} > T_{\text{Table}}$ ($-2.002 > 1.68288$), it means that partially there is a significant influence between Profitability and Tax Aggressiveness. So from this case it can be concluded that partially Profitability has a significant effect on Tax Aggressiveness in mining sector companies listed on the Indonesia Stock Exchange (IDX).
- 2) For the Company Size variable, namely $T_{\text{Count}} > T_{\text{Table}}$ ($1.486 < 1.68288$), it means that partially there is a significant influence between Company Size and Tax Aggressiveness. So from this case it can be concluded that partially Company Size has a significant effect on Tax Aggressiveness in mining sector companies listed on the Indonesia Stock Exchange (IDX).
- 3) For the variable of corporate growth moderating Liquidity, namely $T_{\text{Count}} > T_{\text{Table}}$ ($-0.987 > 1.68288$), it means that partially Liquidity and Tax Aggressiveness. So from this case it can be concluded that partially Liquidity in the value in mining companies listed on the Indonesia Stock Exchange (IDX).

The regression model is systematically formulated as follows:

$$Y = -128 - 1,818 \text{ Prof} + 0.141 \text{ Company Size} - 0,251 \text{ Likui} + \epsilon$$

Where :

- a. $\beta_0 = -128$; meaning that if Profitability, Company Size, and Likuidity are worth 0, then the Tax Aggressiveness is worth 128.
- b. $\beta_1 = -1,818$; meaning that if Profitability increases by 1, then the Tax Aggressiveness will decrease by 1,818.
- c. $\beta_2 = 0.141$; this means that if the Company Size increases by 1, then the Tax Aggressiveness will increase by 0.141.
- d. $\beta_3 = -0.251$; this means that if the Liquidity by 1, then the Tax Aggressiveness will decrease by 0.251.

2. Simultaneous Statistics Reliability (F-Statistics / ANOVA)

F Test

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18196867866319	3	60656226221063	3.151	.035 ^b
		176000.000		91600.000		
	Residual	76996968615068	40	19249242153767		
		100000.000		02720.000		
	Total	95193836481387	43			
		280000.000				

a. Dependent Variable: AGRESIVITAS PAJAK

b. Predictors: (Constant), LIKUIDITAS , UKURAN PERUSAHAAN , PROFITABILITAS

Based on the table, it is obtained that the F count is 3.151, using a confidence level of 95%, $\alpha = 5\%$, it is obtained for F Table of 2,83. Value of F Count $>$ F Table ($3,151 > 2.83$), then H_0 is rejected. This means that there is a significant influence between Profitability, Company Size, and Liquidity on Tax Aggressiveness. So it can be concluded that Profitability, Company Size, and Liquidity together have an effect on Tax Aggressiveness.

DISCUSSION

The Relationship of the Effect of Profitability on Tax Aggressiveness

Based on the results of the T test on the hypothesis test that the significant value on the profitability variable resulted in 0.05. Which means the nominal is smaller than the significant limit value which aims to determine whether it has an effect or not. So, it can be concluded that profitability has a significant effect on tax aggressiveness.

The Relationship between Company Size and Tax Aggressiveness

Firm size has no significant effect on tax aggressiveness. This is because this research was conducted during a pandemic in 2020. The whole world experienced a decline in its effectiveness and experienced a declining economic condition. Therefore, if an asset of the company experiences an increase, it can be assumed that the company is carrying out tax aggressiveness, but in 2020 the company experienced a decrease in assets which causes results that have no effect. This also happened to mining companies because of the declining world economic conditions, sales results and effectiveness levels also could not run normally as in previous years. If the level of effectiveness is running normally as usual, then the company's expenses will increase while the company's sales are not going well. Therefore the level of company effectiveness must also be minimized in order to save company expenses and comply with the Health protocol rules that have been implemented.

Relationship between Liquidity and Tax Aggressiveness

Liquidity has no significant effect on Tax Aggressiveness. This is because at the time of this study there was an effect of the Covid-

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19 pandemic that hit during 2020 and until now. As a result of the effects of this pandemic, all companies and SMEs in the world have declined. From the economic conditions to the level of effectiveness of the company. This causes the company's revenue to not run as smoothly as in previous years. The liquidity ratio is a ratio related to debt, things that make liquidity have no effect because high or low levels of company debt have no effect on profitability, however, the profitability obtained by the company will be minus due to the 2020 pandemic that hit. Therefore the company experienced a decline, therefore many companies increased debt to cover losses and the company could still be effective in producing products. And also the higher the level of debt in a company, the interest earned by the company is also high, this makes the tax burden received by the company decreases because of the high level of debt owned by the company.

CONCLUSION

Based on the first hypothesis test (H1) is the effect of Profitability ratios on Tax Aggressiveness. It can be concluded that profitability has a significant effect on tax aggressiveness. From these results, it can be concluded that the size of the profitability or income of a company can affect a company in carrying out tax aggressiveness actions.

Based on the second hypothesis test (H2) is the effect of firm size on tax aggressiveness. It can be concluded that company size has no significant effect on tax aggressiveness. From these results, it can be concluded that the assets owned by a company will affect whether the company takes tax aggressiveness actions or not.

Based on the third hypothesis test (H3) is the effect of Liquidity on Tax Aggressiveness. It can be concluded that liquidity has no significant effect on tax aggressiveness. From these results, it can be concluded that the size of the debt owned by the company will affect a company in carrying out tax aggressiveness and is also supported by the level of profitability of the company.

SUGGESTION

Some suggestions that can be put forward in the results of this study are due to the imperfections of the research conducted by the author, so the authors provide suggestions that are expected to be able to add knowledge from this research, namely Further research is needed to be able to find out more things to tax aggressiveness and The research time should be made long, in order to provide a better picture. Because the results are likely to be different when using different periods..

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The Effect of the Ameliorasi Action on the Reeds (*Imperata*) Land Area



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ABSTRACT: This evaluation is being conducted with intended to determine the rate of Organic Soil Treatment (OST) and identifying the benefits of Organic soil treatment as a material that improves the chemical properties of the soil in the reeds (*imperata*) area as arable land. The OST material contains Leonardite humus and various organic elements to stimulate biological processes has the ability to regenerate the soil. Treatment uses a full factorial randomized design with 4 doses of OST, i.e no treatment (control), 3 grams/pot, 6 grams/pot and 9 grams/pot. Treatment results showed improvements in pH, organic matter, organic C, ECEC, B-c, N, P, K and instead it degrades Al-dd which is a detrimental chemical property.

KEYWORDS: soil chemical, ameliorasi, reeds (*imperata*) land

INTRODUCTION

The expansion of land for growing agricultural products is still very possible in East Kalimantan, because in this area there are about 11.5 million hectares of peripheral land, of which about 13% is along along land (reeds land). *Alang-alang* (*Imperata cylindrica*) is a very harmful weed for agricultural cultivation because it absorbs a large amount of macronutrients, especially N, P, K and Ca. Countries dominated by *alang-alang* are generally red-yellow podzolic soils, the several have unfavorable plots of land to develop as agricultural farmland. Because it contains macronutrients, organic matter and low soil acidity. In addition, it also has poor physical properties, namely, dense structure, prone to high soil density, slow soil permeability, and poor soil aeration because it is saturated with water relatively quickly and stagnates easily, causing severe erosion. This condition makes the land of reeds (*imperata*) has low cultivation capacity both physically and in its fertility status, because the growth rate of reeds (*imperata*) is low from 1 to 4 years, then the growth rate from 5 to 7 years or more is too short.

Overcoming the low bearing capacity of Reeds (*imperata*) soil does not produce satisfactory results when only macro and micronutrients are added through organic fertilizers and inorganic fertilizers through soil and foliage. And it turns out that simply adding agricultural lime to the soil or just treating the fertilizer has no appreciable effect. This is because reeds (*imperata*) land in humid tropical areas such as East Kalimantan is known to have very high erodibility and soil erodibility values. For this reason, an improvement measure is required by introducing into the soil a special organic material capable of remodeling and generating a biological activity of the soil. Application of a specific amelioration technology is expected to optimize the soil in the area of marginal to support the growth of food crops. Which in turn has a positive effect on the chemical state of the soil (nutrient availability).) and the state of the physical structure of the soil, including through the use of Organic Soil Treatment (OST). Organic Soil Treatment (OST) is a result of the mixing process assortment of organic elements such as humus, peat surface bog, fossil flour, a mixture of a wide variety of natural proteins, and soil bacteria (*Azotobacter*, *Agrobacterium*, *Azospirillum*, *Aspergillus*, *Rhizobium*, *Mycorrhiza*, etc)

. OST fertilizer contains organic compounds that have undergone a decomposition process perfect and will be able to turn a marginal soils become productive again in natural processes. Therefore, technology is needed to improve soil properties through amelioration and fertilization to improve soil fertility. Thus, if mineral nutrients can be extracted from the soil in a controlled manner and the availability of organic matter renewed, then soil treated with improvements can certainly produce good and sustainable agricultural growth and production.

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RESEARCH METODOLOGY

This study was conducted in an area with a yellow-red podzolic soil type that was dominated by the actively growing along along plant for 7 to 10 years. OST treatment was consists of 4 levels, namely no OST (UP₀), 3 grams OST/pot (UP₁), 6 grams OST/pot (UP₂) and 9 grams OST/pot (UP₃), and was performed for 8 replicates . All research units were in the open field for 4 months without additional treatment.

RESULTS AND DISCUSSION

Analysis of the chemical properties of the soil was carried out in 2 stages, namely the soil before receiving the improving treatment and the soil after 3 months after receiving the improving treatment. The analysis of the chemical properties of the soil was carried out 3 months after the improvement treatment, assuming that at the age of 3 months the food crop, especially on dry land, was in the generative phase, i.e. the nutrient requirements were relatively constant.

The results of the analysis of the chemical properties of the soil of all research units (PU) can be seen in Table 1,

Table 1. The results of the analysis of the chemical properties of the soil.

chemical properties of soil	UP ₀	Crit.	UP ₁	Crit.	UP ₂	Crit.	UP ₃	Crit.
pH H ₂ O	3,81	MB	4,65	Ac	4,85	Ac	5,78	Ac
IO (%)	1,57	B	2,99	Ac	3,23	Ac	3,61	Ac
CO (%)	0,91	MB	2,66	Ac	2,31	Ac	2,51	Ac
ECEC	17,16	Ac	51,08	A	58,05	A	59,83	A
CB (me)	63,35	A	80,01	A	92,24	mA	95,49	mA
N-t (%)	0,11	MB	0,81	B	1,09	Ac	1,09	A
P-d (ppm)	46,00	Ac	50,61	Ac	55,75	A	58,75	A
K-d (ppm)	24,56	Ac	30,52	Ac	32,43	A	33,01	A
Al-dd (me)	6,29	A	2,51	B	1,38	B	0,51	B

Information:

Criteria = criteria; CO = Organic Carbon; IO = Organic Ingredients; Bc = Base Capacity

K-d = Available Potassium; P-d = Available Phosphorus; N-t =Total Nitrogen

ECEC = Effective cation exchange capacity; Al-dd=Aluminum is interchangeable.

mA = Very High; A = High ; Ac = Currently; B = Low; MB = Very Low

The results of the soil tests showed that the soil chemistry in Reeds (*imperata*) land had various bad conditions with very low pH and high Al-dd content. The state of the chemical properties of the soil in Reeds (*imperata*) land is theoretically very likely for the occurrence of aluminum (Al) element poisoning and will lead to saturation or decomposition of the proteins that make up the cells, which in turn will cause other elements to become less present . Because soils with a very low pH and a very high Al-dd content easily increase the fixation process of the P element, since this element very easily combines with the elements Al, Fe or Mn and forms complex compounds which are not easily soluble are. in the water, making it unavailable to plants.

The application of organic soil treatment as an improvement material over a 2 month period has improved several poor soil characteristics on Reeds (*imperata*) land. All treatments were able to increase the content of organic C and CEC, but the increase was too small when compared with those without ameliorant having C-organic content and CEC. From Table 1 it can be seen that soil acidity changes from very low to moderate, even approaching the optimum pH required for food crops, particularly rice, corn, soybeans, peanuts and others. The same can be seen in the increased availability of other macronutrients.

Changes in these macronutrients include increased total N availability from a very low to a moderate to high state. P-available and K-available items from mid state to high state. The same can also be seen in the parameters Total Organic Matter and C-Organic content.

The increasing existence of the two soil chemistry properties has a beneficial effect on other essential components required by plants, especially the availability of groundwater. This is due to the increased ability of the soil to store water, which greatly stimulates the activity and mechanism of the mineralization process in the soil. At the same time, the strengthening of soil mineralization processes and the increase in soil water holding capacity are very beneficial for the development of soil microorganisms. The general condition obtained after 2 months of application of the organic soil treatment corresponds to the main function of OST as a soil regenerator.

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The OST material contains Leonardite humus to stimulate biological processes in the soil so that it has the ability to regenerate the soil. In addition, OST also contains various organic elements that naturally help to increase soil uptake based on the principle of controlled release of mineral nutrients and nutrients to activate soil microorganisms. The benefit of using OST is the high nutrient, organic matter, and protein content of OST. Added to this is the supply of nitrogenous nutrients by reducing their formation from the soil, this is due to the availability of N elements in organic form bound to carbon compounds necessary for plants. This will tend to reduce leaching losses, support micronutrient solubility and availability, create stable conditions for favorable long-term soil chemistry, and allow for the controlled release of nutrients from the soil that are directly available to plants. available and required by plants for use by soil microorganisms and plants.

According to Suswati (2009), the coastal sediment ameliorant could replace the role of lime in increasing pH and base saturation (BS). Results of the study of Suswati et al. (2015) showed that the addition of coastal sediment on PIGM land reduced soil acidity, and improved CEC, BS, and availability of soil nutrients (K⁺, Ca²⁺, Mg²⁺ and Na⁺).

There are several physico-chemical properties of soil that are improved by adding soil ameliorants. These are the soil properties improved by soil ameliorants: pH

Salinity, fertility. heavy metals, micronutrients. macronutrients, electrical conductivity, biological and biochemical quality The impact of ameliorants of different nature (source of nitrogen – urea, mineral adsorbent – glauconite, humic agent – potassium humate, bacterial preparation) and with different mode of action on the biological condition of black soil was assessed for the first time. Application of coastal sediment at a dose of 40 t/ha on peat could increase the yield of hybrid maize that reached 12 ton/ha. Application of agricultural lime and rice husk charcoal produced the same growth rate value but it was significantly higher than without ameliorant treatment.

The results of this study showed that vegetation applied with OST gave better growth rate than that without ameliorant. The results of this study indicated a significant influence between the three treatments tested. In this case, ameliorant application was capable in improving soil chemical properties thus creating a better condition for crop growth.

CONCLUSION

Based on the above description, it can be generally concluded that the application of ost as a improver can reduce poor soil chemical properties of reeds (*imperata*) plots and at the same time improve soil fertility with a tendency to have a beneficial impact with higher OST provisions

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Development of Student Worksheets (LKPD) Based on Discovery Learning to Improve Students' Critical Thinking Ability on Movement System and Digestive System Materials in Class XI SMA/MA



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ABSTRACT: The type of research conducted by the researcher is research development (*research development*). The product developed is LKPD based on *Discovery Learning* (DL). The aim is to improve the critical thinking skills of class XI students of SMAN 1 XI Koto Sungai Lasi The LKPD trial was carried out to obtain data that would be used in revising the product. The development model used in this research is the P lomp model. This model consists of three stages, namely the initial investigation stage (*preliminary research*), the development or prototyping phase (*development or prototyping phase*) and the assessment phase (*assessment phase*). Evaluation of the prototype is carried out by means of *formative evaluation* as described in. The trials carried out consisted of a one- *to-one evaluation* , *small group evaluation* and *large field test*. The next step is to revise the product based on the results of a one-on-one evaluation. Then the revised DL-based LKPD product was re-tested in a *small group*. The results of the revision were tested again on a large group (*field test*) of students in one class. The trial aims to identify product deficiencies if used in actual conditions, see the effectiveness and practicality of the product. Research results The validation results by the validators show that *discovery learning -based worksheets* on the movement and digestive system material show a very valid category with a value of 84.05%. The results of the practicality test obtained from teachers and students showed that *discovery learning -based worksheets* on the movement and digestive system material showed a very practical category with a value of 95.00 % from teachers and 90.34 % from students. The results of the effectiveness test of *discovery learning -based worksheets* on the motion and digestive system material show that it is effective in improving students' critical thinking skills.

KEYWORDS- development, discovery learning, critical thinking

I. INTRODUCTION

Learning is a process carried out by a person to obtain a new behavior change as a whole, as a result of his own experience in interaction with his environment (Slameto, 2010). Rusman (2012) said learning is a process carried out by individuals to obtain changes in personality, while the learning process is a process that contains a series of actions of teachers and students on the basis of reciprocal relationships that take place in educational situations to achieve certain goals . a teacher activity programmed in instructional design to make students learn actively which emphasizes providing Learning Resources. Supriadie and Darmawan (2013) said it should be in learning activities there is a communication process to convey messages from educators with the aim of so that messages can be well received and affect understanding and behavior change, thus learning success activities are very important depends on the effectiveness of the communication process that occurs in learning that .

Biology is a branch of natural science that studies the symptoms, phenomena of living things, both animals, plants and humans. Biology in school learning is an interesting lesson because the learning process is not only carried out in the classroom but also outside the classroom (Ridhayani and Manurung, 2010). Lufri (2007) said that learning biology demands scientific and conceptual learning. The curriculum is a set of plans and arrangements regarding the objectives, content and learning materials as well as the

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methods used as guidelines for the implementation of learning activities to achieve the objectives of certain learning activities (Susilo and M. Joko, 2007).

The implementation of the 2013 Curriculum in the education system in Indonesia led to the implementation of several things in the world of education, including the application of a scientific approach or a scientific approach. Based on the results of an interview with a biology teacher at SMAN 1 XI Koto Sungai Lasi, Mr. Afrinaldi S.Pd, on August 16, 2021, it was known that at the time of learning there were still many students who had not followed the lesson well. During the biology learning process, the teacher still applies conventional learning that does not refer to the students' critical thinking skills. Teachers also have not used attractive worksheets that can help train students' critical thinking skills so that there are still many students who have not been able to process their reasoning, questioning, and analysis skills.

During the learning process, the teacher only uses questions in printed books and questions that are made directly by the teacher. The LKPD has not been compiled using the learning model in the 2013 Curriculum that directs students to practice critical thinking skills towards a developing phenomenon. The teacher provides theoretical learning without being faced with problems that develop in the everyday environment. In addition, in teacher learning still leads to teacher centeredness which makes students only receive information from a teacher, which causes students' critical thinking skills are not yet trained and are still very low. The LKPD questions made by the teacher only contain questions related to ongoing learning with a few pictures related to the material so that students are less interested in participating in the learning. The LKPD made by the teacher has not been attractive and has not helped students to train critical thinking. Lack of teaching materials in learning can make students' critical thinking skills low.

Low critical thinking skills can have an unfavorable impact on further education. This is in line with Anwar's statement (2020) which states that critical thinking skills must be possessed by all students at every level of education, therefore critical thinking skills need to be trained. Then it is also supported by the opinion of Yuliati (2013) which states that critical thinking can be taught and requires practice to be able to have it. One way to train students' critical thinking skills is through questions based on critical thinking skills.

Based on these problems, there are several shortcomings that exist in the LKPD used, namely the existing LKPD has not been compiled according to the model recommended in the 2013 Curriculum, the LKPD which is compiled directly leads students to carry out activities or investigations without presenting a problem to students to think critically, LKPD which is compiled does not train students to think critically when conducting discussions and the compiled LKPD does not yet present interesting pictures or colors related to discussions on subject matter that can attract the attention of students.

Discovery learning is an active learning model in which students build their own knowledge by conducting an experiment and discovering a principle from the experiment. This discovery learning model is considered suitable for overcoming the problems that exist in students because it can train students' critical thinking skills to solve a problem related to ongoing material and relate it in everyday life. Based on the results of observations on 22 students, 63% of students assessed the motion system material including material that was difficult to understand and 77% of students rated the digestive system material as difficult to understand. The LKPD that will be developed consists of 2 KD, namely KD 3.5 on the movement system and KD 3.7 on the digestive system.

Based on the problems that have been stated above, it encourages researchers to conduct research on student worksheets using discovery learning -based learning models to improve students' thinking skills which are made for motion system material and digestive system material. Based on this, a research will be conducted on "Development of Student Worksheets (LKPD) Based on Discovery Learning to Improve Students' Critical Thinking Ability on Movement System and Digestive System Materials in Class XI SMA/MA".

II. RESEARCH METHODS

This DL-based LKPD development research uses the Plomp model which consists of three stages, namely the preliminary research phase, the development or prototyping phase, and the assessment phase. The results of the research conducted can be described as follows.

Initial Investigation Phase (Preliminary Research Phase)

This stage is carried out to get an overview of the conditions regarding the characteristics of the product that is developed and can be used in learning.

Results of Analysis of Problems and Needs of Teachers and Students

Based on the results of the needs analysis on 22 students, interviews and questionnaires were distributed on the needs of students for teaching materials. It was found that the problem with the students was that 50% of the students had difficulty

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understanding the material. As many as 63% of students said the motion system material was difficult to understand and 77% of students said the digestive system was difficult to understand. The presentation of the material has not linked the material with the problems that exist in everyday life and the LKPD used also has not trained the thinking skills of these students. From the results of the questionnaire given, 86% of students wanted LKPD that was interesting and had clear pictures, colors and materials.

Student Analysis Results

Based on the results of the questionnaire given to students, the tendency of students to respond to difficult learning is that as many as 77% of students choose to listen to the teacher's explanation to understand a material. students choose to listen to the teacher's explanation to understand a material. Most of the students said that learning biology was rather difficult and complicated to understand, so that when the learning took place, the students did not listen well what the teacher said. To help students during the learning process, most students want LKPD that is interesting and easy to understand and displays relevant pictures related to the material being studied.

Results of Student Worksheet Analysis (LKPD)

Based on the results of the analysis, it is known that there are weaknesses in the activity sheet from the teacher used by students ie 63% of students said the LKPD had not been prepared according to the model recommended in the 2013 curriculum, namely the DL model. There are as many as 45.5% of students saying the LKPD used by the teacher is not interesting and difficult to understand. There are as many as 91% of students agree that class learning is more understandable if using DL-based worksheets.

Curriculum Analysis Results

Curriculum analysis is focused on the analysis of Core Competencies (KI) and Basic Competencies (KD) which have been determined in the standard content of Biology subjects in accordance with the 2013 curriculum. This analysis aims to serve as a guide in developing Discovery Learning (DL) based worksheets for SMA class XI MIPA. The results of the KI and KD analysis contained in the content standard are translated into Competency Achievement Indicators. Based on the curriculum analysis that has been carried out, students are required not only to be able to explain but also to be able to analyze the motion and digestive system material, collect information and present data and propose ideas in solving problems related to the material.

Development or prototyping stage (Prototyping phase)

The results obtained at the initial investigation stage are used as guidelines in developing Discovery Learning (DL) based worksheets on the motion and digestive system material. The results of the development activities carried out at this stage are as follows.

Didactic Aspect

LKPD development refers to the 2013 curriculum which is adapted to KI and KD. Indicators and learning objectives are made based on KI and KD. The development of each activity in the DL-based LKPD is adjusted to achieve the learning objectives. The LKPD components that have been made refer to the LKPD disclosed by Prastowo (2011), which consists of instructions for use, subject matter, student worksheets, evaluation and assessment sheets.

Construct Aspect

At this stage, students are faced with something that causes confusion and a desire arises to investigate on their own. Teachers can start learning activities by asking questions, recommending reading books and other learning activities that lead to the preparation of problem solving. **Technical Aspect**

LKPD is made using Microsoft Word 2010 on the cover and content. The type of writing used on the cover of the LKPD is Candara with sizes varying from 12-20. The selection of the type of writing is an important aspect to form an impression on the product being developed (Tinarbuko, 2012). According to Pujirianto (2005) the use of this type of writing can give a formal, classic, and elegant impression, so it is suitable for use in the headline.

Assessment Phase

The activities carried out at this stage of the assessment are LKPD assessments which were developed in actual conditions. The test was carried out on two test classes, namely the experimental class and the control class. The purpose of the large group assessment is to determine the level of practicality and effectiveness of the developed LKPD.

Table. 1 Practicality Assessment by Teacher

No.	Aspect	Score (%)	Criteria
1	Ease of Use	88.00	Very practical
2	Efficiency	87.5	Very practical

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3	Attractiveness	100	Very practical
4	Easy to interpret	100	Very practical
5	Have Equivalence	100	Very practical
Average Practicality Score		95.00	Very practical

Based on Table 1. above, it is known that the average practicality value of the DL-based LKPD which is filled by the teacher is 95.00% with very practical criteria.

Table. 2 Student Practicality Assessment

No.	Aspects	Score (%)	Criteria
1	Ease of Use	89.58	Very practical
2	Efficiency	86.93	Very practical
3	Attractiveness	95.45	Very practical
4	Easy to interpret	89.39	Very practical
5	Have Equivalence	90.34	Very practical
Average Practicality Score		90.34	Very practical

Based on Table. 2 it is known that the average practicality value of the DL-based LKPD on the motion and digestion material filled out by students is 90.34% with very practical criteria. This shows that the LKPD developed is practically used by students.

Table. 3 Results of Critical Thinking Skills Assessment

Class	N	Xmin	Xmax	\bar{x}	Standard Deviation
Experiment	22	52	92	78.00	10,600
Control	22	40	84	60.36	11,704

Based on Table 3. it can be seen that the average critical thinking ability of the experimental class students is higher than the control class average. The experimental class is a class that is given treatment in the form of DL-based worksheets on motion material, while the control class is a class without treatment. The average value of critical thinking skills in the experimental class is 78.00 with a critical category with a standard deviation of 10,600, while the average value of critical thinking skills in the control class is 60.36 with a fairly critical category with a standard deviation of 11,704.

The next stage is hypothesis testing, but first the normality test and homogeneity test are carried out as a condition for data analysis. Based on the results of the analysis prerequisite test, it was found that the value of critical thinking skills was normally distributed and homogeneous. Furthermore, this critical thinking ability data was tested using the *Independent Samples T Test*.

Table. 4 Prerequisite Test Results for Normality and Homogeneity of Critical Thinking Skills

No.	Parameter	Significance	Information
1	Normality	0.200	Normal
2	Homogeneity	0.707	Homogeneous

Based on the results of the normality test, it shows greater significance, namely $0.200 > 0.05$ and the homogeneity test is $0.707 > 0.05$, meaning that the value of critical thinking ability is normally distributed and homogeneous. Furthermore, this critical thinking ability data was tested for hypotheses using the *Independent Samples T Test* or t-test.

Table. 5 Calculation Results of Critical Thinking Skills t-test

Class	Significance	Conclusion
Control	0.000	H_0 rejected
Experiment		

Development of Student Worksheets (LKPD) Based on Discovery Learning to Improve Students' Critical Thinking Ability on Movement System and Digestive System Materials in Class XI SMA/MA

Based on Table 5. it is known that the significance value of students' critical thinking skills is 0.000. This indicates that the significance value is <0.05 , which means that H_0 is rejected and H_1 is accepted. Thus, it is known that the use of DL-based LKPD in motion and digestion material affects the critical thinking skills of class XI students of SMAN 1 XI Koto Sungai Lasi.

III. CONCLUSION

Based on the development of LKPD based on Discovery Learning for class XI students of SMAN 1 XI Koto Sungai Lasi, the validation results obtained by the validators show that LKPD based on discovery learning on the material of the movement and digestive system shows a very valid category with a value of 84.05%. The results of the practicality test obtained from teachers and students showed that discovery learning -based worksheets on the movement and digestive system material showed a very practical category with a value of 95.00 % from teachers and 90.34 % from students. The results of the effectiveness test of discovery learning -based worksheets on the motion and digestive system material show that it is effective in improving students' critical thinking skills.

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Elementary Piano Teaching Technologies in Music and Art Schools



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ABSTRACT: This article discusses elementary piano teaching technologies in music and art schools. The main form of piano lessons is individual lessons. They have a number of advantages: they allow for close communication with students, and the ability to constantly find, correct, and update the means and methods of influencing each student' creates a favorable environment for students to gain a deeper understanding of their identity, and so on. It is important to take into account the individual characteristics of young educators. However, the life of secondary special education and the practical process are different. There are situations that do not correspond to pedagogical theory.

KEYWORDS: piano lessons, teaching technologies, pedagogical theory, art schools, individual lessons, close communication, favorable environment, individual characteristics, young educators, special education, practical process.

INTRODUCTION

Over the past twenty-five years, the education system of the country has undergone radical reforms to bring the young generation to mental, physical and spiritual maturity.

As the First President I.A. Karimov noted: "The world of spirituality will be enriched with new meanings only if the ancient and eternal problems of this complex world, as well as comprehensive scientific answers to the pressing issues of each epoch are found, in other words, every scientific discovery, every discovery is a stimulus to a new way of thinking and worldview, a unique influence on the formation of spirituality".

It is important to involve students in creative and independent activities in educational institutions, to increase their effectiveness, so that they take a serious approach to independent activity, finding their place and setting life goals according to their age.

THE MAIN FINDINGS AND RESULTS

"The National Program of Personnel Training" aims to increase the legal and economic knowledge of students at all levels of continuing education, improve the education of students, educates cultured and faithful youth. The social activity of the members of the society is determined by their scientific potential and scientific outlook. The economic, political, social and cultural development of developed countries today is closely linked to the development of science. The national model of training identifies the development of fundamental and applied research in nature and society, the creation of infrastructure for scientific support of the training of highly qualified personnel, the organization of the integration of our country's science into world science. The fulfillment of the tasks set by the Government of the Republic in the field of higher and public education largely depends on the teacher. In the new economic environment, the teacher is responsible for achieving the goals of education, organizing various activities of students, raising them to be educated, polite, faithful, hardworking, well-rounded people. The future of our people, the independence of independent Uzbekistan largely depends on the teacher, his/her level, readiness, dedication, attitude to the education and upbringing of the younger generation. The system of continuing education is being implemented. In this regard, the organization and retraining of teachers is the focus of the state and society. Emphasis is placed on educators being philosophically broad-minded, highly skilled, and thoughtful. It should be noted that pedagogy is an honorable but very complex profession. It is not enough to have a pedagogical theory to be a good teacher. Because the pedagogical theory describes the general principles of teaching and educating students, generalized methodological ideas. It is important to take into account the individual characteristics of young educators. However, the life of secondary special

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education and the practical process are different. There are situations that do not correspond to pedagogical theory. This requires a wide range of knowledge, thorough practical training, high pedagogical skills and creativity of the teacher. Therefore, a teacher working in general education institutions of the Independent State of Uzbekistan, capable of pedagogical activity, creative, businesslike, perfectly possessing national culture and universal values, secular, religious knowledge, spiritually mature, for the development of Uzbekistan as an independent state It is important to have a faithful citizen, specialization, psychological, pedagogical knowledge and skills, who correctly understands the patriotic duty of the believer.

Looking at the process of teaching piano as a whole system, we define the content of teaching based on the goals of music and aesthetic education at the present stage and the specific educational tasks of the school in this historical period.

The goals and objectives of general music education for piano students are based on the principles of new personality development.

The full development of the individual is ensured by the unity of labor education, mental, aesthetic and physical education. Aesthetic education, including music education: the formation of creative abilities in the field of art, the development of a sense of beauty and sophistication in art and life, and the need to devote time to the chosen type of aesthetic activity.

From the point of view of the requirements of aesthetic education, the teaching of music in the general system of music education should be subordinated first of all to the musical-educational and music-educational tasks. These tasks are to increase students' general musical knowledge. Introducing children to the valuable works of musical art, including the best examples of classical music, as well as the promotion of musical and aesthetic knowledge of modern composers to active participants in the artistic hobby.

The role of the piano club is not limited to teaching the piano. The educator should strive to instill in students an interest in music, to help them develop their overall musical development, to develop their musical-creative and performance skills, to gain a deeper understanding of musical works, and to be able to evaluate them independently. In addition to performing, students should be able to practice music.

Practical educators, reflecting on the development of general music education, noted that children should be able to play musical instruments at the amateur level, to be able to independently study any work on the notes of music, to know the art of music and various events. These future amateurs must regularly listen to music and analyze it from the beginning, learn to read it from scratch, and play popular plays.

The current theoretical and practical state of teaching piano to students in the general system of music education, on the one hand, effective scientific research on some problems of musical aesthetic education of future music fans "M. Avazashvili, T. Berkman, G. Kimyoklis, V. Shulgina, O. Shelokova et al.", on the other hand, is characterized by the lack of an integrated system for students, the lack of categorical elements such as the content, form and methods of teaching students to play the piano.

In recent years, in the analysis of educational didactics, the principles of adherence to the principle of integrated reflection of science in the content of education as a system of knowledge, a system of cognitive methods and a system of relations of science with other forms of social consciousness are expanding.

A more effective approach to defining the content of piano classroom education in accordance with the goals and objectives of modern musical aesthetic education is to rely on a system developed by M.N. Skatkin, which can adapt to the conditions of students' musical activities.

M.N. Skatkin introduces relevant knowledge into the content of science teaching, the depth of their coverage should be determined for each class, taking into account the age and abilities of students. The next component consists of three types of skills and competencies: subject, general mental (mental work methods), academic and independent learning skills. Students gain creative experience in the form of cognitive research tasks that need to be learned to solve on the basis of science material. Research assignments are developed for each class. Educational tasks are reflected in the program content of science in the form of worldviews, ethical and aesthetic generalizations, and they are given to students on the basis of specific material on a scientific topic.

Thus, we rely on the following resources to develop the content of piano lessons:

1. The system of musicology and piano based on this science:
2. Musical activity on musical perception, performance and primary creation, therefore, in designing the content of the discipline of "music" the basics of the relevant discipline are not described, but the type and rules of activity are expressed;
3. Knowledge of the educational process, which helps to determine the structure of the subject, the size of its components and the order of their acquisition;
4. Psychological knowledge that represents the structure of the person, the field of justification, the psychological mechanism of musical activity and should be acquired as a result of the study.

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We have included the following components in the content of piano teaching in the general music education system: musical-aesthetic knowledge, performance skills, practical skills in music, systems of skills analysis and aesthetic evaluation of musical works, performance of musical works and Experience of creative activity on intellectual interpretation and creation of partial music, experience of aesthetic approach to music and musical activity.

The diversity of the components of the content of music teaching determines the types of musical activities, and in the process of mastering them, the goals of education and upbringing of the piano class are realized. From the point of view of V. Asafyev's musicology, which is a three-element art of composing, performing and comprehending melodies, the pianist serves to justify the need to educate students in music, which includes various activities and interdependence.

While teaching performance to children in a piano classroom is a major task, students' activities cannot be limited to performance. In contrast to the traditional system, where the narrow special tasks of piano education are solved in the current method, the main purpose is to engage children in music, to encourage them to play the piano, to connect them with music in the piano class.

The teacher does not separate the different types of activities in the field of piano, but gathers them around the main repertoire of the student and connects them with the studied works. There are a variety of ways in which a pianist can provide excellent musical education to students, which requires the teacher to be creative, imaginative, and methodologically prepared. By properly selecting and systematizing piano pieces, as well as assigning specific tasks to students, the main task is to coordinate interrelated activities aimed at giving children musical perfection and expressing them in a unity of different types of musical activities.

The main form of piano lessons is individual lessons. They have a number of advantages: they allow for close communication with students, and the ability to constantly find, correct, and update the means and methods of influencing each student' creates a favorable environment for students to gain a deeper understanding of their identity, and so on.

But in order to achieve all this, the teacher must provide purposeful pedagogical guidance through a system of lessons and classes.

Students should be given specific tasks in each lesson. For example, they should be given theoretical knowledge or work to consolidate their knowledge, cultivate musical literacy, work on achieving a certain quality of sound, work on the difficult element of rhythmic or pedalization.

Logical and emotional factors are combined in the teaching process. The logical factor is reflected in the provision of a system of knowledge, skills and competencies based on the explanation of the laws of the art of music and the use of tools developed by advanced methods of piano teaching. Emotional factors are, first of all, the expression of the essence of art, its impact by nature, as well as the creative conduct of the teacher's lesson, the creation of search situations, the formation of creative qualities in the personality of the student.

The quality of the lesson depends on the readiness of the teacher. A good analysis of each lesson is necessary, first of all, to evaluate what it has given to the student for the present, as well as for his/her perfection in the near and distant future. The teacher needs to know the repertoire that the students will perform, and in addition to playing these pieces, he or she must be able to edit and interpret them. The student's repertoire should be constantly enriched with new works, some of which should be read from the page, some superficial and some of which should be studied independently, and so on.

The piano plays a special role in the implementation of all the tasks of mass teaching, the material on which these tasks are solved, that is, the educational repertoire. Choosing and applying this repertoire correctly gives ample opportunity to cultivate a love for music, and the repertoire itself can and should serve as an endless source of music and live interest.

When it comes to imparting knowledge and skills to teachers in a comprehensive way, the piano classroom repertoire is very diverse and rich enough that it is not only educational but also artistic for the students. Fulfillment of these requirements will help to solve the problems of musical and aesthetic education, especially in expanding the range of artistic ideas of students, as well as to arouse their interest and love for music by introducing them to popular music, to develop aesthetic taste.

To cultivate a love for music, students also need to be given serious performance tasks based on appropriate material. In order to consolidate the results achieved in the classroom, daily assignments should be given to memorize as many of the previously learned plays as possible.

Music requires a certain set of general and specific skills. Ability is a set of qualities or attributes that determine a person's ability to successfully perform a socially useful activity.

The division of abilities into latent and actual abilities allows us to analyze their formation and growth. In this case, the dialectic of the formation of the individual finds its expression: it shapes the social personality and turns it into a real proof of the existence of one or another hidden mental feature of the person. The latent abilities of a person are considered to be the

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peculiarities of a person, and these qualities are the basis for his/her further development, in which he creates a unique character, each of which is most in line with his/her mental nature is evident in the choice of activity.

Therefore, we believe that every child should be involved in music, so musical information can be identified, formed and developed only through a purposeful and consistent system of music lessons.

It is difficult to form such an idea about children in order to develop their musical abilities. In such cases, how to determine their attitude to music? The first step is to test the child, but to give him/her some tasks, such as saying some abstract, incomprehensible sounds or clicking on rhythmic shapes. A good way to identify music reading is to tell your child about different content and characters. When a child sings such a song, his or her perception of music, musical memory, rhythm, and ability to hear are determined. Accurate and expressive performance of a song shows the attitude to the music being played, the correct touch of musical images.

One of the most important of musical skills is understanding music. In psychology, it is understood as perceiving music, feeling its beauty and expressiveness, imagining a specific artistic content, and connecting it to one's emotions and experiences.

Comprehension of music can be nurtured and its development depends on how music lessons are organized. Understanding music is nurtured on the basis of a vivid image and high artistic materials that children can understand. It is necessary to arouse in the child a passion for music lessons, to make him/her enjoy the colors of music, the imagery of musical works.

Along with listening, you need to develop rhythm, which is the most important element of musical speech. Rhythm work should not only consist of precise note-taking and mechanical calculation. True artistic rhythm always has an element of "more or less" relative freedom. However, rhythmic accuracy is determined by the content and style of the work: in some works the rhythm is stronger, in others it is free. From the very first lesson, students should understand what the laws of rhythmic purposefulness are, determine the size of the play, the importance of strong contributions in expression, the intonation of the phrase, and feel the climax of the work. Special performance skills are seen in the need to play for the masses, to be able to perform on stage, to play brightly, with inspiration, and to delight the audience.

CONCLUSION

In conclusion, in order to teach a student to hear a sound, it is necessary to recommend plays that are bright, varied in character and mood, close to the reader and understandable. When working on them, it is necessary to achieve expressive performance and demonstration of playing movements that facilitate vocal tasks and help to express musical meaning. It should be noted that in the beginning, playing a song with a legato allows a child with underdeveloped fingers to use more sounds. Later, the ability to hear the sound in accordance with the movements of the music helps to acquire a pleasant legato, ensure the integrity of the musical phrase, and the live development of the musical texture.

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Aesthetics of Psychological Analysis and the World of Creators



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ABSTRACT: This article is devoted to the philosophical observations of the fine arts. The method of mental analysis in medicine, founded by Sigmund Freud, is widely analyzed in the imagination and creativity of the creators of the scientific-theoretical current "Philosophy of Psychological Analysis". The essence of the features of consciousness and unconsciousness in the personality of the creator is widely analyzed.

KEYWORDS: irrational, conscious, unconscious, aesthetic perception, object.

INTRODUCTION

A person who encounters a work of art seeks from the creator a fantasy based on creativity, rich in universal values, lofty ideas and a play of various images, from fantasies focused on the realization of his petty dreams. As a result, people who are well acquainted with art and literature, in addition to reaching new heights during their careers, have a high aesthetic taste, the manager will be able to implement advanced ideas, the scientist will be able to make discoveries, and the creator will be able to create high-level works.

THE MAIN FINDINGS AND RESULTS

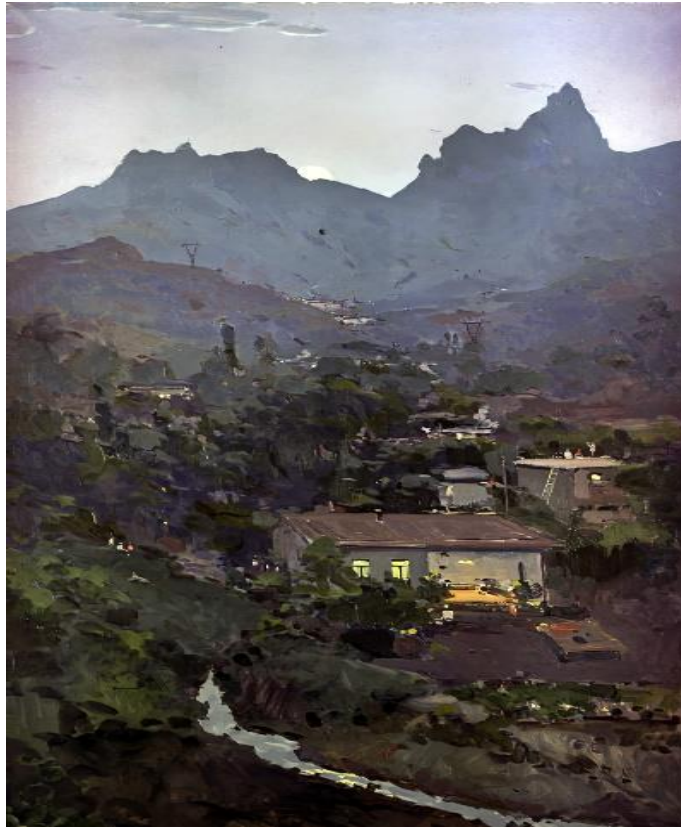
Aesthetic attitude is a type of relationship that arises from the inner, spiritual needs of man, and this relationship is an emotional relationship that observes the emergence of man - from the war of the heart to death:

As a spiritual phenomenon, it differs from other relationships in that the participation of the individual, especially his spiritual outlook, aesthetic tastes and emotions, is manifested as a basic conditionality. That is, no matter how skillfully a work of art is done, if it is not treated by those around it, the work will lose its ability to perform its function. So the aesthetic attitude is important for the development of creativity and art. This attitude does not occur unless the audience's emotions are focused on the object - the work:

No matter how much a work of art has a high aesthetic value, if there is no audience that perceives it, if there is no aesthetic relationship, the future of the work will be in the abstract. Adequately evaluating a work of art from an aesthetic point of view depends on the people who perceive it. In this case, it is important that the person has a spiritual wealth, his aesthetic taste, the ability to understand the work and have some experience in this area:

For example, a shop assistant who sells Ural Tansiqbaev's "Togdagi qishloq" does not have an aesthetic attitude to the painting, the seller sees it only as a commodity, with the goal of selling it for as much money as possible. That is, the seller does not experience the aesthetic process, but focuses his time, observation, attention mainly on the buying and selling process. His attitude does not go beyond economic and financial boundaries. The buyer, who bought the painting, sees in it a part of the Motherland, the beauty of the mountain village, the invisible but inward feeling of the soul, a part of the so-called childhood left in the distance, a mixture of sighs and joys. His constant approach to painting is an aesthetic one. Thus, if the seller is satisfied with the money he receives, the lover will enjoy the beauty of the scene, the feeling in his heart, the fantasy of "going far", and even the imaginary scene created by the "impulse" of the imagination" [1.188].

Since the ability to understand a work and its proper evaluation is directly related to aesthetic education, modern trends in aesthetics in this regard seek to establish new methods of aesthetic education, the creative process, creative and unique approaches to the work. In particular, while the aesthetics of existentialism manifests itself as a call for freedom in education, in terms of mental analysis, aesthetic education strengthens a person's mental and physical health, enriches it with key factors in shaping his/her philosophical worldview.



Ural Tansiqbaev. "Togdagi qishloq". 1962.

By the end of the 19th century, such theoretical foundations spanned nearly a century and a half, giving rise to two major philosophical directions: existentialism dealing with the problems of human existence and psychological analysis based on the study of the relationship of the human soul to the external and internal world. The ideas of German philosophers I. Kant, F. Schiller and F. Nietzsche are especially noteworthy. In particular, F. Nietzsche's scientific hypotheses became the beginning of philosophical ideas that served the harmony of Eastern and Western philosophy.

"...Understanding such a person and explaining to him his situation could not be done in the traditional rational way alone. Nietzsche was one of the first philosophers to realize this, and he took a new, different, unexpected path, and finally laid the foundations for a new philosophical direction called the "philosophy of life" on a large scale. This direction later served as an ideological and theoretical basis for such trends as pragmatism, phenomenology, existentialism, psychological analysis, which later made a significant contribution to the development of world philosophy" [4.156].

Emerging in the late nineteenth century, the method of mental analysis in medicine, founded by Sigmund Freud, had a philosophical scope and formed a separate scientific-theoretical movement called "Philosophy of Psychological Analysis". That is why the philosophy of mental analysis is one of the most relevant philosophical currents today.

In the philosophy of spiritual analysis, great importance is given to moral and aesthetic values. In particular, the aesthetics of mental analysis is distinguished by its artistic approach and its new approach to the creator.

This direction has gained a special status not only in its relationship with man and being, but also in the study of the creative personality, the creative process and the impact of art on man. Indeed, it is precisely this direction that deals with the problem of art and the artist, and for the first time treats artistic creation mainly as a product of ignorance. That is, the irrational approach to creativity and ingenuity has risen to a high level in the aesthetics of Sigmund Freud and his followers. They were deeply and perfectly engaged not only in the product of artistic creation, but also in the creative process and the creative spirit.

The tasks of the aesthetics of mental analysis are to study the impact of the unconscious mental state on the work in the process of artistic creation; to pay attention to the mental state of the artist in the process of creating a work; striving to identify the differences between an original work of art and a simulated work in terms of the method of aesthetic analysis of psyche; attempting to analyze creative spiritual types in artistic creation; showing the place of unconsciousness in contemporary art; the relationship between individual unconsciousness and collective unconsciousness in the creative process and their differences; is determined by scientific approaches to the impact of archetypes on the work in the creative process. The creative personality, the creative process and the work created in this process are the main objects of study in the aesthetics of mental analysis.

Aesthetics of Psychological Analysis and the World of Creators

The direction of mental analysis, founded by Sigmund Freud, was based on the principle of self-awareness, clarifying assumptions about ability, talent, and genius, and radically changing the rigid one-sided approaches to it.

First of all, if we talk about the concept of unconsciousness, *Bewusstlose* (in German) means a state of unconsciousness. Usually in the Uzbek scientific literature it is called unconsciousness (*ohne bewusstsein*). However, the term unconsciousness refers to the inactivity of the mind. (We think that this is due to the incorrect translation of the word “*bessozantelnoe*” from Russian). Psychological analysis does not imply this. On the contrary, unconsciousness is a reality that has more potential than consciousness, creating vast opportunities for creativity (F.A.).

If the problem of the creator and the creative process requires a separate study, then the individual who evaluates the originality and artistic value of the work - the perceptual individual, needs a new approach as an undiscovered guard because the cognitive process is directly related to emotion. After all, aesthetic perception, unlike ordinary perception, plays an important role in the formation of aesthetic culture. Aesthetic perception is an attitude that includes not only the understanding of works of art, but also artistic perception:

“When we say aesthetic perception, we usually mean “understanding” a work of art. However, this psycho-didactic state in man requires the perception of all objects that have an aesthetic feature or characteristics and manifests itself as a complete aesthetic activity. Hence, aesthetic perception is not limited to art, i.e., it includes a broader, artistic perception than artistic perception. Because artistic perception is mainly associated with the artistic perception of the creative reality of the creative person, and aesthetic perception is a type of perception that belongs not only to the creator of the work of art, but also to the person who needs it” [1.349-350].

Aesthetic perception includes not only the perception of art objects, but also non-art objects: “By non-artistic aesthetic objects, we mean reality that is not the result of human aesthetic activity (nature) and as a type of aesthetic activity, which has not risen to the level of art, but has an artistic expression (such as design, sports)” [1.350].

There must be an aesthetic distance in the perception of a work of art. This distance is reminiscent of the distance between your real life and artistic reality. That is, when you perceive a work, you realize that this truth is an artistic truth. You will not be able to access it completely: Take, for example, the famous Uzbek artist Ruzi Choriev’s “*Surkhandarya Taronasi*”. It depicts a mother earth descending from the glorious mountains, a stream in the middle, three young men (at the top) on both sides of the stream, and three girls (below) who have learned to cut their hair, dreams, aspirations, happiness and sadness. In the picture you really see *Surkhandarya*, you listen to its thousand-year-old melody in the language of paints. You give up. But it is also the work of an artist framed in a rectangular frame. As soon as you realize it, you “go to *Surkhandarya*” and “come back” to the exhibition hall, you feel from time to time that you are not in *Surkhandarya*, that you are watching a picture. However, this aesthetic distance does not prevent you from perceiving the work, you see the truth in front of you, not only the reality of life, but the artistic truth: the image is more beautiful, more colorful and ambiguous than the object, in which you see both the picture and the artist” [1.356].

Freud connects creativity in art with the doctrine of the emergence of dreams. For example, he said: “Dreams often think with images” or “but for dreams, the content of such elements is characteristic, they appear to us in the form of images. In these images, dreams create situations, they depict some reality, they dramatize the thought,” he said, noting the connection between dreams and art, and that dreams inspire poets and composers, especially as their form can be used in works of art: “The interplay between fairy tales and other artistic fantasies in our typical dreams is not a separate or accidental event. “Sometimes the sharpness of observation, the poetic look, leads to dreams” [2.55].

Freud argued that the interpretation of dreams, which he had previously used as an aid in diagnosing neurosis, could, over time, come closer to a spiritual interpretation of “poetry, myths, language, and the life of the people”. Freud took the first steps in proving that dreams were associated with myth and art forms. As a psychologist, he connects dreams with the creative process and regularly quotes from the works of artists such as Sophocles, Shakespeare, Goethe, Schiller, Hayne, and Dode.

For example, “I want to show that the artist has a good understanding of the connection between events and dreams in the example of a reproduction of a painting by Schwind from the Shakkell Gallery in Munich,” said Freud. – It is “*The Prisoner’s Dream*”, which has no meaning other than striving for freedom. It is noteworthy that the release must take place through a window, as the prisoner awakens from the nerve-wracking light coming from the window. He sees his condition in the efforts of the gnomes lined up in a row to get out the window (Gnomes are widely used in the West, especially among Christians; according to the creed, these human beings are magicians who make people’s unfulfilled dreams come true or, conversely, prevent them from doing so). If I’m not mistaken in understanding the artist’s intentions, the prisoner is doing what he wants, above all, and the gnome is sawing the fence, because the gnome’s face looks like a prisoner’s ...” [2.76].



Morits von Shvind. "The Prisoner's Dream". (1836)[3]

CONCLUSION

Hence, the internal influences reflected in dreams in human spiritual life are just as important as the external influences. Spiritual influences from the outside world, although they are less noticeable during waking hours, emerge through dreams. Sometimes, dreams come true or, conversely, fears and anxieties take on a serious character and turn into horror: "...The dream not only conveys to us a spiritual arousal, but also processes it, points to it, "persuades" it to a certain connection, replacing it with something else. This aspect of dreams is to connect with the creative process.

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Awareness and Implementation of Philippine Fisheries Code and the Challenges in the Fishing Industry during Covid 19 Pandemic



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ABSTRACT: The Visayan Sea had been the source of abundant fishes supplying Iloilo and nearby provinces. It is considered as the major fishing ground due to its abundance to different pelagic fishes, crabs and squids. The study was conducted in the coastal Barangays of Carles, Iloilo including Gigantes Island which was considered to be the center of Visayan Sea. Respondents of the study were the 900 residents of Carles including the Barangay Captains of the coastal barangays. Result shows that the coastal residents of Carles has a high level of awareness on the closed season policy however a significant difference is noted in their awareness when grouped according to their marital status and educational attainment. Covid 19 pandemic post challenges to fisherfolks and the biggest challenge is loss of income because they cannot catch pelagic fishes and alternative source of income such as crab and shrimp caught has no buyer. Increase in transportation cost due to limited number of trucking services operating during the pandemic is also considered as a major problem. Based on the results, it is recommended that a stable and unseasonal alternative source of income should be provided in the coastal community, especially in the island barangays. Revival of NIPSC extension program to the people of Gigantes Island is highly encouraged.

KEYWORDS: Fisheries Code, Awareness, Implementation, Closed Season, Covid 19 Challenges

INTRODUCTION

Fisheries value chains are experiencing greater demand from consumers coupled with a declining trend in the sustainability of some fish stocks; capture production has slowed and stabilized, and the proportion of fish stocks sustainably exploited has declined to below 70%-90%. The full range of activities that are required to deliver fish and fish products from fisheries and aquaculture production to the final consumers are complex, and technologies employed to manage these value chains vary from artisanal to highly-industrial. (FAO,2021).

In the outbreak of pandemic, new challenges has been faced by Fishing Industry. Social distancing and confinement measures have led to the closure of many fish markets globally, while trade has been further affected by border closures and significant declines in the availability, and increases in the cost, of global air-freight as passenger flights are cancelled. These impacts have created further challenges for the sale of fresh fish products, even where demand still exists domestically and internationally (OECD,2020).

The Visayan Sea had been the source of abundant fishes supplying not only Region VI but other regions as well. It is considered as the major fishing ground due to its abundance to different pelagic fishes, crabs and squids. The Bureau of Fisheries and Aquatic Resources had a moving result in their stock assessment of the Visayan sea that such abundance is now depleting due to prohibited fishing gears, blast fishing, use of fine mesh nets and the lack of concern and knowledge of the people of the laws and the current situation of the Visayan Sea. But before resolving the bigger picture of the Visayan sea, the researchers find it realistic to start first within the community hence, it became the subject the coastal barangays in the Municipality of Carles as it is covered by the annual fishing closure starting November 15 to February 15 to give time for spawns to grow especially for pelagic fishes.

Uncertainty continues to dominate the outlook for the fisheries and aquaculture sector, particularly with regard to the duration and severity of the pandemic (FAO,2020). The researchers therefore find it necessary to assess the level of awareness and the implementation of REPUBLIC ACT NO. 8550, OTHERWISE KNOWN AS "THE PHILIPPINE FISHERIES CODE OF 1998 as amended by RA 10654, AN ACT TO PREVENT, DETER AND ELIMINATE ILLEGAL, UNREPORTED AND UNREGULATED FISHING, of the

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resident in the coastal barangays of Carles during closed season and amidst the pandemic. Problems encountered in the fishing industry amidst Covid-19 pandemic was given attention and a viable livelihood program shall be designed in cooperation with the local municipality of Carles.

METHODOLOGY

The study utilized a descriptive design using the survey method. The study was conducted in the 18 coastal Barangays of Carles, Iloilo. Respondents of the study were the household heads living in the coastal barangays. Total respondents are 900 residents of Coastal Barangay in Carles, Iloilo . A modified researcher made questionnaire anchored on RA 8550 to collect the primary data was used. Interviews with the barangay officials and scanning of the vicinity was done to supplement data collected. Data gathered were compiled, summarized and categorized and analyzed using IBM SPSS v.23.

The data collected were analyzed using the following descriptive statistics: frequency count, mean and percentages, to describe the number of observations particularly for socio-demographic profile of the respondents and the level of awareness of coastal residents. To established significant differences a Mann Whitney U-test and Kruskal Wallis test was administered.

REVIEW OF RELATED LITERATURE

REPUBLIC ACT NO. **10654**. AN ACT TO PREVENT, DETER AND ELIMINATE ILLEGAL, UNREPORTED AND UNREGULATED FISHING, AMENDING REPUBLIC ACT NO. 8550, OTHERWISE KNOWN AS "THE PHILIPPINE FISHERIES CODE OF 1998," AND FOR OTHER PURPOSES

SECTION 1. Section 2 of Republic Act No. 8550, otherwise known as "The Philippine Fisheries Code of 1998", is hereby amended, as follows:

"SEC. 2. *Declaration of Policy*. – It is hereby declared the policy of the State:

To ensure the rational and sustainable development, management and conservation of the fishery and aquatic resources in Philippine waters including the Exclusive Economic Zone (EEZ) and in the adjacent high seas, consistent with the primordial objective of maintaining a sound ecological balance, protecting and enhancing the quality of the environment. The Philippines shall pursue its commitment to international conventions and cooperate with other states and international bodies, in order to conserve and manage threatened , aquatic species, straddling and highly migratory fish stocks and other living marine resources;

In the study *How is the pandemic affecting global fisheries and aquaculture, and what are the potential consequences?* Changes in food consumption and difficulties in reaching consumers are significantly impacting demand and prices Public health responses to the COVID-19 pandemic and associated measures, from confinement and social distancing to stricter border controls and reduced air traffic, are having significant and complex impacts on the demand and prices for fish products. Demand from the hospitality, restaurant and catering (HORECA) sector represents a significant share of fish consumption in many OECD countries. The closure of restaurants and cancellation of both public and private events has resulted in a collapse in demand for certain fish products, in particular high-end products, such as lobsters, oysters, bluefin tuna, and mahi-mahi. The loss of domestic demand has often been further compounded by a collapse in export markets. The cancellation of lunar new year celebrations in the People's Republic of China (hereafter "China"), for example, which are traditionally associated with the consumption of high value seafood, has had devastating impacts on lobster fisheries in Australia, Kenya, New Zealand, the United Kingdom, and the United States, among others. Social distancing and confinement measures have also led to the closure of many fish markets globally, while trade has been further affected by border closures and significant declines in the availability, and increases in the cost, of global air-freight as passenger flights are cancelled. These impacts have created further challenges for the sale of fresh fish products, even where demand still exists domestically and internationally (OECD,2020).

Threatened Fishery Ecosystem and Coastal Resource Management Initiatives at securing the coastal and fishery resources have been a long struggle for many communities, local government units and concerned sectors. Issues and attempts at coastal resource management in the Visayan waters and islands are found below. The Visayan Sea Angel Alcalá, former secretary of the Department of Environment and Natural Resources (DENR) and well-respected academic, has aptly summarized the problem of one of the largest fishing grounds of the Visayas, the Visayan sea (enclosed by Panay, Negros, Cebu and Masbate islands). In his research on Negros and Northeastern Panay in 2004, Mr. Alcalá notes : "The Visayan Sea was once a very fishery-productive inland sea of the Philippines. But 50-60 years ago, the sea was heavily fished by trawlers with the approval of the BFAR. The Visayan Sea also hosts some of the terrestrial species endemic to central Philippines, indicating its evolutionary importance... The overexploited more valuable fish species have been replaced by the less nutritious species of squids and cuttlefish, following the known trend in other similar depleted areas in the Philippines. There are no visible conservation measures, except for the 30,000-

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hectare Maka Reef complex off Sagay City, where reef and seagrass species are protected from fishing. Destructive fishing methods such as blast-fishing and compressor-fishing plus cyanide, are still used by fishers.

RESULTS and DISCUSSION

Level of Awareness of the coastal residents of the salient provision of RA 8550

Respondents has a high level of awareness on the salient provision of the Fisheries Code or RA 8550, with a grand mean of 4.12 interpreted as Aware.

Full awareness has been noted in provisions regarding existence of local Aquartic Resource Management Council, Closed Season Policy, using fine mesh net in fishing, collecting and selling of corals and using dynamite or electricity in fishing and marine protected area of Carles. This simply means that coastal residents are fully aware that the mentioned provisions are strictly prohibited and punishable by law.

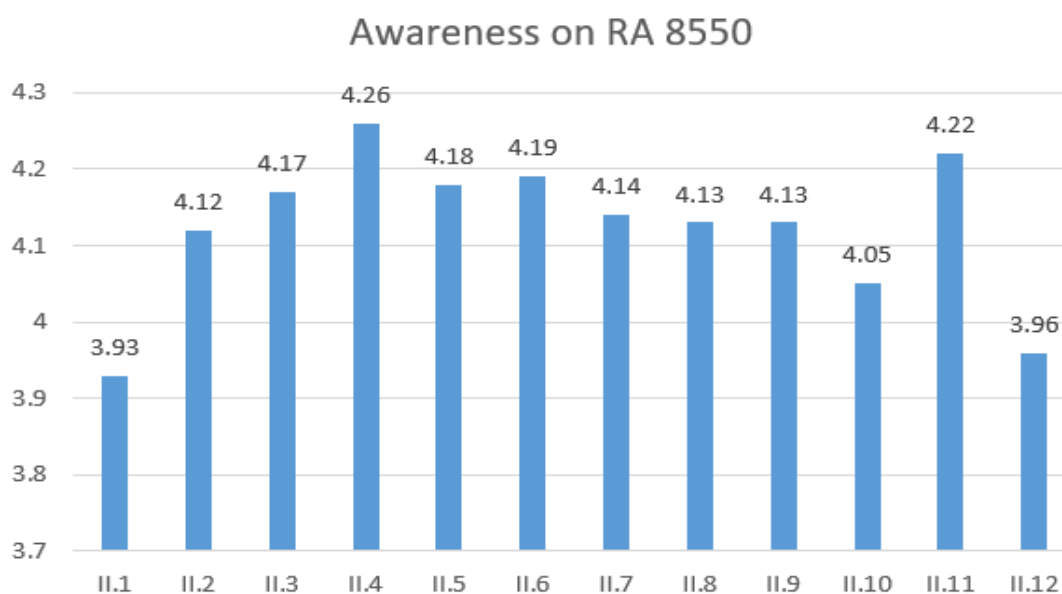


Figure 1. Level Of Awareness Of Of The Coastal Residents Of The Salient Provision Of RA 8550

Significant Difference in the Level of Awareness of the coastal residents in the salient provision of RA 8550

Result shows that there is a highly significant difference in the level of awareness of the coastal residents in the salient provision of RA 8550 when grouped according to their educational attainment, age, civil status ,sex and household size. This simply implied that the level of awareness of the coastal residents in the salient provision of RA 8550 is highly influenced by their demographic profile educational attainment, age, civil status, sex and household size.

Table 1 Significant Difference In The Level Of Awareness Of The Coastal Residents In The Salient Provision Of RA 8550

VARIABLE	TEST	RESULT	SIGNIFICANCE
Educational Attainment	Kruskal Wallis	0.000	Highly Significant
Age	Kruskal Wallis	0.000	Highly Significant
Civil Status	Kruskal Wallis	0.000	Significant
Sex	Mann Whitney	0.000	Highly Significant
Household Size	Kruskal Wallis	0.000	Highly Significant

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Level of Implementation of the salient provision of RA 8550 to the coastal residents of Carles

Result shows that municipality of Carles has high level of implementation towards the salient provisions of Fisheries Code or RA 8550, with a grand mean of 4.15 verbally interpreted as Implemented. Provisions that were fully implemented includes Closed Season Fishing Policy and catching of pelagic fishes during the closed season. Full implementation on no dynamite and cyanide fishing is also noted. This simply means that the Local Government Unit is strictly implementing the RA 8550 and the penalty clause of the said provision.

Implementation of RA8550

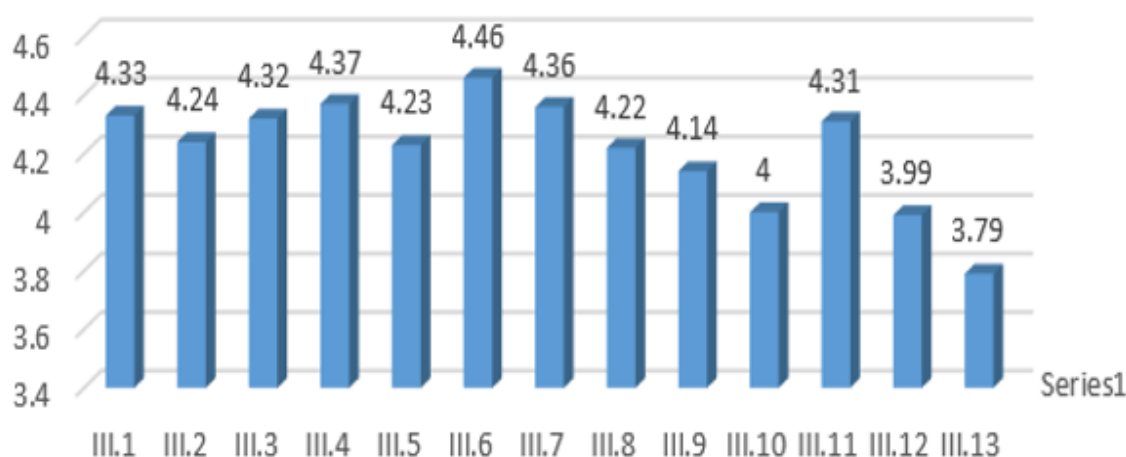


Figure 2. Level Of Implementation Of The Salient Provision Of RA 8550

Significant Difference In The Level Of Implementation Of The Salient Provision Of RA 8550

Result shows that there is a highly significant difference in the level of implementation of the salient provision of RA 8550 to the coastal residents of Carles when respondents were grouped according to educational attainment, age, sex and household size. This implied that implementation of RA 8550 is influenced by respondents' educational attainment, age, civil status, sex and household size.

Table 2 Significant difference in the level of Implementation of the salient provision of RA 8550

VARIABLE	TEST	RESULT	SIGNIFICANCE
Educational Attainment	Kruskal Wallis	0.000	Highly Significant
Age	Kruskal Wallis	0.000	Highly Significant
Civil Status	Kruskal Wallis	0.000	Highly Significant
Sex	Mann Whitney	0.000	Highly Significant
Household Size	Kruskal Wallis	0.000	Highly Significant

Respondents Need For Alternative Income

Result in table 3 shows respondents need for alternative income during close fishing season, almost all 885 out of 900 respondents or 98.3% says they needed additional income especially during closed season. As to their willingness to be trained for a livelihood program, 96.2% said they are willing to be trained.

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Table 3. Respondents Need for Alternative Income

Particulars	Frequency	Percentage
Do you need an alternative source of income during closed fishing season?	900	100
Yes	885	98.3
No	15	1.7
Are you willing to undergo training on livelihood and economic upliftment?	900	100
Yes	866	96.2
No	34	3.8
Preferred trainings		
Food Processing	426	47
Household Products	309	34.5
Shellcraft Making	150	17
Others	15	1.5

Problems encountered by the Fishing Industry during Pandemic

Covid 19 pandemic post challenges to fisherfolks and the biggest challenge is loss of income because they cannot catch pelagic fishes and alternative source of income such as crab and shrimp caught has no buyer. Increase in transportation cost due to limited number of trucking services operating during the pandemic is also considered as a major problem. Other problems aired were strict quarantine protocols that limit number of fishermen in pumpboat and lack of support/ programs to fisherfolks to help them during pandemic.

CONCLUSION

There is a significant difference in the level of awareness of the coastal residents when they are grouped according to their educational attainment, age, sex and household size and civil status.

The coastal residents of Carles has a high level of implementation on the salient provisions of the Fisheries Code of the Philippines or RA 8550. There is a significant difference in the level of implementation of the coastal residents when they are grouped according to their educational attainment, age, sex and household size , however, there is no significant difference in the level of their compliance when they are grouped according to their marital status. Problems encountered by the residents should be addressed and given attention especially the need for the alternative source of income.

Based on the results, it is recommended that a stable and unseasonal alternative source of income should be provided in the coastal community, especially in the island barangays. Revival of NIPSC shell craft extension program to the people of Gigantes Island is highly encouraged. Introduction of household products such as Do-it-Yourself liquid dishwashing, hand soap and alcolgel is highly recommended specially demand for such items have increased amidst this pandemic.

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Personalization of learning, the current situation and proposed solutions for Vietnamese education



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ABSTRACT: Learning is a natural human activity that is shaped by personal experiences, cognitive perceptions, personal formations, opinions, cultural background and environment. So learning is a personalized experience that allows a person to expand their knowledge, perspective, skills and understanding. Personalization of learning is an inevitable trend in the context of Industrial Revolution 4.0. To contribute to a better explanation of learning personalization, this study aims to synthesize and analyze the concepts related concepts, current situation and proposed solutions should be conducted during the development process Effective personalized teaching, especially applied to Vietnamese education.

KEYWORDS: Personalized learning, Vietnamese education, personal capacity, digital environment, learner - centered approach, educational perspectives.

1. INTRODUCTION

Recently, personalized learners have been widely talked about in many countries and attracted the attention of educators. Learning is described as a steady and persistent change in what a person knows and can do (Spector, 2015). Personalized learning is a complex work-operational approach, which is the product of self-organization (Chatti, 2010; Miliband, 2006) or customized learning and instruction that considers needs and goals personal. Each active learning process can be an effective approach that can enhance motivation, attention, and understanding (Pontual Falcão, e Peres, Sales de Morais and da Silva Oliveira, 2018), maximum measure learner satisfaction, learning effectiveness, and learning performance (Gómez, Zervas, Sampson and Fabregat, 2014).

According to Schmid & Petko (2019), an overview of research literature in the world today shows that personalized learning is a multi-layered category with many different definitions and different forms of implementation. In its broadest definition, it is the creation of learning environments and experiences tailored to the unique needs and strengths of each student, allowing learners greater control and control of their learning while giving them a more meaningful and effective education. The concept of personalized learning is often confused with other educational terms, such as blended learning, competency-based learning, etc. Many of these are distinct educational methods and may include attributes of personalized learning or be a core aspect of a personalized learning model.

According to the research results, Theobald, C. pointed out in his doctoral thesis titled Changing our behaviors as teachers in order to meet the needs of our culturally diverse students: a thesis presented in partial fulfillment of the requirements for the degree of master of education (teaching and learning) at Massey University, New Zealand, personalized learning is about: "Shaping student learning activities and program content/knowledge reflecting information student input and preferences". This way, students can understand how they learn, own and drive their learning, and are codesigners of their curriculum and learning environments. A student's learning needs, interests and abilities are the factors that determine how fast they learn. With the same view, researchers believe that learning needs to be adjusted and continuously improved to suit the conditions, abilities, interests, background knowledge, interests and goals of each person. learning and can adapt to the learners' evolving skills and knowledge. In Vietnam, there have also been studies on personalized learning. According to the authors Le Thai Hung and Nguyen Thai Ha: "Personalized learning is a teaching method in which the learning pace and teaching approach are optimized for the needs of each learner."

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In the document Transforming American education: Learning powered by technology, the US Department of Education has also defined personalized learning as including customizing the learning rate for each student (personalization), adjusting teaching methods (differentiation) and personalization of learning content. Then, in the 2017 report, the US Department of Education continued to explain that personalized learning is the delivery of learning instructions to meet the needs of optimizing learning speed and learning style with all students. Learning goals, teaching methods, content of instruction, can all be different depending on the needs of the learners. Furthermore, learning activities need to be meaningful and relevant to learners, based on learners' interest and self-discipline.

Research confirms that each learner gets training material based on their unique learning style, needs and preferences. Personalized learning and teaching can be considered the highest level of training. Personalized learning is not a substitute for special education. It is a general education approach that can work with an individualized education program (IEP), response to intervention, or other specialized intervention programs. Teachers do not lead all students through the same lessons.

Instead, teachers guide each student on an individual journey. What, when, where and how learning is tailored to meet the strengths, skills, needs, and interests of each student. Students can learn a number of skills at different speeds. But their study plan still keeps them on track to reach the ultimate standard. If done well, all students will be more engaged in learning. And students who have difficulty will get help sooner. If not done well, students with disabilities may fall behind.

Effective personalized learning methods help learners increase motivation and interest in learning, thereby improving learning outcomes. According to Lee et al., personalized learning should become a solution that enables learning to meet the needs and personal experiences of each learner, thereby helping them reach their fullest potential through custom instructions. The customized instructions include what is taught, and how and at what pace it is delivered. They help learning to meet the individual needs and interests of learners in diverse situations in teaching practice. Furthermore, FitzGerald et al, have shown that personalization of learning is currently a trend that is being talked about a lot in government agencies, mass media, conferences, research papers as well. as technology innovation projects. However, personalized learning is a very difficult process to implement because of its complexity, cost, and even impossible without the support of advanced and powerful technological means. Therefore, although personalized learning plays an important role in modern society, it has not been fully implemented in educational systems.

A successful personalized learning initiative has the following characteristics:

- Students' interests and abilities are engaged in authentic, real-world activities to promote the learning of content area standards.
- Teachers take on the roles of facilitators and coaches in the classroom rather than the dispensers of knowledge.
- Students take control over the learning paths they take to achieve established goals, building self-efficacy, critical thinking, and creativity skills.
- Technology enables students' choices related to what they learn, how they learn, and how they demonstrate their learning. Formative assessment throughout the learning cycle, supported by digital tools, helps teachers and students address weaknesses and build on strengths.
- Progress through subject area content is measured by the demonstration of proficiency in identified skills and understanding.
- Technology is integrated throughout teachers and students' experiences to support learning.

2. CURRENT SITUATION

The current state of world education

Education today still maintains exam-based learning, based mainly on rote learning and stereotypes, using test scores as the main or sole criterion for assessing students. Thus, education worldwide is authoritarian in nature and produces good test scores rather than multi-talented, creative and innovative citizens. It is like a monopoly while the supplier (schools, educational institutions) does not really care about the needs of the target audience (learners) and continues to sell outdated products because people consumers buy it anyway. Methods such as storytelling, discussion, training, and research are mostly ignored or used superficially. Currently, teachers in regular classrooms (Regular classroom is understood as a classroom with traditional teaching methods, the main equipment of the classroom includes chalkboards and learning materials including textbooks/ textbooks and printed materials) have to face many big problems, affecting students' learning efficiency.

Countries like China and Singapore have tried to focus on skills development. However, it is easy to see that there is still a large gap. Therefore, the world needs an education system that encourages and motivates learners and facilitates learning to fulfill their potential. This means offering a program of practical learning, vocational training that combines theoretical research.

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Some advanced and developed education systems in the world are geared towards personalized learning and are also highly appreciated for the quality of their teaching, such as:

Finland education

Finland education is an education system. Education is recognized worldwide for the quality of its training. One of the most prominent advantages of the Finland education system is the student-based foundation to tailor the training program accordingly. Students in Finland enroll later than other countries, do not hold exams to avoid achievement diseases, all students have the right to choose a study program that is suitable for their ability.

Australian education

The education system in Australia is always among the best in the world. The government of this country always aims for fairness, promoting creativity and innovation. Encourage students to pursue their passions and interests.

The current state of education in Vietnam

In the current trend of digital transformation in education in Vietnam, there are quite a few documents and expert perspectives that all acknowledge and affirm the role of applying a personalized learning method that will contribute to changing the quality of education.

In Vietnam, Decision 749/QĐ-TTg has clearly stated that educational innovation, through the application of technology, is a national development and competition strategy, included in the "National Digital Transformation Program to 2025", oriented towards 2030". However, this field is still very fragmented and focuses mainly on digitizing teaching materials, providing pre-recorded video learning solutions and lacking high-quality innovative educational platforms, applications Deep application of big data and artificial intelligence.

Main challenges of Vietnamese education

- One-way knowledge transmission is still the main teaching method of many teachers.
- The number of teachers who are often proactive and creative in coordinating teaching methods to promote students' positivity, self-reliance and creativity is still small.
- Many teachers and lecturers have not properly applied the test preparation process, so the tests are still very subjective. Assessment activities right in the process of organizing teaching activities in the classroom have not been paid attention to and implemented in a scientific and effective way.
- The application of information and communication technology, the use of teaching means have not been widely and effectively implemented in high schools.
- Despite efforts to improve the quality of education by strengthening competency-based teaching practices and reforming curricula and textbooks, there is still a need for clear guidelines and facilitation for teachers to teach based on the individual ability of the student.
- Vietnam's education system is still too heavy on knowledge transmission but not on developing learners' qualities and capacities. It is organized in the direction of teaching "classes" rather than teaching "learners", which has not directly met the needs and established individual learning paths of learners.
- The research on learners, learner-centered in Vietnam is still quite limited, the collection of opinions of learners, interests and activities around learners, are still not very scientific. Learners have not had opportunities to develop their full abilities and apply creativity, but mainly in the form of mechanical stereotypes according to specific programs.
- At universities in Vietnam, there are some forms orienting the development of personalization, however, they are still unclear. They allow learner-owned which means that learners can decide their learning, but still under supervision. For example, at National Economics University, we are moving towards digitization of learners, learner-centered; learners can register for credits, subjects, develop their own skills, etc... however, they are still very limited. Besides, some other universities in Vietnam still follow the stereotyped form, attach importance to grades, rather than develop maximum creative thinking, critical thinking, logic of learners.... In addition, the application of science and technology in education management is at a basic step, with no specific orientation for learners to see "personalization". Learners do not get any chance to experience, exchange, improve their own capacity and they are still confined in the old environment.

3. SOLUTIONS

Through analysing the educational situation in the world as well as in Vietnam and the role of personalized learning, it can be concluded that the application of personalized learning plays an important role in developing education in every country in general and in Vietnam in particular. In order to apply this learning model effectively, in the near future, the central tasks and solutions need to be carried out as follows:

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First, personalized learning needs to be organized methodically and systematically for the purpose of ensuring it is accessible to all learners and teachers.

Second, drawing up a visionary plan for the school is a necessary step towards change. Including: Convincing stakeholders; There are managers willing to change and dedicated to giving; Building a school culture where there is empowerment and trust; Personalize teacher professional development; Capacity development for students; Building and maintaining a supportive infrastructure system; Building a skilled team to deploy.

Third, it is necessary to raise public awareness of the value of personalized learning so that they are ready to accept new learning methods.

Fourth, the school needs to cooperate with the Ministry of Education to build an effective learning system which is suitable for the immediate educational situation of Vietnam.

Fifth, teachers must be trained in new teaching methods which approach personalization and in the application of technology in teaching and learning when using this new method.

Sixth, using technology to guide learning. Every school has to create their own platform to best fit the needs of both students and educators. The school's technology keeps track of student learning, offers assessments, allows students to submit homework, and allows teachers to keep attendance and perform scheduling and grading functions as well.

4. CONCLUSION

Today, there is no excuse for the existence of an imposing, stereotyped educational system that does not allow all students to develop on their own terms. We must be aware that students are individuals with different talents and dreams. These distinctions lead to the fact that not all of them can learn effectively in the same way. We need to work towards a differentiated system, based on a common core of essential skills and knowledge that allows students to develop their own unique talents and aspirations. In order to effectively deploy a personalized learning environment, it is necessary to carefully consult relevant learning theories to understand the general characteristics of learners in this environment. Moreover, the techniques also need to be implemented in each case to match the output standards of the program.

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The Reality of Creativity in Speaking Skills and Logical Thinking Among Students With Autism Spectrum Disorders Within the English Language Curriculum for Basic Stages in the Light of the List of Multiple Intelligences from the Point of View of English Language Teachers Working in Jordanian Private Education Schools



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ABSTRACT: The current study aimed to identify the reality of creativity in speaking and logical thinking skills among students with autism spectrum disorders within the English language curriculum for basic stages in the light of the list of multiple intelligences from the perspective of English language teachers in Jordanian private education schools. The study sample consisted of (320) male and female teachers, who were selected in a stratified random manner. The descriptive survey method was used in the current study. To achieve the objectives of the study, a questionnaire was developed, and its validity and reliability were confirmed. The results showed that the reality of creativity in speaking and logical thinking skills among students with autism spectrum disorders within the English language curriculum for the basic stages in the light of the list of multiple intelligences from the perspective of English language teachers in Jordanian private education schools came to a medium degree. The results of the research also showed that there were statistically significant differences at the significance level ($\alpha \leq 0.05$) according to the gender variable in favor of the female category, and the absence of statistically significant differences according to the educational qualification variable, and the absence of statistically significant differences according to the years of experience variable. In light of these results, the study recommended that the special education departments pay attention to the levels of creativity in the skills of logical thinking and speaking within the English language curriculum for students of basic stages, and hold specialized courses and workshops for teachers of basic education stages to train them on ways to develop creativity.

KEYWORDS: creativity, speaking skill, logical thinking skill, list of multiple intelligences.

INTRODUCTION

Creativity is a process that involves the application of new ideas in any field of life. Creativity is linked to solving problems and dealing with them outside the framework of stereotypes and familiarity. This includes; Finding goals and choosing the best of them, preparing data, laying hands on the problem and trying to determine the best way to address it, In addition to evoking ideas, alternatives, strategies, perceptions, methods and means, and working on laying foundations that would lead to a creative solution to any dilemma facing the educational process or the educational organization.

To reach creative work, this requires one's willingness to move from observing things to inspiration and innovation. Knowing that these stages may occur together, there is in fact one stage combined in the creative process, it is the stage of creative creation that appears in the radiance and the birth of a new idea. Without that, creativity cannot be available; whatever that human action is (Al-Baher, 2021).

Perhaps it is important to point out that the creative process is faced by factors that may constitute an element of development or impede, the most important of which is; Mental factors related to providing mental images, and environmental factors play a role in developing or suppressing creativity, such as the school and social environment. As it evokes the set of circumstances, variables, and situations that prepare the growth of creativity until it comes to fruition after completing its clear form. Also, the factors related to the human personality constitute an element of growth or destruction, considering that they are factors that contribute significantly to the change, development and development of society (Al-Dahla, 2010).

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The creativity that the individual exercises in the midst of his daily work stems from a set of skills that enable him to perform the work quickly and accurately and ensure the achievement of goals and objectives with ease. Perhaps the skill of speaking, persuasion, interaction and communication are among the most important skills that a student needs. Considering that it constitutes the bridge on which the learner leans in communicating what he means by saying or doing through a clear verbal statement through which he expresses his thoughts and knowledge that may contribute to achieving outstanding achievement. Perhaps reaching these skills requires a high degree of intelligence and self-motivation for self-esteem and achievement, preference for what challenges thinking over simple things, and tolerance for ambiguity. Relative freedom from anxiety, avoidance of cognitive and emotional rigidity, task performance, open-mindedness, imagination, tolerance with others, high achievement, productive thinking, and the ability to deal with presented ideas (Abdulaziz, 2006). Several studies have been conducted that dealt with creativity in basic skills, especially speaking and interaction skills, within different teaching curricula, such as the study of Al-Kharabsha (2018), which emphasized the impact of using creativity-based thinking in developing interaction skills with academic courses in a manner that ensures outstanding achievement. As well as the study of Al-Mustarhi (2019), which showed the effect of great creativity in developing speaking skills in the English language curriculum through the use of the think-pair-share strategy.

THE STUDY PROBLEM

Proceeding from the great role that creativity plays in the student's departure from the ordinary and his orientation towards presenting new ideas that would transfer knowledge to a larger world, Because of the importance of creativity in developing the skill of logical thinking and the ability to speak and express what is on the mind of the student In addition to the low levels of academic achievement based on discussion questions and expressing the topics raised in the English language curriculum In addition to noting the low volume of class participations in the school radio for students of the English language curriculum with regard to raising topics and presenting them to the students in the morning school queue,

Therefore, it was of great importance to research the reality of creativity in speaking skills and logical thinking in the English language curriculum, as it is a curriculum related to the mother tongue of our students in the basic stages. Perhaps what confirm the importance of this is the study of each of; Al-Mustarihi (2019), Rabaa (2017), and Abdul Hamid (2013).

Study questions

The current study seeks to identify the reality of creativity in speaking and logical thinking skills among students with autism spectrum disorders within the English language curriculum for the basic stages in light of the list of multiple intelligences by answering the following questions:

1. What is the reality of creativity in speaking and logical thinking skills for people with autism spectrum disorders within the English language curriculum for the basic stages in light of the list of multiple intelligences?
2. Are there statistically significant differences at the significance level ($\alpha \leq 0.05$) between the arithmetic averages of the responses of the study sample members towards the reality of creativity in speaking and logical thinking skills among students with autism spectrum disorders within the English language curriculum due to the variables (gender, years of experience) and academic qualification)

Objectives of the study

The current study aims to achieve the following:

- Theoretically; recognizing the reality of creativity in speaking and logical thinking skills in the Arabic language curriculum, and trying to measure the level of creativity among students in the basic stages.
- Practically; helping those in charge of the educational process to create an environment for the educational system for the basic stages to ensure raising the level of creativity among students in the basic stages.

Terminology of study

The current study included the following terms:

Creativity: is to come up with everything that is new, get out of the circle of stereotypes and familiarity, and produce new ideas that fit a specific goal within a field (Al-Bahr, 2019).

- The skill of logical thinking: it is the skill of moving from a related statement to another or from a specific related idea to another idea, where the first statements of logical thinking are called precedents and subsequent statements with suffixes (Al-Karimi, 2021). Multiple Intelligences List: It is a cognitive model that shows how a person can use his multiple intelligences to solve problems in different ways, and focuses on the processes carried out by the human mind in the process of dealing with the content of the situation until it reaches the desired solution (Salim, 2021).

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THE LIMITS OF THE STUDY

The limitations of the study included the following:

- Human limits: English language teachers in Jordanian private schools.
- Time limits: the second half of the 2021/2022 school year.
- Spatial limits: Jordanian private education schools.

Related previous studies

This part includes a presentation of the previous studies that were reviewed, both English and foreign, arranged historically from the oldest to the most recent, as follows:

Abu Hamad (2014) conducted a study that aimed to identify the impact of the theory of multiple intelligences on the achievement of sixth grade students in the English language curriculum and the development of critical thinking in government schools in Nablus governorate for the 2013-2014 academic years, The study tool consisted of an achievement test and a critical thinking test. The study concluded that the method of teaching using the list of multiple intelligences affects students' achievement and the development of their critical thinking.

Aldig and Arseven (2017) examined teachers' opinions about the contribution of the learning outcomes of listening skills in the sixth, seventh and eighth grades and their impact on the development of creative thinking skills among students in Turkey, The researchers adopted the descriptive survey approach, where the sample consisted of (150) teachers from (35) schools, and the results of the study concluded that the outcomes of learning to listen in the Turkish curriculum have contributed to the development of creative thinking among students.

Al-Kharabsheh (2018) also conducted a study aimed at identifying the effect of using some creative thinking skills on the achievement of third grade students and retention of information in teaching science in private schools in the capital, Amman, To achieve this goal, the researcher used the quasi-experimental approach, and conducted an achievement test consisting of (30) multiple-choice items after verifying its validity and reliability by scientific and statistical methods and methods. The sample of the study consisted of (42) male and female students who were intentionally selected from two private schools in the capital, Amman. They were randomly distributed into two groups, the first was a control group with (21) students, and an experimental group with (21) students. The results of the study concluded that there were statistically significant differences in students' achievement between the experimental group that learned using the expansion and flexibility skills, and the control group that learned the usual way, and the differences were in favor of the experimental group. The study also concluded that there were statistically significant differences between the experimental group that learned using the expansion and flexibility skills in their retention of information and the control group that learned in the usual way, and the differences were in favor of the experimental group.

Al-Sayed (2018) conducted a study aimed at finding out the degree to which the English language textbook for the eighth grade in Jordan includes linguistic and social intelligence skills. The study sample consisted of the English language book for the eighth grade. The researcher used the content analysis method to reveal the skills of linguistic intelligence and social intelligence included in it, According to its frequency and percentage. The study reached a number of results, the most important of which are: The English language book included (508) linguistic intelligence skills. The skill of communicating with others came in speech and writing with the highest frequency of (63) times, and at a rate of (40.12%), and the skill of being able to perceive the difference between words in order and rhythm with the lowest repetition reached (17) times, with a percentage of (34.3%), The results also showed that the English language book included (168) social intelligence skills, as came the skill: mastering the patterns of linguistic communication with others, With the highest recurrence amounted to (40) and at a rate of (80.23 percent), and skill: the ability to understand the moods, intentions and feelings of others, with the lowest recurrence amounted to (12) and at a rate of (14.7).

The study of Al-Bari and Al-Zayyat (2019) aimed to identify the reality of creativity in the Jordanian school from an educational point of view, and to know the impact of gender, academic qualification and experience in this reality. The study sample consisted of (400) male and female teachers, and a questionnaire was prepared on creativity skills. The results of the study showed that the reality of creativity in the Jordanian school came to a medium degree. The results also showed that there is a statistically significant presence in the reality of creativity attributable to the scientific qualification in favor of holders of higher degrees from teachers and teachers and in favor of those who have experience of ten years or more. The results did not show an impact of gender in that

Al-Mustrehi (2019) conducted a study aimed at identifying the impact of the (think-pair-share) strategy on improving the English speaking skills of sixth graders. The study sample consisted of (101) male and female students, divided into two groups: an

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experimental group, which studied with the "think-pair-share" strategy, and a control group studied by the usual method. To achieve the study's objectives, a teacher's guide was prepared; The implementation of the experiment includes the topics of discussion (the importance of youth participation in volunteer work, the importance of the sun in our lives, the impact of optimism in building a happy life, and a teacher for students), From the English language book for the sixth grade. A pre-post test consisting of five speaking attitudes was prepared, and a tool for measuring speaking attitudes (a note card) was prepared. The results of the studies showed the presence of statistically significant marks for the experimental group that studied strategy (Fakar- Zoua- Share) in every skill of the skills and the skills in society, and the lack of a sign of the statistics in all the skills of the skills of the skills in each and sex, The absence of statistically significant differences due to gender in the speaking skills test combined, and in skills (language safety, communication with listeners, student personality); While there were differences in the skill (organizing ideas), and in favor of females.

Summary of previous studies and the location of the current study

Previous studies have benefited from the knowledge of the appropriate methodology and statistical processes, and through which the theoretical framework of the study's subjects and variables was identified, And in building the research tool, especially the study of Al-Mustarhi (2018), the study of Al-Bari and Al-Zayyat (2019), and the study of Abu Hamad (2014). The current research agrees with previous studies in reviewing the concept of creativity and the skills related to it. The current research was similar to previous studies, especially the study of; Al-Bari and Al-Zayyat (2019), and Al-Khrabsha (2018) in some variables of the study as speaking cameras. However, it was distinguished from those studies in its focus on English language teachers in Jordanian private education schools, in addition to its focus on variables that were not addressed in previous studies.

STUDY METHODOLOGY: The descriptive survey method was used to achieve the research objectives.

Study sample: The study sample consisted of English language teachers in Jordanian private education schools, and their number is (320) male and female teachers, and table (1) shows the distribution of the study sample according to the study variables.

Table No. 1: Distribution of the sample according to the study variables

Variable	Category	Frequency	Total
Gender	Male	150	320
	Female	170	
Academic qualification	Postgraduate degree	70	320
	BA degree	250	
Years of experience	Five years or less	124	320
	More than five years	196	

Study tool

The study tool was developed, with reference to the theoretical literature, and some previous studies such as; Study of Berry and Excess (2019), And the study of Al-Sayed (2018), and the study of Kharabsheh Abu Hamad (2014) in order to achieve the objectives of the study and answer its questions.

The study tool, in its final form, consisted of (15) items divided into two domains: the speaking skill domain, which consisted of (8) items, and the logical thinking skill domain, which consisted of (7) items. To verify the validity of the tool, the validity of the content was approved in terms of the formulation of the paragraphs, and their relevance to the field in which they were placed by presenting them to (8) arbitrators.

To verify the stability of the tool, the internal consistency coefficient was used according to the Cronbach Alpha equation to extract the stability of the study tool by domains, and Table (2) shows the stability coefficients of the tool fields:

Table No. 2: Cronbach Alpha stability coefficients for the study tool areas

No.	Area	Cronbach Alpha coefficient value
	speaking skill	0.92
	Logical thinking skill	0.90

Table (2) shows that the stability coefficients are acceptable, and to judge the reality of creativity in speaking and logical thinking skills for people with autism spectrum disorders within the English language curriculum for the basic stages in the light of the list

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of multiple intelligences, The following scale was adopted: low availability (2.33 and less), medium availability (2.34-3.67), and high availability (3.68 and more).

STUDY RESULTS AND DISCUSSION:

Results related to the answer to the first question, which states: The first question: What is the reality of creativity in speaking and logical thinking skills within the English language curriculum for people with autism spectrum disorders for the basic stages in light of the list of multiple intelligences?

To answer this question, the arithmetic averages and standard deviations of the responses of the study sample members in general and for each field of study were calculated, and Table (3) shows this.

Table No. 3: Arithmetic averages, standard deviations, and arrangement of the reality of creativity in speaking and logical thinking skills among people with autism spectrum disorders within the English language curriculum for the basic stages in the light of the list of multiple intelligences

No.	Area	Mean	Std.	Rank	Level
1	speaking skill	3.51	0.89	1	Moderate
2	Logical thinking skill	3.43	1.03	2	Moderate
	Total	3.48	0.92		Moderate

It is noted from Table (3) that the reality of creativity in speaking and logical thinking skills for people with autism spectrum disorders within the English language curriculum for the basic stages in the light of the list of multiple intelligences was medium, The arithmetic mean was (3.37) and standard deviation (0.91), and the domains were average, and the speaking skill came in the first rank, with an arithmetic mean (3.51) and a standard deviation (0.86), In the last rank came the domain of logical thinking skill with an arithmetic mean (3.29) and a standard deviation (1.01). As for the paragraphs of each domain, the results were as follows:

1. Speaking skill domain: Arithmetic averages, standard deviations, and ranks were calculated for the paragraphs of this domain, and Table (4) shows this:

Table No. 4: Arithmetic averages, standard deviations, order and degree in the speaking skill domain, arranged in descending order

No.	Statement	Mean	Std.	Rank	Level
3	Ability to adjust pronunciations	3.57	0.82	1	Moderate
5	Speed in the production of words according to the conditions of its construction and installation	3.52	1.01	2	Moderate
2	The ability to recall the information available in the cognitive building	3.53	0.86	3	Moderate
1	The ability to put words into as many sentences and phrases as possible	3.54	0.92	4	Moderate
8	The ability to decorate words to look more aesthetic	3.52	1.01	5	Moderate
6	Focus on the quality of the words, not the number	3.49	0.88	6	Moderate
7	Avoid repeating the same words in different places	3.53	0.94	7	Moderate
4	The ability to add various new details to a single idea	3.51	1.00	8	Moderate
	Total	3.54	0.93		Moderate

It is noted in Table (4) that the reality of creativity in speaking skills and logical thinking for people with autism spectrum disorders within the English language curriculum for the basic stages in the light of the list of multiple intelligences in the light of the speaking skill field has been moderate. The arithmetic mean was (3.54) and standard deviation was (0.93), as the arithmetic averages ranged between (3.57-3.49), and paragraph (3) came in the first rank, which states "the ability to control the spoken words", Paragraph (6) came in the last rank, which states "focusing on the quality of words, not on their number." This may be due to the teacher's belief that speaking skill is the responsibility of the family and that parents are partners in that. And therefore does not give this skill more time and effort, as this may be attributed to the teacher's belief that providing the

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student with a grammatical or linguistic base is considered an innovation that helps the student to practice fluent speaking skill. In addition to providing students with the largest possible number of words while neglecting the form and quality of those words, in the belief that speaking skill is closely related to the quantity of words and not their quality, and that focusing on the quantity of words gives the student the opportunity to choose what he deems appropriate of these ideas.

2. Logical thinking skill domain: Arithmetic averages and standard deviations were calculated for the paragraphs of this domain, and Table (5) shows this:

Table No. 5: Arithmetic averages, standard deviations, order, and degree of availability for the logical thinking skill domain

No.	Statement	Mean	Std.	Rank	Level
6	The ability to switch from one thought to another	3.63	0.91	1	Moderate
2	The ability to generate ideas taking into account the results	3.60	0.91	2	Moderate
5	The ability to change a mindset or state of mind	3.60	0.89	3	Moderate
3	The ability to link different ideas tightly	3.57	1.01	4	Moderate
7	The ability to see things from different angles The ability to elaborate on the ideas presented	3.54	0.92	5	Moderate
1	The ability to reorganize ideas and put them into new templates	3.51	1.02	6	Moderate
4	The ability to spot loopholes in common ideas	3.49	0.93	7	Moderate
Total		3.57	0.94		Moderate

Table (5) shows that the reality of creativity in speaking and logical thinking skills for people with autism spectrum disorders within the English language curriculum for the basic stages in light of the list of multiple intelligences in the light of the field of logical thinking skill was medium, The arithmetic mean was (3.57) and the standard deviation was (0.94), and all the paragraphs of the field were average. Paragraph (6) came in the first place, which states “the ability to transform from one thinking to another.” Paragraph (4) came in the last rank, which states “the ability to discover loopholes in circulating ideas,” This may be due to the difficulty of diversifying the students’ thinking strategies, especially as they are passing through the basic stage of their education, which makes it imperative for the teacher to focus on the basics and not accept that the student’s level of thinking goes beyond what is in the English language curriculum. This is for fear of causing confusion to the rest of the students, especially those who do not possess the skill of logical thinking, based on taking into account individual differences among students and achieving equal educational opportunities for all students in the basic stages.

Results related to the answer to the second question, which states: Are there statistically significant differences at the level of significance ($\alpha \leq 0.05$) between the arithmetic averages of the responses of the study sample members towards the reality of creativity in speaking and logical thinking skills for people with autism spectrum disorders within the English language curriculum for the basic stages in light of List of multiple intelligences attributed to the variables (gender, years of experience, and educational qualification)?

This question was answered as follows: a. Gender variable: The arithmetic means and standard deviations were calculated, and the t-test was calculated according to the gender variable, and Table (6) shows that.

Table No. 6: Arithmetic means, standard deviations, and t-test according to the sex variable

Area	Gender	Frequency	Mean	Std.	T value	Sig.
speaking skill	Female	170	3.72	0.72	2.439	**0.003
	Male	150	3.63	0.84		
	Total	320	3.67	0.77		
Logical thinking skill	Female	170	3.56	0.90	0.856	0.015
	Male	150	3.53	0.91		
	Total	320	3.53	0.90		
Total	Female	170	3.59	0.83	1.595	**0.007

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	Male	150	3.41	0.89		
	Total	320		0.84	2.439	**0.003

** The difference is statistically significant at the significance level ($\alpha \leq 0.05$)

To determine whether the differences between the means are statistically significant at the significance level ($\alpha \leq 0.05$), the t-test was applied. The results in Table (6) indicate that there are statistically significant differences at the significance level ($\alpha \leq 0.05$) according to the gender variable, based on the calculated (T) value, which amounted to (1.595) and at the level of significance (0.007). Where the difference was in favor of females, as evidenced by their high arithmetic averages, and this may be due to the fact that the teachers have a broader understanding of the merits of speaking and logical thinking skills, due to the duality of their task in raising young people. In her school she is a teacher and in her home she is a nanny, which reinforces in them an inner conviction of the need to improve the students' speaking and logical thinking skills at a level that ensures the achievement of the required creativity within this field. This may also be due to the fact that female teachers are ahead of teachers in verbal intelligence by virtue of the nature of females, psychomotor and psychological, which results in the female teachers' ability to limit students' weaknesses in speaking and logical thinking skills.

B. Years of experience variable: The arithmetic averages and standard deviations were calculated, and the (t-test) test was done according to the years of experience variable, and Table (7) shows that.

Table No. 7: Arithmetic averages, standard deviations, and t-test according to the variable years of experience

Area	Years of Experience	Frequency	Mean	Std.	T value	Sig.
speaking skill	Five years or less	124	3.66	0.72	-1.671	0.071
	more than five years	196	3.79	0.81		
	Total	320	3.75	0.79		
Logical thinking skill	Five years or less	124	3.45	0.92	-3.328	**0.011
	more than five years	196	3.68	0.89		
	Total	320	3.57	0.90		
Total	Five years or less	124	3.52	1.65	-1.162	0.196
	more than five years	196	3.59	1.66		
	Total	320	3.55	1.65		

** The difference is statistically significant at the significance level ($\alpha \leq 0.05$)

To determine whether the differences between the means are statistically significant at the significance level ($\alpha \leq 0.05$), the t-test was applied, The results in Table (7) indicate that there are no statistically significant differences at the significance level ($\alpha \leq 0.05$) according to the years of experience variable based on the calculated (t) value, which amounted to (-1.162) and at the level of significance (0.196). The difference was in favor of those whose years of experience reached more than five years, as evidenced by their high arithmetic averages. This may be attributed to the long teaching experience that makes the teacher fully aware of better knowledge of speaking and logical thinking skills and how to raise the level of creativity in them on the one hand. On the other hand, we find that this category of teachers has a high level of professionalism, sincerity, a sense of responsibility and the desire to perform the teaching profession to the fullest extent towards students.

c. Educational qualification variable: Arithmetic averages and standard deviations were calculated according to the educational qualification variable, and Table (8) shows that.

Table No. 8: Arithmetic averages and standard deviations according to the educational qualification variable

Area	academic qualification	Frequency	Mean	Std.
speaking skill	Postgraduate degree	70	3.72	0.53
	BA degree	250	3.79	0.81

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	Total	320	3.74	0.72
Logical thinking skill	Postgraduate degree	70	3.57	0.84
	BA degree	250	3.66	0.83
	Total	320	3.65	0.79
Total	Postgraduate degree	70	3.58	0.77
	BA degree	250	3.65	0.84
	Total	320	3.59	0.81

It is noted from Table (8) that there are apparent differences between the arithmetic averages, according to the educational qualification variable, as those in the (Bachelor) category got the highest arithmetic average of (3.65), Those in the category of (higher studies) ranked last, with an arithmetic mean of 3.58, This may be due to the fact that teachers who are in the bachelor's category are considered to be more concerned with teaching primary school students, which results in their ability to define the gap more accurately, With regard to the level of creativity in speaking and logical thinking skills within the English language curriculum for this group of students.

RECOMMENDATIONS

After reviewing the results of the study, the researchers recommend the following:

1. The need for special education departments to pay attention to the levels of creativity in the skills of logical thinking and speaking within the English language curriculum among students of the basic stages.
2. Holding specialized courses and workshops for teachers of the basic education stages to train them on ways to develop creativity in speaking and thinking skills within a scientific framework and with short-term plans.
3. Conducting more studies and research on the need to raise the reality of creativity in developing speaking and thinking skills and inventing new methods that simulate the mentality of the student in the basic education stages and better advance him.

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Design and Build an Application for Patient Registration Services at Prosthetics Orthotics Clinic, Health Polytechnic of Jakarta I



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ABSTRACT: This study aims to design a patient registration service application for the Prosthetics Orthotics Clinic at the Health Polytechnic of Jakarta I. Several methods for developing patient registration applications that were previously developed used the waterfall method. In this study, it was designed using the Rapid Application Development method with the hope that the development process could be faster with good results compared to the waterfall method. The result of this design is the formation of input and output designs for patient registration services for prosthetic orthotic clinics. This is followed by the implementation of this design to be able to speed up the service process to patients and store patient data more efficiently.

KEYWORDS: Patient registration, Clinic, Prosthetics Orthotics, RAD.

I. INTRODUCTION

Department of Prosthetic Orthotics, Health Polytechnic Jakarta I is a public university in the field of Prosthetic Orthotic Services which was established in 2009 in collaboration between the Ministry of Health of the Republic of Indonesia and an NGO from the UK, namely The Cambodia Trust, which is in charge of Prosthetic Orthotic education which provides assistance in bringing in expatriates from several countries that are reliable in their fields with technology transfer and workshop assistance along with materials in accordance with the National curriculum and ISPO/WHO curriculum.

The Prosthetic Orthotic Study Program at the Health Polytechnic Jakarta I has clinical services aimed at people with disabilities. In 2021, the prosthetic orthotic department is still dedicated to helping old patients who directly assist the educational process as patient models by providing repair tools, or replacement of assistive devices in order to create the best applied educational environment that is adaptive to the work environment.

Currently, the prosthetic orthotic clinic in recording patient registration and patient medical records still uses a manual system, which is recorded through a registration form written by the patient and a medical record form recorded by the prosthetic orthotic clinic admin. Along with the development of the era towards the digitalization of information systems where the collection of data and information should have been recorded through the information system.

Based on a literature study of several articles discussing patient registration, the development of an information system on patient registration services has been carried out, but still uses the waterfall method where there is a faster and more efficient method of developing applications, namely the Rapid Application Development method [1–3]. RAD is a software process model that emphasizes a short development life cycle, and a rapid adaptation version of the Waterfall method using component construction [4]. From these problems, it is necessary to develop an information system or application for registration of patients at the prosthetic orthotic clinic at the Health Polytechnic Jakarta I.

II. METHOD AND MATERIAL

The methodology used is Rapid Application Development (RAD) with a prototype approach and the resulting product is a prototype of Patient Registration Services at the Prosthetic Orthotic Clinic, Health Polytechnic Jakarta I. This method allows system development to be carried out faster and increases system users' understanding of technology quickly [5]. Researchers will carry out the analysis, design, and implementation phases sequentially and iteratively to obtain a simplified version more quickly. The RAD method is very suitable for use on systems that are not so large and complex [6]. It's just that this research did not carry out a redesign phase based on the results of the re-analysis of the first prototype until it finally produced an implementation product. The stages carried out in the development of this research information system are as follows:

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1. Planning

At this stage, identification of the resources needed in the development of information systems is carried out by reviewing the literature and related theories which are limited by the scope of the research.

2. RAD design workshop

The analysis is carried out on the system that is already running to find out the shortcomings and problems of the system. This information provides the resource requirements used in correct and efficient system improvement. The data and information used at this stage comes from document analysis, in-depth interviews with related parties and observations.

The results of the needs analysis are used in designing information systems according to needs. The design of the data flow and user interface follows the applicable design rules. The creation of the database is adjusted to the needs of data storage, traffic/data transactions and the needs of the data in the indicators. The activities carried out at this stage are:

- Input design, by designing the form, the input display form of the user interface (user interface) follows the applicable design rules.
- Output design, by designing views for system output, including documents and user interfaces.
- Database design, by designing the shape of the database and files needed in the development of an information system for patient registration services at the orthotic prosthetic clinic of Health Polytechnic Jakarta I.

3. Implementation

The form of the implemented application is a prototype of the designed application. The test is carried out thoroughly, both in terms of interface design, flow of database usage and the completeness of the required information. Then it was tested on the first prototype of the system that was produced.

III. RESULT

1. Logical Record Structure (LRS) Design

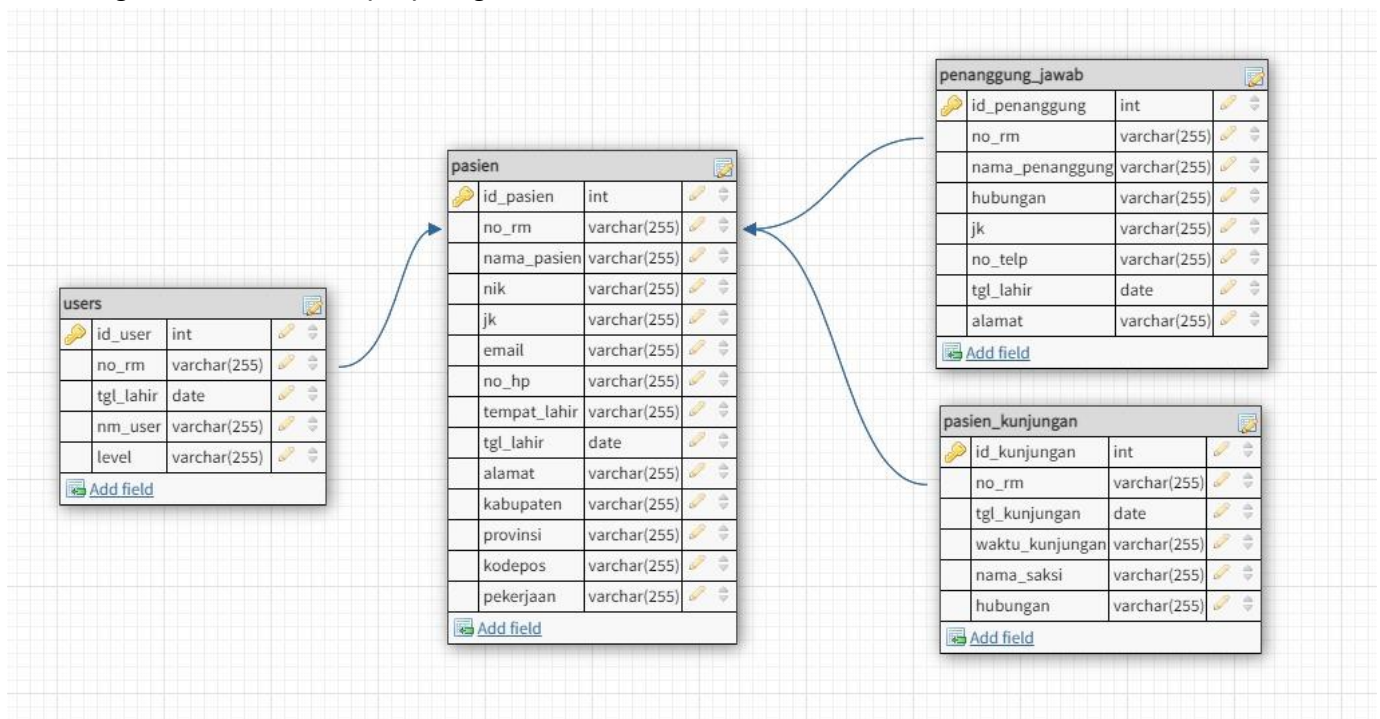


Figure 1. Design of Logical Record Structure (LRS)

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2. Sequence Diagram Design

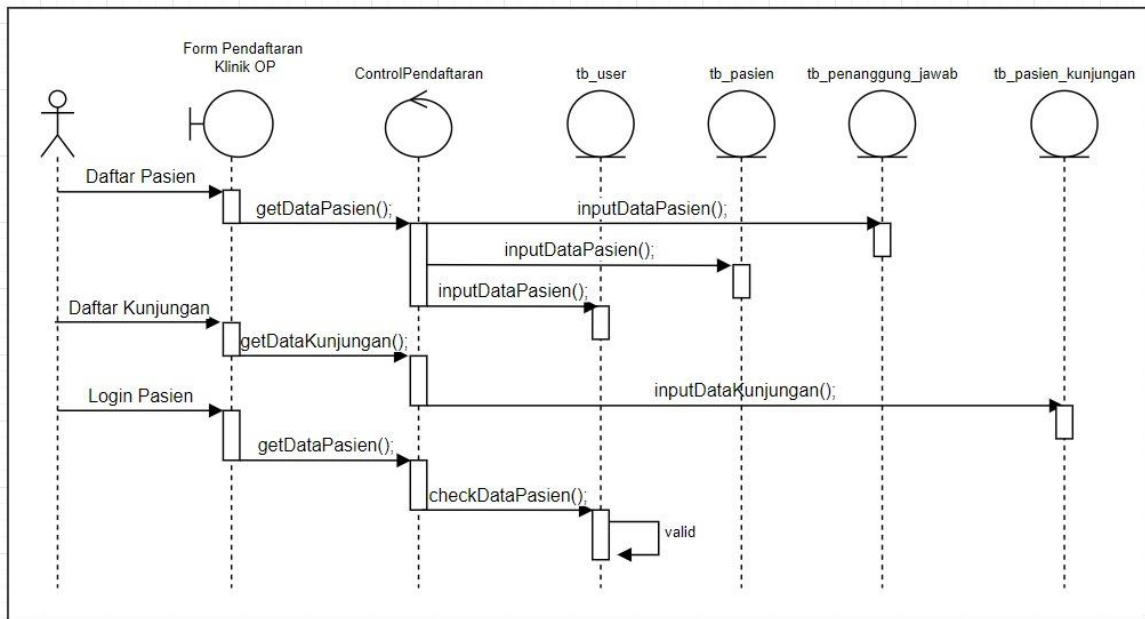


Figure 2. Sequence Diagram design (patient registration process)

3. System Prototype Design

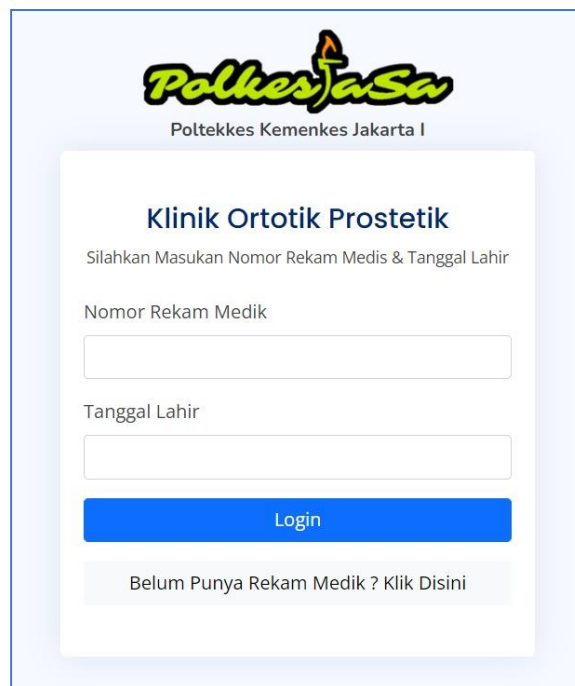


Figure 3. Login page design

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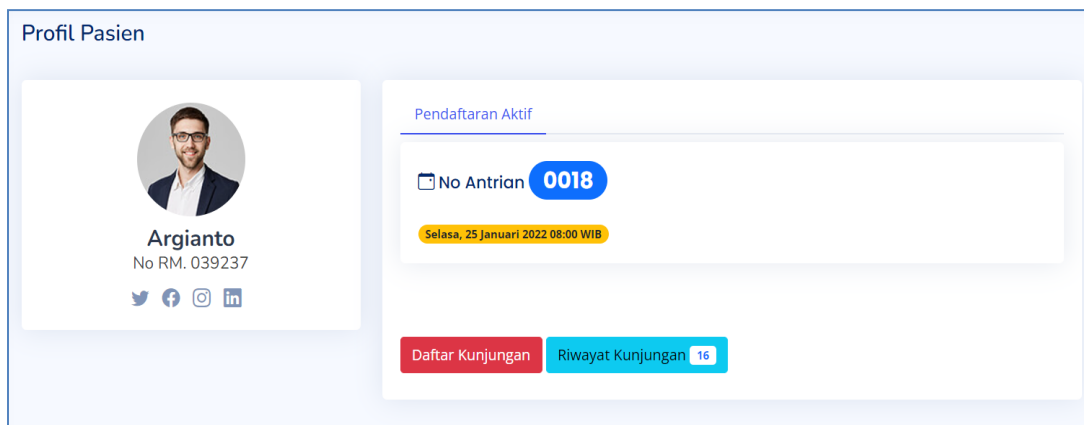


Figure 4. Patient profile page

The form is titled "Registrasi Pasien Baru" with the subtitle "Lengkapi Formulir Dibawah Ini". It features the "Poltekjasu" logo at the top. The form is divided into two main sections: "Identitas Pasien" and "Penanggung Jawab Pasien".

Identitas Pasien

Nama Lengkap: [Text Input]
NIK: [Text Input] Jenis Kelamin: [Dropdown: Pilih...]
Email: [Text Input] No. HP: [Text Input]
Tempat Lahir: [Text Input] Tgl Lahir: [Text Input]
Alamat Lengkap: [Text Input: 1234 Main St]
Kab/Kota: [Text Input] Provinsi: [Text Input] Kodepos: [Text Input]
Pekerjaan: [Text Input]

Penanggung Jawab Pasien

Nama Lengkap: [Text Input]
Hubungan: [Dropdown: Pilih...] Jenis Kelamin: [Dropdown: Pilih...]
No. HP: [Text Input] Tgl Lahir: [Text Input]
Alamat Lengkap: [Text Input: 1234 Main St]
 Saya menyetujui [Syarat dan Ketentuan](#)

Buttons: [DAFTAR] [BATAL]

Figure 5. New patient registration page design

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Pendaftaran Kunjungan

Pasien Umum

No RM: 039237
Nama: Argianto
No KTP: 3175094707490007
No HP: 0182910830

Tgl Kunjungan:
Waktu Kunjungan:

Saksi

Nama Saksi:
Hubungan dg pasien:

Saya telah membaca dan menyetujui PERSETUJUAN /IJIN PELAYANAN ORTOTIK PROSTETIK

DAFTAR SEKARANG

Figure 6. Patient visit registration page

Riwayat Kunjungan

Daftar Kunjungan

#	Tanggal	Waktu	Petugas	Status
1	Senin, 01 Januari 2022	09:00 WIB	Ahmad	Sukses
2	Senin, 02 Januari 2022	09:00 WIB	Subekti	Batal
3	Senin, 03 Januari 2022	09:00 WIB	Ahmad	Batal
4	Senin, 04 Januari 2022	09:00 WIB	Ahmad	Sukses

Figure 7. Patient visit history page

PolkesJasa
Poltekkes Kemenkes Jakarta I

Bukti Pendaftaran



No Pendaftaran : 0018

Nomor Rekam Medik
039237

Nama **Argianto**

Tgl Kunjungan
Selasa, 26 Januari 2022

Pukul
09.00 WIB

Figure 8. Patient registration proof page

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V. CONCLUSIONS

Applications for patient registration services at the prosthetic orthotic clinic can speed up the service process to patients and store patient data more efficiently. In addition, a prosthetic orthotic clinic with an educational orientation where students can directly see the process of recording and examining patients directly so that students can use the clinic for the learning and research process.

ACKNOWLEDGMENT

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Implementation of Training Management and Adaptation of Karate Exercise during the COVID-19 Pandemic



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ABSTRACT: This study aims to find out (1) How to training management is performed by karate trainers during the pandemic. (2) How was the degree of adaptability of karate trainers during the pandemic. (3) There is any connection between adaptability and karate training management during the Covid-19 pandemic. (4) What obstacles did the trainer face in the exercise during the pandemic.

This type of research is quantitative descriptive research with a survey method. Research sites in Dojo/Clubs/Forki across Indonesia. The timing of this study was carried out from late February 2021 to March 2022. The population of this study is all karate martial sports trainers who belong to FORKI spread throughout Indonesia. Sample research incidental sampling was taken, and 108 respondents were obtained. Data collection techniques used questionnaires in the form of Google Forms. Validity of the instrument is performed through expert judgment, and reliability using Alpha Cronbach's. Data analysis is performed descriptively quantitatively, using SPSS.

Research results show (1) Karate training management in the Covid-19 pandemic was in the "quite high" category (75.93%), with the highest average aspect in the planning aspect and the lowest in the actuating aspect, as well as the implementation of health protocols at the time of exercise in the Covid-19 pandemic, being high. (2) Adaptability of karate trainers in times of the Covid-19 pandemic was in the "adequate" category (74.07%), with the highest adaptation to the learning innovation skills aspect, and the implementation of karate exercises during the Covid-19 pandemic period in both online and offline ways. (3) There is a relationship between adaptability and karate training management during the Covid-19 pandemic. (4) Obstacles encountered on the problem of signals and quota availability, the lack of satisfaction of trainers in the exercise implementation, and the technical aspects of training movements that are very difficult to carry out online.

KEYWORDS: Trainer, Exercise, Karate, Pandemic, Covid-19, Training Management, Adaptability

INTRODUCTION

The COVID-19 pandemic calls for changes in both exercise and learning patterns in the field of sports (Garcia-Garcia et al., 2020). In Indonesia, the implementation of the 2020 PON has also been postponed to 2021. This postponement certainly impacts all athletes and sportsmen, given that the periodic implementation of events has an important role in the lives of athletes (Grix et al., 2021); (Oblinger-Peters & Krenn, 2020); (Stambulova et al., 2022). Cancellation and postponement of sports events can have an impact on athletes including on their mental health of athletes (Şenışık et al., 2021); (Terry et al., 2020). A trainer as one of the management players in sports is required to be able to solve problems in carrying out training, therefore the imagination and creativity of a trainer must continue to develop and improve in the exercise. The trainer is the spearhead in carrying out the training of the younger generation (Susilawati, 2020). In this 21st century, the world is undergoing very rapid change. These changes cover all walks of life, i.e. areas of economics, transportation, technology, communications, information, etc. Such changes are attributed to the presence of pandemic COVID-19. This results in trainers having to have high adaptability and faster. The competition is intensifying, so even training children need new demand. Therefore, trainers are required to have new ways that are more creative and meaningful in training to impact trainees both physically and mentally positively. The trainer is required to be courageous to make decisions, and courageous to communicate all the problems faced, both to his trainees and to parents. Creative thinking about how exercises should be implemented in order to keep safety awake. That decision-making has an impact on how and methods are carried out if the trainer chooses to carry out the exercise in times of the Covid-19 pandemic. In deciding matters the trainer is required to manage the exercise based on skills and ability to obtain an outcome in order to achieve the goal

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through the activities. The adaptability and managerial ability of a trainer are two interesting factors to examine, so through this study, it is desirable to reveal how the adaptability of trainers and exercise management was implemented during the pandemic period of COVID-19. This variable disclosure is essential to study to ensure certainty that sports training, which is the spearhead of quality training of superior human resources, remains enforceable, under any circumstances and conditions. This study aims to find out how to exercise the management and adaptability of the trainer in the pandemic COVID-19 period.

METHODOLOGY

This type of study is quantitative, judging by its method including survey research, judging by its level of exposure including descriptive research. This study was conducted at Dojo/Club/Forki throughout Indonesia, which carried out karate exercises during pandemic times. The research time was conducted from late February 2021 to early March 2022. The research population is all karate martial sports trainers who belong to FORKI, the membership of FORKI consists of 28 karate colleges spread across districts/cities in Indonesia. Samples were taken based on region samples.

Random sampling technique, with incidental sampling technique of 108 respondents. Data collection techniques are used in the form of questionnaires. The use of questionnaires is a technique that is a staple for the data collection of this study to find out how the management performed by karate trainers during the period of COVID-19 was implemented. The use of questionnaires in the current google form is becoming very effective today. Instruments for implementing health protocols using the Guttman scale. Alternative answers are arranged in the form of a Guttman scale that is: (a) yes and (b) no. Categories for positive statements are Yes = 1 and No = 0, while categories for negative statements are Yes = 0 and No = 1.

Training management instruments were developed based on indicators of planning, actuating, leading, and controlling (Mujahidin et al., 2021) using the Likert scale. Alternative answers are arranged in the form of a Likert scale which is: very often, often, sometimes, never. The Likert scale score was the highest score of "four" and the lowest score of "one."

The questionnaire was composed based on a grid of research Instruments, which aims to facilitate the preparation of research instruments. On the instrument grid, the points of essential indicators to be used as the basis for preparing the research questionnaire are outlined. The following is a questionnaire grid used in networking data on how to exercise management was conducted by karate trainers during the pandemic period of COVID-19. The research instrument for measuring training management consisted of 26 statements, each of which statement items consisted of positive statements and negative statements as well as 12 Statements related to the implementation of health protocols in exercises that have been compiled based on existing requirements. Each statement submitted corresponds to a theoretical study that has examined various sources. For more details, see the following table:

Table No. 1: Management Instrument Grid

Variable	Indicator	Sub Indicator	Item	
			Favourable	Unfavourable
Training Management	Planing	Develop a training program	1, 4	2, 3
		Set a final goal of the exercise	6, 7	5
	Actuating	Method	9, 10	8
		Tools / Resource	11	12
		Strategy	13	14
	Leading	Giving directions	15	16
		Motivating	17	18
		Managing conflict	20	19
	Controlling	Assess the success	21	22
		Making correction	23	24
		Develop goals	25	26
	Total			26

Furthermore, in supporting training management during of COVID-19 the need for the Health Protocol to be structured based on the requirements set out, it is then structured into an instrument in the form of a questionnaire which is:

Table No. 2: Grid Implementation of Health Protocol RequirementsIn Exercise Implementation

No	Indicator	No Item
1.	Coordinate with the task force	1
2.	Limitations on the number of participants	2

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3.	Carried out outdoors	3
4.	Divide exercise into several exercise sessions	4
5.	Body temperature check	5
6.	Sterilization of the training ground	6
7.	Facilitate hand washing	7
8.	Sport equipment sterility	8
9.	Hand hygiene	9

Adaptability Instrument grids are structured based on operational definitions, especially the ability of trainers to adapt to the demands of the times plus the presence of the Covid-19 pandemic.

Table No. 3: Trainer Adaptability Instrument Grid

Variable	Indicator	Sub Indicator	No Item
Adaptability	Learning and innovation skills	Learning ability	1, 2
		Ability to innovate	3, 4
	Digital literacy skills	Ability to use information literacy	5, 6
		Ability to use media literacy	7, 8
		Ability to use technology	9
	Career and life skills	Ability to behave flexibly	10, 11
		Initiative ability	12, 13
		Responsible ability	14, 15
	Total		

Once the data is collected, then it is analyzed using SPSS 2020; before hypothesis testing is performed, it is necessary to perform a prerequisite test. The validity test of this study used a construct validity test using expert opinions (judgment experts). Instruments that have been reconstructed by grounded theories are subsequently validated by experts. The results of such validation are instruments ready for use in collecting research data. The results of the validation test conducted using the opinions of experts, in this case, were three people of the Faculty of Sports Science lecturer in sports management, sports evaluation, and senior trainers in karate. In addition, content validity testing was conducted on 30 respondents and further processed using the SPSS 23 program. The instrument reliability test uses the formula "Alpha Cronbach's," which states that Cronbach's Alpha 0 0.70, then it can be said that the instruments of all research variables have high reliability. Data analysis techniques are a way used to process data in order to produce an appropriate conclusion. There are 2 (two) analytical techniques to be used in this study, namely descriptive analysis, and Chi-square Test analysis.

RESULT AND DISCUSSION

Based on the exercise management variable there are 26 statement items that are then tested for their validity. There is one invalid item, i.e. item number 4 (count $r > r$ table). Furthermore, the invalid item is not used in data collection, with the reason already represented in the other item, so the number of items is reduced by one to 25 items. Furthermore, in the health protocol items supporting exercise management in the Covid-19 pandemic period, there were 12 statement items that were tested for their validity, from the overall question of implementation variables of health protocol requirements in exercise implementation all validly proven with (count $< r$ table). Based on the adaptability variable there were 15 statement items that were then tested for their validity. Of all the questions, the adaptability variable was all valid (calculate $r > r$ table).

Table No. 4: Reliability Test

No	Variable	Cronbach's Alpha	Description
1.	Training Management	0,947	Reliabel
2.	Adaptability	0,928	Reliabel

Based on the reliability test results in Table 4, training management and adaptability show that Cronbach's Alpha 0 value is 0.70. It can be said that the instruments of all research variables have high reliability.

Results of a study of karate trainer exercise management in the Covid-19 pandemic period in table 5:

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Table No. 5: Practice Management Assessment Norms

No	Interval	Category	Frequency	Percentage
1	81 <	High	26	24,07%
2	44 - 81	Adequate	82	75,93%
3	≤ 44	Low	0	0,00%
Total			108	100%

Based on table 21 above shows that the training management of karate trainers during the Covid-19 pandemic was in the "low" category of 0.00% (0 traineres), "adequate" of 75.93% (82 traineres), and "high" of 24.07% (6 traineres). Thus the categorization of the scores of research results based on the above data and the mean gain of 76.76 exercise management were categorized sufficiently. Next karate trainer exercise management in the Covid-19 pandemic was analyzed according to the items presented in Table 6:

Table No 6: Average Score of Training Management Items

No	Statement	Mean	Category
1	Monitor and plan daily programs	3,65	High
2	Prepare and plan weekly program	3,65	High
3	Prepare and plan monthly program	3,63	High
4	Incorporate material on history, philosophy and karate tradition	3,27	High
5	Setting goals is carried out in discussions with the trainees	2,83	Adequate
6	Planning an exercise program in the form of technical, physical, tactical, and mental exercises	3,12	High
7	Provide practice materials with instructions only	2,34	Adequate
8	Demonstrating the movement and making sure the child is trained to pay attention to the movement	2,88	Adequate
9	Prepare and plan monthly programs	2,51	Adequate
10	Have a team / accompanied by other trainers in the implementation of training	3,06	High
11	Ensure the availability of training facilities such as mattresses, bags, and others	3,21	High
12	Explain the type and material of the exercise first to the trainee	2,28	Adequate
13	Give the task of what movements the child must repeat at home	3,00	Adequate
14	Give a warning if the child trains to make a mistake in the exercise	3,18	High
15	Give a warning if my training child cheats in practice.	2,72	Adequate
16	Motivate the trainees to keep the spirit in practicing	3,08	High
17	Give praise when there are children who train to achieve success.	2,65	Adequate
18	Provide training materials that are adapted to the conditions during the level increase exam/ karate competition.	3,36	High
19	Open communication openly to reduce awkwardness with the trainee	3,34	High
20	Record the results of the exercise, including the strengths and weaknesses of the trainees	3,45	High
21	Delivering written evaluations to trainees	3,48	High
22	Have a discussion with the trainees after finishing the exercise.	3,06	High
23	Give feedback to the trainees to improve better results.	3,05	High
24	Helping the trainees practice to analyze their shortcomings.	3,14	High
25	Use the evaluation results to develop further programs.	2,81	Adequate

Based on item analysis it can be found that the management ability of the respondents on each item shows as many as 9 items (36%) showed sufficient categories and 16 items (64%) of those items in high categories. The highest consecutive items on compiling and planning daily programs (3.65), compiling and planning weekly programs (3.65), and compiling and planning monthly programs (3.65). All three items are in the Planning indicator. Whereas low-level items exist in explaining the type and material of exercise first to the exercising child (2.12) Provide exercise material only with instructions, (2.51) Explain the type and

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material of exercise first to the exercising child (2.28). The thing with the most item scores is the actuating indicator. This shows that even though the trainer has designed the training program well, there are many difficulties in implementing the implementation aspect because karate actually leads to more motion training, but the instructions and reproofs carried out through online program training are still difficult to implement. Furthermore based on the clustering of the management functions, then the data are presented in Table 7.

Table No. 7: Management Function Implementation Score in Karate Exercise

No	Management Function	Score	Average	Category	Rank
1	Planning	2176	3,36	High	I
2	Actuating	2083	2,76	Adequate	IV
3	Leading	1980	3,06	High	III
4	Controlling	2051	3,17	High	II
Average			3,09		

Based on the grouping in table 7, it appears that the implementation of management in karate exercise was highest on the aspect of planning with rata 3.36. The controlling aspect has the second-highest with an average of 3.17 Aspect leading in the third order with 3.06 rata. Whereas in the actuating aspect it is in the fourth order with an average of 2.76. Planning gained high categories because trainers were able to plan daily, weekly and monthly programs. Then on the leading aspect obtain high categories because the trainer seeks to manage the conflicts that occur by adjusting the training materials according to the conditions, as well as opening communication to reduce awkwardness with the training child. The aspect of control is because the trainer always conducts evaluations both directly and in writing to his training child. Whereas in the implementation or actuating aspects, due to the large number of programs that are disrupted due to some limitations that must be carried out.

The results of the research on health protocol requirements in the implementation of exercise training during the Covid-19 pandemic are in table 8 as follows:

Table No. 8. Norms for Assessment of Implementation of Health Protocol Requirements in the Implementation of Exercise

No	Interval	Category	Frequency	Percentage
1	9 <	High	62	57,41%
2	3 - 9	Adequate	43	39,81%
3	≤ 3	Low	3	2,78%
Total			108	100%

Based on table 8 above shows that the implementation of health protocol requirements in the implementation of karate exercises during the Covid-19 pandemic was in the "low" category of 2.78% (3 trainers), "adequate" 39.81% (43 trainers), and "high" 57.41% (62 trainers). Based on the mean calculation result of 9.41, it can be inferred that the implementation of health protocols in exercise implementation is in the high category. Usual sustains how the implementation of health protocol requirements in exercise trainers implementation in times of Covid-19 pandemic. The results of an analysis of the implementation of health protocol requirements are presented in Table 9:

Table No 9: Average of Each Item Implementation of Health Protocol Requirements in the Implementation of Exercise

No	Statement	Mean	Kategori
1	Coordinate with the Covid-19 task force in the local area in order to practice karate	0,84	High
2	Plan to limit the number of trainees in one session.	0,75	High
3	Carried out outdoor exercise	0,88	High
4	Divide the exercise into several practice sessions if the trainees exceed 50% of the room capacity	0,73	High
5	Check your body temperature before starting the exercise	1,00	High
6	The sterilization of the place and exercise equipment is my concern	1,00	High
7	Ensure the availability of adequate hand washing facilities	0,76	High
8	Clean hands with soap before entering the practice area	0,71	High
9	Bring and use hand sanitizer when in contact with other people	0,70	High
10	Set the training distance between athletes at least 1 meter	0,74	High
11	Provide training by making direct contact with athletes/fellow athletes	0,69	Adequate

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12	Ensure athletes do not take off/lower masks during training	0,60	Adequate
Average		0,78	

The data in table 9 show that the item indicating the highest category at the implementation of the health protocol by looking at the average is checking body temperature before exercise (1.00) and sterilization of exercise places and tools (1.00), while the least is to ensure athletes do not remove or lower masks during exercise, (0.60).

The Results of a karate trainer adaptability study in times of Covid-19 pandemic in table 10:

Table No. 10: Adaptability Assessment Norms

No	Interval	Category	Frequency	Percentage
1	$49 < X$	High	28	25,93%
2	$26 < X \leq 49$	Adequate	80	74,07%
3	$X \leq 36$	Rendah	0	0,00%
Total			108	100%

Based on table 10 above shows that the adaptability of karate trainers in the Covid-19 pandemic was in the "low" category of 0.00% (0 traineres), "adequate" of 74.07% (80 traineres), and "very high" 25.93% (28 traineres). Judging from the average value, which is 47.33, the adaptability of the respondents is in the category sufficiently.

Table No. 11: Average Adaptability of Each Item

No	Statement	Mean	Kategori
1	Learn how to use new applications that will be used for training activities	3,57	High
2	Learn to understand various government policies regarding the adaptation of new habits	3,44	High
3	Develop training programs during this pandemic	3,48	High
4	Try new ways of training by leveraging video learning resources	3,48	High
5	Using information from the internet to gain knowledge about karate.	3,54	High
6	Informing the exercise schedule through digital media (WA, Instagram, Fb)	3,33	High
7	Using youtube and others media as practice material	2,93	Adequate
8	Looking for sources of material to be used as training media	3,18	High
9	Using various digital features to train children's learning resources	2,65	Adequate
10	Adjusting the training regulations with the new rules set by the government.	2,94	Adequate
11	Make my ideas accepted by others	2,81	Adequate
12	Offers a new training method in the great outdoors	3,13	High
13	Make a video to give an example of the right technique	3,16	High
14	My trainee is my responsibility in developing his ability in the field of karate	2,68	Adequate
15	Paying special attention to slow learners	3,01	High

Based on item analysis it can be found that the adaptability of respondents to each item showed as many as 5 items (33.33%) in the sufficient category and 10 items (66.66%) in the high category. Learned how to use new applications to be used for exercise activities (3.57) and developed exercise programs during pandemic times, (3.48), and tried new ways of training by exploiting video learning resources (3.48). While the items with the lowest adaptation are the use of various digital features for training children's learning resources (2.65) and the sense of responsibility for training in developing their skills in karate (2.68)

Table No. 12: Adaptability Score

No	Adaptability	Score	Average	Category	Rank
1	Learning and innovation skills	1510	3,5	High	I
2	Digital literacy skills	1687	3,12	High	II
3	Career and life skills	1915	2,96	Adequate	III
Average			3,16		

The data in table 12 shows out of the 3 (three) adaptability indicators that the highest-scoring trainer has the Learning and innovation skills, (3.5) and continued Digital literacy skills (3.12). This is very reasonable considering that adaptability during this pandemic, should be used as momentum to learn new skills, in addition to opportunities to deal with the digital leaps necessary for future education.

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Analysis techniques were used to test the relationship between adaptability and karate training management using Chi-Square analysis techniques with the help of the SPSS 23.0 computer program. The provisions used are a 0.05 error rate, where the test criterion is, if the probability (Sig) of 0.05, then it is significant. If the probability (Sig) of 0.05, then it is not significant. The complete Chi-Square analysis results are in Table 13.

Table No. 13: The results of Chi Square Analysis of the relationship between Adaptability and Karate Training Management

		Exercise Management		Total	value	sig
		Adequate	High			
Adaptability	Adequate	77	3	80	65,269 ^a	0,000
	High	6	22	28		
Total		83	25	108		

After conducting a chi-square test with a significant extent of 5% (0.05), it was obtained that a significance value was 0.000, which means significance was 0 0.05, so it can be concluded that there is a relationship between adaptability ability and karate training management during the Covid-19 pandemic.

Table No. 14: Difficulties in Online Training

No	Difficulties Encountered	F	Percentage (%)
1	Unstable internet connection so the practice is not smooth	63	58 %
2	Cannot directly correct the wrong technique and movement	21	19,44%
3	Dissatisfaction with training, lack of emotional involvement, difficulty motivating, feeling ineffective	24	22,22%
Total		108	100 %

An online exercise system (in a network) is an exercise system without face-to-face directly between a trainer and a trainee but is carried out online using the internet network. The implementation of karate exercises, in particular, online exercises in times of the Covid-19 pandemic hit several obstacles. The problem that occurs with quota availability that requires a high cost is reasonably priced to facilitate the need for online practice. Quotas purchased for internet needs are becoming soaring and many parents are not prepared to supplement budgets by providing internet networks. This is also a very important issue for trainers and training children when karate exercise is done. The second difficulty is the lack of satisfaction of trainers in carrying out training online because karate involves a sense, emotion, and even commitment, so obstacles arise from oneself because it feels unable to motivate and bring the child to practice optimally. The third difficulty of training karate is very identical to motion training, so training that is not held offline is clearly the biggest difficulty for trainers to shape the athletes' achievements.

EXERCISE MANAGEMENT

Based on the results of the study showed that the management of the karate trainer exercise during the Covid-19 pandemic was in the sufficient category. The training management here is based on planning, organizing, leading, and controlling. Linking exercise management during the COVID-19 period requires training planning, training organization, training direction, and controlling exercise results. The main task in the exercise is to explore, compile, and develop the concept of "practicing to train" by combining practical experience and a scientific approach, so that the training process can take place precisely, quickly, effectively, and efficiently (Wati & Sugihartono, 2018).

The implementation of offline exercise is carried out by making many restrictions and adjustments. One is by using the Health protocol. Based on the research results shows that implementation of health protocol requirements in the implementation of karate trainer exercises in times of the Covid-19 pandemic was in the category sufficiently. Covid-19 transmission can occur in contact, droplet, air, fomit, Fecal-Oral, blood, mother-to-child, and human animals ((Bao & Bihn, 2022); (Yadav et al., 2020)).

Regardless of the postponement of major events in the world of sports, the WHO prepares steps or protocols that must be complied with when it is to hold meetings a mass meeting (Ebrahim et al., 2020) identifying step steps to be implemented, especially cancellation or suspension of the event when deemed to make the spread of the disease possible, carry out physical distancing to reduce direct contact. Travel restrictions, including reduction of flights and public transportation as well as route restrictions without reducing essential services, carry out quarantine at home. Of course, this has an impact on the usual sports activities involving many people whether it's a matching activity or training activities in sports clubs.

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The implementation of the health protocol should involve the role of relevant parties, including officials, in conducting order and supervision, as well as paying attention to the crisis point of COVID-19 transmission in terms of "The type and characteristics of activities/activity, the size of activities, the location of activities, the length of activities, the number of people involved, vulnerable groups (mother) pregnant, toddlers, children, the elderly, comorbid people, people with disabilities, etc.) (Hanafi et al., 2021).

Entering the New Normal period, a number of activities can already be carried out with health rules or protocols that must be obeyed by people who carry out activities. The importance of following health protocol rules that must be implemented during the new normal is to reduce the spread of the COVID-19 virus. Always wearing a mask when outside the home, diligently washing your hands, and keeping your distance, is a health protocol that everyone who does outdoor activities must comply with. In new normal times, the government is preserving scenarios for the recovery of economic activities, schools, and other activities.

ADAPTABILITY

Research results show that karate trainers' adaptability during the Covid-19 pandemic was in the sufficient category. Adaptability aims to minimize the risks caused by changes so that established performance can be achieved (Novikov, 2020). Adaptability is a very complex behavior because it involves a number of functions and intellectuals. For example, reasoning, work memory, and learning skills are getting higher (Rifani, 2019).

Adjustments related to increasing competency demands for trainers are currently urgently needed. There are various reasons, including one of the strategic plans outlined by the Ministry of Youth and Sports in 2020-2024 is the increase in the availability of qualified and competency-certified sports personnel to ensure sports achievement at the Olympics and Paralympic sports. Similarly, one of its performance targets is the establishment of a sports training system on a regular basis tiered, and continuous based Olympic and Paralympic sports branches supported the implementation of IPTEK sports, national standards of sports as well as award systems. In addition, the demands of future competencies that cannot be delayed cause trainers to like or dislike having to learn and be willing to improve themselves in the face of various existing changes.

Based on the result of the study, a form of karate exercise conducted during the Covid-19 pandemic, trainers used online media and offline (face-to-face). The online media used are Whatsapp, Telegram, Line, Media Chatting, Zoom Meeting, Google Meet, Meeting app, Google Classroom, Instagram, and Youtube. Offline exercises are also performed if possible with health rules or protocols. Exercise is done by checking body temperature, always wearing a mask or face shield, washing hands before and after exercise or using hand sanitizer, keeping distance or minimizing direct contact, maintaining cleanliness, and reducing exercise duration. These various platforms can be utilized to support knowledge transfer supported by various discussion techniques and others. Online learning is effective in carrying out learning even though educators and training children are in different places (Churiyah et al., 2020). Variations of available platforms and resources help sustain the exercise process during the COVID-19 pandemic. Online training is a new way in the training process that utilizes electronic devices, especially the internet, in delivering training. Online training is completely dependent on internet network access.

The Relationship between Adaptability and Karate Training Management

Based on the results of the study shows that there is a relationship between adaptability and karate training management during the COVID-19 pandemic. The better the adaptability of the trainer, the better the management of karate exercise during the COVID-19 pandemic will be. Adaptability refers to the characteristics of building the environment (Pinder et al., 2017). Adaptive individuals will anticipate problems and develop alternative solutions for various possibilities in assessing and responding to a changing environment (Boylan & Turner, 2017).

Increasing adaptability can lead individuals to sell innovative ideas effectively through self-confidence (Smith & Webster, 2018). In other words, self-perception of adaptability will lead individuals to act in innovative ways, thereby motivating themselves to succeed in justifying the resulting innovations for others. Adaptability will increase exposure to various tasks and experiences with other people around, which will increase the ability of individuals in situations where individuals have to develop new strategies and skills. In other words, adaptability relies on HR practices to achieve a competitive advantage.

The Difficulties of Karate Trainers in Exercise during the Covid-19 Pandemic

The online exercise system (on the network) is a training system without face-to-face directly between trainer and trainees but is carried out online using the internet network. Online training is completely dependent on internet network access. Although online learning is able to provide attractive and effective services, its implementation still has its own challenges ((Hebebcı et al., 2020) (Coman et al., 2020)). The various benefits obtained, of course, have obstacles that are felt by trainers and children who train in online exercise. The obstacles faced are the various regional conditions in Indonesia, causing not all areas to be reached by internet services, and the distribution of internet networks is slow from time to time.

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The implementation of karate exercises, especially online exercises during the COVID-19 pandemic, encountered several obstacles. The problem that occurs is the availability of quotas which require a fairly high price to facilitate the need for online exercise. The quota purchased for internet needs is increasing, and many parents are not ready to increase the budget to provide internet networks. This is also a very important issue for trainers and children when practicing karate.

The research conducted (Sya'diah & Jatmiko, 2021) stated that the purpose of their study was to find out the obstacles experienced by athletes and the solutions provided during the COVID-19 pandemic and to determine the efficiency of the exercise monitoring system during the COVID-19 pandemic. The results of the study found that the obstacles in exercise lie in the facilities and infrastructure, sparring partners, as well as TFH-applied training. Solutions for exercise facilities by finding a large place outside the home and buying some matching equipment, solutions to replace sparring partners, athletes are continuing to train with friends who live in the same area, and supervising athletes' exercise through e-teleconference through the zoom meeting application.

CONCLUSION

Training management conducted by karate trainers during the COVID-19 pandemic was in the sufficient category of 75.93% (82 trainers), and "high" was 24.07% (6 trainers), and the average showed a sufficient category with a score of 76.76. Furthermore, the implementation of the management function was highest on the planning aspect, on a scale of 1 to 4 there was a score of 3.36 and lowest on the actuating aspect with an average score of 2.76. The highest aspect of planning was obtained because trainers were able to plan daily, weekly, and monthly programs. Whereas the implementation or actuating aspect is the lowest, due to the large number of programs being disrupted due to some limitations that must be carried out.

The implementation of health protocol requirements in the implementation of karate trainer exercise during the Covid-19 pandemic was in a high category, with the most frequency of 57.41% (62 trainers), and the average score showed a high category of 9.41. Offline exercise is also carried out by checking body temperature, always wearing a mask or face shield, washing hands before and after training or using hand sanitizers, keeping distance or minimizing direct contact, maintaining cleanliness, and exercise duration reduced.

The karate trainer's adaptability in times of the Covid-19 pandemic was in the "adequate" category with an average of 47.33. with a frequency of 74.07% (80 trainers), and "very high" 25.93% (28 trainers). The adaptability of the karate trainer during the Covid-19 pandemic was in the "adequate" category with an average of 47.33. with a frequency of 74.07% (80 trainers), and "very high" 25.93% (28 trainers). This adaptability has the largest average score on Learning and innovation skills which is 3.5, and the lowest on Career and life skills, with an average of 2.96. This adaptability capability trainers perform by learning how to use the new applications to be used for training activities, learning to understand various existing policies, as well as developing training programs.

A form of karate exercise conducted during the COVID-19 pandemic trainers uses online (networking) and offline (face-to-face) media. The online media used are Whatsapp, Telegram, Line, Media Chatting, Zoom Meeting, Google Meet, Meeting App, Google Classroom, Instagram, and Youtube, with the most applications using online meet such as zoom, and google meet. There was a relationship between adaptability and karate training management during the Covid-19 pandemic, with a significance of 0.05. The better the coach's adaptability is, the karate training management in times of the Covid-19 pandemic will be the better.

The implementation of karate exercises in particular online exercises in times of the COVID-19 pandemic hit several obstacles. The biggest constraints are signal problems and quota availability issues that require sufficiently high costs to facilitate the need for online exercises. Quotas purchased for internet needs are becoming soaring, and many parents are not prepared to supplement budgets by providing internet networks. This is also a very important issue for trainers and training children when karate exercise is done.

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The Impact of COVID-19 Pandemic on The Livelihood of Urban Refugees in Arua City, Uganda



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ABSTRACT: This study focused on the impact of COVID-19 pandemic on the livelihood of urban refugees in Arua City, Uganda. The research design adopted in this study was qualitative interview study, underpinned on the interpretivism philosophy. Data were sourced through 10 to 15 minutes face to face in-depth interviews consisting of 12 Urban refugee homesteads registered with the Office of the Prime Minister (OPM), Arua branch. The Qualitative data was analyzed using thematic analysis. Thematic analysis is an accessible and flexible approach to qualitative data analysis, which is based on coding (Braun & Clarke, 2006). Results have shown that urban refugees have been hit hard by the COVID-19 Pandemic and will continue to face tough and difficult times in the future.

Our findings should be interpreted in the context of the potential limitations of our study: Firstly, the qualitative approach provides depth to our understanding of this problem but may not be generalizable to all urban refugees in other cities. We only interviewed urban refugees in Arua city, a single metropolitan area. Further work should explore how these experiences vary across the urban refugee hosting countries. Secondly, in all qualitative studies, findings may be influenced by the perspectives of the investigators. Finally, participants provided retrospective accounts of their experiences about COVID-Pandemic, recall and social desirability bias cannot be excluded. UNHCR, Donors and the government of Uganda can use the findings of this study to develop appropriate strategies to support urban refugees in a bid to salvage their lives.

KEYWORDS: COVID-19, Pandemic, Impact, Urban refugees, Uganda

1.0 INTRODUCTION

Urban refugees are entitled to humane life just like any other human being in the world. Worldwide, refugees are increasingly settling in urban areas, with over half of the world's 11.7 million refugees living in cities (UNHCR, 2014). Unfortunately, living a humane life has remained a myth to the urban refugee community in Arua city in Uganda during the COVID-19 pandemic as proclaimed by one of the refugees living in Obolokofuku Cell, Central Division, Arua city. Urban refugee populations are comprised of predominantly the young, single males, women, children and older people (Monteith et al., 2012). They normally support themselves by engaging in informal income generating activities such as vendor business since they do not receive regular humanitarian assistance, as per urban refugee policy (UNHCR, 2020). According to the Uganda Refugee Act 2006, refugees have freedom of movement, right to work and/or do business, right to education, right to recognition before the law, right to good shelter, feeding, and access to national health care services. Notably, Uganda hosts the fourth-highest number of refugees in the world, surpassed only by Turkey, Colombia and Pakistan. Over 1.4 million refugees have settled in Uganda and more than 80,000 of them live in the urban areas. The displaced population arrived mostly from conflict-affected areas across the East Africa region. As of 31 December 2020, Uganda hosts 889,054 South Sudanese refugees, 421,563 refugees from the Democratic Republic of Congo (DRC), 49,728 Burundian refugees, 44,479 Somali refugees and 17,883 Rwandan refugees (GOU, 2020).

Regrettably, the COVID-19 pandemic seems to have a devastating impact on the lives of the urban refugees and it is one of the greatest events in human history that will be remembered (Bulafara et al., 2021). COVID-19 first emerged on December 1, 2019 in Wuhan City, Hubei Province, China (Huang et al, 2020). In Uganda, the first corona virus case was discovered on January 2020. By march 2020, the pandemic spread across the globe and the worst that has affected the global economy since the great economic depression (Erdem, 2011; IMF, 2020; WHO, 2020). The total number of confirmed cases across the globe was 209,876,613 as of August 20, 2021, with 4,400,284 deaths (WHO,2021). In a bid to control the spread of the pandemic, the Ugandan government has imposed repetitive lockdowns, closed markets, factories, places of worship, schools, social clubs, as well

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as restrictions of movement of people, goods and services. In addition, Standard Operating Procedures (SOPs) such as mandatory wearing of face masks, regular handwashing or sanitizing, and social distancing from one another have become the new normal (GOU, 2021). This has echoed its effect on the lives of the urban refugees, many of whom were struggling to get by in the informal economy before the pandemic.

According to Mainey Karemere, a Congolese refugee who makes and sells handbags in Arua city, her customers were the daily commuters, now absent from the once bustling markets shut down following a government lockdown aimed at slowing the spread of coronavirus. Another weeping remark comes from a Rwandese female refugee who said that for the last 10 years, her daily work was moving along the streets selling necklaces. Since the time of lockdown that started in March 2020, she was not able to pursue this work as she cannot access the materials necessary, and her children are showing signs of malnutrition due to hunger.

In a related development, a survey commissioned by the World Food Program in July 2021 reported that about half of a sampled population of 212 refugees in Kampala, the capital city of Uganda, 159 (75%) lost household income. The proportion of households without an income earner increased from 31% before the pandemic to 72%. In response, UNHCR, the UN Refugee Agency in Uganda is supposed to provide cash assistance to all registered urban refugees and asylum seekers in Uganda on an exceptional basis to contribute towards rent and basic household needs including soap and masks. However, according to Joel Boutroue, UNHCR's Representative in Uganda, UNHCR is seeking an additional \$5.1 million to fund this planned assistance to meet the urgent needs of urban refugees. He further laments that "We are faced with an extraordinary situation where a health emergency is rapidly turning into a global humanitarian crisis like no other," (WFP report, 2021).

1.1 Statement of the Problem

Refugees living in urban areas face a myriad of livelihood problems as a result of the global COVID-19 pandemic. The different control measures imposed to curtail the spread of the disease seem to have negatively affected the livelihoods of the urban refugees in the whole country and Arua city in particular as declared by Mainey Karemere, a 44-year-old single mother of three who now survives on food handouts from a community church because she cannot make and sell handbags due to the absence of her clients whom she used to meet in the streets of Arua city. "She lamented in desperation that right now, the biggest worry for urban refugees is hunger. If we go out, we risk contracting coronavirus, if we stay home, hunger will kill us. Our children eat once a day and are not going to school. This situation is worse than a war".

Furthermore, although UNHCR has planned to provide cash assistance to all registered urban refugees and asylum seekers without an income, whose proportion has increased from 31% to 72% due to the pandemic on an exceptional basis, the UN agency has a deficit of \$5.1 million to fund this planned assistance (WFP, 2021) thus, depriving the target beneficiaries of the assistance. This urban refugee livelihood status is worrying and cannot be tolerated, otherwise many can be tempted to steal, rob or even go back to their countries that they left because of hostility, hence risking their lives. Thus, the need to understand the impact of COVID-19 pandemic on the livelihoods of urban refugees so as to devise workable means to turn things round is vital and necessary.

1.2 Objectives of the Study

The general objective of the study is to examine the impact of COVID-19 pandemic on the livelihood of urban refugees in Arua city, Uganda. The specific objectives are to:

1. Establish how COVID-19 pandemic has affected the livelihood of urban refugees in Arua city.
2. Determine the impact of the pandemic on the livelihood of the urban refugees in Arua city.
3. Explore avenues to manage the impact of COVID-19 pandemic on the livelihood of the urban refugees in Arua city.

1.3 Research Questions

1. In what ways has COVID-19 pandemic affected the livelihood of urban refugees in Arua city?
2. What will be the impact of the pandemic on the livelihood of urban refugees in Arua city?
3. What are the different avenues that can help urban refugees sustain and recover from the troubles brought by the COVID-19 pandemic?

The drive of this phenomenological study therefore is to fully understand the effect of COVID-19 pandemic on the livelihoods of urban refugees in Arua city, in Uganda. This study has both theoretical and practical contributions. Theoretically, scholars and academicians will find this study an invaluable source of reference material for future studies and subsequent discussions in the area. Practically, this study will be helpful to the government of Uganda, UNHCR and her sister organizations, who can use the findings of the study to better plan and improve livelihoods of urban refugees in the face of global pandemics such as coronavirus.

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2. LITERATURE REVIEW

2.1 Theoretical underpinning

This qualitative study is underpinned by the following theories: Systems theory (von Bertalanffy, 1951; Boulding, 1956); that centers on the assumption that ‘the whole is more than the sum of its parts’. The social ecological theory (Bookchin, 1960) provides an understanding of behavioral reactions from individual, interpersonal, organizational, community and public policy regarding the formation of behavior within the surrounding social environment.

Systems theory of Bertalanffy of 1951, increasingly elaborates across a continuum that encompasses the person-in-environment (Anderson, 1995). The idea that system theory centers on that ‘the whole is more than the sum of its parts’ (Bertalanffy, 1951) is fundamental to the approaches of biologists Ludwig (1968) and Uri Bronfen Brenner (1979); and sociologists are Emile Durkheim (1858–1917) and Talcott Parsons (1902–1979). These ‘parts’, in Durkheim’s view function to integrate the society and to maintain social solidarity (Otite, 1994). Durkheim further explained that individuals perform different types of roles that lead to specialization and segmentation, which ultimately lead to mutual interdependence between units. No unit can exist in isolation of others (Durkheim, 1984). Generally, there are three familiar demarcations of social systems; Micro System-small size, social system such as individuals and couples; Mezzo System-intermediate size system such as groups, extended families; and Macro System-large systems such as communities and organizations.

However, each level is a unit of wholeness with a distinct property or structural limitation that delineates from other systems (Friedman et al., 2011). This is termed system’s boundary by Bertalanffy. Herein, COVID-19 pandemic is interpreted as an element that breaks the boundaries of well-being, and social systems, which are normatively defined. In addition, many societies to date value communal culture and interaction within families, groups, organizations, and communities, these societies also experience significantly weak health structures and low health outcomes. Thus, the spread of a deadly virus such as corona is positively inclined. The relevance of systems theory in this study is that individuals and communities can adopt a number of strategies (i.e., loosen or tighten) conditions in either responding to or challenging the environment. Therefore, urban refugees need to adopt to monumental shocks that may rock the society in event of disasters such as the COVID-19 pandemic. However, systems theory views individuals and environment as concrete items which is not the case, and has failed to explicitly define the shocks of global pandemics.

Another important theory is the social ecological theory of Murray Bookchin 1960. The theory focuses on the understanding of behavioral reactions from individual, interpersonal, organizational, community and public policy regarding the formation of behavior within the surrounding social environment. The social ecological theory helps to understand factors affecting behavior and also provides guidance for developing successful programs through social environments. Social ecological models emphasize multiple levels of influence (such as individual, interpersonal, organizational, community and public policy) and the idea that behaviors both shape and are shaped by the social environment. The principles of social ecological models are consistent with social cognitive theory concepts which suggest that creating an environment conducive to change is important to making it easier to adopt healthy behaviors.

Given the emergence of coronavirus pandemic that is desolating Uganda and other countries, more attention should be geared towards shaping and adopting healthy behaviors such as sanitization, social distancing, restricted movement, ban on congressional prayers, testing suspects, isolation, quarantining and business closures. The relevance of social ecological theory in this study is the insight in understanding the reasons as to why we behave the way we do. Therefore, urban refugees that are able to change their ways of doing things during and after the COVID -19 pandemic will survive and live a good life. However, critics of the theory contend that social ecological theory does not give insight into the magnitude of effect of change in behavior on other aspects of life. Additionally, changing lifestyles can be extremely difficult over a short period of time.

Table 1: Summary of Theories on which the study is anchored

Theory	Author	Year	Gist of the theory	Relevancy	Limitation
ST	Bertalanffy	1951	‘The whole is more than the sum of its parts’.	Develop the whole and the parts get better. Develop the parts, the whole gets better.	Neglected differential individual capabilities. Ignored disruptions in life such as pandemics

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SET	Bookchin	1960	Behavioral reactions/change.	Understanding the reasons as to why we behave the way we do.	Neglecting the effect of change in behavior and difficulty in changing lifestyles.
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ST - Systems Theory

SET - Social Ecological Theory

2.2 Conceptual review

Corona Virus Disease 2019 (COVID-19) caused by SARS-CoV-2, a novel coronavirus, emerged on December 1, 2019 in Wuhan City, Hubei Province, China (Huang et al, 2020). It is highly infectious, and there is no effective treatment method to date. The World Health Organization (WHO) declared the COVID-19 epidemic as an international public health emergency on January 30, 2020. By then, the overall confirmed cases in China had reached 78,959, by February 27, 2020, a total of 2,791 people had died of the disease. As of March 2020, the pandemic spread across the globe and the worst that had affected the global economy since the great depression (IMF, 2020; WHO, 2020). By August 20, 2021 the total number of confirmed cases across the globe was 209,876,613 with 4,400,284 deaths (WHO, 2021).

People infected with the virus experience respiratory disorder and do not require any treatment to recover. Mostly, the elderly and those with medical problems or underlying chronic medical and immunosuppressed conditions such as cardiovascular disease, diabetes, respiratory disease, and cancer are developing severe sickness. The major avenues through which individuals contract the virus are droplets of saliva/discharge from the nose when an infected person coughs or sneezes (Harapan et al., 2020). Therefore, it becomes necessary for people to adopt measures such as lockdown, social distancing, quarantine, and also, observation of simple hygiene which include; washing hands regularly, wearing facemasks, coughing into the flexed elbow, etc (Ohia et al., 2020).

Although COVID-19 vaccine programs continue to roll out globally, we are seeing the myths and misconceptions around the vaccines also increasing. For instance, many contend that COVID-19 vaccines are not safe because they were developed so quickly, Covid-19 vaccine can affect women's fertility, getting the COVID-19 vaccine gives you COVID-19, the side effects of the COVID-19 vaccine are dangerous, and the COVID-19 vaccine enters your cells and changes your DNA (Lai, 2021). This has resulted into hesitancy in the uptake of Covid-19 vaccination. Consequently, more and more people risk contracting the virus, necessitating continued lock downs so as to prevent, reduce infections and mortality rates.

2.3 Empirical studies on the effect of COVID-19 on the livelihoods of urban refugees

In responding to the growing research interest in understanding the effect of COVID-19 pandemic on livelihoods of urban refugees, a few empirical studies have been conducted by researchers around the world since the emergence of the COVID-19 pandemic. For instance, Ram et al., (2020) explored the impact of COVID-19 on migration and livelihood of refugees in India, they concluded that there are many challenges refugees face during the COVID-19 pandemic such as in adequate food, basic amenities, poor health care, economic stress, in sufficient transportation facilities and lack of psychological support.

Another seminal work was done by Elçi et al., (2021) in Turkey. Using a survey of 1749 Syrian refugees living in Turkey, they examined the financial impacts of COVID-19 on the refugee communities in Turkey. Their findings indicate that the initial COVID-19 measures had a higher financial impact on Syrian refugees when controlled for employment, wealth, and education, among other variables.

In USA, Dempster et al., (2020) explored the impact of COVID-19 on Refugees' economic inclusion. Using data from eight refugee hosting countries, results have shown that the COVID-19 pandemic has led to widespread loss of livelihoods and an increase in poverty among refugee populations following looming economic recession, increasing unemployment, and rising xenophobia faced by the refugee hosting countries.

In Uganda, Lozet and Easton-Calabria (2020) studied counting on urban refugees during COVID-19 in Uganda. Their findings demonstrated that authorities cannot provide services and assistance that refugees need. In a related development, Bukuluki et al., (2020) examined socio-economic and psychosocial impact of COVID-19 pandemic on urban refugees in Uganda, results reveal that the lockdown has increased urban refugee income insecurity, sexual and gender-based violence and anxiety.

Much as the a few reviewed scholarly works above denote that COVID-19 pandemic has led to some socio-economic crisis on every individual and the refugee communities in the diaspora, still there is much more to be done in order to establish the effect of the COVID-19 pandemic on the livelihoods of urban refugees, more specifically urban refugees living in some parts of Uganda.

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Therefore, this study examines the effect of COVID-19 pandemic on the livelihoods of urban refugees in Uganda, specifically in Arua city.

3.0 METHODOLOGY

The researcher used qualitative research design, underpinned by interpretivism philosophy. Data were sourced through face-to-face interviews consisting of 15 Urban refuge homesteads registered with the Office of the prime Minister (OPM), Arua branch. The participants included family heads and family caretakers. Purposeful random sampling technique was used because we wanted individuals with the knowledge and experience about family livelihood matters. Participants were given a study information sheet and their informed consent was obtained by signing the informed consent letter. The interview guide was piloted on the first three participants. Interviews were conducted in-person at the participants' homestead. Interviews ranged from 15 to 20 minutes. Interview guide (see box 1).

The qualitative data was analyzed using thematic analysis. Thematic analysis is an accessible and flexible approach to qualitative data analysis, which is based on coding (Braun & Clarke, 2006). Coding refers to categorizing data that is, labelling parts of text to a certain category (Joffe & Yardley, 2004). Interviews were transcribed, coded, and categorized, and analyzed on an ongoing basis as a source for further questions, the emergence of themes was used as an eventual source for organizing patterns of response across categories and individuals in line with the aims of the study. Transcripts were coded and the coded data were investigated for relationships which linked them. The final thematic framework (box 2) was developed by the researcher.

Box 1: Interview guide

How was your way of life before COVID-19?
What has changed in your way of life during COVID-19?
In your view, what should the UNHCR and the sister organizations do now/urgently to help you withstand the challenges brought by the COVID-19 pandemic?
What do you think will be the long-term impact (5-10yrs) of COVID-19 on your family?
What actions should be taken to enable your family recover from the impact of COVID-19 in the next 5 to 10 years?
In your opinion, what should UNHCR and the sister organizations do in order to guard against pandemics such as this in future?

4.0 RESULTS AND DISCUSSION OF FINDINGS

In total, twelve family heads and caretakers participated in the study as depicted in table 2 below. 67% of the participants are male, while 33% are female. Majority of the refugees (75%) have lived for over 4years in Arua city; hence, able to understand the pattern of their livelihood. Only 23% have lived for less than 4years in the city. The four main themes are presented with data from the interview transcripts (with the participant identifier) to reflect the main points of interest

Table 2: Participant characteristics

Identifier	Role	Gender	No. of family members	Location	No of years lived in the city
FH1	Familyhead1	Female	7	Awindiri ward	6
CT1	Caretaker1	Male	16	Tanganyika ward	4
FH2	Familyhead2	Male	12	Kenya ward	5
FH3	Familyhead3	Female	6	Awindiri ward	5
CT2	Caretaker2	Male	5	Tanganyika ward	6
FH4	Familyhead4	Female	10	Tanganyika ward	7
FH5	Familyhead5	Male	5	Tanganyika ward	6
CT3	Caretaker2	Male	16	Kenya ward	5

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FH6	Familyhead6	Male	12	Awindiri ward	3
FH7	Familyhead7	Female	15	Awindiri ward	4
FH8	Familyhead8	Male	5	Kenya ward	9
FH9	Familyhead9	Male	10	Kenya ward	8

* FH – Family Head

* CT – Care Taker

Thematic framework: The Impact of COVID-19 Pandemic on The Livelihood of Urban Refugees in Arua City.

Effect of COVID-19 pandemic

Challenges in receiving financial assistance from our relatives

Difficulty in accessing food from the settlement camp

Reduced food stuff ratio from UNHCR

Our children have stopped learning

Struggle to control unnecessary movement of these kids.

Accumulated house rent arrears.

Impact of COVID-19 pandemic

Economic recession

Loss of jobs and income

Illiterate generation

Possible short-term solutions

Negotiation with the government of Uganda

Establishment of food distribution Centre in the city

Urban refugees should return to settlement camps

UNHCR should increase the food ratio instead of reducing

Mass vaccination and opening up the economy.

Strategic long-term interventions

Lobbying for more resources from donors

Adoption of blended learning system

Invention of drugs to cure the coronavirus.

Theme 1: Effect of COVID-19 pandemic on livelihood

When asked about the effect of COVID-19 pandemic on the livelihood of the urban refugees, participants overwhelmingly reported problematic, difficult and challenging livelihood status. "The various restrictions to combat the pandemic denied us a lot of things". For me, I use to sell bread, cakes and snacks downtown to maintain the family, this is no more given the closure of all business activities" (FH1). "Due to movement restrictions, we have challenges in receiving financial assistance from our relatives who is working in the diaspora, let alone getting a transport means to access food stuffs from the camp (CT1). "The additional support in form of food from UNHCR has drastically reduced. The ratio has been reduced by half and is not supplied consistently and timely, causing feeding problems" (FH4). "Our children have stopped learning since all educational institutions have been closed. It is no easy task to stay with children, they don't want revise their books, insisting why they should read when the future is not clear" (FH2). "We struggle to control unnecessary movement of these kids. The children used to speak in English language in most times, but now days, you hardly hear them speak in English language. They have resorted to the mother tongue. My biggest fear is how they will cope up once schools reopen" (FH3).

"We have accumulated house rent arrears. I have not paid my landlord rent of eight months. The landlord is not willing to wave off the rent arrears despite the fact that the COVID-19 pandemic has devastating economic consequences" (FH9). "Some families have been forced to vacate houses they live in. Others have been reported to the government local council chair persons for non-payment of house rent" (FH6). CT3 asserted that, "the issue of house rent is very disturbing, landlords don't want to hear the financial difficulties we are going through, all the need is the money. Many urban refugee families will be thrown out of the rental houses they live in. This is a complex situation, unless donors come to our rescue". These findings corroborate with Elçi et al.,

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(2021) in Turkey whose survey of 1749 Syrian refugees living in Turkey indicated that the initial COVID-19 measures had a higher financial impact on Syrian refugees when controlled for employment, wealth, and education, among other variables. Similarly, the findings are in agreement with Ram et al., (2020) who explored the impact of COVID-19 on migration and livelihood of refugees in India, and concluded that there are many challenges refugees face during the COVID-19 pandemic such as inadequate food, basic amenities, poor health care, economic stress, insufficient transportation facilities and lack of psychological support.

The results imply that the urban refugees have been hit hard by the COVID-19 pandemic given the fact that before the pandemic, the urban refugees used to supplement their household income by engaging in informal businesses and receipt of financial assistance from relatives working in the diaspora, as further emphasized by Karemere, a 44-year-old single mother of three who now survives on food handouts from a community church that, right now the biggest worry for urban refugees is hunger, if we go out, we risk contracting coronavirus, if we stay home, hunger will kill us. Our children eat once a day and are not going to school. This situation is worse than a war.

Theme 2: Impact of COVID-19 pandemic on urban refugee families

When asked as to what the impact of the pandemic will be on the livelihood of urban refugee families, “participants indicated that there will be economic recession. This will be associated with high cost of living, collapse of businesses, making it difficult to get back to normal”. (FH5, CT2, CT5, & FH8). Furthermore, “participants showed that many workers will lose their jobs, both in the host country and their own countries such as the South Sudan, Democratic Republic of Congo, Rwanda and Somalia. This will obviously affect household income status, complicate access to additional financial assistance from the working class, and hence increase poverty levels amongst the urban refugees, making meeting of ends difficult if not impossible”. (CT1, FH2 & FH9).

Illiterate generation. “Respondents also maintained that due to the closure of schools for all this long and the escalating economic hardships, we will witness increased school dropout rates, rampant teenage pregnancies, increased illiteracy levels, ensuing to an illiterate generation”. (FH2, FH3, FH6, FH7 & FH1). The results indicate a tough and difficult time and or future awaiting the urban refugee community, thus the future is unclear and it will be difficult if not impossible to get back to normal.

These findings are in agreement with study conducted by Olema (2020) who found out that many businesses are destined for failure as a result of coronavirus. And indeed, we are witnessing a myriad of businesses collapsing world over even after opening the economies, for instance, Orange Telcom Ltd closed operations in Uganda, Stanbic closed its branch in Koboko District, Afriland First Bank Ltd, an indigenous bank have also closed business. In the same vein, other businesses are rebranding themselves, for example the famous Buckley’s Bank in Uganda has changed its name to Access Bank Ltd, and Orient bank has become Investments and Mortgages Bank. Similarly, West Nile is witnessing rampant student strikes following the re-opening of schools by the government of Uganda. The widespread student strikes have negative upshots that include among others loss of lives, destruction of property, extraordinary payments by parents, and dismissal of students. (Daily Monitor, Wednesday March 16, 2022).

Theme 3: Possible short-term solutions

Possible remedies that were considered important by the participants included negotiation with the government of Uganda, establishment of food distribution Centre in the city, full support by UNHCR, increase food ratio, urban refugees should return to settlement camps, mass vaccination and open up the economy and sponsor brilliant refugee students. Respondents highlighted UNHCR’s collaboration with the government of Uganda as an important matter to turn around the challenging situation urban refugees are going through.

“FHs and CTs jointly echoed the need for UNHCR and the sister organizations to negotiate with the government of Republic of Uganda to use their powers to support the urban refugees in form of food supplies and pay accumulated rent arrears of the landlords”. These would reduce on the pressure mounted on the urban refugees to feed their families and other demands.

To solve the challenge of accessing supplementary food aid from the settlement camps, UNHCR should establish food distribution Centre in the city, and maintain or increase the food ratio per family instead of reducing the ratio in the names of resource scarcity. (FH6, FH9). According to FH7, “Urban refugees should go back to the settlement camps in order to avoid hurdles in the city like feeding, rent, transport to and from the camp. This would get rid of the issues of restricted movements, difficult and costly transportation”.

Mass vaccination and opening up the economy. “Respondents unanimously proposed that mass sensitization and vaccination of all eligible individuals would help in opening the entire economy, and schools in particular, so that children go back to school. Besides, strict standard operating procedures (SOPs) should be enforced in all the learning institutions in the country. In the same vein, donors should sponsor brilliant urban refugee children who can not afford to pay schools once schools open”. Opening the economy enables people to resume their routine activities of making ends meet, such as office work and informal business that

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improves and supplements propensity to save and consume. This would be a great relief for the urban refugees who are currently going difficult time.

Theme 4: Strategic long-term interventions to curb the impact of COVID-19 Pandemic on the livelihood of urban refugees.

In regard to strategic long-term interventions to mitigate the impact of COVID-19 Pandemic on the livelihood of urban refugees, respondents identified lobbying for more resources from donors, adoption of blended learning system and invention of drugs to cure the coronavirus as significant long term strategic interventions to halt the impact of COVID-19 Pandemic on the livelihood of urban refugees.

Lobbying for more resources from donors. "UNHCR, sister organizations and the government of republic of Uganda should lobby for more funds, goods and services from the donors like United States of America, Germany, Japan, European Union, Sweden, other governments, non-governmental organizations, individuals and the private sector. Once more resources are lobbied, UNHCR will be in position to increase her support to the refugees, instead of decreasing the little. This would help in solving the issue global recession and increasing cost of living and the associated outcomes" (FH1, FH2 & CT3).

Adoption of blended learning system. To me "sensitization of stakeholders in education and enforcement of the SOPs in all learning institutions are temporary measures to guarantee learning continuity in the country. The government of the republic of Uganda should instead invest in the information communication technology infrastructure in general, and electronic learning system in particular so that learning will always continue in the event of global pandemic such as the coronavirus connected with prolonged lockdowns befall the diaspora". (FH2).

Invention of drugs to cure the coronavirus. "Currently, COVID-19 vaccine programs continue to roll out globally in a bid to curtail the sporadic spread of the virus. The populace is being sensitized about the various COVID-19 vaccines like the Modena, AstraZeneca, Janssen, Faiza, Sinopharm, Covax, Novavax, Pfizer among others to increase acceptance and mass uptake. However, it must be noted with concern that mass vaccination is a momentary endeavor that may not be of help in the long run, but rather manufacture or invention of drugs for curation of the virus could provide a lasting solution to the impact of the COVID-19 pandemic". (CTs and FHs).

5.0 CONCLUSION

This study sought to establish the Impact of COVID-19 Pandemic on The Livelihood of Urban Refugees in Arua City, Uganda. Results have demonstrated that urban refugees have been hit hard by the COVID-19 Pandemic and will continue to face tough and difficult times in the future. Specifically, the findings have shown that the pandemic has led to challenges in receiving financial assistance from relatives, difficulty in accessing food from the settlement camps, reduced food stuff ratio from UNHCR and accumulated house rent arrears in the short run, and economic recession, loss of jobs and income and emergence of illiterate generation in the long run. We therefore, recommend UNHCR, Donors and the government of Uganda to intervene and step up the support for the urban refugees.

6.0 IMPLICATIONS FOR PRACTICE

The results from this study should be viewed as a contribution to the knowledge on the impact of COVID-19 Pandemic on urban refugees. UNHCR, Donors and the government of Uganda can use the findings of this study to develop appropriate strategies to support urban refugees in a bid to salvage their lives. Finally, this article highlights the voice of both urban refugee family heads and caretakers on the impact of COVID-19 Pandemic on urban refugees and this may aid in devising necessary remedies now and in the future.

7.0 LIMITATIONS

Our findings should be interpreted in the context of the potential limitations of our study. Firstly, the qualitative approach provides depth to our understanding of this problem but may not be generalizable to all urban refugees in other cities. We only interviewed urban refugees in Arua city, a single metropolitan area. Further work should explore how these experiences vary across the urban refugee hosting countries. Secondly, in all qualitative studies, findings may be influenced by the perspectives of the investigators. Finally, participants provided retrospective accounts of their experiences about COVID-Pandemic, recall and social desirability bias cannot be excluded.

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The Effect of Capital Structure, Profitability, Size, Ownership Structure, Independent Commissioners and Audit Committee on Timeliness in Submitting Financial Statements (Empirical Study on Coal Mining Companies Listed on the Indonesia Stock Exchange (Idx) 2017-2019)



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ABSTRACT: Financial Report is a record of financial information in a company during an accounting period that can be used to describe the company's performance as well as for decision making for internal & external parties of the company in determining the company's strategic decisions and plans to be carried out to maximize profits. One of the things that describe the situation in the company's finances is the timeliness in submitting financial statements. There are many phenomena regarding the timeliness in submitting financial reports, including 43 companies listed on the Indonesia Stock Exchange (IDX) are required to pay fines for not submitting interim financial reports ending on March 31, 2020. Based on the IDX announcement dated August 10, 2020, from all 799 companies listed on the new stock exchange 628 that submitted interim financial reports ending March 31, 2020 in a timely manner.

The purpose of this study was to determine the effect of Capital Structure, Profitability, Size, Ownership Structure, Independent Commissioner & Audit Committee on timeliness in submitting financial reports to mining companies. The method used in this study is a quantitative research method with secondary data from IDX data in 2017 - 2019. The population of data in this study is 24 companies. And the results of this study indicate that profitability and ownership structure have a significant effect on the accuracy of financial reporting and capital structure, size, independent commissioners, and audit committees have no significant effect on timeliness in submitting financial statements.

KEYWORDS: Capital Structure, Profitability, Size, Ownership Structure, Independent Commissioner, Audit Committee, timeliness

PRELIMINARY

Research Background

Financial Statements are a record of financial information in a company during an accounting period that can be used to describe the company's performance as well as for decision making for internal & external parties of the company in determining the company's strategic decisions and plans to be carried out to maximize profits.

One of the things that describe the situation in the company's finances is the timeliness in submitting financial statements. In a financial report where there are several users, including investors, employees, lenders, suppliers / other business creditors, customers, government & society.

Based on the Decree of the IDX Board of Directors No.Kep-00027/BEI/03-2020 dated March 20, 2020 regarding Relaxation of the Deadline for Submission of Financial Statements and Annual Reports, the deadline for submitting financial reports for the first quarter of 2020 has been extended to June 30, 2020. from the 31st calendar to the 60th calendar day since the expiration of the time limit, the listed company still does not fulfill its obligations, the stock exchange will issue a written warning letter II and a fine of Rp. 50 million.

Research by Wiwik Utami (2006) states that the delay in the publication of financial statements is very detrimental to investors because it can increase information asymmetry in the market, insider trading, and give rise to rumors that make the market uncertain..

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Identification of problems

From the background described above, it can be identified the problem to be studied in relation to the phenomenon of the problem, is there any influence of capital structure, profitability, size, ownership structure, audit committee, and independent commissioner on accuracy in financial reporting?

Formulation of the problem

Based on the background that has been explained, the formulation of the problem in this study is there any effect of capital structure, profitability, size, ownership structure, audit committee, and independent commissioner on accuracy in financial reporting?

Research purposes

The purpose of this study was to determine the effect of capital structure, profitability, size, ownership structure, audit committee, and independent commissioners on the accuracy of financial reporting.

LITERATURE REVIEW, FRAMEWORK AND HYPOTHESES LITERATURE REVIEW

Timeliness

Timeliness is one way to measure the transparency and quality of financial reporting. According to Mareta (2015), the delivery of information as early as possible is very necessary so that it can be used as a basis for making economic decisions and preventing delays in making these decisions. A way to support the relevance of information, so that it is presented in a transparent and quality manner in a financial report. (McGee, 2009) This variable is measured by a dummy variable. Category 1 is for companies that are on time in submitting financial statements and category 0 is for companies that are not on time.

Capital Structure

According to Palupi (2006) capital structure is a comparison or balance of the company's long-term funding which is indicated by the comparison of long-term debt to its own capital or it can be concluded that the relationship between the debt owned by the company and the capital owned by the company (Nasution, 2017).

Profitability

The ratio that describes the company's ability to meet short-term obligations (debt) is the liquidity ratio. To meet these debts, especially debts that are past due, the company will be billed. To show or measure the company's ability to meet its maturing obligations, both obligations to parties outside the company (business entity liquidity) and within the company (company liquidity) that is a function of the liquidity ratio. So this ratio is to determine the company's ability to finance and fulfill obligations (debts) when billed (Kasmir, 2017).

Profitability is a measure of the company's ability to generate profits, both in relation to sales, certain assets and share capital. This ratio provides a measure of the level of management effectiveness of a company. Low profitability indicates that the level of performance of the company's management is not good (Mareta, 2015) or it can be concluded from various sources is the relationship between the debt owned by the company and the capital owned by the company (Nasution, 2017).

Size

The size of the company assesses a company's worth or not, can be judged from the number of assets owned by the company. If the assets in a company are large, it can be said that the level of the company is high or large. On the other hand, if the assets in a company are low or small, it can be said that the level of the company is low or small.

Ownership Structure

Ownership Structure variable which is proxied with institutional ownership above 50% using a ratio scale and the data unit is decimal. Which is measured by comparing the number of institutional shares with the number of shares outstanding.

Independent Commissioner

Independent commissioners are members of the Board of Commissioners who come from outside the issuer or public company (not affiliated). Or According to the Limited Liability Company Law Number 40 of 2007, an independent commissioner is a member of the board of commissioners who is not affiliated with the board of directors, other members of the board of commissioners and the controlling shareholder, and is free from business relationships or other relationships that affect his ability to act independently or act solely for the benefit of the company. Independent commissioners are measured using the same size as research by Rosadi (2014).

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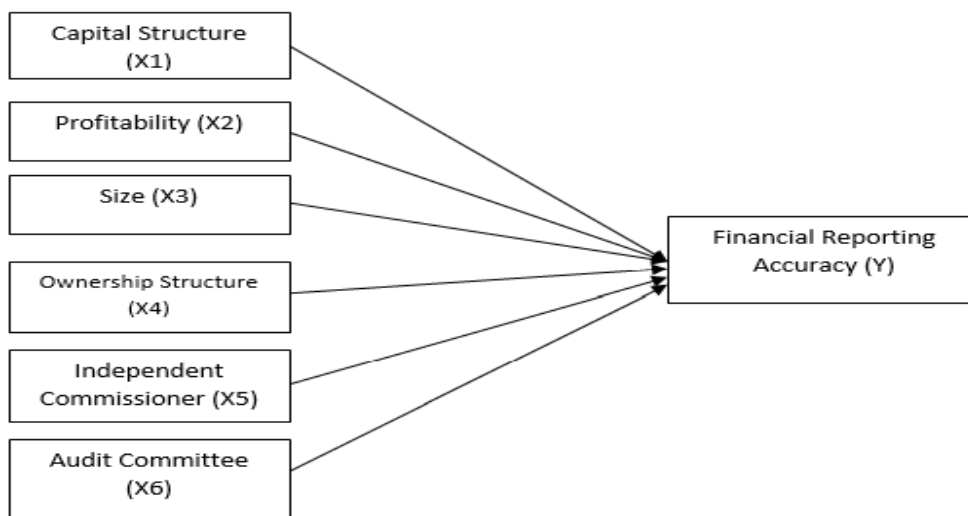
Audit Committee

The Audit Committee is to ensure the implementation of corporate governance. The audit committee which is part of the organ of the board of commissioners and is the party that has direct access and communication mechanisms with various parties in every element of control in the company (Baskoro, 2017).

Research Variable

Variabel	Indicator	Measuring Scale
Timeliness in Submitting Financial Reports	Category 1 is for companies that are on time in submitting financial statements and category 0 is for companies that are not on time.	Nominal
Capital Structure	$DER = \frac{\text{Total Utang}}{\text{Ekuitas}}$	Ratio
Profitability	$\text{Return on Asset} = \frac{\text{Net Profit}}{\text{Total Asset}} \times 100\%$	Ratio
Size	$\ln \text{TotalAset}$	Ratio
Audit Committee Member	Frequency of Audit Committee meetings in 1 year	Ratio
Ownership Structure	$\text{Kep. Institusional} = \frac{\text{Jumlah Saham Investor Institusi}}{\text{Jumlah Saham yang Beredar}} \times 100\%$ Menurut (Indah Suryani, Dahlia 2018)	Ratio
Independent commissioner	$\text{Proporsi komisaris independen} = \frac{\text{jumlah komisaris independen}}{\text{jumlah dewan komisaris}} \times 100\%$	Ratio

Framework



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RESEARCH METHODS

Population and Research Samples

The population in this study are mining companies listed on the Indonesia Stock Exchange for the period 2017-2019. According to Sugiyono (2010: 149), the sample is part of the number and characteristics possessed by the population. Sampling was carried out by purposive sampling with the type of judgment sampling, namely the sampling was carried out with certain criteria in order to obtain a relevant sample. The sampling technique used is non-probability sampling using purposive sampling method. According to Sugiyono (2010: 120) Non Probability sampling is a sampling technique that does not provide an opportunity or opportunity for each member of the population to be selected as a sample. And purposive sampling is a sampling technique with certain considerations or criteria.

Data Analysis Method

Data analysis was performed using logistic regression analysis covering the following analysis:

Overall Model Fit

This test is used to test simultaneously the effect of independent variables on the dependent variable. The first step is to overall fit the model for data. Some statistical tests are given to assess this. The hypothesis for assessing model fit is. Ghazali (2011)

H₀: The hypothesized model is fit with the data

H_A: The hypothesized model does not fit the data

From this hypothesis it is clear that we will not reject the null hypothesis so that the model is fit with the data. The statistics used are based on the likelihood function. Likelihood L of the model is the probability that the hypothesized model represents the input data. To test the null and alternative hypotheses, L is transformed into $-2\text{Log}L$.

Goodness of Fit Test

The accuracy of the sample regression function in estimating the actual value can be measured from the Goodness of Fit Test [18]. This test is carried out using the statistical value of the Hosmer and Lemeshow Test to test the null hypothesis and obtain evidence that the empirical data used is in accordance with the model. If the statistical value of the Hosmer and Lemeshow Test is significant or smaller than 0.05, then the null hypothesis is rejected and the model is deemed unfit. However, if the statistical value of the Hosmer and Lemeshow Test is greater than 0.05, then the null hypothesis is accepted and means that the model is able to predict its observational value or the model can be said to be in accordance with its observational data.

Coefficient of Determination (Cox and Snell R Square dan Nagelkerke's R Square)

The coefficient of determination is overview which states how well the sample regression line matches the data. Tests carried out to measure how much power the independent variable can explain the dependent variable. The coefficient of determination is 0 and 1. A small R² value means that the ability of the independent variables to explain the independent variables is very limited. A value close to 1 means that the independent variables provide almost all the information needed to predict the dependent variable. Ghazali (2011)

Hypothesis Testing

This test is carried out to test how far all the independent variables entered in the model are able to influence the dependent variable. This test is performed using a significance level of 0.05 ($\alpha = 5\%$). Acceptance or rejection of the hypothesis is carried out with the following criteria:

- If the significant value is greater than 0.05 then the hypothesis is rejected (the regression coefficient is not significant). This means that partially the independent variable does not have a significant effect on the dependent variable.
- If the significant value is less than 0.05 then the hypothesis is accepted (significant regression coefficient). This means that partially the independent variable has a significant effect on the dependent variable.

RESEARCH RESULTS AND DISCUSSION

Hypothesis Testing and Discussion

Goodness of Fit Test

The accuracy of the sample regression function in estimating the actual value can be measured from the Goodness of Fit Test (Ghazali; 2011). This test is carried out using the statistical value of the Hosmer and Lemeshow Test to test the null hypothesis and obtain evidence that the empirical data used is in accordance with the model. Where is the hypothesis H₀: Eligible Model and H₁: Model is not feasible.

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Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	1.108	8	.997

From the table above it can be seen that the Sig value is 0.997 which means that the model of this test is feasible because the Sig value >0.05 then the hypothesis is accepted and means that the model is able to predict the value of the observations or the model can be said to be in accordance with the observational data.

Coefficient of Determination (Cox and Snell R Square dan Nagelkerke’s R Square)

The coefficient of determination is an overview that states how well the sample regression line matches the data. Tests carried out to measure how much power the independent variable can explain the dependent variable. The coefficient of determination is 0 and 1. A small R2 value means that the ability of the independent variables to explain the independent variables is very limited. A value close to 1 means that the independent variables provide almost all the information needed to predict the dependent variable

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	16.597 ^a	.304	.657

Based on the results in the table above, it shows that the value of Adjusted R Square (R²) is 0.304 or 30.14%. This can be interpreted as an independent variable measured by Timeliness, which can be explained by the variation of the six independent variables, namely Capital Structure, Profitability, Size, Ownership Structure, Independent Commissioner & Audit Committee. While the remaining 69.86% is influenced by other factors or variables not examined.

Hypothesis Testing

This test is carried out to test how far all the independent variables entered in the model are able to influence the dependent variable. This test is performed using a significance level of 0.05 (α = 5%)

Variables in the Equation

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Step 1 ^a Struktur_Modal	.777	1.144	.461	1	.497	2.174	.231	20.474
Profitabilitas	.965	.506	3.647	1	.056	2.626	.975	7.073
Size	-.240	.269	.792	1	.374	.787	.464	1.334
Struktur_Kepemilikan	-37.021	18.453	4.025	1	.045	.000	.000	.426
Komisaris_Independen	20.158	11.193	3.243	1	.072	568141438.697	.169	1914668776004542720.000
Komite_Audit	.142	.238	.357	1	.550	1.153	.723	1.839
Constant	18.456	11.524	2.565	1	.109	103621847.226		

a. Variable(s) entered on step 1: Struktur_Modal, Profitabilitas, Size, Struktur_Kepemilikan, Komisaris_Independen, Komite_Audit.

From the table above, it can be seen that the variables that affect the timeliness of submitting financial statements are profitability (0.05) and ownership structure (0.045) because <0.05 while Capital Structure (0.497), Size (0.374), Independent Commissioner (0.072) , and the audit committee (0.550) > 0.05, which means that it has no significant effect on the timeliness of submitting financial statements.

While the value of Exp (B) to determine the type of influence on variables that have a significant effect. If the value is below "1",

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it means less risk for the timely submission of financial statements. Exp (B) on size (0.787) and ownership structure (0.000) tend to have less risk in timeliness in submitting financial reports, while for variables capital structure (2.174), profitability (2.626), independent commissioners (568.141.438.6) , and the audit committee (1,153) is more than "1" which means a big risk in the timeliness of submitting financial statements.

DISCUSSION

From the analysis above, it can be concluded that Sig > 0.05 which means that there is no significant effect between Capital Structure, Size, Independent Commissioner and Audit Committee with the accuracy of financial reporting. The results are different from Anita, Lusiana, and Puput which result that capital structure and size have a significant effect. And it is also different in the research of I Gede Ari Pramana Putra and Wayan Ramantha with the results of the independent commissioner having a significant effect and the audit committee having an insignificant effect, the same as the results of this study. The same results were also obtained from Rina Yuliasuty Asmara's research which resulted in company size having an insignificant effect on timeliness.

And for the variables of profitability and ownership structure in this study have a significant influence on the accuracy of financial reporting, these results are different from the research conducted by Indah and Dahlia which results that profitability and ownership structure have no significant effect on the accuracy of financial reporting.

CONCLUSIONS AND SUGGESTIONS

CONCLUSION

Logistic Regression Testing is done to see the effect of the independent variable with the dependent variable. The logistic regression equation results obtained are:

$$Y = 18,456 + 0,777 X_1 + 0,965 X_2 - 0,240 X_3 - 37,021 X_4 + 20,158 X_5 + 0,142 X_6 + e$$

The regression equation shows that there is a negative relationship between size and ownership structure in the accuracy of financial reporting submissions. A negative relationship means that the movement of size and ownership structure does not go in the same direction, as size and ownership structure increase, resulting in a decrease in accuracy in financial reporting on the contrary. Meanwhile, the variables of capital structure, profitability, independent commissioners and audit committees have positive values, which means that the movement of the variables of capital structure, profitability, independent commissioners and audit committees goes in the same direction. the right financial or in accordance with the time.

The results of the hypothesis from the study are that profitability and ownership structure have a significant effect on the timeliness of submitting financial reports, while other variables, namely capital structure, size, independent commissioners, and audit committees have no significant effect on timeliness in submitting financial statements.

SUGGESTION

- Some suggestions that can be put forward in the results of this study are due to the imperfections of the research carried out by the author, the author provides suggestions that are expected to gain knowledge from this research, as follows:

- Further research needs to be done to find out more things that affect the timeliness in submitting financial statements other than the variables of capital structure, profitability, size, ownership structure, independent commissioner, and audit committee.
- The research time should be made long, so that it can give a better picture. Because the results may be different when using different periods.

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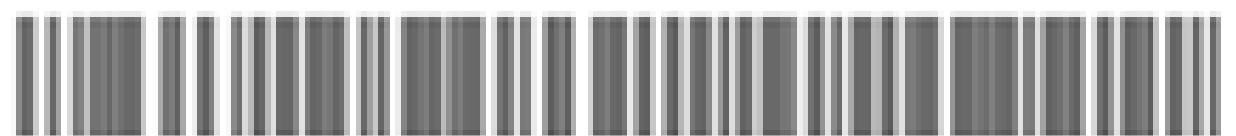
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