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Assoc. Prof. University of Oradea, 1 Universitatii str., 410089, Oradea, **Romania**

Professor Ibrahim Ormanovich Darvishov (Doctor of Philosophy in Philology, (PhD))
Acting Associate Professor of Uzbek Language and Literature, Namangan State University
Namangan Region, Mingbulak District

Professor Abdulvohid Khabibullevich Abdullazizov
Acting Head of the Department of Russian Language and Literature, Namangan State University
Namangan Region, Uychi District

Dr. Bogdan Constantin Ungurean (PhD Biology)
Lector, Faculty of Physical Education and Sport of "Al. I. Cuza" University
Str. Toma Cozma Nr. 3, Iasi 700554**, Romania**

Dr Kadir Shukurlaev (DCs)
Head of the Department of Physiology and Pathological Physiology, Urgench branch of the Tashkent Medical Academy
Republic Of Karakalpakstan, Amudarya District

Dr Bakhromjon A. Otakulov (Doctor of Philosophy in Technical Sciences)
Senior Lecturer of the department "Manufacture of building materials, products and structures" Fergana Polytechnic Institute
Fergana Region, **Fergana District**

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Uzbekistan

Dr. P.Ganesh Kumar (Doctorate(PhD))
Professor in Networking, K.L.N College of Engineering, Anna University
Anna University, Chennai, **Tamil Nadu, India, 2009**

Dr Durdana E. Lutfullayeva (Doctor of Philological Sciences)
Leading Researcher of the Department of Modern Uzbek Language of the Institute of Uzbek Language, Literature and Folklore of the Academy of Sciences
Tashkent City, Shayhontohur District

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Head of the Department of Preschool Education, Navoi State Pedagogical Institute
Navoi City, Lomonosova Street

Dr. Gulmira K. Obidova(Ph.D. in Pedagogical Sciences)
Assistant of the Department of Languages and Sports, Fergana Branch,Tashkent University of Information Technologies
Fergana Region, Fergana City

Dr. Md. Amir Hossain (PhD)
Assistant Professor, Department of English IBAIS University (International Business Administration and Information System)
Bangladesh

Dr. Parizod Sh. Turopova(Doctor of Philosophy in Philology)
Senior Lecturer of the department of teaching methods of Uzbek literature of Jizzakh State Pedagogical Institute
Jizzakh City, Uratepalik Mahalla

Dr. Nodira I. Soatova (Philological Sciences)
Associate Professor of the Department of Methods of Teaching Uzbek Literature at Jizzakh State Pedagogical Institute
Sh.Rashidov District, Uzbekistan

Tahir, Nura Musa (B. Eng. (BUK), M Eng. (UTM, Malaysia).)
Department of Mechatronics and System Engineering, Faculty of Engineering and Engineering Technology, Abubakar TafawaBalewa University, Bauchi,
P.M.B 0248, Bauchi, Bauchi State, Nigeria

Dr. Saida I. Sadiqova(PhD)
Associate Professor of the Department of Internal Medicine No. 2 of the Tashkent Medical Academy
Namangan City, Namangan Region

Dr. Manoj Kumar Rastogi (Ph.D. (Statistics))
Assistant Professor Department of Statistics Patna University,
Department Of Statistics, Patna University, Patna-05, **Bihar**

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Associate Professor of ENT Diseases, Tashkent Medical Academy
Tashkent Region, Zangiota District

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Post-doctoral fellow,Department of Information strategy, Electronics and Telecommunications Research Institute (ETRI)
Electronics And Telecommunications Research Institute (ETRI) Dormitory, Gajeong-Dong,Yuseong-Gu, Daejeon 34129, South **Korea**

Dr. Shakhnoza Mukhamedjanovna Jalolova (Doctor of Philosophy in Philology)
Acting Associate Professor of English Philology, National University of Uzbekistan named after Mirzo Ulugbek
Tashkent City, Chilanzar District, Kyzyl Sharq District, **Uzbekistan**

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Asst. Prof. in College of Business and Administration in PRINCESS NOURA BINT ABDUL RAHMAN UNIVERSITY, Riyadh
Saudi Arabia

Dr. Abdilatip Abdirakhimovich Sarimsokov (Historical Sciences)
Acting Head of the Department of Archeology, Namangan State University
Namangan City, Porloq MCM, 3rd Micro-District, 3rd House, 8th Apartment

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Assistant Professor, Modern College of Business and Science (MCBS), Sultanate of Oman
Oman

Dr. Ayman Shehata Mohammed Ahmed Osman Mohammed El-Shazly (Ph.D. (Pure Mathematics- Mathematical Analysis - Complex Analysis))
Lecturer, Department of Mathematics, Faculty of Science, Assiut University, Assiut 71516**,**
Egypt

Dr. Jamila Sharipovna Jumabayeva (Doctor of Philological Sciences)
Head of the Department of English Philology, Faculty of Foreign Philology, National University of Uzbekistan named after Mirzo **Ulugbek Tashkent**

Dr. Lola S. Ortikova (Doctor of Philosophy in Agricultural Sciences)
Lecturer of the Department of Biology Teaching Methods, Jizzakh State Pedagogical Institute
Jizzakh City, Almazar Mahalla,

Farisa T S(M.Tech (CSE))
Digital signal processing, Data Mining, Natural Language Processing **INDIA**

Dr. G.RakeshP.hd(Computer Science & Application)
Dean of Science JAIRAMS COLLEGE OF ARTS & SCIENCE, KARUR.**INDIA**

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Head of the Department of Management and Marketing, Tashkent Financial Institute
Tashkent City, Mirzo Ulugbek District

Dr. Rashmi Rai(Ph. D,(Quality of Work-Life and Job Performance))
Assistant Professor , Management Department , Christ University, **Bangalore,INDIA**

Dr. Ravshan Khudayberganov(PhD on historical sciences)
Senior scientific researcher, Al-Beruni Institute of Oriental Studies, Academy of Sciences of the Republic of Uzbekistan, Tashkent,
Tashkent, Uzbekistan

Dr. Mohammed Nader Shalaby(Ph.D. Degree of Pathobiology and Physiology)
Associate Prof. of Biological Sciences and Sports Health Department, Faculty of Physical Education, Suez Canal University
Egypt, Ismailia

Dr.Mona Mostafa Abdo Sakoury(P.hd)
Associate Professor, Faculty of Applied Studies and Community, Service, Imam Abdulrahman Bin Al- Faisal University.
Saudi Arabia

Dr. Rita Greengold(Ph. D, Histroy)
College of William & MaryLyon G. Tyler Department of History.

Dr. Nargiza Sharopalievna Mullaboeva(Doctor of Philosophy in Psychology (PhD))
Senior Lecturer of Namangan Institute of Engineering and Technology, **Uzbekistan**

Dr. Shuchi Gupta(PhD (Commerce))
Associate Professor,University of Hail, KSA
Haryana, India

Dr. P.Malyadri(Ph.D. (Bank Finance for Rural Development))
Principal for 11 Years in Government Degree Colleges,Srisailam,Patancheru, Tandur,Chevella,Serilingampally,Kukatpally
Hyderabad, INDIA

Dr. Makhmud Akhmedovich Shakhodjaev
Associate Professor of Fergana Polytechnic Institute, Faculty of Energy, "EEE"
Fergana Region, Margilan City, M.Khofiz Street

Dr. Xaynazarov Baxromjon (Phd In History)
Faculty of History,National University of Uzbekistan
Tashkent, Uzbekistan

Dr. Dildora Bakhadirjanovna Agzamova
Associate Professor of "Translation Theory and Comparative Linguistics" of the National University of Uzbekistan named after
Mirzo Ulugbek

Dr. Izzatilla Makhmutalievich Khaydarov
Associate Professor of "History and Ethnology of the Peoples of Central Asia" Tashkent State University of Oriental Studies

Dr. Khurshida Erkinovna Yunusova(Doctor of Historical Sciences)
Professor of the Department of History of Uzbekistan, National University of Uzbekistan named after Mirzo Ulugbek
Tashkent City, Chilanzar District , Uzbekistan

Dr. Ravshan Berdimurodovich Siddikov(Doctor of Historical Sciences)
Associate Professor of History of Uzbekistan, National University of Uzbekistan named after Mirzo Ulugbek
Tashkent City, Almazar District, Uzbekistan

Dr. Ijod Narziqul ugli Akhmedov(Doctor of Philosophy (PhD) in Philosophy)
Head of the Department of Distance Education in Social Sciences and Humanities Jizzakh State Pedagogical Institute

Dr.Moise Adrian Cristian (Doctorate(PhD))
Associate Professor, Spiru Haret University of Bucharest, **Romania**

Dr. Umidjon Yandashalievich Kuziev
Acting Head of Department of Uzbek Language and Literature, Namangan State University
Namangan Region, Chust District

Akpojaro Ogheneochuko Owens (Msc, PGD,HND, ND)
Assistant Lecturer, School of Basic ScienceProgramme(Mathematics Unit), **Nigeria**

Dr. Prof. Shoeb Ahmad (Ph.D.)
PROFESSOR, Al Zahra College for Women, (Muscat) Oman
(Muscat) Oman

Rajibkumar Sanyal (M.Sc., PGDM, Ph.D., D.Sc. (Honoris Causa))
Associate Professor & Senior Researcher of Economics
Amity University, Kolkata Action Area II, Major Arterial Road, New Town

Dr. Askar R. Babaev
Acting Associate Professor
Tashkent City, Mirabad District,

Dr. Thirupathi Dongala(Ph.D, M.Sc. B.Sc. IT)
Working as Analytical Scientist-I with AUREX LABORATORIES LLC, 10 Lake drive, East Windsor, NJ, 08520 USA

Dr. Samuel Jacob Bunu (Doctor of Pharmacy)
Department of Pharmaceutical and Medicinal Chemistry, Faculty of Pharmacy, Niger Delta University, Wilberforce Island, Bayelsa State, **Nigeria.**

Chibuisi C. Okorieimoh Doctoral Researcher)
Assistant lecturer School of Multidisciplinary Technologies, Technological University Dublin

Dr. G.V.P. Samaranayake
Lecturer (Probationary), Department of Ayurveda Basic Principles, GampahaWickramarachchi Ayurveda Institute, University of Kelaniya, **Sri Lanka**

Khalid Zemam Amer
Responsible for the Division of Marketing of Scientific Products / Department of Scientific Affairs / Presidency of Mustansiriyah University

Dr.Wafaa Mohamed Mohamed Moustafa(M.Sc., B.Sc., Ph.D, chemical engineering)
Head of the Central Laboratory of Environmental Isotope Hydrology, **Egypt**

Dr. Chandramohan Andavar(Doctorate in Biochemistry. M.Sc., M.Tech)
Associate Professor and Head in the Department of Biochemistry Annai Violet College of Arts and Science Menambedu, Ambattur, Chennai, **India.**

Dr. Oyepata Simeon Joseph (Ph. D in Pharmacology and Toxicology)
Senior Lecturer, Department of Pharmacology, Faculty of Pharmaceutical Sciences, Bingham University, Karu, Nasarawa State, **Nigeria**

Dr. Ulughbek M. Ergashev(PhD in Medical Sciences)
Senior Lecturer of the Department of Otorhinolaryngology and Dentistry, Tashkent Medical Academy
Tashkent City, Yashnabad District

Dr. Jamolbek A. Djuraev(Doctor of Philosophy in Medical Sciences)
Senior Lecturer, Department of Otolaryngology and Dentistry, Tashkent Medical Academy
Tashkent City, Almazar District

Dr. Lola S. Ortikova Senior Lecturer of the Department of Otolaryngology and Dentistry, Tashkent Medical Academy
Tashkent City, Mirabad District, Sadyk Azimov Street

Dr Ziyoda G. Mukhamedova(Doctor of Sciences in Technics)
Doctoral student of the Department of Freight Transport Systems, Tashkent State University of Transport (DSc)
Tashkent City, Yunusabad District

Dr. Shahzada Mudasir Rashid(PhD)
Assistant Professor (Scientist) Division of Veterinary Biochemistry, Faculty of Veterinary Sciences, SKUAST-K, Shuhama, Alustang, Srinagar.

Professor Rustam Djumayev
Professor of the Department of "Oriental Policy and International Relations" of the Tashkent State University of Oriental Studies
Uzbekistan

Dr. Karno Kumar Mondal(Ph.D)
Teaching Assistantship Undergraduate Lab Department of Physics Khulna University of Engineering & Technology, Khulna-9203

Dr. Begzodbek Kh. Abdullaev(Doctor of Philosophy in Philology)
Associate professor , Andijan State Universitys
Andijan Region, Altynkul District

Dr Farida T. Rabbimova(Doctor of Pedagogical Sciences)
Senior Lecturer of the Department of General Biology and Methods of Teaching ,Jizzakh State Pedagogical Institute

Dr. Rakhimjon Kh. Muradov(Doctor of Philosophy in Technical Sciences)
Senior Lecturer, Namangan Institute of Civil Engineering
Namangan Region, Mingbulak District

Dr.Vishal Dubey (Ph.D)
Director, Department of Pharmaceutical Sciences, Naraina Vidya Peeth Group of Institutions, **INDIA**

Dr. Venkataraman Mugundan(PhD in Mathematics)
Math Lecturer in 'INSTITUTE OF APPLIED TECHNOLOGY',(GOVERNMENT OF ABU DHABI), Fujairah, United Arab Emirates, **U.A.E.**

Dr Muzraf T. Rabbimov(Ph.D)
Associate Professor at the Department of Primary Education at Jizzakh State Pedagogical Institute

Dr Otabek Sh. Ochildiev(Doctor of Philosophy in Technical Sciences)
Head of the Laboratory "Software Management and Mechatronics"of the Research Institute of Agricultural Mechanization
Tashkent Region, Yangiyul District,

Dr Umidbek B. Yusupov(Doctor of Philosophy in Technical Sciences)
Acting Associate Professor of "Vehicle Engineering" Tashkent State Transport University
Tashkent City, Sergeli District,

Dr Abdirasuli A. Ibragimov(Doctor of Philosophy in Technical Sciences)
Scientific Secretary of the Research Institute of Agricultural Mechanization and Electrification
Tashkent Region, Yangiyul District,

Dr. Altinoy Masalieva (Associate Professor Candidate of Historical Sciences)
Uzbek State University of World Languages, Associate Professor of History of Uzbekistan

Dr. Yusup Kh. Manzarov(Associate Professor Candidate of Historical Sciences)
Assistant of the Department of Social Sciences at Karshi Engineering and Economics Institute.

Dr. Durdona A. Mustafoeva(Doctor of Philosophy in Pedagogical Sciences)
Associate Professor (PhD), Department of "Professional Education and Physical Culture",Tashkent Institute of Irrigation and Agricultural Mechanization Engineers,
Tashkent Region, Tashkent District,

Dr. Mamurzhan A. Mirzazhanov(Candidate of Technical Sciences)
Associate Professor of Production of Products and Structures, Fergana Polytechnic Institute of Building Materials
Fergana Region, Oltiariq District

Dr. Mahmudjon M. Ergashev(Candidate of Technical Sciences)
Head of the Department of Production of Building Materials, Products and Structures of Fergana Polytechnic Institute
Fergana Region, Quvasoy City

Dr. Iyanda Kamoru Ahmed (Doctor of Philosophy (Legal and Social History))
Department of History and International Studies, Federal University Gashua, Yobe State, **Nigeria**

Dr. J.GAJENDRA NAIDU (Ph.D In Finance)
Head of the Department, Faculty of Finance Botho university: Gaborone Campus: Botswana

Dr Nilufar M. Turdieva (Doctor of agricultural science)
Chairperson of laboratory Scientific research Institute protection of plants
Uzbekistan

Dr. Kutbiddin B. Imomkulov (Doctor of Technical Sciences)
Trade Specialist for Innovative Projects of Agricultural Research Institute
Tashkent Region, Yangiyul District

Dr. Omer Allagabo Omer Mustafa (PhD. in Economics)
Assistant professor of Economics, Banking and Finance, Sudan Academy for Banking and Financial Sciences (SABFS-Sudan)
Sudan, North Africa

Dr. Cristobal Millenes Ambayon (Doctor of Education)
Associate Professor V Sultan Kudarat State University, College of Teacher Education ACCESS, EJC Montilla, Tacurong City
Tacurong, Philippines

Dr. Khamid M. Sodikov (Doctor of Philosophy in Pedagogical Sciences)
Dean of the Faculty of Physics and Technological Education of Jizzakh State Pedagogical Institute
Jizzakh District, Navoi SFU

Dr. Nazokat G. Juraeva (Doctor of Philological Sciences)
National Institute of Arts and Design named after K.Bekzod, **Tashkent**

Dr. Nwodim Obinna (Doctor of Philosophy (Development Studies))
Department of Political and Administrative Studies, Faculty of Social Sciences, University of Port Harcourt
Nigeria

Dr. Atalla Fahed Al-Serhan (PhD)
Assistant Professor, Department of Business Administration, Al Albayt University, Mafraq, Jordan

Dr Nasiba N. Panjieva(Doctor of Philological Sciences)
Associate Professor of English Language and Literature, Termez State University
Surkhandarya Region, Termez City

Dr. Shakhlo B. Samanova (Doctor of Philosophy)
Associate Professor of "Theory of building a democratic society in Uzbekistan." Urgench State University.
Khorezm Region, Urgench District

Dr. Abderraouf Mtiraoui (Ph.D in Economics)
Assistant Professor in Economics at the Higher Institute of Finance and Taxation (HIFT)-Sousse- **Tunisia**

Dr. Muhammad Faizal bin Samat (Doctor of Philosophy (Marketing Communication))
Senior Lecturer at Malaysian Academy of SME & Entrepreneurship Development, Universiti Teknologi MARA, Shah Alam
Malaysia

Dr. Wulan Rahmadhani (Doctor in Public Health)
Lecturer, Department of Midwifery, Sekolah Tinggi Ilmu Kesehatan Muhammadiyah Gombong, **Indonesia**

Dr. Adeboye, N. Olawale (Doctor of Philosophy (PhD))
Department of Mathematics & Statistics, Federal Polytechnic Ilaro, Nigeria

Ewa, Moses Apie (Ph.D)
Lecturer Department of Educational Foundations & Childhood Education, Faculty of Education, Cross River University of Technology (CRUTECH), Calabar, **Nigeria**

Shaimaa Mohamed Hassanin (Ph.D in English Literature)
Lecturer of English language and American literature at Horus University
Damietta, Egypt

Dr. Dildora S. Davronova (Doctor of Philosophy in Pedagogical Sciences)
Associate Professor of "Pedagogy and Psychology" at the Uzbek State University of World Languages
Chilonzor Region Tashkent, Uzbekistan

Dr. Karima J. Tulenova(Doctor of Philosophy)
Acting Head of the Department of Social Sciences, Tashkent State Pedagogical University named after Nizami
Tashkent City, Yakkasaray District

Yannick Boum (Ph.D in English Language)
A researcher from the University of Yaounde **Cameroon, Central Africa**

Dr. Rashmi S (Doctor of Philosophy in Botany)
Assistant Professor, Post Graduate Department of Botany, JSS College of Arts, Commerce and Science (Autonomous) Ooty Road, Mysore, Karnataka, **India**

Dr Abdimurot U. Kuziev(Candidate of Technical Sciences)
Head of the Department of Transport Systems and Structures of Termez State University
Surkhandarya Region, Termez City

Dr. Normakhmat P. Panjiev (Doctor of Philological Sciences)
Head of the Department of Russian Linguistics, Termez State University
Surkhandarya Region, Termez City

Rawda Bashir Abdulla (Ph.D.)
Assistant Professor in Teaching English language and Applied Linguistics, Department of English Language Skills Jouf University
Kingdom of **Saudi Arabia**

Dr. Nemat Kh. Kushvaktov(Ph.D Pedagogical Sciences)
Head of the Department of General Pedagogy of Jizzakh State Pedagogical Institute.
Jizzakh City, Navruz Mahalla

Dr Khurshid A. Sattarov (Ph.D.)
Head of the Department of Electronics and Radio Engineering, Tashkent University of Information Technologies named after Muhammad al-Khwarizmi, **Tashkent City, Mirabad District**

Dr. Manoj Kumara.N.V (Ph.D in Finance)
Associate Professor in Department of Management Sciences, Maharaja Institute of Technology- Mysore.
Karnataka, India

Jupeth Toriano Pentang (Doctor of Philosophy Major in Educational Management)
Mathematics Educator, Researcher and Extensionist, College of Education, Western Philippines University Puerto Princesa City,
Philippines

Housseine Bachiri (Ph.D)
Assistant Professor at the Faculty of Sciences and Technologies, Tangier
Tangier (Morocco)

Dr. Sarvarbek Kh. Jumaboev(Doctor of Philosophy in Technical Sciences)
Acting Associate Professor of Power Supply, Tashkent State Transport University
Uchtepa District

Dr. Gulmira J. Tulenova
Professor,Tashkent University of Information Technologies named after Muhammad al-Khwarizmi, Tashkent, Uzbekistan
Uzbekistan

Seham Ismail (Doctor Philosophy in Agricultural Sciences)
Head of Department of Insect Population Toxicology, Central Agricultural Pesticides Laboratory, Agriculture Research Center,
Dokki, Giza, Egypt
 Egypt

Dr. Veena N (Ph.D. in Educational Psychology)
Associate Professor, Christ Academy Institute for Advanced Studies (CAIAS), Bangalore
Bangalore

Dr. Djuraev Jamolbek Abdukakharovich (Ph.D.)
Senior Lecturer Department of Otolaryngology and Dentistry TMA
Tashkent

Dr. V.KIRUTHIGA (Ph.D)
Assistant Professor, Department of Management Studies, Faculty of Engineering and Technology, Jawaharlal Nehru Salai, 100 Feet
Road, Vadapalani, Chennai-600026
Chennai

Dr. Govind Shinde (Ph.D.)
Professor, Babasaheb Gawde Institute of Management Studies. (Approved Associate Professor Finance Faculty University of
Mumbai)
Mumbai

Prof. Dr. Nagham Mahmood Aljamali (Ph.D.)
Professor in organic chemistry, Department of Chemistry, Synthetic Organic Field, IRAQ
Iraq

Dr. Tiziana Ciarambino (Ph.D. in Geriatrics Phisiopathology)
Teacher at the University of Campania
Campania

Dr. Kalandarov Palvan Iskandarovich (Doctor of Technical Sciences)
Professor at the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers in Tashkent
Tashkent, Uzbekistan

Dr. MC Manjunatha (Phd.)
Assistant Professor, Department of Civil Engineering, Maharaja Institute of Technology, Thandavapura, Mysuru -571 302
Mysuru

Dr. Sourabodhi Bhattacharyya (Ph.D)
Assistant Professor of Sanskrit (Stage II) Galsi Mahavidyalaya, B.U, Galsi,Purba Bardhaman , W.B-713406
India

Dr. Naftaly Gisore Mose (Ph.D in Economics)
Lecturer (Economics) University of Eldoret
Kenya

Dr. ARTI (Ph.D. in Law)
Assistant Professor, Desh Bhagat University, Punjab
INDIA

Dr. MOTHUKURI ANJAIAH (Ph.D. In Library Science)
Assistant Professor (Dept. of Library and Information Science)
INDIA

Dr. Youssif Zaghwani Omar (PhD in English Education)
General Director of the Institute of Human Resources Development at the Libyan Academy
Libya

Dr. Ndubuisi-Okolo (Ph. D)
Lecturer, Nnamdi Azikiwe University
Nigeria

Dr. Mourad Romdhani (Ph.D. in English Literature)
Assistant Professor, the Faculty of Letters and Humanities, University of Sousse, Tunisia
Tunisia

Dr. Utemuratova Gulshirin Najimatdinovna(PHD in Biological Science)
Karakalpak Scientific Research Institute of Natural Sciences Laboratory of Animal Science, Doctor of Philosophy PHD, Biological Science, Uzbekistan
 Uzbekistan

Dr. Tureyev Abat Arisovich, PhD(Doctor of Philosophy (Tourism))
lecturer of technology of storage and processing of agricultural crops, philosopher of Biological Sciences ,Karakalpakstan Institute of Agriculture and Agrotechnology,
Uzbekistan

Dr. Rico Paulo G. Tolentino (PhD in Development Education)
School Principal, Department of Education, Schools Division of Bulacan, Philippines
Philippines

Dr. Nik Alif Amri Bin NikHashim (Doctor of Philosophy (Tourism))
Senior Lecturer (DS51), Faculty of Hospitality, Tourism & Wellness, University **Malaysia Kelantan**
Australia

Shuang Li (Ph.D. in Sociology)
Sociology Lecturer, Department of Sociology and Social Work University of Wisconsin-Stevens Point
Wisconsin

Dr. V.KAVITHA (Ph.D. in English Literature)
Assistant Professor of English, Nehru Arts and Science College (Autonomous), Coimbatore
Coimbatore

Dr. Samieva Gulnoza Utkurovna
Doctor of medical sciences (DSC), Samarkand State medical institute, Uzbekistan
Uzbekistan

ANOKE, Amechi Fabian (Ph.D)
Lecturer, Department of Business Administration, Faculty of Management Sciences; Nnamdi Azikiwe University, Awka, Anambra State **Nigeria**

Dr..L.Bhuvana (Ph.D)
Assistant Professor of Chemistry, Shrimati Indira Gandhi College, Tiruchirappalli
Tamil Nadu, India

Dr. Norjigit T. Nishonov(Candidate of Agricultural Sciences)
Senior Lecturer, Department of Agrochemistry, Soil Science, Plant Protection and Quarantine, Samarkand Veterinary Medical Institute Samarkand Region

Dr. Esirgap I. Turapov(Ph.D)
Associate professor of the Department of "Machine Engineering Technology" at the Almalyk Branch
Jizzakh Region, Galla-Aral District

Dr Alisher J. Shokirov(Doctor of Agricultural Sciences)
Dean of the Faculty of Storage and Processing of Agricultural Products, Tashkent State Agrarian University
Tashkent Region, Yunusobod District

Dr. Patkhillo Siddikov(Doctor of Technical Sciences)
Professor of "Technology of textile fabrics" of the Tashkent Institute of Textile and Light Industry
Tashkent City, Chilanzar District

Suyarova Nargiza Yuldoshevna (Doctor of Philosophy (PhD))
Senior teacher, Philological Sciences, Karshy State University, Uzbekistan

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Literature Review on the Natural Enemies of Spodoptera Frugiperda J. E. Smith (Lepidoptera: Noctuidae) and the Effectiveness of Their Use in the Management of This Pest in Corn (Zea Mays L.)

Manguilibè Tchao[1], Agbéko Kodjo Tounou[1], Komi Agboka[1], Gnon Tchein[1], Tchegueni Matotiloa[1], Atama Gnamkoulamba[1,2], Komla Sanda[3]

[1]Laboratoire de Recherche sur les Agroressources et Santé Environnementale (LARASE), Ecole Supérieure d'Agronomie (ESA), Université de Lomé (UL)

[1,2]Institut National de Formation Agricole (INFA) de Tové

[3] Université de Kara

ABSTRACT: The fall armyworm *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) is an important maize pests that threaten food security in sub-Saharan Africa. In order to evaluate the diversity of natural enemies and especially their effectiveness for a sustainable management of this pest in Africa, a literature review was carried out. It consisted in exploiting 35 scientific publications from the most highly rated journals, over the period 2015-2020 relating to the inventory of the natural enemies of S. frugiperda and their effectiveness in the world in general and more particularly in Africa. It emerges from this study that there is a large diversity of natural enemies of *S. frugiperda* in the world. In total, 66 species of natural enemies belonging to 21 families in 10 orders have been recorded. Parasitoids have been the most studied 43 (64.18%) and the most used in the control of *S. frugiperda*, followed by predators 13 (19.40%) and entomopathogens (13.42%). In Africa, 24 of the 67 species have been recorded in 9 countries. Parasitoids were also created with a rate of 26.86% or 75.00% at the African level. The main most effective parasitoids were *Telenomus remus* (Hymenoptera: Scelionidae), *Chelonus insularis* Cresson (Hymenoptera: Braconidae) and *Cotesia marginiventris* Cresson (Hymenoptera: Braconidae) with parasitism rates varying between 0.85 and 9.90% depending on the environments. In view of the results, since these species have been listed in Africa, they seem to be real candidates for future programs for the sustainable management of this caterpillar. Research is underway in Togo and probably in the rest of the countries of the continent for a better knowledge and development of these natural enemies.

KEYWORDS: Corn, *S. frugiperda*, natural enemies, efficacy.

I. INTRODUCTION

The harmful consequences of chemical pesticides on human health and on the balance of the various ecosystems are no longer in doubt [1]. The issues of pollution, loss of biodiversity and diseases linked to the use of plant protection products are becoming increasingly alarming [2]. Since the dawn of time with the industrial revolution, the use of chemicals to control crop pests has always been controversial. Cereals, and in particular corne, are the staple food of sub-Saharan populations [3]. Since 2016, an exotic caterpillar *Spodoptera frugiperda* (J. E. Smith) (Lepidoptera: Noctuidae) has emerged, reducing maize production by 15-73% and thus posing a serious threat to global food security [4]. In order to achieve the Sustainable development goals, which call for the preservation of biodiversity [5], environmentally friendly control methods are increasingly being promoted in various biodiversity management programmes. Much research has been done and more is underway to sustainably manage pests with bio-pesticides. Genetic improvement for pest control is controversial in terms of ethics under the 1992 Rio Convention on Biological Diversity, but also in terms of the loss of intrinsic values of wild varieties. A study by [6] on two corn varieties showed that the new varieties were less resistant to *S. frugiperda* due to the loss of resistance genes during the crossing process. There is a range of techniques to manage this caterpillar but the sustainable management strategy is one that includes the use of natural enemies [7]. Natural enemies are therefore alternatives to chemicals against *S. frugiperda* but also a technique to support environmental protection and the sustainability of agroecosystems [8]. Several investigations have been carried out on this topic

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in the USA, where the insect originates [9, 10], in Mexico and Central America [11] and in Latin America [12, 13]. Although recognised as effective, pest management using natural enemies remains a vast area of instigation in sub-Saharan Africa. There is very little knowledge that can constitute a reliable database on the use of natural enemies in pest management over the last five years worldwide and more particularly in Africa. This study aims to summarise the work done on the main natural enemies of *S. frugiperda* and especially on their effectiveness in the management of this pest in the world in order to lay the foundations for sustainable biological control in Africa.

II. MATERIALS AND METHODS

A. Source of Information
The need to develop sustainable management methods for *S. frugiperda*, has led to recent bibliographic syntheses on the inventory of natural enemies of this pest and especially on tests to evaluate their effectiveness in influential journals. The research focused on the collection of relevant information from 35 published scientific articles, from bibliographic references on the inventories of natural enemies of *S. frugiperda* and their efficacy on the pest, and also from articles and abstracts of scientific papers. The synthesis was inspired by the methodology used by [11] in the USA to make a synthesis on parasitoids and parasites of *S. frugiperda*. They identified and analysed the literature related to the inventory of natural enemies of *S. frugiperda* and tests to evaluate their level of parasitism. Based on the work of [11], the methodological approach of the present paper, which focuses on the period 2015-2020, pays attention to the careful choice of the keywords to be inserted in the search engines so as not to lead to works significantly far from the main meaning of the subject. The approach was adopted by using mainly the following words and phrases: "natural enemies", "*S. frugiperda*", "parasitism rate", "efficiency". Publications mainly from journals such as "Florida entomologist", "Biological control", "Journal of insect science", "Elsevier", "PLOS ONE" and "Economic Entomology" were used for this synthesis.

B. Information's Organisation
Various information was obtained on the natural enemies of *S. frugiperda* in the world in general and in Africa in particular and is presented in Table 1. The information is presented in Table 1. It covers, in order, parasites and parasitoids of S. frugiperda, predators, entomopathogenic fungi, bacteria and viruses. For each of the natural enemies, information such as: classification, country in which it was reported and the reference of the article are reported. Then the results on the effectiveness of the main natural enemies were presented. These results were also discus, according to the study environments.

The approach was therefore to make a comparative study of the diversity of natural enemies in Africa and in the world. The efficiencies of the main natural enemies were then assessed in order to give some guidance on the possible potential of natural enemies at the African level.

III. RESULTS

A. Management of S. Frugiperda in Togo
In Togo as in most African countries, several investigations in recent years have focused on the management of *S. frugiperda*. [14], found molecular similarity between *S. frugiperda* genes from Togo and those from the Americas and the West Indies. In the perspective of sustainable management, efficiency tests of different pheromone traps were carried out in Togo [15]. The latter evaluated both the effectiveness of three different types of pheromone traps in terms of sensitivity, specificity and cost. Nowadays, contrary to the countries where the insect originates, no more information about natural enemies and even less about their effectiveness in the African context and more particularly in Togo. [16], showed that although *S. frugiperda* infestations seem to be gradually decreasing from 2016 to 2018, they remain high in Togo compared to Ghana. Hence the need to shed light on all the work done on the inventory of *S. frugiperda* natural enemies and especially their efficacy during the period 2015-2020.

B. Summary of the Main Natural Enemies Recorded
The inventory of the main natural enemies of S. frugiperda during our synthesis period resulted in the identification of numerous natural enemies of *S. frugiperda* (Table 1). All the natural enemies recorded were divided by order of representation into 10 main orders: Hymenoptera, Diptera, Coleoptera, Dermaptera, Heteroptera, Hypocreales, Nematoda. The different results are presented in the following order: parasites and parasitoids, predators and entomopathogens

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Table 1. SUMMARY of NATURAL ENEMIES of *S. FRUGIPERDA* RECORDED WORLDWIDE DURING the PERIOD 2015-2020

TYPE of NATURAL ENEMY	ORDER and FAMILY	COUNTRY of COLLECTION	CULTURE	REFERENCE
1-Parasits and Parasitoids				
Chelonus bifoveolatus Szpligeti	Hymenoptera: Braconidae	Ghana, Senegal, Benin	Corn	[17] ; [18] ; [16]
Ch. insularis Cresson	Hymenoptera: Braconidae	Mexico, Florida, Tanzania, India	Corn, Sorghum	[19]; [10] ; [20] ; [21] ; [22] ; [23]; [24]
Ch. curvimaculatus Cameron	Hymenoptera: Braconidae	Kenya	Corn	[25]
Ch. formosanus Sonan	Hymenoptera, Braconidae	India	Corn	[24]
Meteorus arizonensis Muesebeck	Hymenoptera: Braconidae	Mexico, Florida	Corn	[19] ; [10]
M. laphygmae Viereck	Hymenoptera: Braconidae	Mexico	Corn	[20]
Microplitis manilae Ashmead	Hymenoptera: Braconidae	India	Corn	[24]
Coccygidium luteum Brullé	Hymenoptera: Braconidae	Benin, Ghana, Mozambique	Corn	[17] ; [26] ; [16]
Bracon sp.	Hymenoptera: Braconidae	Ghana	Corn	[16]
Cotesia icipe Fernandez,	Hymenoptera: Braconidae	Benin, Ghana, Ethiopia	Corn	[17] ; [25] ; [16]
C. ruficrus Haliday	Hymenoptera: Braconidae	India	Corn	[27]
C. marginiventris Cresson	Hymenoptera: Braconidae	Florida, Tanzania, India	Corn	[10]; [20]; [23]; [24]
Meteoridea testacea Granger	Hymenoptera: Braconidae	Ghana, Benin	Corn	[17]; [16]
Glyptapanteles creatonoti Viereck	Hymenoptera: Braconidae	India	Corn	[28]
Aleiodes laphygmae Viereck	Hymenoptera: Braconidae	Florida	Corn	[10]
Coccygidium melleum Roman	Hymenoptera: Braconidae	India, Tanzanie	Corn	[29]; [23]
Campoletis sonorensis Cameron	Hymenoptera: Ichneumonidae	Mexico, Senegal	Corn	[19]; [18]
C. flavicincta Ashmead	Hymenoptera: Ichneumonidae	Mexico	Corn	[19]
Charops sp.	Hymenoptera: Ichneumonidae	Benin, Ghana	Corn	[17]
Pristomerus sp	Hymenoptera: Ichneumonidae	Mexico	Corn	[19]
Ophion flavidus	Hymenoptera: Ichneumonidae	Florida	Corn	[10]
Metopius discolor Tosquinet	Hymenoptera: Ichneumonidae	Ghana	Corn	[17]
M. rufus Ashmead	Hymenoptera: Ichneumonidae	India	Corn	[24]
Netelia sp.	Hymenoptera: Ichneumonidae	India	Corn	[24]
Ichneumon promissorius Erichson	Hymenoptera: Ichneumonidae	India	Corn	[24]
Pristomerus pallidus Kriechbaumer	Hymenoptera: Ichneumonidae	Benin	Corn	[17]
Euplectrus platyhypenae Howard	Hymenoptera: Eulophidae	Mexico, Florida	Corn	[19]

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Anatrichus erinaceus Loew	Diptera: Chloropidae	Ghana	Corn	[16]
Eucelatoria bryani	Diptera: Chloropidae	Mexico	Corn, Sorghum	[21]
Exorista sorbillans Wiedemann	Diptera: Tachinidae	India	Corn	[29]
Drino quadrizonula Thomson	Diptera: Tachinidae	Benin, Ghana, Mozambique	Corn	[17] ; [26]
Archytas marmoratus Townsend	Diptera: Tachinidae	Mexico	Corn	[19]
Lespesia sp.	Diptera: Tachinidae	Mexico	Corn	[19]
Une brachycère non identifiée	Diptera: Tachinidae	Ghana	Corn	[16]
Eriborus sp.	Hymenoptera: Ichneumonidae	India	Corn	[10] ; [29]
Campoletis sp.	Hymenoptera: Ichneumonidae	Senegal	Corn	[18]
C. chlorideae Uchida	Hymenoptera: Ichneumonidae	India	Corn	[28], [29]
Metopius rufus Ashmead	Hymenoptera: Ichneumonidae	India	Corn	[24]
Odontepyris sp.	Hymenoptera: Bethylidae	India	Corn	[29]
Telenomus remus	Hymenoptera: Scelionidae	South Africa, Benin, Ivory Coast, Niger, Kenya, Mexico, China	Corn, Sorghum	[21] ; [30] ; [31] ; [25]
Telenomus sp.	Hymenoptera: Platygastridae	India	Corn	[28]
Trichogramma sp.	Hymenoptera: Trichogrammatidae	India	Corn	[28]
Trichogramma atopovirilia Oatman and Platner	Hymenoptera: Trichogrammatidae	Mexico	Corn, Sorghum	[22]
Hexamermis cf. albicans Siebold	Mermithida: Mermithidae	India	Corn	[24]
2-Prédators				
Pheidole megacephala	Hymenoptera: Formicidae	Ghana	Corn	[16]
Haematochares obscuripennis Stål,	Heteroptera: Reduviidae	Ghana	Corn	[16]
Peprius nodulipes Signoret	Heteroptera: Reduviidae	Ghana	Corn	[16]
Cosmolestes sp.	Heteroptera: Reduviidae	India	Corn	[24]
Forficula sp.	Dermaptera: Forficulidae	India	Corn	[28] ; [29]
Harmonia octomaculata Fabricius	Coleoptera: Coccinellidae	India	Corn	[29]
Coccinella transversalis Fabricius	Coleoptera: Coccinellidae	India	Corn	[29]
Doru sp.	Dermaptera : Forficulidae	Mexico	Corn, Sorghum	[22]
Eocanthecona furcellata Wolff	Hemiptera: Pentatomidae	India	Corn	[24]
Andrallus spinidens Fabricius	Hemiptera: Pentatomidae	India	Corn	[24]
Podisus maculiventris	Hemiptera: Pentatomidae	India	Corn	[24]

Ropalidia brevita	Hymenoptera: Vespidae	India	Corn	[24]
Polistes cf. olivaceus	Hymenoptera: Vespidae	India	Corn	[24]
3- Nematode				
Hexamermis sp.	Nematoda : Mermithidae	Senegal	Corn	[18]
Ovomermis sinensis	Nematoda: Mermithidae	China	Corn	[32]
4-Fungi				
Beauveria bassiana	Hypocreales: Cordycipitaceae	Mexico, India	Corn	[19] ; [33] ; [24]
Metarhizium anisopliae	Hypocreales: Clavicipitaceae	Mexico, India	Corn	[19] ; [33] ; [24]
M. rileyi (Farl.)	Hypocreales: Clavicipitaceae	Kenya	Corn	[34]
Nomuraea rileyi (Farl.) Samson	Hypocreales: Clavicipitaceae	India	Corn	[28]; [29]
5- Virus				
SfMNPV		Mexico, India	Corn	[35] ; [19]; [24]
SfGV ARG.		Argentina	Corn	[36]
6- Bacteria				
Bacterial 16S rRNA gene.		Kenya	Corn	[34]

1) PARASITS and PARASITOIDS of S. FRUGIPERDA*: Parasits and parasitoids represent the most important natural enemy of *S. frugiperda* among all other groups both in number and in species. Forty-three (43) parasitoids have been reported worldwide. [19], in their work in Mexico reported the presence of *Chelonus insularis* Cresson and *Meteorus arizonensis* Muesebeck (Hymenoptera: Braconidae); Campoletis sonorensis Cameron, *Pristomerus* sp. and *C. flavicincta* Ashmead (Hymenoptera: Ichneumonidae); *Euplectrus platyhypenae* Howard (Hymenoptera: Eulophidae); *Archytas marmoratus* Townsend and *Lespesia* sp. (Diptera: Tachinidae) on Corn. [10] reported in their work during the period of 2010-2015 in three countries of South Florida, two main parasitoids of *S. frugiperda* eggs on Corn crop which are *Cotesia marginiventris* Cresson (Hymenoptera: Braconidae) and *C. insularis*. The work of [20] in northern Sinaloa focused on *Meteorus laphygmae* Viereck (Hymenoptera: Braconidae), *C. insularis* and *C. marginiventris* as the most abundant parasitoids. The work of [21] and [22] has confirmed the presence of *C. insularis* in some areas of Mexico. These investigations also identified *Telenomus remus* (Hymenoptera: Scelionidae) *Trichogramma atopovirilia* (Hymenoptera: Trichogrammatidae) and a Diptera *Eucelatoria bryani* (Diptera: Chloropidae) on corn and sorghum.

In Asia, research by [28] identified parasitoids such as *Glyptapanteles creatonoti* Viereck (Hymenoptera: Braconidae), *Telenomus* sp. (Hymenoptera: Platygastridae), *Trichogramma* sp. (Hymenoptera: Trichogrammatidae) and C. chlorideae (Hymenoptera: Ichneumonidae) on Corn in India. A year later, [27] and [29] identified four new parasitoids in the same country which are *Odontepyris* sp. (Hymenoptera: Bethylidae); *Eriborus* sp. (Hymenoptera: Ichneumonidae); *Exorista sorbillans* Wiedemann (Diptera: Tachinidae); *Coccygidium melleum* Roman (Hymenoptera: Braconidae) and *C. ruficrus* Haliday (Hymenoptera: Braconidae). The latest research by [24] has identified 5 new parasitoids and one parasite in India. These parasitoids are : *Metopius rufus* Ashmead, *Ichneumon promissorius* Erichson ; *Netelia* sp. (Hymenoptera: Ichneumonidae); *C. formosanus* Sonan; *Microplitis manilae* Ashmead (Hymenoptera: Braconidae). The species Hexamermis cf. albicans Siebold (Mermithida: Mermithidae) remains the only parasite identified during this work in India on Corn. In China, T. remus was the first natural enemy to be identified on Corn in the south of the country [30].

In Africa, although research on possible natural enemies of *S. frugiperda* is recent, to date there are numerous natural enemies, mainly parasitoids, recorded across Africa. The first report on the parasitoid of *S. frugiperda* was done by [25] and later supplemented by [31] and later by the same author [25]. The work of [17]; [18] and [16] completes the very limited list of work done on the natural enemies of this insect in Africa. Indeed, [25] identified for the first time in Africa and more particularly in Tanzania, Ethiopia, Kenya and Mozambique 5 species of eggs and larvae parasitoids of *S. frugiperda* during their work on Corn. They identified for the first time in three localities in Ethiopia *Cotesia icipe* Fernandez, *Coccygidium luteum* Brullé (Hymenoptera: Braconidae) and *Palexorista zonata* (Diptera: Tachinidae). In Kenya, *Charops ater* (Hymenoptera: Ichneumonidae), *P. zonata*, *C.*

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luteum, C. icipe and *C. curvimaculatus* were identified in five localities. In Tanzania, however, *C. ater* and *C. luteum* were observed for the first time in four localities. In the Mozambique Republic it was only in 2020 that *C. luteum* and *D. quadrizonula* were reported for the first time on Corn in the central province of Monica. Work on the natural enemies of *S. frugiperda* in West Africa highlighted the presence of *C. bifoveolatus* for the first time in Benin [17], Senegal [18] and Ghana [16]. *C. luteum*, *Charops* sp. and *Meteoridea testacea*, were identified in Benin and Ghana by [16, 17]. *T. remus* has been an important egg parasitoid, identified in South Africa, Benin, Ivory coast, Niger and Kenya by [31] and [25]. Recent studies in Tanzania have identified *C. insularis* as an egg parasitoid of *S. frugiperda* [23].

2) PREDATORS of S. FRUGIPERDA: Predators are the second most abundant group after parasitoids and parasites. They represent 19.70% of the species listed in all the articles consulted for this synthesis. These predators belong to five main orders, which are Hymenoptera, Hemiptera, Heteroptera, Coleoptera and Dermaptera.

In the Americas and more specifically in Mexico, [22] reported in their work a single predator species on Corn and Sorghum, a Forficulidae called *Doru* sp. (Dermaptera: Forficulidae). Research in Asia, particularly in India and China, has identified several species of predators. [28], reported the presence of *Forficula* sp (Dermaptera: Forficulidae) in their work. A year later, this species was confirmed in the same country by [29]. The latter were able to record two other species *Harmonia octomaculata* Fabricius and *Coccinella transversalis* Fabricius (Coleoptera: Coccinellidae). The most recent research on the natural enemies of *S. frugiperda* in India was carried out by [24] on Corn. Six (6) species of predator were recorded belonging to three (3) families from three different orders. Hemipterans represented by three (3) species of the Pentatomidae family, two (2) species of Hymenoptera of the family Vespidae and one Heteroptera of the family Reduviidae. These species are *Eocanthecona furcellata* Wolff, *Andrallus spinidens* Fabricius and *Podisus maculiventris* (Hemiptera: Pentatomidae); *Ropalidia brevita* and *Polistes cf*. olivaceus (Hymenoptera: Vespidae) and *Cosmolestes* sp. (Heteroptera: Reduviidae).

3) ENTOMOPATHOGENS of S. FRUGIPERDA : The entomopathogens listed in this inventory are mainly nematodes, fungi, bacteria and viruses. Two (2) species of nematodes were reported in this review. These include *Hexamermis* sp. (Nematoda: Mermithidae), recorded in Senegal on corn (Tendeng et al., 2019) and Ovomermis sinensis (Nematoda: Mermithidae) also on corn in China [32]. Concerning entomopathogenic fungi, *Beauveria bassiana* (Hypocreales: Cordycipitaceae), *Metarhizium anisopliae* (Hypocreales: Clavicipitaceae), *M. rileyi* and *Nomuraea rileyi* (Hypocreales: Clavicipitaceae) were recorded in the different works. *B. bassiana* and *M. anisopliae* were identified in India [19] before being confirmed 3 years later by [33]. In Mexico, the research conducted by [24] reported this species. N. rileyi was the third fungal species reported from India by [28,29]. In Africa, only one species of fungus has been reported in Kenya: *M. rileyi* [34]. Two (2) viruses have been observed in Argentina in Mexico and India and a bacterium in Kenya on Corn as natural enemies of Corn. SfMNPV (Spodoptera frugiperda nucleopolyhedrovirus) was observed in Mexico [37] and India [24; 35] on Corn. On the other hand, SfGV ARG is a virus that has only been observed in Argentina [36]. The bacterium that has been identified in Kenya is Bacterial 16S rRNA gene according to research conducted by [34].

C. SUMMARY OF THE EFFECTIVENESS OF S. FRUGIPERDA NATURAL ENEMIES WORLDWIDE

The management of *S. frugiperda* by means of its natural enemies has been the subject of much research around the world. As well as the inventory of these natural enemies, the implications of parasitoids in the management of this pest are enormous. This section summarises the main work on sustainable management of S. frugiperda during the period 2015-2020.

The majority of publications consulted on the use of natural enemies in the management of S. frugiperda have been carried out in the Americas, where the pest originates. In general, parasitoids and parasites have been the most used. [21] reported a parasitism rate between 5; 6.3 and 9.9% for three main parasitoids on Corn in Mexico which are *C. insularis*, *N. rileyi* and *Trichogramma* spp. In Brazil, [38] reported that the use of *T. pretiosum* in the control of *S. frugiperda* reduced larval density and promoted a production gain of 0.7t/ha equivalent to a financial gain of US$96.5 per hectare. [39] showed that the entomopathogenic virus SfMNPV controlled the population dynamics of S. frugiperda by breaking the insect's resistance. A significant increase in larval mortality of S. frugiperda was obtained in Brazil by [40] using *M. anisopliae* strains. The influence of the migration capacity of *T. remus* on the efficiency of this parasitoid, evaluated in Brazil has been demonstrated [41]. [37] also pointed out that the application of the entomopathogenic virus SfMNPV at a frequency of 7 days controlled the larval density of the caterpillar by 84% and reduced the incidence of parasitoids in Mexico. In the same country, [22] showed the efficiency of T. atopovirilia with parasitism rates of 70, 14 and 8% respectively in laboratory and field conditions. Competition relationships were highlighted by [42] in their work in Brazil on three egg parasitoids *T. remus*, *Trichogramma* spp. and *T. pretiosum* of *S. frigiperda*. [43] showed the effectiveness of the predator-parasitoid symbiosis in controlling the caterpillar in Brazil under laboratory conditions. In Florida, [44] showed the effectiveness of the association of *P. maculiventris*, *E. floridanus* and *C. marginiventris* in

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the integrated management of *S. frugiperda* and the conditions for a better use of these natural enemies. In their study, [45] showed that the association of the fungus *Trichoderma atroviride* with the Corn root system improved the parasitism rate of *Campoletis sonorensis* (Hymenoptera: Ichneumonidae) on *S. frugiperda* in Mexico. [46] showed the efficacy of *M. anisopliae* in reducing the incidence and level of leaf damage associated with the pest on Corn. Recent investigations in Mexico showed the synergistic effect of combinations of *B. bassiana*, *M. anisopliae* and small doses of spinosad in controlling the dynamics of the L3 stage larvae of *S. frugiperda* in the laboratory [33]. [47] showed the efficiency of *T. remus* in controlling *S. frugiperda* according to the larval density of the parasitoid and the phenological stage of the plant and the influence of temperature in the mass rearing of this parasitoid in Brazil.

In Asia, control trials against S. frugiperda using N. rileyi reduced infestation rates by 58.91-62.87% and leaf damage levels and larval density by 62.50-66.46% and 66.84-73.05% on Corn depending on the locality [48] in India. A parasitism rate between 10 and 15% of this fungus was also reported on Corn one year later in the same country [29]. In their investigations, [49] showed predation of both adults and larvae of *Chrysopa pallens* (Neuroptera: Chrisopidae) on *S. frugiperda*. The entomopathogenic fungus *M. rileyi* and the bacterulovirus, SpfrNPV were reported to be the most dominant entomopathogens in controlling the caterpillar with a larval mortality rate of more than 50 % in India [24].

In Africa, [50] carried out the first work on the efficacy of natural enemies, especially entomopathogenic fungi. They used 20 different concentrations of two strains of fungi, which are B. bassiana and M. anisopliae in the laboratory on L2 stage larvae and neonates in their trials. The lowest efficacy was 30% with B. bassiana on second instar larvae. Most concentrations gave efficacy ranging from 83-97.5% on both second instar larvae and neonates but the best efficiencies were obtained with M. anisopliae. The concentrations that provided the best mortality rates were proposed for experiments under field conditions for further evaluation. [23] showed the efficacy of *C. margiventris* in combination cropping in controlling *S. frugiperda*. In Kenya, *T. remus* was reported to be the most effective egg parasitoid to be promoted in the control of the caterpillar with a parasitism rate of 69.3% against only 42% for the larval parasitoid *C. icipe* [25]. [26] pointed out that with a parasitism rate of 23.68% and 8.86% and relative abundance values of 100 and 96.3 for *C. luteum* and *D. quadrizonula*, respectively, these are important to promote.

III. DISCUSSION

The inventory of the natural enemies of the armyworm through 35 recent articles and publications covering the period 2015-2020, made it possible to identify 67 species belonging to 21 families divided into 10 orders. In general, the work published has focused on three continents: America, Africa and Asia.

Very little work has been done on the inventory of the natural enemies of this caterpillar in America during this period. These results can be explained by the fact that the caterpillar is native to the Americas, and much research has already been carried out in this area with a view to highlighting the biodiversity of the natural enemies of this pest and testing their effectiveness. [51] had already reported for the first time in North and South America, 53 species of parasitoids of *S. frugiperda* belonging to 43 genera and 10 families, of which the families Braconidae, Ichneumonidae and Tachinidae represented respectively 16, 19 and 47 % of the genera and 15, 17 and 53 % of the species. Secondly, [11] identified 150 species of parasitoids and parasits of *S. frugiperda* in the Americas and the Caribbean Basin, belonging to 14 families from 3 main orders: Hymenoptera, Diptera and nematodes. In Africa, as in Asia, many inventories have been made because the caterpillar is a current threat and, as in the country of origin, better control requires a better knowledge of the insect's bioecology. In such a short period of time, the work already done on these continents shows an important biodiversity of natural enemies, including most of those already reported on the American continent. These continents would have many alternative host plants and favourable climatic conditions for the development of the insect and of these natural enemies. These results confirm those of [52] who reported that the insect would be an endemic and multi-generational pest in Africa because the continent offers diverse host plant sources and favourable climatic conditions for constant reproduction.

With regard to the effectiveness of natural enemies, parasitoids were the most effective against the caterpillar. Predators were the second most effective group of natural enemies. These results are in agreement with those of [10] and [20] but disagree with those of [53] who showed that parasitoids, notably *T. remus*, did not have a significant effect on the reduction of *S. frugiperda* larval density and that this reduction was rather linked to natural mortality but also to the action of predators. The natural enemies of *S. frugiperda* would also be those of the main stem and ear borers of Corn, thus explaining the interest in this pest. Indeed, our results confirm those obtained by [54], who showed that *Telenomus busseolae* Gahan and *T. isis* Polaszek were the main ovolarvarian parasitoids of *B. fusca* and *S. calamistis* on Corn, Sorghum and millet. They also confirm those of [55] who reported that *Trichogramma* sp. was the main ovolarvular parasitoid of *Chilo partellus* on Corn and Sorghum. Our results also support those of [56] who mentioned Bracon sesamiae as the main larval parasitoid of *E. saccharina* on Corn. Entomopathogenes have been less

recommended because they are slow acting and therefore, in relation to the biology of the insect, would not be effective in controlling it. Our investigations support the work of [33] who recommended a combination of entomopathogenic fungi *B. basssiana* and *M. anisopleae* with small doses of spinosad insecticides to control L3 stage larvae in the laboratory. They also support those of [57] with the use of the entomopathogenic nematode *Steinernema carpocapsae* (Rhabditida: Steinernematidae) in combination with low doses of chemical pesticides in the management of *S. frugiperda* in the USA. In Africa, [25; 58] were able to promote the first natural enemies to be valued. *T. remus* was proposed by [17] in Ghana and Benin and [16] in Ghana to control the caterpillar.

According to [59], the production of a parasitoid such as *T. remus* on *S. frugiperda* eggs would require 0.0004 US$ (on average 3 CFA francs). Given the whole process to be followed before their release, the production cost of natural enemies would remain one of the major constraints to biological control based on the use of natural enemies in Africa.

IV. CONCLUSION

At the end of this study, it is noted that there is a significant diversity of natural enemies of S. frugiperda around the world. Very little research has been done on natural enemy inventories in the USA, unlike in other countries. This is because much work has already been done to identify natural enemies, and perspectives on their efficacy are sought. In contrast, in African and Asian countries, research on potential natural enemies is just beginning. In only five years after its official report on the African continent and only two years on the Asian continent, the majority of the natural enemies listed on the American continent have already been found on these continents. This study lays the groundwork for the start of research into the use of the most effective natural enemies in our countries. The research is ongoing and will allow a better assessment of natural enemies and their efficacy in Africa.

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Factors Impact on Perceived Value of Customer in Higher Education

Thanh Hoa Thi Phan[1] , Huyen Trang Nguyen[2] , Nhat Vinh Nguyen[3] , Dieu Linh Nguyen[4] , Ngoc Linh Ngoc Mai[5]

[1]Lecture, Department of Business Administration, National Economics University, Hanoi, Vietnam
[2,4,5] Student, Corporate Management, National Economics University, Hanoi, Vietnam
[3]Student, Department of Business Administration, National Economics University, Hanoi, Vietnam

ABSTRACT:

PERCEIVED VALUE'S ROLE IN CONSUMERISM AND HIGHER EDUCATION

The rapid development of all industries and firms in the twenty-first century has increased corporate competitiveness in terms of making customers feel fulfilled and appreciated receive what they have paid for

In the service business, perceived value, or customer happiness, is always a prerequisite factor, a critical aspect for the existence and preservation of competitive advantages (Ravald & Gronroos, 1996).

To be successful in this field, companies must consider not just the quality of their products and services, but also the feelings and contentment of their customers. Customers will never use a product again if it does not meet their demands or meet their standards, regardless of how "high-quality" the product or service is provided by that company.

Overall aspects such as responsiveness, environment, workers, etc., amenities, and so on all affect consumer perception and satisfaction in research on perceived value in various service industries such as internet consumption, supermarkets, hotels, restaurants, and so on. Similarly, the topic of this research study is the customer's perceived value in higher education: influential elements. Universities can use this research to change their behavior, service quality, and service delivery process to better meet and guide customers in Higher Education, such as students, parents, families, society, businesses, and so on, when determining how these factors affect quantitatively and qualitatively the perceived value of customers in Higher Education, such as students, parents, families, society, businesses, and so on.

KEYWORDS: Perceived Value, Higher education, service quality, customers, factors, influential elements, satisfactory

INTRODUCTION

The purpose of the research study on the elements influencing consumer perceived value in higher education is to solve the problem; the questions raised are: what is perceived value? In higher education, who are the customers? What factors influence perceived value, and how do they influence it? … We evaluate the elements affecting each aspect of the perceived value using Sheth, Newman, and Groth's (1991) model of five factors composing the perceived value to study the influencing factors. Using the SERVQUAL methodology of Parasuraman to assess the link between training service quality and customer happiness.

Customers' perceived value assesses items and services on two levels: go and return. It can be viewed as an idea of getting good value for your money (Sweeney &Soutar, 2001).

Sweeney and Soutar (2001) developed a scale in their research.

Quality, pricing, emotional value, and social value are the four dimensions of the PERVAL multi-dimensional measurement that aim to measure perceived value. Petrick (2002) continued to grow in the service industry and introduced the SERV-PERVAL scale, in which quality, emotional response, monetary price, behavioral pricing, and reputation are the five components that make up a customer's perceived value.

RESEARCH MODEL OVERVIEW

This study is based on the 5-factor model of the SERVQUAL service quality scale (Service Quality) of Parasuraman et al. (1988) and a few variants of it, the SERVPERF scale, which has been widely used by many researchers throughout the world. It is extensively applied in measuring service quality, including measuring service quality in higher education as in the study above.

Factors Impact on Perceived Value of Customer in Higher Education
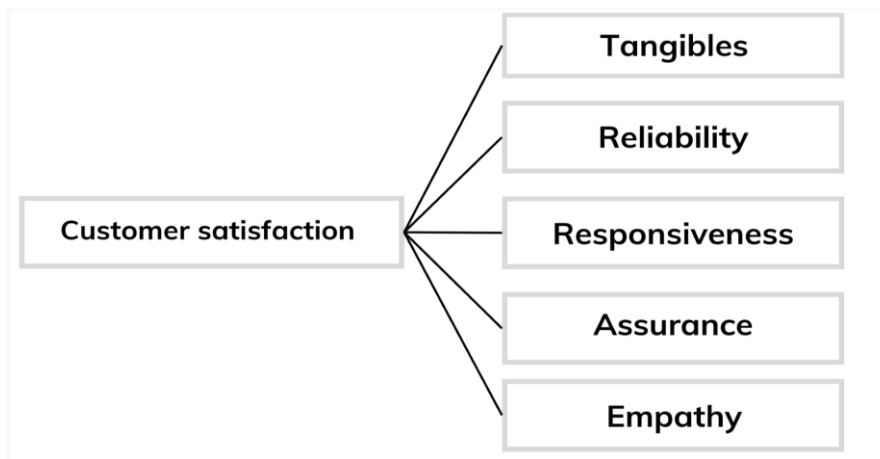
H1: **Tangible means (Facilities):** External manifestations of facilities include
Classrooms, teaching equipment, practice tool, learning materials, etc.

H2: **Reliability**: The ability to deliver the given service consistently and precisely.

H3: **Responsiveness**: Willingness to help clients and give assistance as soon as possible.

H4: **Assurance**: Employee knowledge and courtesy as well as the capacity to inspire trust and confidence.

H5: **Empathy**: The personal care and attention they provide to their customers and ensure that no one is forgotten.

In addition, Sheth, Newman, and Groth's 5-factor model of perceived value below are also used to evaluate the influence of factors affecting customer's perceived value.
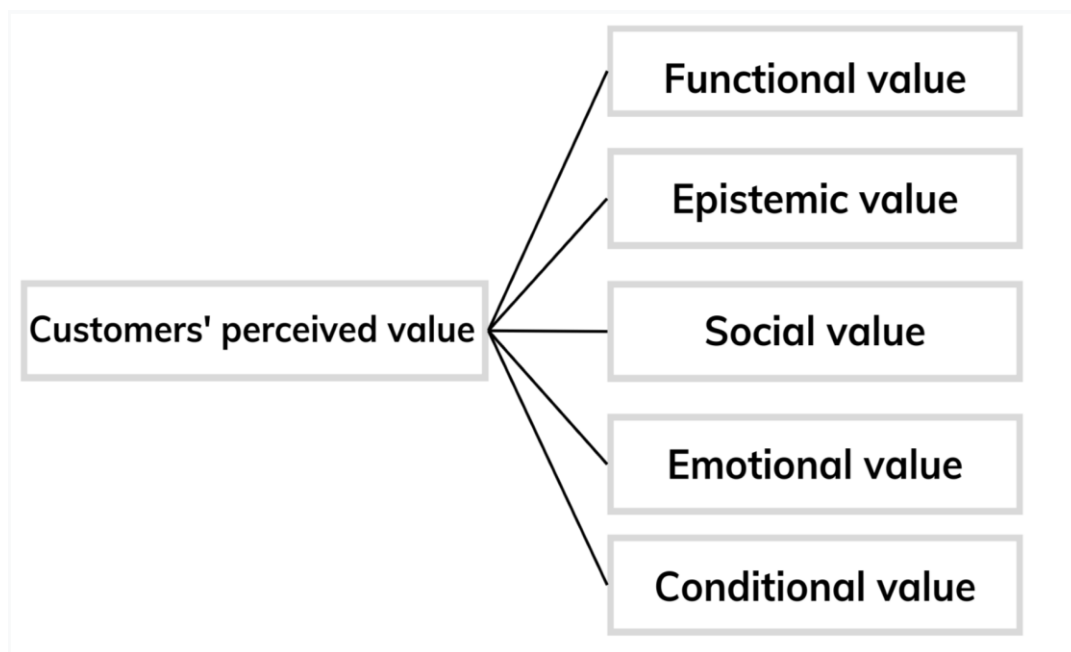
In which, the values are understood as follows:

- **Functional value** is related to economic practicality, to the benefits associated with owning a product or service, which is evaluated by customers on a series of prominent features such as price, reliability, and durability. It is worth noting that in many previous studies these issues have been identified as determinants of quality.

- **Epistemic value** is defined in the study of Sheth and his colleagues as the ability of a product or service to provide novelty or understanding satisfaction.

- **Social value** refers to the advantages of customer association with certain social groupings such as friends and related groups. Sheth believed that social value plays a role important in the customer's evaluation of the product - service.

- **Emotional value** refers to the values r elated to feelings or emotional states of happiness or sadness when purchasing goods and services, as well as the customer's impression during consumption.

- **Conditional value** is described as a set of scenarios customers experience when selecting a product or service, in which context factors are thought to influence the customer's judgment of the product or service.

Factors Impact on Perceived Value of Customer in Higher Education

THE NEWISTANCE OF RESEARCH

Documenting proposal on "factorial influence on customer perception of value in higher education" reveals a new area in the study of perceived value, that is, educational value perception. Customers for education, and more especially higher education, are individuals, groups, and organizations that are vital to the growth of the community, the nation, and society. The opportunity to reform education, to alter teaching and learning techniques, to raise morale, to teach responsibility and to give prominence to the guidance of the lecturer, not merely the traditional "teaching and learning" style will be greatly increased by this new area of research. However, there are still challenges that require the educational environment to adapt, change, become more comprehensive and more active in order to direct learners - the main customers - to knowledge, enhance skills learning and improve quality of life.

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Macroeconomic Variables and Effect on Stock Prices: Correlation Evidence from Nepal
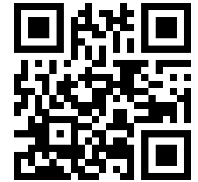
Thani Prashad Ghimire

Nepal Open University, Lalitpur, Nepal

ABSTRACT: This paper attempts to study the macroeconomic factors that affect the stock prices in Nepal. It considers the annual data of four macroeconomic variables that affect the NEPSE Index; inflation rate, broad money supply, gross domestic product, and per capita income from 2011-2021 and tries to find out the influence of these variables on the NEPSE index (stock prices). It uses the Pearson correlation matrix to study the relationship between stock prices ad macroeconomic variables. The results obtained from correlation analysis revealed that market performance of stock prices is found to respond positively to broad money supply and gross domestic product and negatively to the inflation rate as expected. Also, the NEPSE index is not affected by the changes in the per capita income of the nation. These findings help to build up economic and financial policies in the nation and stabilize the capital stock market in Nepal.

KEYWORDS: NEPSE, Nepal, Macroeconomics, Stock Prices, Inflation, Correlation.

1. INTRODUCTION

The relationship between inflation with various macroeconomic variables such as broad money supply, gross domestic product, NEPSE index, per capita income is studied by different economists belonging to public, private, and academic sectors, in which most of the researchers concluded that inflation occurs mainly due to budget deficit (Ali et al., 2015). Monetization ultimately leads to an increase in the money supply, which directly causes inflation to rise in the long run. Stock prices are affected by economic variables (Valcarcel, 2012), for this reason, the significance of macroeconomic variables cannot be neglected (Goyal and Welch, 2008; Valcarcel, 2012, Rapach and Zhou, 2013). Long-run stock prices, in most of the studies, showed to be affected by inflation (Gupta and Inglesi-Lotz, 2012). The stock market is the unpredictably volatile premise with unanticipated moves that give investors either positive or negative signs about stock returns. Besides inflation rates, the stock returns also depend on the interest rates in particular. High inflation rates indicate low real money value and less purchasing power of the consumers, declined profitability, and reduction in real investment returns. In the long run, inflation parameters affect real stock returns due to monetary non-neutrality (Rapach, 2002; Bjørnland and Leitemo, 2009; Valcarcel, 2012; Bjørnland and Jacobsen, 2013). Numerous channels can affect the stock prices. According to the Gordon (1962) growth model, the stock price has a direct correlation with current growth rates of dividend returns. However, it has an inverse relationship with the required rate of returns on equity. Whether dividend returns increased or expected returns on investment decreased, both serve to increase stock prices.

Global history has suffered an increased preoccupation with inflation in many countries, including Nepal. This has prompted theoretical and empirical economic research on the relation between stock prices and inflation (Solnik, 1983). (Fama & Schwert, 1977) found out that stock returns were inversely related to inflationary expectations. The failure of the Fisherian model to clarify the observed correlation between stock prices and inflation has led to the evolution of alternative macro-economic hypotheses. Both economic policy and monetary policy were observed to affect the stock prices (Grande et al., n.d.). When the central bank is supposed to be actively dedicated to price stability, even a minor surge in inflation expectations engenders the market to fear a high monetary policy reaction, which would result in higher interest rates, poor economic activity, and fewer expected dividends. Consequently, stock prices decrease, and the negative relationship between stock returns and expected inflation is obtained, which is called the proxy hypothesis proposed by Fama (1981). In this manner, the negative relationship can reflect changes in the expected return. The inflation-stock return correlation has been undergone depth study at the end of the 1970s and the beginning of the 1980s (Boucher, 2006). The objective of this paper is to evaluate the influence of macroeconomic variables on the stock prices of the Nepali stock market during the period 2011-2021. It is based on the hypothesis that every macroeconomic variable that are under consideration have relationship with the stock prices. The findings of this study help the reader to understand

whether the fluctuation of stock prices in Nepal is attributed to some macroeconomic variables change. Investors will perceive this study as a helpful piece of literature for them to recognize some basic economic variables that they should take into consideration while investing in share market, and thus help in profitable decision.

1.1 Review of Literature in the context of Nepal

Several kinds of literature associated with the relationship between several macroeconomic variables with the stock prices and the NEPSE Index has been published for the developed countries like the USA. There is very little literature published in the context of Nepal. G.C. and Neupane (2006), to study the causality relationship, carried out the research entitled "Stock Market and Economic Development: a causality test". The study was performed by using the Granger causality test and was based on time series data for the years 1988-2005. The findings of this study were empirical estimation of long-run integration and causality of several economic variables and stock prices indicators in Nepal. It was calculated in real terms. It succeeds to explain the importance of the stock market's role in the economic growth and development of the nation, and answers the question of how economic development could be achieved with a positive NEPSE index. Baskota (2007), by considering the NEPSE data of 1994-2006, performed the research about the effect of money supply, interest rate, inflation rate, and trading volumes. He performed regression analysis and study the relationship among different variables. The result showed that Nepalese market stock is unpredictable and largely volatile, and the stock price movements are difficult to explain by macroeconomic variables. Bhattarai and Joshi (2009) studied the fluctuating relationship among stock prices and macroeconomic variables, for both short-run and long-run interdependence. The findings of this study support the globally popular view that stock prices are the hedges against inflation. It also supported the relationship between broad money supply and stock prices in the short run. It concluded that monetary authority in the country would likely influence the stock prices only in the short-run, however in the long run it hardly influences the NEPSE Index.

Shrestha and Subedi (2014) performed empirical research on determinants of stock prices in Nepal, by considering the month-base data for the period of 2000 to 2014. The results obtained from regression analysis revealed that stock prices are positively related to inflation and broad money supply, and negatively related to the interest rate. This suggests that Nepalese investors seem to take stock just as an alternative financial instrument. The study on the relationship of several macroeconomic variables on the stock prices seems to vary across the data available. When a large number of literatures are available in developed countries, there are only a few pieces of literature of this type in the context of Nepal. Thus, our study serves as an attempt to study the relationship between macroeconomic variables and stock prices value in Nepal for the period of a decade, 2011-2021.

2. CONCEPTUAL CLARIFICATION

2.1 Inflation

A well-known concept of an increase in the general level of prices, that is inflation, is typically measured through Consumer Price Index (CPI) (Oxman, 2012). However, it is not only the measure of inflation, as there may be different variables affecting inflation. The term "Inflation" is quite important for investors. The long-term research has yet not clearly defined the relationship of inflation with other economic variables due to the volatility of the stock market. Since inflation is used as an input into the valuation multiple, its uses vary in different economic perspectives. The inverse relationship had been evident among low inflation and valuations (What Drives the Stock Market? n.d.). The average inflation rate in Nepal was estimated at approximately 4.64 % in 2019, a little drop to the year 2018. The inflation rate is evaluated from the price increase of a specific product and service, on which the average consumer expends money annually. They incorporate expenses for daily items, clothes, shelter, power, telecommunications, recreational activities, and raw materials (e.g. gas, oil), and federal taxes (*Nepal Inflation Rate 2014-2024*, n.d.).
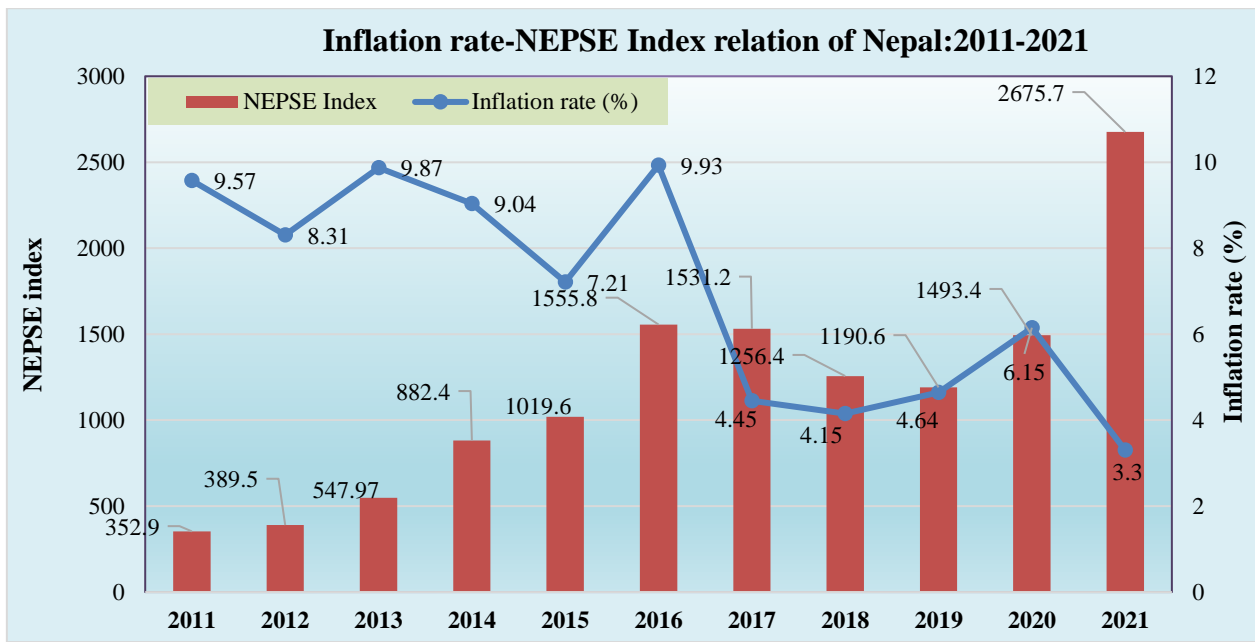
Figure 1 Inflation rate-NEPSE Index relation of Nepal:2011-2021

The inflation in most of the developing countries, including Nepal is valued as the annual percentage change in Consumer Price Index (CPI), which refers to the price paid by the average customer in their country. Similarly, it can be estimated with other price indices called Producer Price Index (PPI). The intended values of Inflation of many countries lie between 2-3 % per year, which is very less to cause business problems. However, it is very difficult to achieve this value.
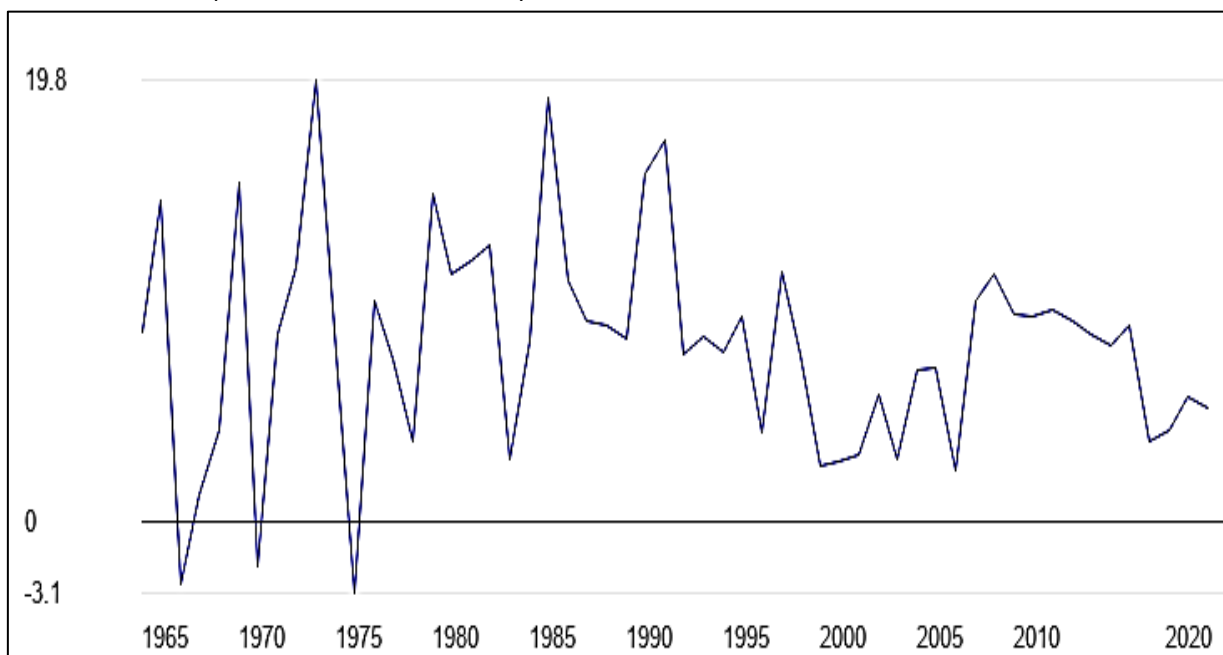
Figure 2 Long series of Inflation dating from 1965-2020

The above figure shows the long series of inflation data dating from 1965 to 2020, where the average value during that period was 7.9 %, the minimum value of -3.1 % (1976), and a maximum of 19.8% (in 1974). However, in 2020, the country has achieved a 5.1 % of inflation rate (Figure 2). In the same year in 2020, the average inflation on a global basis was 4.5 % (Global Economy, 2020).

2.2 The effect of inflation rate on stock returns

Economists are being much concerned on the subject regarding the effect of inflation on stock returns for a long time of economic development. Fisher (1930) suggested that nominal stock returns are hedges as opposed to inflation. On that account, the rise in current and expected inflation should raise the nominal dividend payments. Accordingly, Oxman (2012) justified that the discount rate should be calculated by the returns rate which the investors had expected to gain as dividend yield on the stock. For that reason, the rise in inflation expectations should have a positive relationship with the flow of nominal dividend payments for stock.

This would result in an upward revision of stock prices. To contrary to the classical theories of economics, modern empirical findings have not supported the theories that stock returns may work on as a hedge against inflation (Joseph, 2012). This may eventually lead to the "Inflation-stock returns puzzle". The post-1953 era reported the negative correlation between the inflation rate and the stock prices in most of the empirical literature reports. Similarly, Olkin and Sampson (2001) observed the inverse relationship between these two variables. Any company tries to increase external financing when the inflation rate rises. No matter whether debt or equity financing is being carried out, any company's real cost of capital increases. Although if the profit margin is at a supporting level, the increase in the real cost of capital will decrease the optimal rate of real growth. (Ali et al., 2015) claimed that the inflation effect is much affected by the money illusion. The majority of the investors bump into money illusion because the investors discount real cash flows, which leads to behavioral problems. Ultimately, it results in inflation-induced valuation errors. The Modigliani–Cohn hypothesis anticipated that the stock market will suffer undervalued when there is high inflation because this undervaluation should be removed once actual nominal cash flows are disclosed. Inflation-stock returns negative correlation is derived from the negative correlation between inflation rates and various macroeconomic activities (Solnik, 1983). It is popularly known as the "Stagflation phenomenon", where there is a positive relationship between stock returns and inflation. Coherent with rational expectations theory, the relation between these two discussed variables relies on the prediction of future real performance. A similar type of negative relationship was reported by (Fama & Schwert, 1977) Moreover, Alexakis et al. (1996) assert that stock prices are largely affected by high inflation rates, due to their volatile nature. The emerging capital markets are mostly succumbed to the volatility effect of inflation, while those countries with developed capital markets experience low inflation rates and have stability in stock prices. Numerous researches agree with the disagreement that the inflation rate usually affects emerging capital markets (Boucher, 2006).

3. RESEARCH METHODOLOGY

3.1 Theoretical framework base

The past literature has empirically shown several macroeconomic variables to affect stock prices. The majority of the theorists mainly focused on the primary macroeconomic variables such as GDP growth, market index (measured as NEPSE index), Broad money Supply (BMS). We have further used Per capita Income (PCI) in our study of correlation analysis to check the relationship among variables. Broad money supply comprises currency, deposits with a fixed maturity of up to 2 years, deposits corrigible at the notice of up to 3 months, and repurchase reconciliation, money market fund shares/units, and debt securities up to 2 years (OCED, 2021). Based on the objective, the conceptual framework of the study is presented in Figure 3.
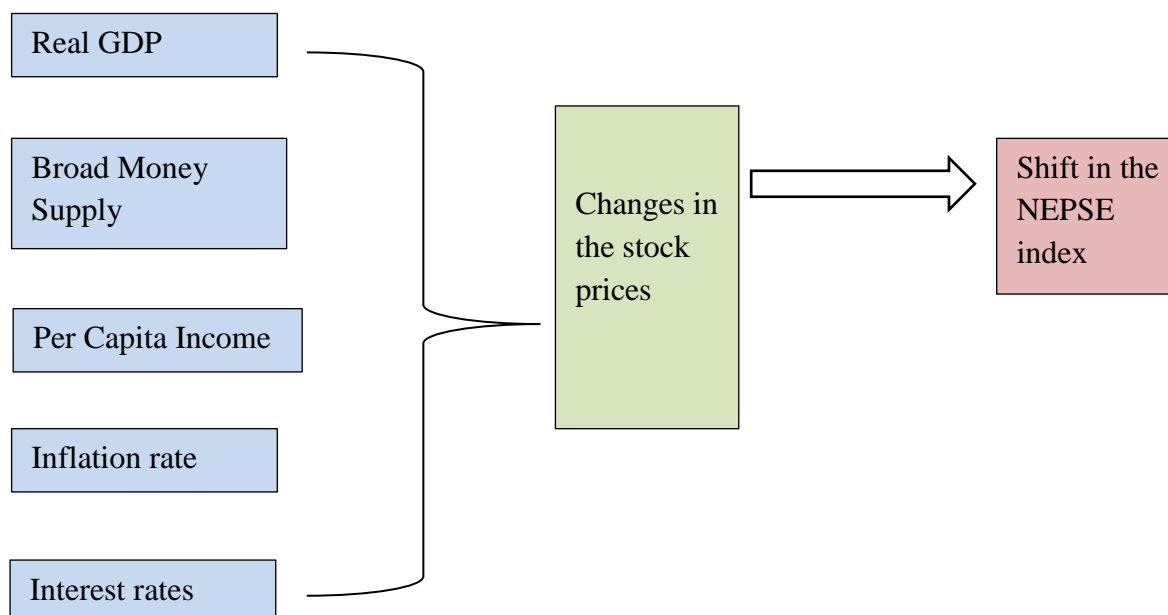
Figure 3 Conceptual framework for macroeconomic factors that affect stock prices

Adjasi et al. (2008) stated that interest rate and inflationary expectations had a strong influence on the stock market capitalization of Ghana, which was in contradiction to a stock market capitalization of Chile where there was a weak influence (Bénétrix et al., 2015). Later, Chen et al (2001) observed a positive correlation between inflationary expectations and stock market capitalization in Chile. However, Joseph (2012) found out that there is a negative correlation between interest rate and stock prices performance.

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3.2 Research Design

Our study used both descriptive and statistical analysis to best deal with the macroeconomic variables influencing stock prices in the context of Nepal. The descriptive-analytical design was used to describe or summarize the characteristics of economic factors, such as mean, median, skewness, kurtosis, variance, and standard deviation. The statistical analysis has been designed to study the relationship among different variables that were under our consideration. Several economic variables like Broad Money Supply, GDP, Per capita income, etc. were studied to check whether they were positively or negatively related to the stock prices in Nepal. The main reason behind our study was to determine whether it is possible to predict the stock returns based on information about other variables affecting the economy

3.3 Data Variables

The present study is based on secondary data, past literature, and historical reviews of the macroeconomic variables that were supposed to affect the stock prices and the NEPSE index. The assumption behind the study performance is that the stock prices are more or less influenced by several macroeconomic variables. Among them, Inflation rate, Interest rates, Broad Money supply, GDP, Per capita income are found to be more important. The required annual data and information of economic factors were collected from World Bank, Nepal Rastra Bank (NRB), Trading economics, etc. Several pieces of articles and reports published in different journals and websites were considered during the preparation of the manuscript, which provided base for past evidence inclusion in our study.

The following data are taken into consideration to study the relationship of various macroeconomic variables with stock prices (Table 1). Different variables code was assigned to different factors: NEPIN to NEPSE index, INR to the Inflation rate, BMS to broad money supply, GDP to gross domestic product, and PCI to per capita income. BMS was expressed as Nepali billion and GDP as USD billion.

Table 1. Economic variables and their description

Variable Code	Variable name	Unit
NEPEAN	NEPSE (Nepal stock exchange) Index	-
InR	Inflation rate	Percentage (%)
BMS	Broad Money Supply	Billion (NRs.)
GDP	Gross Domestic Product	Billion (USD)
PCI	Per Capita Income	USD ($)

4. RESULTS AND DISCUSSIONS

4.1 Descriptive statistics for macroeconomic variables

The descriptive statistics for the Inflation, NEPSE Index, and other macroeconomic variables over the period 2011-2021 are reported in Table 2. It shows that the inflation rate was 7.12 % during the period with a standard deviation of 2.475 %. The mean NEPSE Index was observed to be 1098.37 with a standard deviation of 679.01. As the standard deviation from the mean is high, we can conclude that there was high volatility and fluctuations in the annual NEPSE Index. The mean broad money supply (BMS) and gross domestic product (GDP) were 2505.2 billion NRs. and 26.04 billion USD respectively. The average per capita income during the decade was 926.08 USD, with a standard deviation of 182.79 USD.

Table 2. Descriptive statistics of the macroeconomic variables

Descriptive Statistics							
Variables	Mean	S. D	Variance	Skewness		Kurtosis	
				Statistic	Std. Error	Statistic	Std. Error
NEPSE Index	1098.37	679.01	461057.57	0.899	0.637	1.214	1.232
Inflation rate	7.12	2.475	6.128	-0.334	0.637	-1.671	1.232
Broad Money Supply	2505.2	1447.05	2093954.	0.581	0.637	-0.674	1.232
Gross Domestic Product	26.04	5.7458	33.015	0.061	0.637	-0.894	1.232
Per Capita Income	926.08	182.79	33415.35	0.116	0.637	-0.451	1.232

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4.2 Correlation Analysis

The empirical relationship between inflation and stock prices and other macroeconomic variables has been presented in table 3 which uses a Pearson correlation coefficient that explains the magnitude of correlation among different pairs of macroeconomic variables during the period 2011-2021.

Correlation analysis is the statistical interpretation of data where multiple measurements are carried out on each variable and the relationship is studied (Olkin and Sampson, 2001). The correlation between a variable and itself is always 1. The spearman correlation coefficient indicates the negative relationship between NEPSE Index and the Inflation rate (-0.7). It means that with an increase in the inflation rate, the NEPSE index goes down as expected. This relationship is statistically significant at a 5 % level as it is hypothesized. However, the relationship of the NEPSE Index with other macroeconomic variables like Broad Money supply (0.89) and Gross Domestic Product (0.65) is statistically significant at 1 % and 5 % level of significance respectively. An increase in both Money supply and GDP increases the index value of the Nepal Stock Exchange (NEPSE). However, no significant relationship was found for NEPIN and PCI, indicating that as Per capita income shifts from its present value, no changes in NEPSE Index will occur.

Table 3. Correlation analysis for different variables

Pearson Correlation Matrix					
Variables	**NEPIN**	**InR**	**BMS**	**GDP**	**PCI**
NEPIN	1				
InR	-.700*	1			
BMS	.890**	-.799**	1		
GDP	.650*	.794**	.870**	1	
PCI	0.463	-.667*	.706*	.959**	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

The inflation rate (InR) is found to be negatively correlated with the Broad Money supply, with a correlation coefficient of 0.799. When the government increases the money supply through Nepal Rastra Bank, the inflation rate decreases accordingly. This result approximately hints that the country's money supply plays an important role to predict the inflation rate of that country. Similarly, the calculated significant positive relationship between NEPSE and GDP is consistent with Adel (2004), and Pilinkus (2009), and inconsistent with Flannery and Protopapadakis (2002). A statistically significant positive correlation has been obtained between the Inflation rate (INR) and GDP in Pearson (0.794, being statistically significant at 1 % level of significance). If inflation increases, people will expend more money because they will predict that it will be less valuable in the coming days. Consequently, GDP will increase in the short term, causing the prices to increase further (Barnes, 2021). Even though the fluctuations in the inflation rate can not necessarily change the per capita income (Khalid et al., 2015), our study found a negative significant relationship between these two variables. The Pearson correlation coefficient was 0.667, being statistically significant at a 5 % level of significance. However, no statistically significant relationship was observed between inflation and Per capita income in India, Brazil, and South Africa (Ehiraika, 2008).

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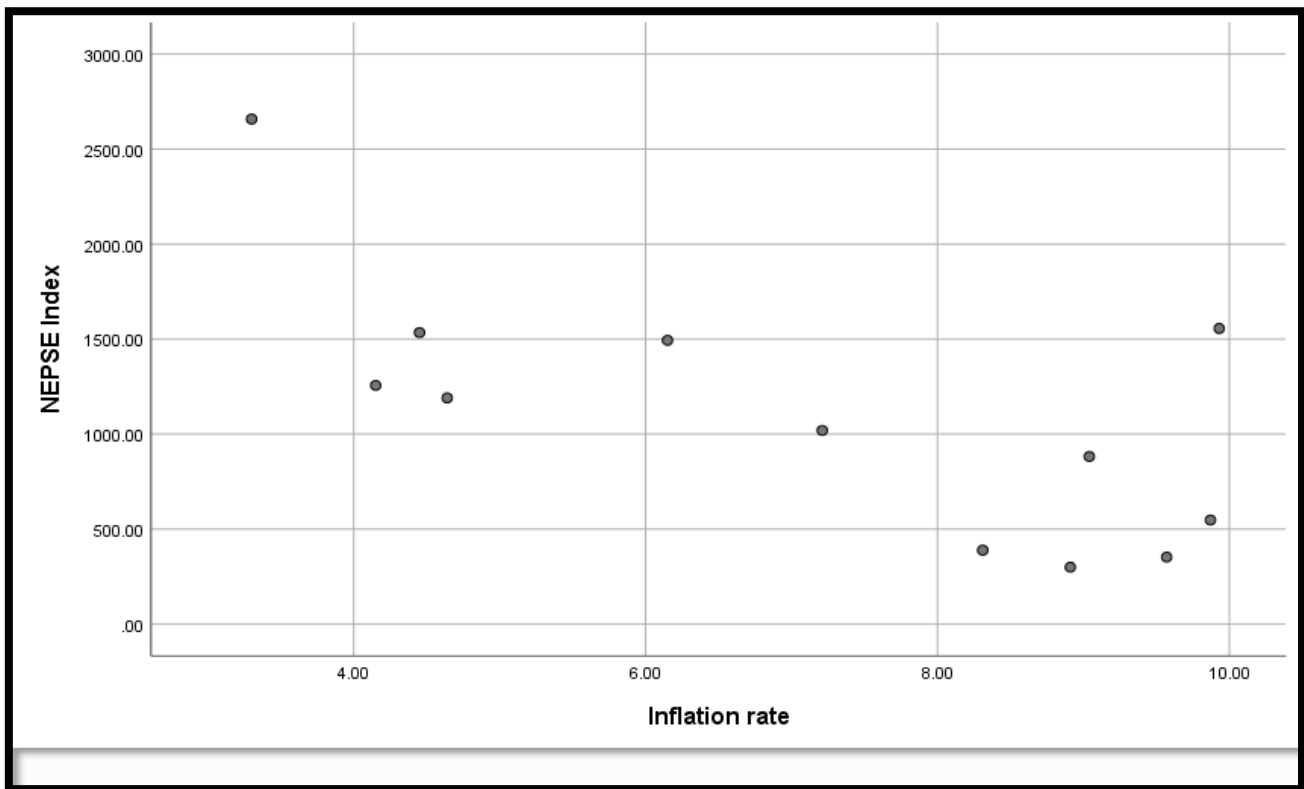
Figure 4. Scattered plot for correlation of InR and NEPIN

The statistical calculation of correlation shows that Per capita Income and Gross domestic product are highly correlated. The Pearson correlation coefficient was 0.959 and was significant at a 1 % level of significance. The increase in GDP has an increment effect on Per capita income (PCI) and vice-versa. Figure 4 shows the scattered plot for the InR-NEPIN relationship, which was negatively related to our findings of correlation analysis.

5. CONCLUSION

Several studies indicated that there must be a positive relationship between the inflation rate and the stock prices, while some opposed this statement. The economy is a wide realm, and stock prices are largely affected by several macroeconomic variables. Besides inflation, stock prices could be affected by broad money supply, per capita income, Gross domestic product, and so on. Out of these, Broad Money supply and GDP have a positive relationship with the NEPSE index (Stock prices), while the inflation rate is negatively related to the stock prices. The results of our correlation analysis further found out that Per capita income does not have any role to increase the NEPSE index in Nepal. The Inflation rate was negatively correlated with both Per capita income and Broad Money supply. The rest of the variables were positively correlated with each other.

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Analysis of Government Expenditure and Economic Growth in Nigeria

Mustapha Mallam Kime[1], Abdullahi Y. Zakari[2]

[1]Department of Economics, Umar Ibn Ibrahim El-Kanemi College of Education Science and Technology, Borno State, Nigeria
[2]Department of Economics, Usmanu Danfodiyo University Sokoto State, Nigeria

ABSTRACT: This study examines the impact of government expenditure on economic growth in Nigeria using time series data spanning from 1980-2020. Variables used includes real gdp, government final consumption expenditure and population growth rate. Augmented Dickey Fuller and Philips-Perron unit root test for stationary of the variable, Johansen Co integration, Vector Error Correction and Granger Causality tests were estimated. Johansen co integration test result indicates the existence of long run relationship while the error corrections model reveals the absence of shot run relation among the variable. Unidirectional causality runs from population growth to economic growth and public expenditure to population growth. Base on the findings, it is recommended that Nigerian government should enhance expenditure on social welfare to improve standard of living of it citizenry

KEYWORDS: GDP, Public Expenditure Population Causality.

1. INTRODUCTION

Government spending has been an impetus for improving economic activities of a nation. This is because it affects the growth rate and the level of production in the private sector. According to Samuel and Oruta (2021) public spending is an important measure in achieving full employment, price stability, improve standard of living, economic growth and other macroeconomic objective Aluthge et.al (2021) described government spending as a vital instrument for development, it manifests itself in all the stages of national growth and development. World bank 2008, Assei et.al 2019, & Vtyunna 2020 stress that a significant number of developed and developing economies rely on public expenditure to influence income distribution, resource allocation and the composition of national income

For the past decade Nigeria government follows an action for development plan programme known as vision 20:2020 targeted at catapulting the economy into among the top 20 economies by the year 2020. This plan by the Nigerian government was happen at the same time with world millennium development goals which Nigeria oblige to partake at the world summit in the year 2000. Nigeria government as at then strategized seven-point economic reform agenda to achieve those two development plans. Among the top issues prioritized by the programme includes power and energy, food security and agriculture, wealth creation and employment, land reforms, security as well as qualitative and functional education. However, the success of this programme may not be guaranteed without a stringent effort by the government in financing the programme. Meanwhile, the plans are not the first of their kind launched in Nigeria, but the past plans yielded no desired results. This created much doubts in the minds of Nigerians. For instance, Okeke (2008) laments that "Over the years, federal budgets in Nigeria, whether under the military or democratic/civilian administration, have turned out to be a mere ritual than the driver of economic growth and development that it ought to be. Consistently, budgetary outcomes have remained far off the mark vis-a-vis the planned targets. Budget implementation monitoring mechanisms are either not put in place or are let to function in a perfunctory manner, leading to the usual below the target outcomes from year to year". Abubakar (2009) however, laments that "poverty in Nigeria increases astronomically, it seems in Nigeria today, the more the country earns and spends money, the higher the level of poverty. To him public expenditure in Nigeria does not help reduce poverty rather it aggravates poverty. For instance, Obi (2007) observed that public spending is the most important and effective means of poverty reduction. To him fiscal policy has to be in place so that government spending would properly be focused on the provision of adequate and affordable goods and services to the poor households.

Analysis of Government Expenditure and Economic Growth in Nigeria

However, few studies have empirically examined the relationship between public expenditure and economic growth for specific country. Even those conducted based on specific country were full of limitations. For instance, in Nigeria very few researches using disaggregate data, small sample sizes and inappropriate econometric tools were conducted. Morrissey (2000) concludes that most of empirical studies on the effect of public expenditure on economic growth are cross-sectional, and specific country studies are rare. Therefore, time series country study is more potential and informative, even though the findings cannot be generalized to other countries.

This research however, differs from the researches by Ahmad (2007) and Genevesi (1995) both on Nigerian economy. The study by Ahmad (2007) investigates the effect of education expenditure on economic growth only without consideration to expenditure to other sectors. He used to disaggregate data of education expenditure which is a segment of the total public expenditure. As such his findings cannot be generalized to other sectors of Nigerian economy. In a study by Genevesi (1995), a small sample of twenty-three years was used contrary to central limit theorem which stated that a time sample must not be less than thirty for normality purpose. However, the degree of reliability of his findings is low because of the small sample taken for the research. For instance, Yahaya (2007) stresses that the larger the sample size, the higher the degree of reliability of the research findings. Therefore, this research intends to use aggregate data of total public expenditure in Nigeria and a larger sample size of forty years. In order to investigate the influence of public expenditure on economic growth in Nigeria, a comprehensive empirical research must be undertaken to investigate the relationship between public expenditure and economic growth using time series data for a couple of decades. This study therefore, aims at investigating the relationship between public expenditure and economic growth in Nigeria.

2. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

Literature review is an integral part of any meaningful research. It therefore believes to be source of gathering vital and relevant information from previous studies that are similar in nature. The theoretical underpinning of this study is not far away from the expositions of great economists like A. Wagner (1863) and J.M. Keynes (1936). Their theories are the most prevailing economic literature with regard to the relationship between public spending and economic growth.

The foremost is what we called Wagner's hypothesis and the latter is Keynesian hypothesis. These two hypothesis sees the working relationship between those variables under a divergent view. According to Wagner (1863) with higher level of economic development, there is long-run propensity for the scope of government to increase The theory is otherwise known as "law of increasing state activities. Therefore, this law affirms that the portion of public sector in the economy will shoot up as economic growth proceeds, due to the intensification of real activities and extension of new ones. Moreover, this law confirms that the direction of causality is running from economic growth to public spending.

Furthermore, the rise in level of state activities, as opined by Wagner in the work of Hany and Ahmed (2019), is as a result of increase in administrative and protective functions of governments towards ensuring demand and supply equilibrium of the market in the course of industrialization, public services provision which are income elastic like welfare expenditure, cultural events, health care facilities and education. Thus, there are ever increasing demand for such services which culminate into allocation of larger percent of public resources especially in modern industrial society. Lastly, technological improvement demands large-scale investment for which private sector have limited resource. In this regards, the Governments have to take part in such project and provide social and merit goods through budgetary mean

In another development, Keynesian are of the view that economic growth would take place as a result of increasing public spending and is regarded as self-standing exogenous variable affecting economic growth. Keynesian theory believe that the causality is running from public spending to economic growth. Keynes (1936) cited in Hany and Ahmed (2019) suggested that government intervention in an economy is a stimulant to aggregate demand particularly during economic recession as a short run solution. As such, aggregate demand component comprises government spending therefore an increase in public expenditure eventually lead to rise in aggregate demand thereby through multiplier effect more employment and output will be achieved. Keynes disputed that government expenditure is a component of fiscal policy and can be used as a policy instrument to influence growth. Therefore, he considered public expenditure to be exogenous. In a similar citation Ahmad (2007) observe government spending as policy tool to trigger economic growth He explained the relationship between public spending and economic growth in his Macroeconomic theory. Consequently, Wagner's and. Keynesian theories are primarily different due to the causal relationship between economic growth and public spending

Conclusively, this study intends to adopt Keynesian theory because it is the theory among all other theories of economic growth and expenditure that regards public expenditure as an exogenous variable which can be utilized as policy instrument to stimulate

economic growth. Unlike in the case of Wagner's law which sees public expenditure as an indigenous variable. Most of the empirical literature reviewed in this research is in favor of Keynesian theory while some of the findings confirmed Wagner's law.

Empirical Literature

Grier and Hullock (1989) Investigate the relationship between economic growth and other macroeconomic variables using panel data egression on 113 countries. The results of their findings reveals long run relationship among the variables. This shows that Government spending has significant effect on economic growth. Davarajan et. Al. (1996) examine the impact of current public expenditure on economic growth among forty-three (43) emerging economies. Their findings indicate that current public spending influences economic growth for the period under review. In the same vein Abu-Bader and Abu-Qarn (2003) employ granger causality technique in determining the direction of causality between public spending and economic growth for Syria, Israel and Egypt. Causality test result reveals feedback for Syria, and Israel in the long run while short run unidirectional causality running from economic growth to government expenditure in Egypt. Similar studies on the effect of public expenditure on defense and economic growth using causality and cointegration analyses was carried out by Kalyoncu and Yucel (2006) in Turkey and Greece. The results showed unidirectional causality from economic growth to expenditure on defense in Turkey. However, there exist cointegrating relation between expenditure on defense and economic growth in those countries. Abubakar, A.B, (2016) investigate Public expenditure and economic growth nexus in Nigeria using co integration and vector error correction model. Finding of the study shows both long and short run relationship among the variable. and that of Mobolaji et al (2011), explore Public spending and Economic Growth in Nigeria through Vector Error Correction model. Their Findings reveals evidence of a long run relationship between economic growth and public spending in Nigeria.

Ifarajimi and Ola (2017) conducted empirical analysis of the nexus between government spending and economic growth in Nigeria for the period 1981 to 2015. Time series data were estimated using DOLS and two-step Engle-Granger residual test. findings reveal long run Dynamic relationship among public expenditure on administration, economic services and nominal exchange rate were significant and had the expected signs except government spending on economic services. Adewara and Oloni (2012) examine the impact of public expenditure on economic growth through vector Autoregressive models (VAR). result of their finding showed that expenditure on education has no significant influence on economic growth for the period under investigation. furthermore, Nwadiubu and Onuka (2015) following the same analytical pattern discovered that public spending has a negative effect on economic growth. But Nwadiubu and Onuka (2015) in their analysis however, proved that increase in public spending resulting in rising economic growth.

Gukat and Ogboru (2017) conducted a study on public expenditure and economic growth in Nigeria. The study uses time series econometric data running from 1981 -2016. Two different model used in testing the impact of government recurrent and capital expenditures. Data use for the study were social service, economic service and administration which were estimated using ols. cointegration and error correction techniques. Findings reveals that social service and economic service have a negative influence and administration has a positive impact on economic growth. Other finding indicates that coefficients of administration and social services were negative and insignificant while economic services was positive

3. METHODOLOGY

The study examines public expenditure and economic growth nexus in Nigeria. Time series data spanning 1980 to 2020 was used. On the sample size, Ogbonna (1994) argues that it is often difficult to study the entire population especially when it is large. This is the major reason why samples have to be taken from the total population, thereby reducing the data to manageable proportion. Therefore, in the course of this time series research, the sample covered a period of thirty-nine (40) years, between 1980 to 2020. However, another reason for selecting thirty-nine years is to adhere to central limit theorem that time sample size must not be less than thirty for normality purpose. Yahaya (2007) stressed that the larger the size of a sample, the greater the degree of reliability of research findings.

Variables for the study includes total Gross Domestic Product (GDP) as dependent variable, public expenditure and population growth rate are independent variables. Data for these variables are from major sources like the Central Bank of Nigeria (CBN) Statistical Bulletin, National Bureau of Statistics and African Development Bank (ADB) selected statistics on African countries.

Model Specification

The identified relationship between public expenditure and economic growth has been investigated using theoretical univariate regression model as follows:

$$yd_t = \beta_o + \beta_1 x_1 + \beta_2 z_2 + u_t \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots . (1)$$

Where yd_t =   Gross domestic product (gdp)

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β_0	=	Constant Parameter
x_t	=	Public Expenditure (final consumption expenditure)
z_t	=	Vector of other factors influencing growth (Population)
β_1	=	Coefficient of public expenditure
β_2	=	Coefficient of Vector of other factors influencing growth
μ_t	=	Error term

The Dickey-Fuller Generalized Least Square (DF- GLS)) unit root test model is given as follows:

$$\Delta yd_t = \beta_o + \beta_1 y_{1-1} + \alpha_i \Sigma \Delta y_{t-1} + u_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (2)$$

Where Δyd_t	=	Differenced value of a given variable
β_0	=	Constant parameter
β_1	=	Coefficient of the first lag value of a given variable
y_{t-1}	=	first level lag value of a series variable
α_i	=	Coefficient of the lag values of the differenced time series variable
Δy_{t-1}	=	Lag values of the differenced time series variable
μ_t	=	Estimated error term

To test for the long run relationship, we tested for Johansen test for cointegrating rank, in the absence of cointegration, and then we applied the vector error correction model. To do this, we subject the residuals estimated from the co-integration regression to differencing and regress the difference value of the residuals on the estimated lagged value of the residuals using Augmented Dickey-Fuller Generalized Least- Square unit root test. If the TS < CV, then the residual is stationary, that is there is no unit root and the series are co- integrated and therefore, long run relationship exists (Garba and Abdullahi 2009).

vector error correction model.

$$\Delta yd_t = \alpha_o + \alpha_1 \Delta y_{1-1} + \alpha_2 \Delta x_{t-1} \Sigma \alpha_i \Delta x_{2t-1} + \alpha_4 u_{t-1} + \epsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots. (3)$$

Where Δydt and Δx_t = the differenced values of public expenditure and proxy for economic growth respectively.

α_0	=	Constant parameter
α_1	=	Coefficient of the lag value of a proxy for economic growth
Δyd_{t-1}	=	First lag value of the differenced value GDP
α_2	=	Coefficient of the lag value of the differenced value of public expenditure
$\sum \alpha_i$	=	Vector of the coefficient of other determinants of GDP in the model
Δx_{1t-1}	=	First lag value of the differenced value of public expenditure
Δx_{2t-1}	=	Lag values of the differenced values of other determinants of GDP.
α_4	=	The coefficient of the first level lag values of the error correction term
μ_{t-1}	=	First lag value of the estimated residual.

VAR Model

$$yd_t = \beta_o + \beta_1 yd_{t-i} + \beta_2 x_{t-i} + u_{t1} \ldots\ldots\ldots\ldots. (4)$$
$$x_t = \alpha_o + \alpha_1 x_{t-i} + \alpha_2 yd_{t-i} + u_{t2} \ldots\ldots\ldots\ldots\ldots. (5)$$

Where: yd_t	=	The dependent variable GDP in equation (4)
β_0	=	Constant parameter
yd_{t-i}	=	Lag values of GDP
β_1	=	Coefficient of the lag values of GDP in equation (4)
x_{t-i}	=	Lag values of public expenditure
β_2	=	Coefficient of the lag values of public expenditure in equation (4)
x_t	=	The dependent variable public expenditure in equation (5)
α_0	=	Constant parameter
α_1	=	coefficient of the lag values of public expenditure in equation (5)
α_2	=	coefficient of the lag values of GDP in equation (5)
μ_{t1}	=	error term in equation (4)
μ_{t2}	=	error term in equation (5)

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4. DATA ANALYSIS

Table 1. Results of Dickey- Fuller Generalized Least Square Unit Root Test

Variables	Level Value	Difference Value	Conclusion
Real GDP	-2.016(8)	-3574(1)**	1(1)
Public Expenditure	-3.001(7)	-4.070(1)***	1(1)
Population Growth Rate	-3.206(1)	-6.612(1)***	1(1)

Source: author's calculation using STATA software

Note: **, *** indicates levels of significance at 5% and 1% respectively. Figures in parenthesis indicates the number of lags.

4.1 Interpretation of Dickey- Fuller Generalized Least Square Unit Root Test Results

As stated earlier in chapter three, time series analysis always begins with unit root testing using Augmented Dickey-Fuller unit root test, Dickey- Fuller Generalized Least Square (DF- GLS) unit root test and others. Therefore, the above table 1 shows the results of Dickey- Fuller Generalized Least Square test for stationarity of the variables both at level and differenced values. The summary of the results reveals that none of the variable attained stationary at 1% level of significance at level value. However, the results of the test show that all the variables attained stationary at first differences at 5% and 1% level of significance. The insinuation of the above results is that even though the variables are not stationary at their level values, they are integrated of the same order at the differenced values. Base on Eagle and Granger (1987) criteria for conducting cointegration analysis, variables under review must be integrated of the same order. Therefore, cointegration test is applicable in this study.

Table 2. Results of Johansen Co Integration Tests

Maximum rank	Parms	LL	Eigenvalue	Trace Statistics	5% Critical Value
0	40	87.418624	--------------	44.0081	29.68
1	45	103.76546	0.60706	11.3144*	15.41
2	48	107.71175	0.20188	3.4219	3.76
3	49	109.42267	0.09314	------------	------------

Source: author's calculation using STATA software

Note: * Indicates the corresponding number of Co integrating rank.

4.2. Interpretation of Results of Johansen Co integration Tests

Table 2 presented Johansen Co integration tests Results for the number of co integration ranks on public spending, rate of population growth and economic growth in Nigeria. The results of the test reveals that there is co integration among the variables. This can be seen from the value of the trace statistic (44.008) which is higher than the critical value (29.68) at significance level of 5%. In addition, the results indicate the presence of one co integrating vector. The trace statistics of 11.3144 is lower than its corresponding critical value of 15.41 at 5% level, this has made the us to accept the null hypothesis of more than one co integrating vector. To this effect we run vector error correction model.

Table 3. Error Correction Model Results

Independent Variables	Dependent Variable Difference of Lag Value of Real GDP
Lag of Difference of Public Expenditure	-0.071 (-3.54)***
Lag of Difference of Population Growth Rate	-2.915 (-6.60)***
Lag of Error Correction Term	-4. 096

Source: author's calculation using STATA software

Note: *** Indicates significant statistical value at 1% level.

ECT = lrgdp – 4.096 -0.071lpubexp – 2.915lpopgrr

Thus: lrgdp normalized as the dependent variable

Lrgdp = 4.096 + 0.071lpubexp + 2.915lpopgrr + μ_t

4.3: Interpretation of the Vector Error Correction Model Results

Since there is evidence of co-integrating vector, we applied vector error correction model (VEC) to ascertain the short- run and long- run relationship. The summary of the vector error correction regression results on the models of, population growth public

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spending and economic growth is presented in Table 3. The VEC results in shows that there is no short-run relationship between population growth, public spending and economic growth. The results further discovered the evidence of long-run relationship among population growth, public spending and economic growth. Therefore, the null hypothesis of no long-run relationship is rejected. The significant negative coefficient of error term indicates the presence of a long-run relationship among the variables.

Table 4. Granger Causality Result

Independent Variables		Dependent Variables		
Lag of Diff of the log of Public Exp	Lag of Diff of the log of PoP Growth Rate	First Diff of the lag of Real GDP		
-0.015 (-0.47)	0.193 (1.80)**			
Lag of Diff of the log of Real GDP	Lag of Diff of the log of PoP Growth Rate	First Diff of the lag of Public Exp		
0.076 (0.09)	-0.0160 (-0.29)			
Lag of Diff of the log of Real GDP	Lag of Diff of the log of Public Exp	First Diff Of The Lag Of PoP Growth rate		
0.291 (1.11)	0.099 (1.98)			
		First Diff of Real GDP	First Diff of Public Exp	First Diff of PoP Growth Rate
X^2		4.411	2.687	5.706

Source: author's calculation using STATA software

Note: significant at 10% (*) and 1% (***), and the figures in parentheses are the Z calculated values.

4.4 Interpretation: Granger Causality Test

Table 4 above presents the causality test results between public expenditure, population growth rate and economic growth. From the results it is discovered that the direction causality is running from population growth to economic growth and from public expenditure to population growth. This can observe from the significant results of the differenced lag values of population growth rate in equation one, and that of public expenditure in equation three.

DISCUSSIONS OF FINDINGS

The data used for the research were analyzed and interpreted. Findings indicate the absence of short-run relationship among, public expenditure, population growth and economic growth. However, the results reveal the existence of long-run equilibrium relationship among economic growth public expenditure, rate the of population growth and in Nigeria. Causal relation test result however reveals the existence of causality from the rate of population growth to economic growth and from public expenditure to the rate of population growth. This results concurred with the findings of Khan (1990), Nagarajan and Spears (1990), Islam and Nazemzadeh (2001). The findings however are opposed to the findings of Pluta (1979) and Ahmad (2007). Furthermore, the findings of this study are contrary to the findings of Jackson et, al (1990), Park (1996) and Abu-Qarn (2003)

However, the coefficient of the error correction term shows a significant long-run relationship among public expenditure, population growth and economic growth in Nigeria. These findings are in tandem with the findings of Davarajan (1996), Mahn and Suruga (2005), Certen, (2004) and Grier and Hullock (1989) who found no short-run relationship between public spending and economic growth. Furthermore, the findings confirm with those of (1995), and Oyinlola (1993) who found long- run relationship between public expenditure and economic growth. The findings contradict the findings of Kormendi and Miguire (1985) and Ramin (2005) who found significant negative short-run relationship between population growth and economic growth. The findings however, are in conformity with the findings of Yin et.al, (1999) and Simon (1981) who found significant positive relationship between population growth and economic growth.

CONCLUSION

In consonant with review of literature and findings of this paper, the following conclusions have been drawn: Firstly, there is no short-run relationship among public expenditure, economic growth and population growth rate in Nigeria. Secondly, A significant

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long-run relationship exist among the rate population growth, public expenditure, and economic growth in Nigeria Thirdly, in Nigerian case, the causality runs from rate population growth to economic growth and from public expenditure to rate population growth. Therefore, from the findings, it is recommended that Nigerian government should enhance expenditure on social welfare to improve living standard of it citizenry

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A Study on Mosquito Density and Trend of Larval Indices from a Hospital Campus of Rural Area, Thrissur District Kerala.

Nithya M C [1], Sruthi M V[2], C R Saju[3], M Mohammed Rafi[4]

[1]Junior resident, Department of Community Medicine, Amala Institute of Medical Sciences, Thrissur, Kerala, India
[2]Assistant Professor, Department of Community Medicine, Amala Institute of Medical Sciences, Thrissur, Kerala, India
[3]Professor and HOD, Department of Community Medicine, Amala Institute of Medical Sciences, Thrissur, Kerala, India
[4]Entomologist; Department of Community Medicine, Amala Institute of Medical Sciences, Thrissur, Kerala, India

ABSTRACT

Introduction: Dengue is one of the most important arboviral disease in Kerala. Development of the control measures mainly depends upon the knowledge regarding the bionomics of mosquito. The larval indices are one of the methods of entomological surveillance, which can predict the outbreak of mosquito borne diseases. The hospital premises need to be mosquito free and need to be safe place for staff and patients. Hence, the present study was done to calculate the standardized larval indices, trends and to determine major breeding source in hospital campus of, Thrissur district, Kerala.

Methods: A cross-sectional study was conducted over a period of five months in a hospital campus. The team of investigators consisting of 1 post graduate student, 5 undergraduate students, and one MSW, under the guidance of entomologist visited the houses and hospital premises. The houses were surveyed for indoor and outdoor water holding containers and inspected for the presence of mosquito larvae. The larval indices like House Index (HI), Container Index (CI) and Breteau Index (BI) were calculated.

Results: In this study, all the entomological indices were found to be above critical level from August (CI=20.33, HI= 35.71%, BI= 69) to November (CI= 25.86%, HI= 48.57%, BI=86). Health education & source reduction was done during the time of survey. In December the indices showed a decline trend (CI=17.95%, HI= 7.14%, BI=10). The commonest species of mosquito identified was Aedes albopictus.

Conclusions: Mosquito borne diseases can be avoided by health education & source reduction.

KEYWORDS: Hospital campus, larval indices, Thrissur

INTRODUCTION

Public health is threatened by vector-borne diseases, such as dengue, chikungunya, malaria, Japanese encephalitis and filariasis. These diseases are transmitted by viruses and parasites. We have been fighting mosquitoes constantly since the 1950s as part of the malaria control program. After the initial success, the war now seems lost because the density of mosquitoes has increased over the past two decades, leading to new epidemics. [1] Several reports of sudden outbreaks of these diseases have emerged in the past few years, sug gesting the re-emergence of these diseases with multiple foci of outbreaks and continuous circulation of pathogens in nature. [2] There are reports of an increase in the incidence of these diseases due to many factors including unplanned urbanization and climate change which favours vector proliferation. [3]

Dengue is one of the most important arboviral diseases in Kerala. It is especially crucial to establish sufficient control against dengue and other mosquito-borne illnesses and infections in healthcare settings, including hospitals, given that health services provide care for the sick and vulnerable. Hospitals are places where thorough knowledge of the function of mosquitoes in disease transmission would be expected and suitable tactics would be adopted because they are positioned at the front lines in combating mosquito-borne diseases. In addition to biting patients and hospital employees, individuals who are hospitalised owing to illnesses spread by mosquitoes may also be sources of infectious diseases that the mosquitoes may spread further. [4]

Both entomological and epidemiological surveillance data are often collected in the country, but there are few examples of health services integrating and fully utilizing such information to control outbreaks and prevent their spread. Ideally, surveillance activities include fever surveillance, effective clinical and laboratory diagnostics, vector surveillance, and identifying the

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environmental and social risk factors for dengue development to ensure early and rapid detection of transmission of dengue fever. [4]

Development of the control measures mainly depends upon the knowledge regarding the bionomics of mosquitoes. The larval indices are one of the methods of entomological surveillance, which can predict the outbreak of mosquito-borne diseases. Effective vector control measures are important for achieving and maintaining dengue-related morbidity. Prophylactic and vector-controlled interventions are aimed at reducing the transmission of dengue fever, thereby reducing the incidence of infection and preventing the outbreak of disease. [5]

This study aims to strengthen mosquito control in the hospital where the study was conducted through health education during the vector survey, most importantly to reduce the risk of transmission of mosquito-borne infections through source reduction but also to lessen discomfort to both patients and staff.

OBJECTIVES

- To determine the standardized larval indices- CI, HI, BI from a hospital campus of a rural area of Thrissur district, Kerala.
- To determine the major breeding sources for mosquitoes in the hospital campus of arural area of Thrissur district, Kerala.
- To study the trends in larval indices from August to December 2021 in the hospital campus of a rural area of Thrissur district, Kerala

MATERIALS AND METHODS

A Cross-sectional study conducted in the Hospital campus of a rural area, Thrissur district. The campus was divided into 70 houses including the doctor's quarters, major hospital blocks, auditorium, ground area, canteen, hostels, biomedical waste treatment plant, nursing college blocks. The team of investigators consisting of 1 post graduate student, 5 undergraduate students, and one MSW, under the guidance of entomologist visited the houses and hospital premises. The houses were surveyed for indoor and outdoor water holding containers and inspected for the presence of mosquito larvae & adult mosquitoes. From each positive container, the larva was pipetted into a plastic cup/ plastic bag and were brought to the laboratory for identification. The type of positive containers, larval presence was entered on a pretested proforma. All the campus areas including the indoors of student's hostel were included in the study. Quarters that were locked, not consented were excluded.

Larval surveys: House Index (HI), Container Index (CI), Breteau Index (BI) the larval indices were calculated:

- CI = Container index = (No. of positive containers / No. of containers inspected) x 100
- HI = House Index = (No.of positive houses / No.of houses inspected) x 100 • BI = Breteau index = (No.of positive containers / No.of houses inspected) x 100 Critical levels for HI, BI are taken as 10%, 5% respectively. BI > 50- high risk area; 5-50- moderate risk.

Pupae surveys: Pupa Index (PI) & Adult surveys
The collected larvae were undergone the species identification and those difficult to identify were kept in the barraud cage for growing it into adult and their species also identified.

Prioritizing areas depending on the potential for outbreak, an area can be placed into one of the four categories. [5]

- Priority I: Death due to dengue confirmed.
- Priority II: HI >5, BI >20.
- Priority III: HI <5, BI <20.
- Priority IV: despite active search, no breeding sites found positive

DATA ANALYSIS

Descriptive analysis was done manually to calculate the larval indices and the proportion of different types of containers.

RESULTS

In this study, the hospital campus was surveyed monthly from august to December 2021. Highest number of wet containers (236) found in the month of January. The most common site for vector breeding as per the survey was identified to be plastics containers except plastic bucket (49.89%) followed by coconut shell (14.10%) and the least was tile piece (0.22%). Different types

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of containers were identified as shown in Figure 1. Aedes albopictus was the major species identified (Table no:1). The potential vector breeding sites which were identified during the survey are given in Table 2.

Table No: 1 Mosquito species identified	August		September		October		November		December	
	female	male	female	male	female	male	female	male	female	male
Aedes albopictus	**7**	0	**11**	3	**10**	1	**8**	1	0	0
Aedes vittatus	1	0	0	0	0	0	0	0	0	0
Culex quinquefasciatus	7	1	5	1	10	0	7	0	0	0

FIGURE:1 TYPES OF CONTAINER (INCLUDING WET & DRY)

- Plastic bucket(9.75%)
- other plastics(49.89%)
- Rubber tyre(2.8%)
- Coconut shell(14.1%)
- Egg shell(1.8%)
- Flower pot(4.03%)
- Unused fish tank(0.7%)
- Barrels/can(2.69%)
- Paper cup(1.34%)
- Tarpaulin sheet(1.34%)
- Paint tin(2.35%)
- Unused wash basin(0.44%)
- shredded leaves(0.33%)
- Broken pipe(2.46%)
- Tile piece(0.22%)
- Glass bottle(1.35%)
- Grinder stone(0.56%)
- Steel utensils(0.89%)
- Concrete tank(0.89%)
- Broken chair(0.44%)
- Mud pot(1.68%)
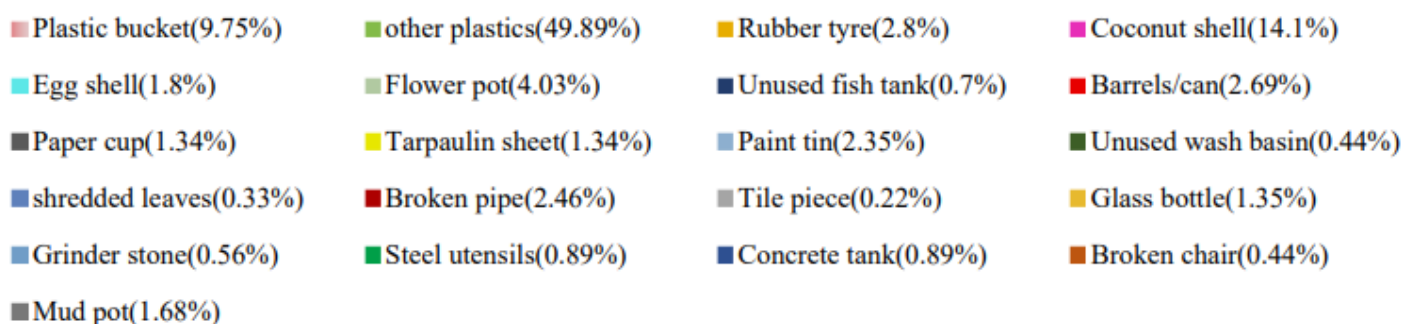
Table no. 2: Number and type of containers with larval presence from August – December 2021										
Container	August		September		October		November		December	
	Wet	Positive	Wet	Positive	Wet	Positive	Wet	Positive	Wet	Positive
Plastic bucket	16	**9**	17	**7**	26	**8**	28	**6**	6	**2**
Other plastics	80	**9**	114	**21**	127	**11**	124	**24**	20	**0**
Rubber tire	8	**6**	8	**5**	4	**2**	4	**4**	1	**1**
Coconut shell	60	**14**	29	**12**	14	**7**	22	**3**	1	**0**

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Egg shell	9	1	5	0	1	0	1	0	0	0
Flower pot	9	1	16	5	7	0	4	0	0	0
Unused fish tank	5	2	1	0	0	0	1	0	0	0
Barrel / can	10	2	7	1	0	0	2	1	9	2
Paper cup	11	0	0	0	1	0	0	0	0	0
Tarpaulin sheet	8	0	0	0	3	2	1	1	0	0
Paint tin	7	3	9	1	5	1	0	0	0	0
Unused wash basin	1	1	0	0	1	0	2	1	0	0
Shredded leaves	0	0	2	1	1	0	0	0	0	0
Broken pipe	6	0	9	1	0	0	7	0	0	0
Tile piece	0	0	2	1	0	0	0	0	0	0
Glass bottle / beer bottle	0	0	3	2	3	0	6	4	0	0
Grinder stone	2	1	2	1	0	0	0	0	1	1
tree hole	0	0	1	0	0	0	0	0	0	0
Steel utensils	0	0	0	0	4	0	4	1		0
Metal sheet	0	0	0	0	2	0	0	0	0	0
Concrete tank/bricks	1	0	4	0	0	0	3	2	0	0
Thermocol	0	0	0	0	2	0	2	1	0	0
Metal container	0	0	0	0	1	1	1	0	0	0
Broken chair/stool	0	0	0	0	3	0	1	1	0	0
Broken stool	0	0	0	0	2	0	0	0	0	0
Cardboard box/cartoon	2	0	2	0	1	0	4	4	0	0
Mud pot	0	0	6	2	1	1	8	6	1	1
Small pit	0	0	0	0	2	0	0	0	0	0
Test tube	0	0	0	0	0	0	2	0	0	0
Aluminium container	1	0	0	0	0	0	0	0	0	0
Cement sack	0	0	0	0	3	0	2	0	0	0
Waste basket	00	0	0	0	0	0	1	1	0	0
Total	236	48	228	60	212	32	232	60	39	7

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FIGURE 2: TRENDS IN VECTOR INDICES

Legend: CI, HI, BI

Data points:
- AUG: CI 20.33, HI 35.71, BI 69
- SEP: CI 26.32, HI 54.29, BI 86
- OCT: CI 15.09, HI 35.71, BI 46
- NOV: CI 25.86, HI 48.57, BI 86
- DEC: CI 17.95, HI 7.14, BI 10
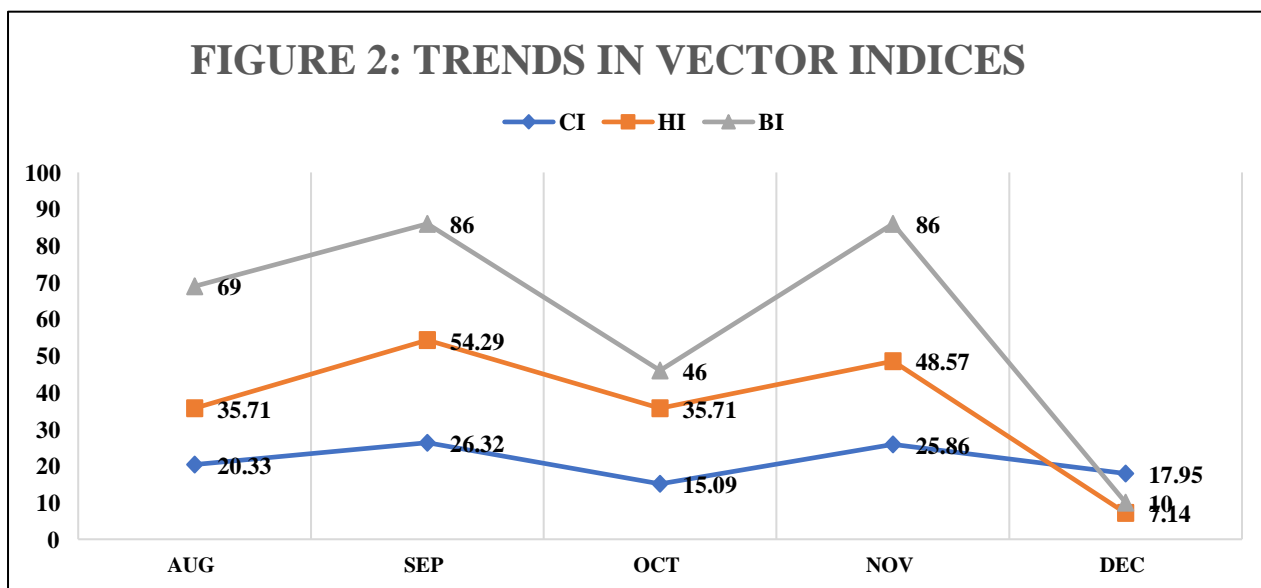
Fig 2: Trends in larval indices, CI, HI, BI were fluctuating from August to November. In the month of December there is a decline in all indices.

DISCUSSION

The hospitals of rural settings, which tend to achieve high mosquito catches and are important for assessing rural transmission of arboviruses. According to the fever surveillance, 20 dengue fever cases had been admitted in the hospital during the study period. So, this hospital-based study has epidemiological importance because patients who are arboviral carriers visiting the hospitals that have large catchments in the area can set off a transmission chain in the neighbourhood through capable mosquito vectors.

In our study, the most common site of vector breeding was identified as plastic containers. This was similar to study done at Thiruvananthapuram [6], Perinthalmana [7]. The major species identified were that of Aedes albopictus among the collected adult mosquitoes & also in larvae. The larvae's collected which were grown into adult and species identified, Aedes albopictus was the major species identified. Similar result found in study from Thiruvananthapuram [8]. It is also the commonest species of Aedes found in South India.

In our present study the larval indices were CI/HI/BI (21.1/36.28/59.14). The result larval indices from other studies Thiruvananthapuram (24.7/17.2/35) [6], Maharashtra (13.6/2.8/10.3) [9], Rachi (53.9/19.38/177.06) [10] compared with our results. The difference may be due to the longer time period of the study and the region where the study was conducted.

The larvae of Aedes mosquitoes breed in areas with artificial water stagnation. Plastic containers, water tanks, coconut shells, tires, leaves or anything that can hold water in it makes a perfect environment for the breeding of these mosquitos. In this study, favourable habitats coexisted with mosquito abundance and species variety. Therefore, effective management of these habitats in rural settings can help much in preventing the spread and outbreak of arboviral diseases. In our study the active source reduction & health education had an impact on the reduction of vector indices.
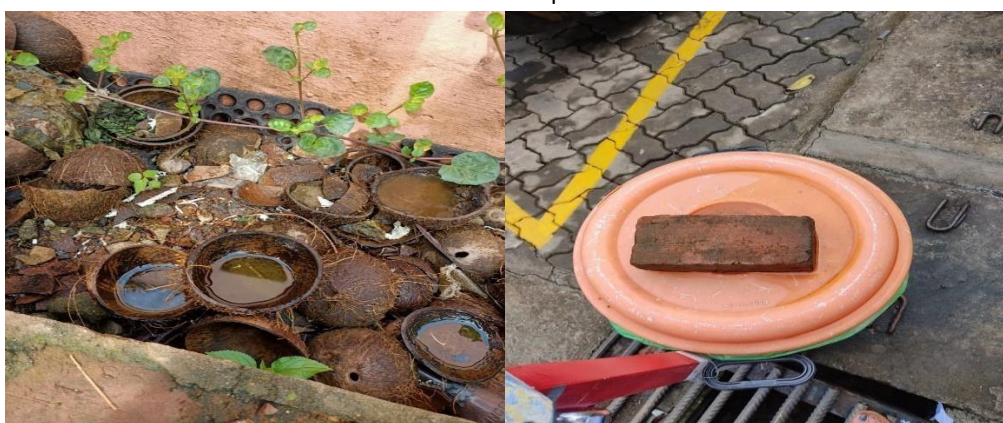
Images taken during vector survey in hospital campus.

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CONCLUSIONS

This study gives a very clear indication that the study area is highly prone to potential dengue outbreaks, it can be avoided by health education & source reduction. Comes under priority II for vector borne diseases like dengue fever. Discarded plastic containers were a major source of vector breeding. There were fluctuations in the larval indices from August to December. Elimination of these preventable breeding sites can greatly reduce the intensity of vector prevalence and thereby the incidence of the diseases caused by them. Limitations of our study were, Due to the COVID pandemic, we were not able to fully explore the indoors of hospital quarters & hostels for the larval presence & Rainfall pattern during the study period was not measured, the density of dengue mosquito fluctuates with temperature, rainfall, and humidity.

RECOMMENDATIONS

Plastic waste control measures, clearing of water-holding containers, Health education regarding the importance of source reduction is important for preventing dengue outbreak.

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The Efficacy of EFT on the Symptoms of Depression, Anxiety and Stress among College Students' during the COVID-19 Pandemic: Basis for the Development of Psychological Acupuncture Intervention

Araceli Bustamante-Paster

College of Health and Allied Sciences, Pamantasan ng Cabuyao

ABSTRACT: The study's major goal was to determine whether lockdowns, remote learning, and other significant changes brought on by the COVID-19 epidemic caused students at a locally supported institution in Laguna to feel depressed, anxious, or stressed. Students enrolled from 2020 to the present or during the pandemic's duration made comprised the study's participants. This was a quasi-experimental design. It was designed to find out if students were displaying signs of stress, anxiety, or depression. An intervention, Emotional Freedom Technique, has been used to mitigate and address their degree of depression, anxiety, and stress. The participants' age, sex, course, and year level demographics were also noted. The research used simple random sampling and the researcher called all the participants who met the criteria. Depression Anxiety Stress Scales (DASS) was utilized to determine their level of symptoms. Moderate to extremely severe symptoms had been invited to participate in the experiment. Volunteered participants had been assigned to three experimental groups namely depression group, anxiety, and stress. Forty-five (45) participants had been subjected to 16 (sixteen) sessions of online intervention with a total of 48 sessions for three groups with an interval post-test within the sessions. Fortunately, after 16 sessions of the emotional freedom technique, the participants in the anxiety group had a baseline of 16.69 mean or severe but after three post-tests they became better as revealed by the last post-test mean of 4.84 or normal. As to depression, they had 22.77 mean or severe, but after sessions it was now 10.38 mean or mild. The participants had 25.50 mean or severe but afterwards 8.70 mean or normal in the stress group. Since quantifiable data has demonstrated how well the emotional liberation technique works, the hypothesis that it is ineffective for reducing the participants' levels of sadness, anxiety, and stress symptoms was rejected. Nevertheless, the researcher will create an intervention called "Psychological Acupuncture for Comfort" as the output for the study.

KEYWORDS: Emotional Freedom Techniques, Depression, Anxiety, Stress

INTRODUCTION

Online learning has become the most feasible way for students to keep track and continue their education. It offers a wide variety to enjoy learning while battling the difficulties and challenges of the present situation. However, as the researcher started teaching in the new normal, no two learners were the same, thus, their adaptations to the new normal would be different. Some students manifested alarming and potential problems related to academics and mental health issues.

Based on the researcher's observation, there were students who did not attend regular synchronous classes regularly, lacked attention and focus during the entire class session, ignored FB messages/audio/video call of the professors, late turn-ins of long-term due projects/assignments, accused teachers of being insensitive when denied the right to submit missed activities, tolerated rampant cheating, lacked self-regulation skills, complained a lot about grades, disregarded student discipline and others. Moreover, according to the light program, 73% of college students as surveyed by the National Alliance on Mental Illness (NAMI) experienced mental health crises while in tertiary. The mental health crisis can be caused by multiple factors like pressure to succeed in academics, financial stress, uncertainty about which major or career path to choose, increased social media use, and less stigma around seeking help.

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Furthermore, it seems that the pandemic has seized its day on everyone, especially college students. An investigation was initiated and finished last May 2021 in the university which revealed that selected engineering students had mild to moderate level of depression.

Hence, this paper focused on the manifestations of depression, anxiety, and stress along with the implementation of an intervention, Emotional Freedom Techniques, to mitigate and address them.

Foremost in the study were the symptoms of depression. The researcher observed that some students show noticeable signs on some occasions related to their lack of interest and involvement during synchronous classes.

Corollary to this, Church's study, quoted by Patterson, S. L (2016), found that after a brief group intervention applying the EFT, college students' depression levels improved with a mean in the "nondepressed" category.

Apart from the evidence of depression, the symptoms of anxiety have been also observed in some students. Some students expressed their anxiety and worry about the whole online classes because of reduced interaction with classmates. For board courses like Psychology, some students have a feeling of apprehension that what they have learned might not be enough to graduate with competence.

Added to this is another study by Ghasemzadeh, Ghamari, and Hosseinian (2019). They found the efficiency of emotional freedom techniques in decreasing anxiety and improving psychological well-being. The study was organized in Parsabad Moghan Branch, Islamic Azad University, wherein students were evaluated using standardized questionnaires by Reef and Catell. The researchers found significant changes in the anxiety level and psychological well-being of the participants after being exposed to the intervention, emotional freedom techniques.

Unfortunately, the students did not only show symptoms of anxiety and depression but also signs of stress. There are cases of students exhibiting symptoms of stress due to the numerous requirements and difficulty of staying connected during synchronous and even asynchronous classes. The reason for the heightened stress level could be the simultaneous assignment of projects and other classroom tasks coupled with problems at home.

To help alleviate the problem caused by the aforementioned symptoms the researcher preferred to use an intervention Emotional Freedom Techniques. Emotional Freedom Technique (EFT) is considered part of the energy psychology, meridian-based energy sciences which was inspired by acupuncture but tapping the protocol-based points using the fingertips and not the needle. The idea is that a distressing event disrupts the body's energy system which eventually produces a negative emotion. The objective of EFT is to address the distortion in the smooth normal energy flow [Qi, Chi, Ki] in the body. The tapping sends a signal to the body's smoke detector, the amygdala, which suppresses and deactivates the arousal circuits in the brain. The person can quickly recover and copes better by addressing the unbalanced QI movement, releasing the pent-up emotional issues, tapping and discussing an encountered distressing event, and accepting oneself.

Furthermore, the study by Gaesser (2020) pointed out the pleasing effect of emotional freedom techniques in relieving stress and anxiety. Apart from the incitement of protocol-identified points, the researcher mixed it with thought reframing, building of awareness, etc. Fortunately, as expected, the participants had reduced anxiety, a high tolerance for frustration, and improved confidence after a few sessions of the emotional freedom technique.

In an article Anthony (2018) stated that the EFT is psychological acupressure or tapping that relieves physical pain and emotional distress. It balances the energy system and addresses pain through tapping the different points. Negative emotions distort the natural smooth flow of energy in our body thereby resulting in different physiological and emotional issues. Even though many studies are continuously initiated dedicated to EFT, many practitioners around the world had witnessed how this intervention helps fight off anxiety, post-traumatic stress disorder, stress, depression, etc. In actuality, war veterans had been using EFT in battling the indications of post-traumatic stress disorder.

The effectivity of an energy psychology technique, emotional freedom, in decreasing the stress and anxiety of nursing students was studied. Undeniably, students are susceptible to feeling restless, tired, anxious, and stressed due to voluminous school-related activities. The researcher utilized standardized questionnaires to quantify the degree of stress and anxiety. Those who conformed to the criteria were subjected to a mixed method study. Experimental and qualitative methods were used to test the effectiveness of the intervention. The posttest revealed significant changes in the students' stress and anxiety after being exposed to the intervention. Moreover, the participants reported lighter feelings and fewer physical symptoms like pain, weakness, etc. (Patterson, 2016).

Colleagues have proven that the emotional freedom technique was efficacious in lowering academic anxiety and enhancing the communication skills of social work students. In addition, the experiences of the participants were also recorded and stated that because of the emotional freedom techniques, they experienced being calm and feeling comfortable. (Boath et al., 2017).

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The major depressive irregularities of adults at Bond University were significantly improved using cognitive behavior therapy and emotional freedom techniques after weeks of exposure to the treatments. (Chatwin, Stapleton, Porter, Devine & Sheldon, 2016)

The investigation was carried out in one of the universities in the province of Laguna. The school was selected since the lockdown started the researcher had witnessed how it was difficult for students to get by and adjust to the new normal.

The literature cited in this research validated that emotional freedom techniques are effective in different issues and problems like anxiety, trauma, depression, pain relief, anger, weight loss, school performance issues, relationship issues, women's issues, student stress, and depression. The researcher has determined that a western intervention, emotional freedom techniques, was helpful to Filipino students in decreasing symptoms of depression, anxiety, and stress brought by various issues like the pandemic, remote learning, familial issues, etc.

The data of this study can be the basis for the university to be vigilant in acting regarding providing comfort to the town's scholars and promoting their well-being.

This study will make a psychological contribution regarding the positive brunt of emotional freedom techniques for symptoms of depression, anxiety and stress. An intervention was created as the output. The intervention, Psychological Acupuncture for Comfort, is a combination of mindfulness and EFT which focuses on helping students liberate themselves from negative, troubling emotions and to set free from emotional bondage. Breaking free from emotional bondage can help in the well-being of a person.

METHODS
Research Design
This study utilized a quasi experimental design. The investigation began with a quantitative procedure that included a pretest. The latter was the foundation of the mediated method, EFT. The posttest then examined the variables researched and analyzed both quantitative and qualitative data.

Research Hypothesis
The emotional freedom technique is not effective to decrease the level manifestations of depression, anxiety, and stress of the participants.

Participants
This study included college sophomores, juniors, and seniors. On the basis of the criteria, they were split into three experimental groups. The students had to fill out an online survey. Because their ages did not fall within the allowed range to answer the standardized questionnaire, first-year students were omitted from the study. Students along with anxiety, stress, and mild to moderate depression were assigned to one of three experimental groups at random. along with anxiety, stress, and mild to moderate depression The research used purposive sampling as the researcher called all who met the criteria. Eligible participants were selected hinged on the gauge for depression, anxiety, and stress signs using Depression Anxiety Stress Scale (DASS). Those who met the criteria were contacted and invited to participate. An informed consent and orientation explaining what the study is, design, and schedule of the intervention was conducted for the eligible participants. The data on the number of students who answered the questionnaire, students who met the criteria, willing students, students who declined, and number of students who could not be contacted were presented.

Procedures
Two hundred thirty-eight (238) students, who are currently enrolled in a locally funded university in Laguna, willingly answered the DASS questionnaire. However only forty-five (45) volunteered to take part in the experiment. The students had moderate to severe levels of depression, anxiety, and stress. Moreover, some of the participants during the experiment shared their experiences, focusing on the remarkable changes during the pre- intervention phase and post-intervention phase.

The researcher was really concerned about some of the alarming manifestations of possible disturbances related to students' demeanor, emotional/psychological, and academic performance. The researcher's observation was further validated by an undergrad research project that was recently finished in May 2021. The study revealed that selected engineering students had mild to moderate levels of depression. Thus, as she was browsing the net for possible ways to help, she came across a cost-efficient, easy to facilitate, and can be done online intervention called emotional freedom techniques.

Then the researcher conducted a review of outcome papers, mechanism papers, clinical reports, and review articles regarding emotional freedom techniques (EFT). The outcome papers were designed to answer whether EFT works. A mechanism

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paper addressed the question of how EFT words in the body. Clinical reports tackled various studies on the use of EFT in different cases. Review articles are published materials about the efficacy of emotional freedom technique. Fortunately, the researcher found approximately 100 studies on the positive impact on business owners, college students, school staff, military personnel, pregnant women (primigravida or primiparous), cancer patients, and many more. Various RCTs, meta-analyses, and only a few qualitative researches were reviewed for different conditions like physiological pain, anxiety, depression, stress, test anxiety, public speaking anxiety, food cravings/unhealthy eating, aggression, students' discomfort, phobia, obesity, and emotional stability. After this, the researcher registered in a short course to become an EFT practitioner in EFT-Pilipinas. In the short course, the facilitator taught how EFT started, who started it, and the rationale behind this fingertip acupuncture.

The proposal was presented to the professor in dissertation writing and approved by the panel of examiners. The researcher has also requested and was granted permission to carry out the research at the chosen institution. The link to the DASS questionnaire was uploaded to an online platform accessible to all students at the university. Students were asked to send a screenshot of their results along with other information such as date, cellphone number, course, year, and age.

The study employed simple random sampling, as the researcher called all the participants who met the criteria. The ethical considerations set forth by the PAP were implemented.

The experiment did not utilize a comparison group since the researcher was only given a short time to finish it. Future studies could do this to investigate this component and increase confidence in the impact of emotional freedom practices on college students' symptoms of sadness, anxiety, and stress.
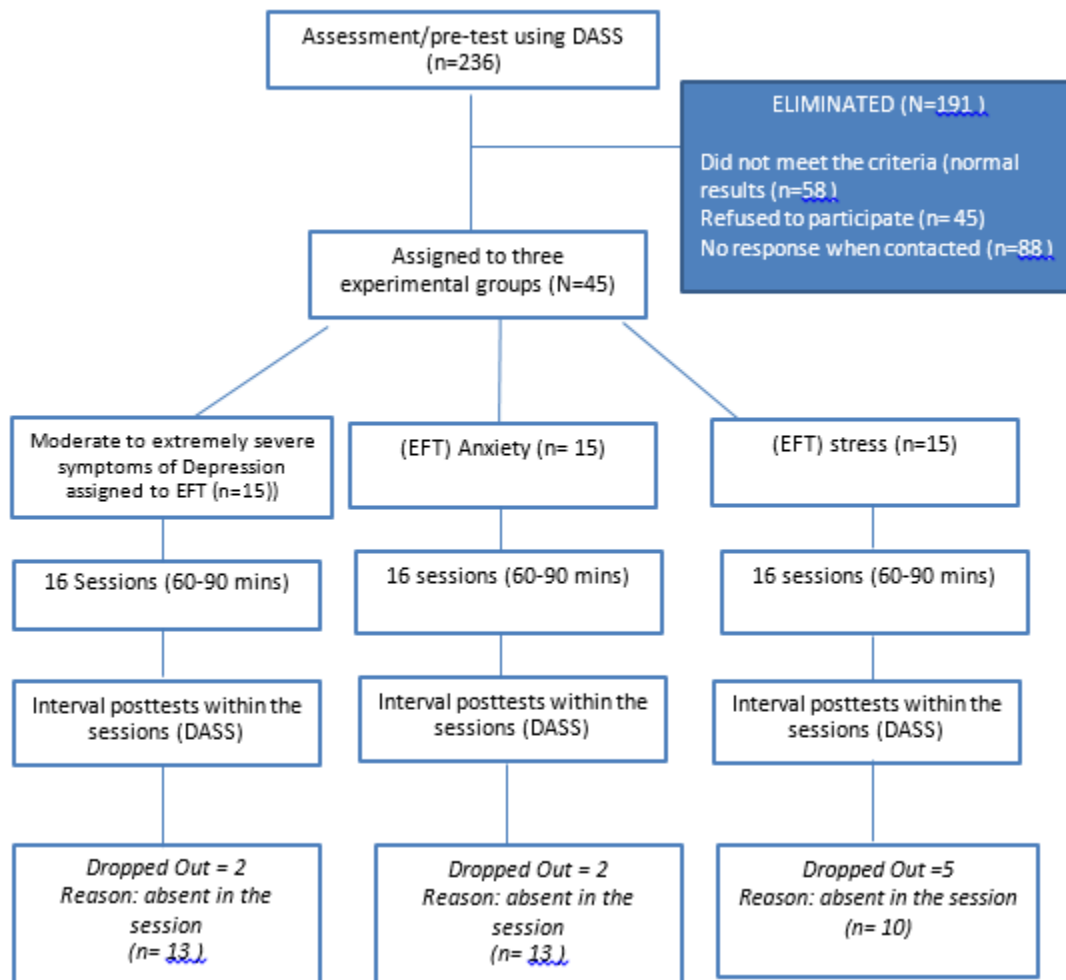
Figure 1. Flow of the Experiment

The figure represents how the experiment was conducted by the researcher.

For detailed EFT schedule of the treatment. (Please see the appendix).

The pretest and posttest were accomplished through web-based DASS questionnaire.

Three experimental groups were created considering outcome of the pre-test. The three groups that were chosen were participants with moderate to severe anxiety, the experimental group of students who fit the criteria for moderate to severe

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depression, and the last experimental group with high levels of stress. For seven (7) weeks, the researcher conducted the intervention-emotional freedom technique experiment. As a result of the college students' ongoing vacation, there were three (3) sessions for two weeks and two sessions for the remaining weeks. Each session lasted approximately sixty to ninety minutes, with one to five days in between. The number of sessions was determined based on the research review. The study used a quasi experimental within-subjects pretest-posttest design, with post-tests to see if the intervention was effective and how it proceeded over time.

Thus, after every two weeks of therapy posttests were carried out to ascertain whether adjustments should be made to make the intervention more appropriate for the participants.

The calibration of the posttests was assured to be similar to minimize threats in the experiment. The intervention was conducted from August 2, 2021 to September 19, 2021. A practicing clinical psychologist was present in all of the 48 sessions. It was done to avoid issues with participants since the researcher is not a licensed psychologist. Moreover, it was planned to create a secret group on facebook as advised by Miss Britney, assistant to Dr. Peta Stapleton. However, as the experiment progressed, the researcher realized that nearly all of the participants hid their whereabouts to avoid being identified. Dr. Stapleton had numerous published studies that utilized emotional freedom technique as the intervention.

The researcher waited for the response from Dr. Dawson Church regarding an online procedure of EFT called Personal Peace Procedure (PPP). Dr. Dawson pioneered various research on emotional freedom techniques. However, since the researcher was only given three months to finish the paper and there was no response from Dr. Dawson Church, the PPP was not utilized for the study. Some participants elaborated elaborate on what they felt before the intervention and described remarkable changes after the experiment.

The obtained information was treated with confidentiality. The series of post-tests were collected followed by tallying, tabulating, and processing of the data using statistics. Everyone (45 participants) in the experiment was eligible to be interviewed, but only five volunteered. The researcher analyzed, tallied, treated, analyzed, interpreted, and encoded the data.

Data Analysis

The effect of EFT was analyzed using repeated measures ANOVAs with the pre-test, series of post-tests in three groups. Changing within–group of the three groups from pre- to post- treatment were tested using paired t-tests.

Ethical Considerations

The guidelines of PAP as stated in Article 10, Research, has been considered for this research paper. They were requested to sign an Informed Consent for Research before participating in the study. A description of the experiment, schedules of treatment, length, and compensation after their participation. The participation to the experiment of participants was voluntary. The participants did not know where or which group they will be assigned to reduce risk of errors. To assure that the intervention did not cause any type of distress or harm to the participants the researcher decided to invite a supervising psychologist. The intervention involved tapping lightly the identified points of emotional freedom techniques. Every session the participants' permission was sought to record the session.

RESULTS

The table shows the frequency of participants in terms of course, year level, age, and sex. Forty-five participants volunteered to join, however, 20 percent or 9 of them had justified reason and stopped the experiment. The three different groups of participants included the Anxiety, Depression, and Stress.

The Anxiety group had 13 participants wherein the 10 or 76.9 percent belonged to Psychology and the other courses include Accountancy with 7.7%, BS Electrical and Computer Engineering with 7.7%, and BSFM with 7.7 percent. When it comes to the year level 69.2% or 9 were third-year level participantsand 1 or 7.7 percent was second year level. In the aspect of age, 5 or 38.5% were 21 and 2 or 15.4 percent were 22 years old and 19 respectively. Moreover, 9 or 69.2% were female.

Table 1: Frequency Table for the Participants' Profile

Profile	Anxiety Group n=13		Depression Group n=13		Stress Group n=10	
	f	%	f	%	f	%
Sex						
Male	4	30.8			2	20.0
Female	9	69.2	13	100	8	80.0
Age						

19	2	15.4	1	7.7	-	-
20	4	30.8	10	76.9	9	90
21	5	38.5	2	15.4	1	10
22	2	15.4	-	-	-	-
Course						
Accountancy	1	7.7	1	7.7	-	-
BS Electrical and CompEng	1	7.7	1	7.7	-	-
Financial Management	1	7.7	1	7.7	1	10.0
Psychology	10	76.9	9	69.2	8	80.0
Nursing	-	-			1	7.7
Marketing Management	-	-	-	-	1	10.0
Year Level						
1st year						
2nd year	1	7.7	3	23.1	2	20
3rd year	9	69.2	8	61.5	7	70
4th year	3	23.1	2	15.4	1	10

In the Depression group, 9 or 69.2% were Psychology students and 8 or 61.5% were third year students. As to age, 10 or 76.9% were 20 and 1 or 7.7% are 19 years old. Majority were female participants with a number of 13 or 100%. In the stress group, 8 or 80.0% were psychology students and 1 or 10.0
% belong to Financial Management and Marketing Management. Seven or 70% were third year students and 1 or 10% was fourth year student. As to age, 9 or 90% were 20 and 1 or 10% was 21 years old. The vast majority of those taking part in the stress group were female, with 8 or 80.00%.

Table 2. Participant's Level of Depression before the implementation of EFT

	Baseline	
	Mean	**Interpretation**
Depression (n=13)	22.77	Severe

Legend: *Anxiety: 0-7 (normal), 8-9 (Mild), 10-14 (Moderate), 15-19 (Severe), 20+ (Extremely severe); Depression: 0-9 (Normal), 10-13 (Mild), 14-20 (Moderate),21-27(Severe), 28+ (Extremely Severe) Stress: 0-14 (Normal), 15-18 (Mild),19-25 (Moderate), 26-33 (Severe), 34+ (extremely Severe)*

Table 2 shows the participants' level of depression. In the depression group, the experiment started with the baseline of the participants who have a mean of 22.77 or severe level of depression.

Table 3: Participant's Level of Anxiety before the implementation of EFT

	Baseline	
	Mean	**Interpretation**
Anxiety (n=13)	16.69	Severe

Legend: *Anxiety: 0-7 (normal), 8-9 (Mild), 10-14 (Moderate), 15-19 (Severe), 20+ (Extremely severe); Depression: 0-9 (Normal), 10-13 (Mild), 14-20 (Moderate), 21-27 (Severe), 28+ (Extremely Severe); Stress: 0-14(Normal),15-18(Mild),19-25(Moderate),26-33(Severe), 34+ (extremely Severe)*

Table 3 shows the participants' level of anxiety. In the anxiety group, the result of the participants' pretest or baseline was on severe level with a mean of 16.69.

Table 4: Participant's Level of Stress before the Implementation of EFT

	Baseline	
	Mean	**Interpretation**
Stress (n=10)	25.50	Severe

Legend: *Anxiety: 0-7 (normal), 8-9 (Mild), 10-14 (Moderate), 15-19 (Severe), 20+ (Extremely severe); Depression: 0-9 (Normal), 10-13 (Mild), 14-20 (Moderate), 21-27(Severe), 28+ (Extremely Severe); Stress: 0-14 (Normal),15-18 (Mild),19-25 (Moderate), 26-33 (Severe), 34+ (extremely Severe)*

In the stress group, the participants' level of stress prior to the experiment was severe which has a mean of 25.50.

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Table 5. Differences on the Participants' Level of Depression when compared according to Profile

	Sex		Age		Course		Year Level	
	t	p-value	F	p-value	F	p-value	F	p-value
Baseline	No difference is computed for sex since all participants for this group were female.		.806	.474	.989	.466	.806	.473
Posttest1			.168	.847	.253	.900	.547	.595
Posttest2			1.704	.231	.676	.627	1.993	.187
Posttest3			2.243	.157	3.153	.078	2.089	.175

Table 5 shows the differences on the participant's level of depression when compared according to profile. All profiles of the participants had no influences on the severity of depression. Even during the pretest period up to the three posttests there were no significant differences.

Table 6. Differences on the Participants' Level of Anxiety when compared according to Profile

	Sex		Age		Course		Year Level	
	t	p-value	F	p-value	F	p-value	F	p-value
Baseline	.479	.642	1.061	.413	3.319	.071	5.497	.025
Posttest1	.591	.566	.451	.723	4.026	.045	1.303	.314
Posttest2	.340	.740	3.911	.049	3.373	.068	.617	.559
Posttest3	-.055	.957	1.269	.342	5.395	.021	1.677	.236

Legend: those with underline is considered significant at 0.05 alpha level

Table 6 shows the differences on the participants' level of anxiety when compared according to profile. A notable difference exists during posttest 1 between level of anxiety and course as evidenced by p-value of 0.45 which is less than 0.05 alpha level.
Furthermore, on the pretest (baseline), the level of anxiety and year level had a significant difference with a p-value of .025.
As to age, in the second posttest, a difference exists between the level of anxiety and age with a p-value of .049.
In terms of age, the majority of participants belonged to the 19-22 age bracket.
However, no differences were computed between level of anxiety and sex during the series of tests.

Table 7. Differences on the Participants' Level of Stress when compared according to Profile

	Sex		Age		Course		Year Level	
	t	p-value	t	p-value	F	p-value	F	p-value
Baseline	-.632	.545	1.233	.253	8.779	.012	3.708	.080
Posttest1	-2.295	.051	.183	.859	.254	.783	.174	.844
Posttest2	-.268	.796	-2.120	.067	.186	.834	3.041	.112
Posttest3	-.068	.947	-.778	.459	.276	.766	.480	.638

Legend: those with underline is considered significant at 0.05 alpha level

Table 7 shows the differences in the participants' level of stress when compared according to profile. A prominent difference during the pretest between courses and stress was noticed.
There were no significant differences between level of stress and year level, age, and sex of the participants.

Table 8: Participant's Level of Depression Before and After the Intervention

	Baseline		Post-test 1		Post-test 2		Post-test 3	
	Mean	Interpre-tation	Mean	Interpre-tation	Mean	Interpre-tation	Mean	Interpre-tation
Depression (n=13)	22.77	Severe	18.38	Moderate	14.92	Moderate	10.38	Mild

*Legend: **Anxiety:** 0-7(normal), 8-9(Mild), 10-14 (Moderate), 15-19 (Severe), 20+ (Extremely severe); **Depression**: 0-9 (Normal), 10-*

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13 (Mild), 14-20 (Moderate), 21-27 (Severe), 28+ (Extremely Severe); *Stress*: 0-14(Normal),15-18(Mild),19-25(Moderate),26-33(Severe), 34+ (extremely Severe)

Table 8 shows the participants' level of depression. In the depression group, the experiment started with the baseline of the participants with a mean of 22.77 or a severe level of depression. Fortunately, the symptoms had improved after 16 sessions of emotional freedom techniques (EFT), as revealed by the post-tests. The post-test 1 shows a mean of 18.38 or a moderate level of depression. It continued in the two post-tests, which showed
14.92 mean or moderate level of depression in post-test 2 and a 10.38 mean or mild level of depression in post-test 3.

Table 9 Participants' Level of Anxiety Before and After the Intervention

	Baseline		Post-test 1		Post-test 2		Post-test 3	
	Mean	*Interpretation*	*Mean*	*Interpretation*	*Mean*	*Interpretation*	*Mean*	*Interpretation*
Anxiety (n=13)	16.69	Severe	9.46	Mild	6.77	Mild	4.84	Normal

Legend: Anxiety: 0-7(normal), 8-9(Mild), 10-14 (Moderate), 15-19 (Severe), 20+ (Extremely severe); Depression: 0-9 (Normal), 10-13 (Mild), 14-20 (Moderate), 21-27 (Severe), 28+ (Extremely Severe); Stress: 0-14(Normal),15-18(Mild),19-25(Moderate),26-33(Severe), 34+ (extremely Severe)

The anxiety group started out with a mean of 16.69, which was considered severe, but after three post-tests, they improved to a mean of 4.84, which was considered normal

Table 10. Participants' Level of Stress before and after the intervention

	Baseline		Post-test 1		Post-test 2		Post-test 3	
	Mean	*Interpretation*	*Mean*	*Interpretation*	*Mean*	*Interpretation*	*Mean*	*Interpretation*
Stress (n=10)	25.50	Severe	14.00	Normal	12.40	Normal	8.70	Normal

Legend: Anxiety: 0-7(Mild), 8-9(Mild), 10-14 (Moderate), 15-19 (Severe), 20+ (Extremely severe); Depression: 0-9 (Normal), 10-13 (Mild), 14-20 (Moderate), 21-27 (Severe), 28+ (Extremely Severe); Stress: 0-14(Normal),15-18(Mild),19-25(Moderate),26-33(Severe), 34+ (extremely Severe)

Prior to the trial, the stress level of the participants in the stress group was severe, with a mean of 25.50. The symptoms improved after using the emotional freedom technique, as evidenced by a mean of 14.00 or a normal level of stress in the first post-test. The situation has improved even further, as seen by the latest two post-tests. The second post-test revealed a normal stress level, with a mean of 12.40 and an average of 8.70, which is normal for post-test 3.

DISCUSSION

TABLE 1

These students willingly volunteered in the experiment while there were other students who had moderate to extremely severe level of depression, anxiety, and stress but denied taking part. The psychology course had the highest participants because they fully understood the essence of an intervention to alleviate and address the surges in their mental state. Most of the female, 21 years old, and third year were affected by the detrimental effects of the online classes and pandemic since the problems were too overwhelming to manage. The majority of university students come from backgrounds with poor socioeconomic standing. Their status has a huge impact on the students which manifested symptoms because of exposure to different issues like being compelled to adjust in the remote learning, financial stress, retrenchment of parents/breadwinner, school projects, and uncooperative group members.

This can be supported by several research studies.

A meta-analysis was conducted and found that manifestations of depression and anxiety were higher in college students at the time the pandemic began than before the pandemic. In addition to these two psychological conditions, the students also experienced sleep disturbances. Students suffer amid the pandemic because if there are academic or family problems, there is no opportunity for them to go and see a guidance counselor. (Deng et. al., 2021)

A disturbing result is that many college students experienced moderate- to-severe depression (35.9%), moderate to severe symptoms of anxiety (27.7%), and high stress (25.1%) in Germany. There was a possibility that students had been exposed

to seeing alarming news about the number of positive cases, simultaneous school requirements, possible financial problems, anxiety about catching the virus and much more. When this happens, the school administration should take immediate action to provide appropriate assistance and comfort to the students. (Karing, 2021).

In addition, Forty-one percent of Chinese college students exhibited and experienced symptoms of anxiety. The pandemic has been very difficult for children, and it is expected that at the right time, the school, family, and people around them will address the difficulties these children face. Many risk factors came out, such as low economic status, lack of social support, etc. It only goes to show that the strain of COVID-19 pandemic can be threatening even to young learners. (Fu et al., 2021).

Added to this, college students in Wuhan, China, experienced symptoms of fear and worry during lockdown. People were frightened and apprehensive since COVID-19 had just begun. These feelings may be due to ignorance about the proper management, exposure to worrisome news about the rising number of COVID positive patients, a struggling government to protect people, sudden loss of freedom to socialize, fear of being infected or dying, and many other possible causes. (Li et al., 2021).

Additionally, a study reviewed if the pandemic had a direct impact on college students, and it turned out that they were affected psychologically. Their analysis revealed that those students had stress and depression. This means that this issue is a global issue and there is a need to give immediate consideration to the learners focused on giving competent interventions for their convenience. (Dilmen, Yasar, Erten, Ekmen, 2021)

Further, the current worldwide situation has significantly impacted students' mental health in the UK. They weren't exercising and were nervous and depressed. This could be due to students being forced to sit all day because of online lessons, being unable to exercise outside owing to the lockdown, and having to adjust to the new normal at school. The decline of young people's mental health is no longer a local issue, but rather a worldwide issue that requires professional intervention. (Savage, James, Magistro, Donadosn, Healy, Nevill, Hennis, 2020)

TABLE 2

In the depression group, the experiment started with the baseline of the participants who have a mean of 22.77 or severe level of depression. Some participants mentioned experiencing problems with undesirable relationships with people, overthinking about the future, losing focus, social isolation, low self-esteem, negative self-care, task escape, self-isolation before to and throughout the experiment.

A published study supports this finding that college students are currently experiencing symptoms of depression. In the study by Werner et al. (2021), it was highlighted that it turned out that the levels of depression, anxiety, and somatic complaints of college students in Germany were higher compared to the period before the pandemic. The elevation may have occurred due to various difficult situations brought on by COVID-19 such as anxiety to have COVID-19, forced adjustment to the new normal, and many others.

Furthermore, a group of undergraduate researchers discovered that tertiary students in the Philippines showed a moderate depression severity during the pandemic in comparison to their mild level of depression. The standardized test, Patient Health Questionnaire (PhQ9), was utilized to measure pre- and post-level depression. Clearly, there was a surge in the severity of depression among engineering students during the pandemic. (Armando J. et al., 2021).

Table 3

In the anxiety group, the result of the participants' pretest or baseline was on severe level with a mean of 16.69. Participants reported feeling physically exhausted, socially disturbed, psychological suffering, self-hatred, intellectually preoccupied, struggling in school, unhealthy social relationships, self-neglect, and destructive self-practices before and throughout the EFT session.

The data can be supported by a study in India. The epidemic in India has caused mild anxiety and mild depression. College students cannot sleep well, and it has become more extensive among women. When there is no proper sleep, it affects a person's mental wellbeing. Poor sleep can lead to poor comfort, anxiety, and depression. Moreover, the researcher warned that a person needs to take care of themselves to avoid serious psychological conditions and suicide. (Verma, 2020).

Additionally, with the shift of instruction from face-to-face classes to online, students felt anxious, nervous, and uncertain. Some students are sometimes embarrassed to face the camera, nervous about answering the teacher, perhaps lacking motivation to study, or unable to keep up due to the associated costs. (Murphy, Eduljee & Croteau, 2020)

Table 4

In the stress group, the participants' level of stress prior to the experiment was severe which has a mean of 25.50. During the pre-intervention phase, participants in the stress group narrated their feelings of uncertainties for the coming academic year, questions of self-worth; self- doubt; concerns about employability; inquiry regarding future employment, dynamic acceptance of

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failed social connections; troubled about future employment, troubled about passing the board exam, overwhelmed to embark on the real world, mixed emotions about new possible experiences in work, negative emotions and exhaustion, pressure due to family obligations, and loss of self-confidence.

Researchers discovered that depression, anxiety, and stress impact 78.7%, 67.9%, and 58.7% of undergraduate students, respectively, and that these rates are higher during "home confinement." The mean sorrow, anxiety, and stress ratings were moderate in another study. Depression, stress, and anxiety have been linked to a variety of demographic, health-related, and lifestyle factors. A variety of attributes were also linked to depression, stress, and anxiety. (S. H. Hamaideh et al., 2022).

Table 6

The participants' level of anxiety has something to do with their course. It was mentioned during the sessions of the experiment that the students felt overwhelmed and nervous because they felt that since they were doing remote learning, their education might not be enough to make them competitive in their course. More than half of them were taking board courses in psychology and accountancy respectively. The sessions started two weeks before their vacation ended and continued until their online classes. They had difficulty with the number of professional courses they had to take, online on-the-job training, thesis writing, adjusting to new professors, and others.

Among the participants, the fourth-year students were outnumbered by third-year students. There was a noted significant difference since they were too anxious as they would face more professional courses, and felt obligated to attend family issues due to the pandemic. Participants who were working and attending remote learning were too problematic financially and mentally.

The age group, 19-22, had to force themselves to adjust to the new normal. Adjustment entails flexibility, resilience, and maturity to take on multiple roles. Some were working so hard to juggle different responsibilities, drastic changes brought on by the pandemic, and remote learning.

Table 7

The course had influenced their baseline score in the stress group because the participants were taking board courses and were too fidgety because of what they would experience in the new semester. It was difficult for them to take the new challenges, like stress about new professional courses, on-the-job training, and board exams.

Table 8

The subjects had significant depression prior to the intervention, which they described during the trial as social isolation, a loss of hope for getting through difficult times, a lack of self-esteem, and compelled people to stay in their lives.

After 16 (sixteen) sessions of the emotional freedom technique, they reported becoming more open to others, valuing more family and friends, avoiding dwelling on negative emotions, feeling happier, returning to routine, optimistic, relieved anxious thoughts, developing more love for themselves, avoiding toxic things for better mental well-being, and accepting that people leave and need space.

The effect of the emotional freedom technique on the level of depression in college students can be supported by a study.

Researchers conducted a meta-analysis involving various RCTs and outcome studies to determine the efficacy of emotional freedom techniques in lowering the symptoms of depression. Historically, depressive symptoms can be addressed by taking anti-depressant drugs, psychotherapy, lifestyle change, cognitive reframing, etc. The researchers initiated the study to determine whether emotional freedom techniques can be added to the list of interventions for depression. The investigation found that all outcome studies and RCTs favored the emotional freedom technique to reduce the symptoms of depression in any population or setting. Its posttest effect size was even higher than trials that used anti-depressants and psychotherapy. (Nelms and Castel, 2016).

Moreover, in Church's study, quoted by Patterson, S. L (2016), found that after a brief group intervention applying the EFT, college students' depression levels improved with a mean in the "nondepressed" category.

Consequently, the emotional freedom technique assisted the participants to change and improve the symptoms of depression.

Table 9

The anxiety group started out with a mean of 16.69, which was considered severe, but after three post-tests, they improved to a mean of 4.84, which was considered normal.

There were improvements in how the individuals felt, thought, and behaved after 16 (sixteen) sessions of the emotional freedom technique. They reported changes in attentive self-care, improved emotional regulation, enhanced productivity, and less awful thoughts during the experiment. This improvement in the level of anxiety using emotional freedom technique is supported by a study.

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The effectivity of an energy psychology technique, emotional freedom, in decreasing the stress and anxiety of nursing students was studied. Undeniably, students are susceptible to feeling restless, tired, anxious, and stressed due to voluminous school-related activities. The researcher utilized standardized questionnaires to quantify the degree of stress and anxiety. Those who conformed to the criteria were subjected to a mixed method study. Experimental and qualitative methods were used to test the effectiveness of the intervention. The posttest revealed significant changes in the students' stress and anxiety after being exposed to the intervention. Moreover, the participants reported lighter feelings and fewer physical symptoms like pain, weakness, etc. (Patterson, 2016).

As a result, the sessions were quite beneficial to those with anxiety symptoms. As a result of the facts and the information, the research hypothesis is rejected.

Table 10

Prior to the trial, the bulk of the participants in the final group were extremely stressed. During the pre-intervention phase, students displayed various indications. Distress about completing a degree, self-doubt, concern about future employment, overwhelmed by responsibilities, no peace of mind, negative connotations about good days, irritability, cognitive difficulty, social isolation, lack of motivation, lack of energy to do healthy routines, and no concern about appearance were among the manifestations.

Significant changes were observed after exposure to the intervention, as measured by the DASS and based on the participants' narratives. Mentally strong, controlled feelings, coped well with stress/grief/anger, good decision-making, decreased distress, positive thoughts/hope, lessened worries, positive disposition, decreased loneliness, acceptance of what she has accomplished thus far, improved focus on academics, revived passion for art, found relief from people, and accepted self-limitations were among the developments.

As a result, it was definitely obvious that the intervention had a positive impact on their perspective, disposition, and attitude toward challenges.

Emotional freedom technique was effective to decrease the manifestations of stress and can be supported by numerous studies.

Rogers and Sears (2015) published a study that further supported the impact of EFT on stress. They examined the efficacy of emotional freedom technique by addressing stress, since it has been demonstrated to be useful in many psychological problems. They put EFT to the test on college students who were dealing with various forms of study-related stress. They decided to split the group into two, with one receiving the emotional freedom technique and stimulating the spots according to the EFT protocol, and the other receiving sham stimulation. After a few sessions, it was shown that students who received the EFT intervention had a 39.3 percent lower stress level than those who received sham point stimulation, which only lowered stress by 8.1 percent.

Another study tested whether the emotional freedom technique is effective in alleviating high student stress in higher education. Students are exposed to a variety of situations that can increase their stress, affecting their wellbeing if not treated promptly. The study revealed that after two months of exposure, the students felt positive change and comfort. (Banerjee, Puri & Luqman, 2015)

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Attitude and Awareness of Mothers Regarding Child Rearing Practices in Tribal and Non-Tribal Areas of Himachal Pradesh

Dr. Pankaj Gupta[1]**, Dr. Vijay Kumar Sharma**[2]

[1]Course Coordinator, School of Environmental Studies, Himachal Pradesh University, Summer Hill, Shimla-171009

[2]School of Development Studies, Himachal Pradesh University, Summer Hill, Shimla-171009

ABSTRACT: Child rearing refers to nurturing of children by mother and is perhaps the most demanding duty for a mother. Effective child rearing is vital for child's complete development. Socio-economic milieu and cultural beliefs determine the child rearing practices. A cross-sectional study was conducted with a view of evaluating mother's attitude and level of awareness about child rearing practices in selected pockets of tribal and non-tribal areas of Himachal. Mother is an important primary care giver and, thus, she should able to take care of her baby and develop a positive attitude towards child rearing practices, which help the child to be psychologically and socially strong. The study concludes that a few poor infant rearing practices still prevail so healthcare delivery system can play an important role to help the mothers to up bring their children.

KEYWORDS: Child rearing practices, breastfeeding, weaning, awareness, supplementary food.

INTRODUCTION

The health of a society can be easily judged by looking into the health of its young ones. Children are a critical resource whose growth and well-being will determine to a large extent the course of a country's social and economic future. The care and concern, which children receive in a particular society, is clearly indicative of the health of the society as a whole (WHO, 1976; Sidhu, 1995). Parents play a significant role in childcare and thus helping their children become contributing members of society. They accomplish this by nurturing and guiding the children. This is done by adhering to the beliefs, values, and appropriate conduct accepted in their culture. Effective child rearing entails the active and persistent physical, emotional, intellectual, and spiritual company of parents in the lives of their children. Child rearing practices vary across cultures. Although culture is the key constituent, the socioeconomic condition and lifestyle also have an impact on parenting. Leninger (1991) stated that it is essential for health care givers to "discover human care diversities and universalities in relation to world view, social structure, and other dimensions". According to Wolf, (1970) it is reasonable to expect that child-rearing practices will be slower to change than other aspects of culture. Hackett and Hackett (1994) in their study compared child-rearing practices of Gujarati mothers from East Manchester with white British-born mothers. Noticeable differences were found in child-rearing practices in the areas of discipline, feeding, sleeping arrangements and toilet training. Kelley and Tseng (1992) examined differences in parenting techniques and goals in immigrant Chinese and Caucasian-American mothers.

Breast-milk, like all other animal milks, is species-specific and has been adapted throughout human existence to meet nutritional and anti-infective requirements of the human infant to ensure optimal growth, development and survival. Human milk is not only species-specific, but is child specific as mother's milk changes as her infant grows. In addition to its richness in nutrient proteins, non-protein nitrogen compounds, breast-milk contains hormones, enzymes, growth factors, and many types of protective agents. The agents like lysozyme (a germ killer) and immunoglobulin A (IgA) have been shown to protect an infant's gastrointestinal tract and protect against bacteria such as *E. coli*, diphtheria, pneumonia, salmonella, streptococcus, and a host of other diseases (Riordan and Auerbach, 1999). Medical and public health experts advocate breastfeeding as the best method of feeding young infants for a wide variety of reasons. Breastfeeding has been a universal practice in the past. There are no marked differences between states or between different income groups. Two major areas of concern are that colostrum feeding is uncommon, and in rural areas there is a delay in introduction of supplements (Ramachandran, 1995).

Many taboos regarding colostrum reach back to the dawn of civilization. For approximately three day's post-partum, a mother's breast produces colostrum. Colostrum is thicker, creamier and more yellow in color than the thin bluish-white mature milk.

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Compared to mature milk, colostrum is richer in protein, including many immunoglobulins and high in some water-soluble vitamins such as A, E, and K, and lower in carbohydrates and fats (Riordan and Auerbach, 1999). But the colostrum is discarded because of the cultural belief that it is "heavy" or "not good for the child". The color of the initial breast milk is slightly yellow which supports the perception that for first two days mothers milk is impure and can be harmful for the child.

It is recommended that breast-feeding should be started as soon as possible after birth and if possible within six hours of birth. Colostrum has distinctive nutritional and antibody properties but it is not fed to infants in some rural areas of India and hence its disadvantages to those infants are recognized and documented. Initiation of early breast-feeding has also been reported from some rural areas of Himachal Pradesh (Belavady *et al.*, 1959). Mudgal *et al.,* (1979) reported early initiation in Madhya Pradesh and an Organizational Research Group (ORG) report in 1989 and various other researchers reported it from urban and rural Gujarat (Khan and Basu, 1987).

MATERIAL & METHODS

Sampling design

The study is a cross-sectional questionnaire-based observational exploration using random sampling scheme. 300 households including 100 from the tribal districts and 170 from the non-tribal were selected using random sampling method. Thirty households were taken from high income households in urban provinces to represent the control group. From the 100 tribal households, 130 children were sampled whereas from the non-tribal households, 220 children were sampled. Thirty five children were taken to represent the control group. Hence, the total sample comprises of 385 children. In some households there were joint families. In all 350 mothers were interviewed from tribal and non-tribal areas and 35 from urban province. Tribal children were selected from districts Kinnaur and Chamba taking fifty households from each district. 130 children were available for sampling from these 100 tribal households at the time of survey. Non-tribal children were selected from districts Mandi, Shimla, Solan and Chamba. Fifty households each were selected and thirty five households each were selected from Chamba and Solan. The control group children were taken from the urban pockets in Shimla and Solan taking 15 households from each district.

Secondary sources

For the accomplishment of the objectives of the study, both primary and secondary data was utilized. The secondary sources used in the study include the Himachal Pradesh human development report, reports and documents of the department of health, tribal sub plan and Himachal Pradesh development report.

Primary sources: Method of data collection

Feeding patterns

(i) Breast feeding:

    a. Time of initiating

    b. Duration of breast feeding

    c. Method of stopping breast feeding

(ii) Time of Weaning and starting of supplementary food.

Awareness of mothers regarding

    a. Colostrum feeding

    b. Breast feeding

    c. Role of oral rehydration syrup (ORS) in managing diarrhea

    d. Vaccination against diseases

    e. Balanced diet and dietary intake during pregnancy

    f. General hygiene and healthcare

Status of breastfeeding, i.e. time of initiation, duration of breastfeeding, method and reason of stopping breastfeeding, and view regarding mother's milk and time of weaning is represented in frequencies and percentages. The Chi-square test has been used for seeing the variance in responses of mothers with regard to the duration for which the child is breastfed. Percentages and frequencies have been calculated for infant feeding practices such as the number of times the child is fed, frequency of cooking special food for the child, the interest of mothers in learning new methods of cooking, consumption of breakfast and lunch by the child, boiling and filtering of drinking water and awareness regarding ORS.

Household conditions

In order to find out the relationship of malnutrition with living condition of the children, conditions around house/locality of subject under study were taken into account. Observation method was used for assessing quality of house in terms of

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maintenance, hygiene, rubbish disposal and sanitary conditions were also taken into consideration. Sunlight and air circulation in rooms, sources of drinking water and fuel used etc.

Awareness regarding the frequency of cleaning the kitchen, conditions of kitchen, type of house, and conditions of the house are tabulated in frequency and percentage tables. Frequencies and percentages are used to represent the time of occurrence of milestones in non-tribal and tribal children.

RESULTS & DISCUSSION

A. Infant Feeding Practices in tribal and non-tribal areas

The literacy level of the mother has a deep impact on the nutritional status of the child, the higher the education level of the mother, the lower the under-nutrition level of the children. The interplay of social, biological, and attitudinal factors thus influences infant-feeding practices and consequently child nutrition and health. Infant feeding and caring practices of mothers are important determinants of children's nutritional status. Proper infant feeding starts from the time of birth and is important for the physical and mental development of the child.

Breastfeeding is the best food for the proper growth and development of the infant. Breastfeeding improves the nutritional status of children and reduces morbidity and mortality. Breast milk not only provides important nutrients but also protects the child against infection. The timing and the type of supplementary foods introduced in an infant's diet also have significant effects on the child's nutritional status. Feeding of colostrum, time of initiation of breast milk, type of pre-lacteal feed, method and reason of stopping breast milk, and time of weaning are important determinants of infant feeding and child care and in turn, affect the nutritional status of a child. Data regarding the status of breastfeeding and weaning among the tribal and non-tribal mothers are discussed as follows:

B. Feeding of colostrum

According to modern medical science, early initiation of breastfeeding is beneficial for both mothers and children because it stimulates the release of a hormone that helps the uterus to contract. The first breast milk i.e. colostrum is highly nutritious, rich in antibodies, and protects the newborn from diseases. Breastfeeding status and the timing of initial breastfeeding in tribal and non-tribal areas of Himachal Pradesh are presented in Table 1. It emerges from the study that breastfeeding is widespread activity in Himachal Pradesh. 98.6 percent of the surveyed children were breastfed at least for some time. A significant number of children in the study area (69.2 percent) received colostrum. 78.5 percent of children in tribal and 63.6 percent of children in non-tribal areas were fed colostrum. Out of 49 illiterate mothers from non-tribal 40 percent of mothers discard colostrum. And out of 42 illiterate mothers from tribal areas, 57.1 percent of mothers discard colostrum. Whereas graduate mothers from both non-tribal (17.8 percent) and tribal (19.8 percent) areas feed colostrum to children. Thus mothers who are educated are more likely to feed colostrum than those who are illiterate (Table 2).

The reasons stated for discarding colostrum by mothers are that it is impure and it is thick milk which is harmful to the child's digestive system. There seems to be a deep-rooted prejudice in some households and in certain parts of the state people are against giving colostrum to the child. Thus, infants are deprived of breast milk for 3 days after birth, especially where the age-old practice of celebrating *harad* (a ritual) exists. But in the control group, it was found that all mothers fed colostrum to their children and they knew the value of colostrum.

In interviewing mothers who fed colostrum to their children, it was found that these mothers are either aware of the value of colostrum or were advised by a doctor or a medical health worker. It was also found that in deliveries done in the hospital colostrum was fed to the child on the advice of doctors and nurses whereas the same was not true for deliveries done at home. Even some mothers who are less educated accepted that they fed first milk to their child even when the delivery is carried out at home and were advised to do so by doctors and health workers when they visited health centers/hospitals for checkups during pregnancy.

C. Initiation of breastfeeding

Modern medical science prescribes the early initiation of breast milk to the child i.e. within one hour after birth. In order to know about the time of initiation of breast milk, mothers are interviewed (Table 1). Data collected during the study indicates that in total; nearly 64 percent of children were breastfed within one hour of birth which is quite satisfactory. In tribal areas, 92.3 percent of children were breastfed within one hour of birth followed by 4.6 percent fed between 12-14 hours after birth, and only 2.3 percent were breastfed on the second day. In non-tribal areas, 56.4 percent of children were breastfed within one hour after birth followed by 10 percent who were breastfed between 12 to 14 hours. 11.8 percent of the children were breastfed on the

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second day after birth and the remaining 21.8 percent of children were breastfed on the third day. However, no difference was seen in the timing of initial breastfeeding with the sex of the child.

Thus more tribal children were breastfed within one hour of birth as compared to their non-tribal counterparts. In tribal areas of Kinnaur, it was seen that out of the total sample, 98 percent of mothers breastfed their infants immediately after birth. In tribal areas, feeding breast milk to the child on the third day is comparatively less as compared to non-tribal areas. 85.7 percent of mothers in the control group initiated breast milk soon after the birth followed by 8.6 percent who initiated it between 12 to 14 hours and the remaining 5.7 percent who started it on the second day. Thus, delivery in a public hospital has enhanced the proportion of mothers who initiate breastfeeding within one hour of birth. But on the contrary, the prevalence of age-old practices of feeding the child on the third day still prevails in both tribal and non-tribal areas.

D. Feeding of Pre-lacteal Feeds

A pre-lacteal feed is a feed other than breast milk that is given to newborns before the regular flow of mother's milk. It is not encouraged by doctors as it is less nutritious than breast milk and is more susceptible to contamination and discourages suckling. However primary survey reveals that 73.9 percent of the children are given pre-lacteal feeds. The data indicate that pre-lacteal feeds are common in both tribal and non-tribal areas. 45.3 percent of children living in the tribal areas received pre-lacteal feeds as compared to 90 percent living in the non-tribal areas. Different types of pre-lacteal feeds are given to neonates. These include honey, sugar/jaggery dissolved in water, diluted milk of cow/buffalo, and *ghutti*. *Ghutti* is given to neonates with a belief that it helps to prevent stomach disorders and acts as a tonic and cleansing agent.

These pre-lacteal feeds are given before the establishment of lactation of the mother. Breast feeding should be more common than pre-lacteal feeding but people are inclined to follow the traditional and outdated methods of infant feeding. Out of 350 mothers interviewed, only 26.2 percent of mothers fed breast milk to their child and avoided any type of pre-lacteal feed. The pre-lacteal feed given to the children in tribal and non-tribal areas (Table 1) comprised of honey (26.6 percent), sugar and water (14.5 percent), and *gur* (molasses) and water (32.8 percent).

The feeding of pre-lacteal feed to the newborn may result in infection because of contamination while feeding the child. Regarding the manner of the feeding of pre-lacteal feed, it is found that it is mostly fed with a finger or spoon. Pre-lacteal feed is also fed with the help of cotton/ cotton cloth. Mothers/ grandmothers were questioned about the cleanliness and hygiene of the cotton/ cotton cloth used for feeding children. They claimed that it is washed dried and kept properly for use. Mothers admitted that pre-lacteal feed is given by some elderly person usually a grandmother or grandfather as it is thought that it would help the child to take after or follow the footsteps of the person who fed the pre-lacteal feed.

In some cases, honey is given as a pre-lacteal feed with a thin gold wire. *Om* is written with the help of a wire and honey is put on the tongue of the infant. This is considered very auspicious among both tribal and non-tribal communities. In some areas of district Solan and Mandi where the breast milk is initiated after two or three days, honey is exclusively fed to the child and in some cases, honey along with milk other than breast milk using a spoon or cotton swab is given. It is also believed that the infant's intestine is filled with dirt that needs to be cleaned and honey is considered a good cleansing agent. Most other pre-lacteal feeds (sugar and water or gur and water) were fed with a spoon. It was found that some communities in district Mandi give a finger touch of cow dung on the tongue of the infants for the purpose of *shudhi* (purification ceremony). This ritual is known as *gulchutu dena*. Also, it is found that 71.4 percent of children were given honey as pre-lacteal feed while the rest 28.6 percent are given no pre-lacteal feed but only breast milk in the control group.

E. Awareness regarding the importance of breast milk

All the mothers interviewed regarding the importance of breast milk responded that breast milk is good for the child (Table 1).

a. Duration of breastfeeding

Exclusive breastfeeding is recommended for the first six months of a child's life because breast milk is uncontaminated and contains all essential nutrients needed by infants in the first few months of life. In addition, the mother's antibodies in breast milk provide immunity to the child. Data on the duration of breastfeeding is presented in Table 1. The majority of mothers (46.8 percent) exclusively breastfed their children up to the 5th month while 41.7 percent of mothers fed their children up to the 8th month. Only 10.2 percent of the mothers breastfed their children for nearly one year. In non-tribal areas, 63.6percent of mothers exclusively fed their children for up to eight months. While analyzing the situation in tribal and non-tribal areas, it was found that 92.3 percent of mothers exclusively feed their child for up to five months in comparison to 20 percent of mothers in the non-tribal areas. Primary data shows that all the respondents of district Mandi exclusively breastfed their infants and did not use bottle feeding.

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b. Methods and reasons for stopping breastfeeding

According to modern medical science, breastfeeding should be continued up to 2 years of age although not exclusively. In tribal areas, 45.4 percent of mothers accepted that they had breastfed their child for up to two years followed by 43.1 percent of mothers who said they had fed their child for up to 3 years (Table 1); while the scenario is different in non-tribal areas, where 55 percent of mothers had breastfed their child for up to two years followed by 24.1 percent of mothers who have breastfed their child for up to 3 years. Thus, only 51.4 percent of mothers in the whole sample were aware of the importance of feeding breast milk for up to two years. In the control group, it was found that 37.1 percent of mothers fed breast milk for less than two years, while 28.6 percent of mothers fed breast milk for more than two years, and the remaining 34.3 percent fed breast milk for less than six months.

The Chi-square test has been used for seeing the variance in responses of mothers with regard to the duration for which the child is breastfed. The results indicate a high variance in responses in the case of both tribal and non-tribal areas. The chi-square value of 128.3 for 4 degrees of freedom at 0.001 percent level of significance, in the case of tribal households, is much higher than the expected chi-square value of 18.5 if the null hypothesis or hypothesis of no variance in responses is true (Table 3). The highest response category for the duration for which a child was breastfed in the case of tribal households is for less than two years (45.4 percent) whereas 43.1 percent responded in favor of 2-3 years.

In the case of non-tribal households, the chi-square value of 276.1 for 5 degrees of freedom at 0.001 percent level of significance is much higher than the expected chi-square value of 20.5 thereby indicating high variance in responses. The highest response category for the duration for which a child is breastfed in the case of non-tribal households is again for 1-2 years (55 percent). 24.1 percent responded in favor of 2-3 years.

In the case of control households, 37.1 percent of households responded in favor of 1-2 years whereas 28.6 percent of households responded in favor of 2-3 years. 17.1 percent of households responded in favor of 3-6 months whereas 17.1percent responded in favor of 6-9 months. The tabulated value of 4.11 at a 0.265 level of significance is higher than the calculated chi-square value of 3.971 indicating that there is no significant evidence of variance.

There is a time for everything to end and breastfeeding is no exception. Many mothers do not know when and how to stop breastfeeding. It is a tough decision for the mother, as both mother and child are emotionally attached to one another. But there are many reasons responsible for stopping breastfeeding at an early stage. Mother's health, less milk, working status of the mother, and even second pregnancy insist mothers stop breastfeeding. 13.8 percent of mothers in tribal and 12.2 percent of mothers in non-tribal areas stopped feeding breast milk because of insufficient milk. Another reason responsible for stopping breast milk is the illness of mothers 9.2 percent of mothers in tribal and 9.1 percent of mothers in non-tribal stopped breastfeeding because of this. In tribal areas, 22.3 percent of mothers stop breastfeeding and in non-tribal areas, 45.6 percent of mothers stop it due to second pregnancy. Another cause of stopping breastfeeding is the working status of mother. In urban areas, mothers are engaged in jobs whereas in rural areas they are busy with fieldwork and other household chores. 11.5 percent of mothers in tribal areas and 9.1percent of mothers in non-tribal areas stop breastfeeding because of their agricultural work or job. But in the control group, it is found that 31.5 percent of mothers stop feeding breast milk to the child because of their job, 20 percent because of a second pregnancy, and 48.5 percent do not feed milk because of insufficient milk.

The method chosen to stop breastfeeding may be gradual or abrupt. The gradual method is considered better because the mother before stopping breastfeeding makes the child familiar with other milk/food which does not affect the health of the child. On contrary, the abrupt method at times makes a child suffer. In this case, at times the child is not prepared or even doesn't like the supplementary food and thus remains hungry. Therefore, mothers choose 'a quick and easy method to replace the sweat-tasting breast milk with some repelling material. The use of various herbs and spices to bring about weaning is common in various societies but this may be harmful to mother and child.

It is observed during the survey that 63.1 percent of mothers in tribal and 65.5 percent of mothers in non-tribal areas gradually stop feeding breast milk to their child, while 36.9 percent in tribal areas and 34.5 percent of mothers in non-tribal areas abruptly stop feeding breast milk (Table 1). Those who abruptly stop feeding children either use some plant base material or another practice to stop it. The various stuffs used for abruptly stopping breastfeeding in non-tribal areas include paste of *kadvo* (*Roylea elegance*) plant, a paste of *mehandi* (*Lawsonia inermis*), the paste of *lal-mirch* (*Capsicum annum*), nail polish etc. Sheep wool is used in tribal areas to make children fear the breast and distract his attention. These are generally smeared on the nipple/breast which changes the taste and repels the child from taking breast milk. But in the control group it is found that 94.3 percent of mothers gradually stop breastfeeding while remaining 5.7 percent stop it abruptly and nothing is used to stop breastfeeding.

Bottle-feeding is discouraged for very young children because of its potential negative effects on a child's health. It is often associated with an increased risk of illness, especially diarrheal diseases. The use of a bottle is associated with a lessening of the

intensity of breastfeeding and a consequent shortening of the period of postpartum amenorrhea. Only 5.4 percent of children are given milk by the bottle in tribal areas as compared to 11.4percent in non-tribal areas (Table 1). Bottle-feeding is more common among working, urban, and high society women. Bottle feeding is relatively rare in Himachal Pradesh. 38.5 percent of mothers in tribal and 60.9 percent of mothers in non-tribal areas only breastfed their child. Another indigenous method of feeding milk to the child in non-tribal areas was the use of a feeding vessel locally named as *charu* which is no longer in use. It is seen in the whole study area that when mothers introduced top milk they feed it with the help of a spoon and cup (30.5 percent) and with a glass (7.7 percent). In the control group, 94.3 percent of mothers feed milk to the child by the bottle along with breastfeeding and the rest 5.7 percent only feed breast milk. No other method of feeding milk is observed in the control area. However, feeding milk with the bottle is relatively higher in the control group in comparison to tribal and non-tribal areas where along with breast and bottle feeding even the indigenous methods of feeding milk such as with cup and spoon, glass, etc. is also observed.

F. Weaning Practices

Weaning is an act of complementing mother's milk with other food items. But early complementary feeding is discouraged for several reasons. It exposes infants to pathogens and increases the risk of infection, especially diarrhoeal disease and also decreases infants' intake of breast milk. In harsh socio-economic environments, supplementary food is often nutritionally inferior. Information on feeding is obtained by asking mothers about the time of weaning and the introduction of complementary feeding in children. Mothers were judged to know the time for starting supplementary foods. It is found that only 3.1 percent of mothers from tribal areas start supplementary food as early as between 3-4 months whereas a maximum (40.8 percent) of mothers start it between 7-8 months (Table 1). About 33 percent of the mothers in the tribal areas introduce supplementary food between the fifth and seventh months. Even 15.3 percent of mothers delay in starting supplementary food i.e. between the 8th and 9th month. The scenario is different in non-tribal areas where 6.8 percent of mothers start supplementary food between 3-4 months followed by 11.4 percent who introduce it between 4-5 months. About 50 percent of mothers in non-tribal areas give supplementary food between the fifth and seventh months. All the mothers interviewed from the control group introduce the supplementary food between 5-6 months which is considered the right time to introduce the supplementary food. The late introduction of supplementary food among many cultures in Himachal Pradesh is celebrated. The formal ceremony is called *lugru* or *khirpu*. This ceremony is considered auspicious and is done between the seventh and eighth months after birth.

Thus, mothers in non-tribal areas start supplementing children's diets earlier than those in tribal areas whereas mothers in Shimla introduce supplementary foods in time. The reason given by the mothers for introducing supplementary foods is insufficient breast milk, pregnancy and work. But the educated mothers and those who are aware of the benefits of timely initiation of supplementary food accepted the advantages of introducing these foods at an appropriate time. 42.5 percent of mothers are forced to change from breast milk to other foods because of another pregnancy. For children, the transition from breast milk to solid foods or other milk is abrupt, usually due to the mother's pregnancy. Such a practice adversely affects the child's health. Moreover, short birth intervals can affect the health of both the mother and the next infant. The working status of the mother has a slight influence on infant-feeding practices. Women working outside the home tend to wean their children earlier and introduce supplementary food early. 57.5 percent of the working mothers feed supplementary foods to their children before the child has attained the age of six months. Other investigators have reported similar reasons given by mothers from developing countries for supplementary food and ceasing breastfeeding (Almroth and Latham, 1982; Ghosh *et al*, 1976; Huffman *et al*, 1980).

G. Supplementary foods and feeding taboos

A number of supplementary foods are prepared by mothers in tribal and non-tribal areas. In non-tribal areas *dal ka paani* (boiled lentil water), *khichari* (rice cooked with lentil), *kheer* (rice pudding), *dalia* (porridge), *chapatti* (bread), *suji kheer* (semolina pudding), *peech* (rice water), *sabudaana* (cooked seeds of *caryota urens*) *savion ke kheer* (vermicelli pudding), *churri* (soup of dried chees), *tayap* (roasted rice soaked in milk), *tehlava* (preparation of dry fruits including almonds, poppy seeds, cucumber seeds), rice, mashed potatoes, fruits, vegetables, and biscuits; while, in non-tribal areas besides the above-mentioned items, some traditional weaned food items given to children are *chulphanting* (gruel of dried apricot), *sattu ki ladoo* (sweetmeat of roasted barley), *bakrey ka* soup (non-veg soup). Some food items to be given as supplementary food are restricted. These include *mash* (*Vigna radiata*) *dal*, *arbi* (*Colocasia spp.*), *rajmaa* (*Phaseolus vulgaris*), curry, and *bhindi* (*Hibiscus esculentus*) because of a popular belief that these food items are not digestible to child and result in digestive disorders including stomach ache and diarrhea. Curd is excluded from supplementary foods by mothers due to the fear of the adverse effect on the health of the child. Both tribal and non-tribal mothers have some knowledge of the importance of fruit or vegetable soup/water as a liquid supplement. However, few mothers give fruit juices, eggs, and non-vegetarian foods to their babies. But in the control group, the trend is different, the

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mothers in addition to all home-based supplementary food included fruits, vegetables, and dry fruits. Mothers also give commercial weaning foods.

Thus, the factors mentioned above are responsible for poor child health in tribal and non-tribal areas as the people are still inclined to follow the traditional and outdated methods of feeding infants. Practices such as discarding of colostrum, unhygienic methods of feeding pre-lacteal feed to the child, late start of breastfeeding after the childbirth at the behest of elders, and early or late start of supplementary food has telling effects on child health. In certain non-tribal areas, in certain families, the infants are deprived of breast milk for 3 days after childbirth due to the prevalence of the age-old practice of celebrating "*Harad*". Such unreasonable and unscientific beliefs still exist in non-tribal areas. In a similar study by Bhat *et al.* (1992), mothers of malnourished and well-nourished infants are interviewed and the practice of breastfeeding and weaning exhibited a direct relationship with infant nutrition. According to studies by Das *et al.* (1995), mothers were assessed for their knowledge and attitude regarding breastfeeding and weaning and it is concluded that most mothers do not have correct knowledge about breastfeeding and the appropriate time for introducing weaning foods. In the present investigation, though mothers are aware of the benefits of breastfeeding and the appropriate time for introducing weaning foods still they are inclined to follow the advice of elders or their tradition. Developmental programs such as the Integrated Child Development Scheme (ICDS) and the national nutrition mission are operative in these areas. Nutrition education in various areas, including breastfeeding and weaning, is also given to mothers of the beneficiary children. In conversing with mothers, it is seen that they took a keen interest in such programs and the impact of this is seen on the infant feeding and caring habits in both tribal and non-tribal areas.

H. Mother's attitude and awareness regarding child-rearing practices

The present study has made an in-depth inquiry into the impact of a mother's literacy, her awareness, and attitude regarding feeding, weaning, and caring habits. It is conclusively found that a higher rate of education equips the mother with the requisite information regarding infant care, feeding and weaning, health and hygiene, and all other related information which reduces the risk of the children falling prey to nutritional deficiency disorders. Mothers in tribal and non-tribal areas know their feeding and caring attitudes. An account of infant feeding and caring practices in tribal and non-tribal areas is recorded in Table 4. Regarding the feeding of the child, 80.5 percent of mothers feed their child thrice a day while 12.5 percent feed their child three to four times a day. Feeding a child, three to four times a day is more (17.7 percent) in the non-tribal areas than in the tribal. About 6.8 percent of children are fed twice a day and this practice is more common in non-tribal areas (9.6 percent) in comparison to tribal areas. All the mothers of the control group feed their children thrice a day.

Mothers were interviewed to know their interest in learning new methods of cooking food and the frequency of serving special foods to the child. In tribal areas, 50 percent of mothers are interested in learning new methods of cooking as compared to 63.1 percent in non-tribal areas. All the mothers of the control group show interest in learning new methods of cooking and they even try these for their families. The frequency of cooking special food for children also varies (Table 4) and only 3.8 percent of mothers in tribal areas and 1.8 percent of mothers in non-tribal areas prepare special food for children daily as against 42.3 percent of mothers in tribal and 39.1 percent mothers in non-tribal areas who never cook anything special for their child and their routine food forms the part of child's diet. The reason behind this is that some mothers are either not interested in cooking special food for children or they don't have the time to do so because of too many household chores to attend. Still, 42.3 percent of mothers in tribal and 35.5 percent in non-tribal areas find time at least once a week to cook something special for their children. 51.4 percent of mothers belonging to the control group cook special food for their children daily while rest 48.6 percent cooked some special food for their children on alternate days.

Feeding a child is the prime duty of the mother and is also an integral part of caring for the child. This responsibility is shared by grandmothers in both tribal and non-tribal areas in both joint and nuclear families where grandmothers are the caretakers as (Table 4). This responsibility is shared by 9.2 percent of grandmothers in tribal and 9.1 percent in non-tribal areas. But in most families, mothers perform this duty. In the control area, 8.5 percent of grandmothers and 91.6 percent of mothers help in feeding children. All children in the present study ate food on separate plates. On the whole 78.3 percent of families, parents and children ate together while in 21.7 percent families meals are taken separately and the reason is the hectic schedule of parents as a result of which they are not able to eat with their children. While all parents of control responded positively in this regard. They take their evening meals with their children. Eating with the child is very essential because it not only helps in checking the diet of the child but also provides a chance for the child to learn and use a communicative approach. All children included in the study are given breakfast and lunch on time. Nowadays most children receive mid-day meals in their school. But prior to this mothers use to give packed lunch to their children.

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Drinking water should be clean because its contamination leads to a number of water-borne diseases including diarrhea. To overcome this problem, water should be boiled or properly filtered. A relatively poor response is given by mothers in this regard. Out of 350 mothers, only 24 percent of mothers boil or filter the water for drinking in tribal and non-tribal areas (Table 4). All the mothers from the control group use boiled or filtered water. Caring practices also include special care for health and hygiene when the child is sick, and special care for diet has to be taken care of. A child suffering from diarrhea should be given liquid, semi-liquid food and should be fed frequently. 93.4 percent of mothers respond well to this. Rest 6.6 percent of mothers are not aware of this due to illiteracy.

Mothers were judged to know about awareness of the use of ORS in the management of diarrhea. 84.4 percent of mothers are aware of its use in tribal areas as compared to 89.5 percent of mothers in non-tribal areas (Table 4). Some outdated feeding and caring practices are also prevalent in both tribal and non-tribal areas.

The environment and the living conditions play a major role in a child's growth and health. The influence of the macro-environment, including social, economic, and cultural variables, on child-rearing practices, is well established. But the micro-environmental conditions such as poor housing and sanitation have been implicated in the synergism of malnutrition and infection. Living conditions and sanitary conditions are assessed in the study area by observation method and by making inquiries from mothers regarding the cleanliness and hygiene maintained (Table 5). The main source of water is tap (82.5 percent) while other sources are spring (10.0 percent) and *bauri* (7.5 percent). Out of total households surveyed in tribal and non-tribal areas, only 81.5 percent of houses have a separate room for a kitchen while 10.5 percent of houses have no separate kitchen. The frequency of cleaning the kitchen also varies. In the control province, all houses have a separate kitchen in good condition. Out of 350 households surveyed in tribal and non-tribal areas, 16.5 percent of women clean their kitchen daily while 11.7 percent clean only once a month and remaining 45.1 percent and 26.8 percent clean the kitchen once a week and once fortnightly. It is found that 49.4 percent of kitchens have satisfactory conditions. 37.4 percent of kitchens in tribal and 20 percent of kitchens in non-tribal areas have poor conditions. In total, only 24.2 percent of kitchens are in good condition (Table 5). In the control group, the conditions of the kitchen in terms of cleanliness are good.

Availability of sanitary facilities is observed in tribal and non-tribal areas and it is found that 56.9 percent of houses in tribal and 70 percent of houses in non-tribal areas have toilets whereas 30.8 percent of people in tribal and 16.4 percent of people in non-tribal areas go outside. 12.3 percent of people in tribal and 13.6 percent of people in non-tribal use common toilets (Table 5). The scenario is altogether different in the control area in all respects. All houses have proper sanitary facilities. Out of the total houses surveyed in tribal and non-tribal areas, 40.2 percent are *kuccha* houses and 42.2 percent are *puccka* houses, whereas all houses in the control area are *puccka*. Conditions of the house in terms of maintenance, cleanliness, and garbage disposal are also assessed. It is found that 37.4 percent of houses in tribal and 20 percent in non-tribal areas are in poor condition while 44.3 percent of houses in tribal and 52.3 percent in non-tribal conditions are satisfactory and only in whole 24.1 percent of houses are in good condition (Table 5). But the conditions of the house in the control area are good in all respects. Binary logistics is run and it is seen that condition of the house has a positive coefficient with regard to nutritional status and better living conditions. Thus, the study indicates that malnutrition among children depends on both better living conditions and dietary intake. Malnutrition among children is much higher among those with poor housing and sanitary conditions even with the same level of dietary intake whereas, in spite of low dietary intake, the level of malnutrition is much low for those living in better sanitary conditions. Similar results are obtained by Yadav and Singh (1999) in their study conducted on tribal children of Bihar.

The study revealed that people are still inclined to follow the traditional and outdated methods of feeding of infants. Practices such as discarding of colostrum, unhygienic methods of feeding pre-lacteal feed to the child, late start of breast feeding after the child birth at the behest of elders, early or late start of supplementary food has telling effect on child health. Living and sanitary conditions were assessed by observation method and by making enquiries from mothers regarding the cleanliness and hygiene.

CONCLUSION

There is a need to formulate realistic health development plans based on need as felt by people in these areas. Healthy nutrition can be encouraged through local produce and local recipes. What all is required to do about food habits, old and new is to protect, support and help preserve the existing good food habits. And if some unhealthy dietary practices exist, it is very essential to first of all understand the knowledge and customs of the people who follow such practices and then slowly eradicate them. Factors which affect the child health, like nutritional needs during pregnancy, immunization of children harmful practices of discarding colostrums, delayed initiation of breastfeeding, proper time for starting supplementary food should be included in health education programmes. Awareness should be generated among mothers to protect, support and promote breast-feeding, proper time of weaning, and to eliminate promotion of breast milk substitutes, bottle feeding and manufactured baby foods. The use of

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locally available complementary foods should be encouraged. There is need to examine the effectiveness of existing programmes related to mother and child health, identify their limitations and feasibility.

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Table 1. Status of breast feeding and weaning among tribal and non-tribal mothers

Sr. No.	Query	Response	Tribal		Non-tribal		Total		Control	
			No.	%	No.	%	No.	%	No.	%
1.	Is colostrum fed to the child after birth?	Yes	102	78.5	140	63.6	242	69.2	35	100.0
		No	28	21.5	80	36.4	108	30.8	-	-
2.	When is the breast milk started?	Within one hour of birth	120	92.3	124	56.4	244	64.0	30	85.7
		Between 12-14 hours	6	4.6	22	10.0	28	8.0	3	8.6
		Second day	3	2.3	26	11.8	29	8.2	2	5.7
		Third day	1	0.8	48	21.8	49	14.0	-	-
3.	What is given to the child just after birth?	Honey	27	20.8	65	29.6	92	26.6	25	71.4
		Sugar and water	21	16.2	30	13.6	51	14.5	-	-
		Gur and water	11	8.5	104	47.3	115	32.8	-	-

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		Breast milk	71	54.6	21	9.5	92	26.2	10	28.6
4.	Duration for which child should be given exclusively breast milk	4-5 months	120	92.3	44	20.0	164	46.8	21	60.0
		7-8 months	6	4.6	140	63.6	146	41.7	-	-
		Up to 1 year	3	2.3	33	15.0	36	10.2	14	40.0
		More than 1 year	1	.8	3	1.4	4	1.1	-	-
5.	Duration for which child was breast-fed	No feeding	0	0	3	1.4	3	1.4	-	-
		0- 3 months	1	.8	21	9.5	22	6.2	6	17.1
		3-6months	6	4.6	6	2.7	12	3.4	5	17.2
		6-9 months	8	6.2	16	7.3	24	6.8	13	37.1
		Less than 2 years	59	45.4	121	55.0	180	51.4	10	28.6
		2-3 year	56	43.1	53	24.1	109	31.1	-	-
6.	Why was breast-feeding stopped?	Insufficient milk	18	13.8	27	12.2	45	12.8	17	48.6
		Sickness	12	9.2	20	9.1	32	9.1	7	-
		Pregnancy	29	22.3	100	45.6	129	36.8	-	20.0
		Work	15	11.5	20	9.1	35	10.0	11	31.5
		Didn't stop feeding milk before 2 years.	56	43.0	53	24.0	109	31.1	-	-
7.	Method of stopping breast feeding.	Gradual	82	63.1	144	65.5	226	64.5	33	94.3
		Abrupt	48	36.9	76	34.5	124	34.5	2	5.7
8.	What was used to stop breastfeeding?	Nothing	103	79.2	153	69.5	256	73.1	35	100.0
		Some material	27	20.8	67	30.5	94	26.9	-	-
9.	Method of feeding milk to child	Bottle	7	5.4	25	11.4	32	9.1	33	94.3
		Only breast milk	50	38.5	134	60.9	184	52.5	2	5.7
		Cup/spoon	54	41.5	53	24.1	107	30.5	-	-
		Glass	19	14.6	8	3.6	27	7.7	-	-
10.	View regarding the nature of breast milk.	Good	130	100.0	220	100.0	350	100.0	35	100.0
		Bad	0	0	0	0	0	0	-	-
11.	When to start supplementary food	3-4 months	4	3.1	15	6.8	19	5.4	-	-
		4-5 months	10	7.7	25	11.4	35	10.0	-	-
		5-6 months	18	13.8	44	20.0	62	17.7	35	100.0
		6-7 months	25	19.2	68	30.9	93	26.5	-	-
		7-8 months	53	40.8	52	23.6	105	30.0	-	-
		8-9 months	19	14.6	16	7.3	35	10.0	-	-
		After 1 year	1	.8	0	0	1	0.8	-	-
12.	Reason for starting early supplementary food.	Stopped feeding breast milk because of second pregnancy	8	57.1	15	37.7	23	42.5	-	-
		Stopped feeding breast milk because of job	6	42.8	25	62.5	31	57.5	-	-

Source: Primary Survey

Table 2. Awareness regarding feeding of colostrum among tribal and non-tribal area

Education	Non- Tribal				Tribal			
	Yes		No		Yes		No	
	No.	%	No.	%	No.	%	No.	%
Illiterate	9	6.4	40	50.0	26	25.4	16	57.1

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Up to 5th	0	-	6	7.5	0	-	0	-
Up to 8th	37	26.4	12	15.0	29	28.4	2	7.2
Matric	45	32.2	13	16.3	15	14.7	3	10.7
Plus Two	24	17.2	1	1.2	12	11.7	0	-
Graduation	25	17.8	8	10.0	20	19.8	7	25.0
Total	**140**	**100.0**	**80**	**100.0**	**102**	**100.0**	**28**	**100.0**

Source: Primary Survey

Table 3. Chi-square results for variance in response with regard to duration of breastfeeding

Area	Duration for which Breastfed							Chi Square results			
	0 months	0- 3 months	3-6 months	6-9 months	1-2 months	2-3 months	Expected frequency	Tabulated value at degrees of freedom (df)	Chi Square Value		Level of significance
	No.	No.	No.	No.	No.	No.		df	value		
Tribal	0	1	6	8	59	56	26.0	4	18.5	128.3	0.001
Non-Tribal	3	21	6	16	121	53	36.7	5	20.5	276.1	0.001
Control	0	0	6	6	13	10	8.8	3	4.11	3.971	0.265

Source: Primary Survey

Table 4. Infant feeding practices among tribal and non-tribal areas

Sr. No.	Query	Response	Tribal		Non-tribal		Total		Control	
			No.	%	No.	%	No.	%	No.	%
1.	Number of times child is fed	Twice a day	3	2.3	21	9.6	24	6.8		
		Thrice a day	122	93.8	160	72.7	282	80.5	32	91.4
		3-4 times a day	5	3.8	39	17.7	44	12.5	3	8.6
2.	Frequency of cooking special food for child	Once a week	55	42.3	78	35.5	133	38.0	-	-
		Daily	5	3.8	4	1.8	9	2.5	18	51.4
		Alternate days	4	3.1	11	5.0	15	4.2	17	48.6
		Once in 15 days	7	5.4	11	5.0	18	5.1	-	-
		Once a month	4	3.1	30	13.6	34	9.7	-	-
		Never	55	42.3	86	39.1	141	40.2		
3.	Interested in learning new methods of cooking	No	65	50.0	79	35.9	144	41.2	-	-
		Yes	65	50.0	141	63.1	206	58.8	35	100.0
4.	Child is fed by	Mother	94	72.3	165	75.0	259	74.0	32	91.4
		Grandmother	12	9.2	20	9.1	32	9.1	3	8.6
		Both	18	13.8	35	15.9	53	15.1		
5.	Children have separate plate	Yes	130	100.0	220	100	350	100.0	35	100.0
		No	0	0	0	0	0	0	-	-
6.		Separately	47	36.2	29	13.2	76	21.7	-	-

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	Food consumption by parents and children	Together	83	63.8	191	86.8	274	78.2	35	100.0
7.	Breakfast consumed by child	Yes	130	100.0	220	100	350	100.0	35	100.0
		No	0	0	0	0	0	0	-	-
8.	Lunch consumed by child	Yes	130	100.0	220	100	350	100.0	35	100.0
		No	0	0	0	0	0	0	-	-
9.	Boiled/filtered drinking water	Yes	22	16.9	62	28.2	84	24.0	35	100.0
		No	108	83.1	158	71.8	266	76.0	-	-
10.	Child suffering from diarrhea should be given liquid, semi-liquid food and should be fed frequently	Yes	130	100.0	197	87.2	327	93.4	35	100.0
		No	0	0	23	10.4	23	6.6	-	-
11.	Awareness regarding ORS	Yes	110	84.6	197	89.5	307	87.7	35	100.0
		No	20	15.4	23	10.5	43	12.3	-	-
12.	Who is fed first among family members	Elders	25	19.2	26	11.8	51	14.5	-	-
		Children	105	80.8	191	86.8	296	84.5	35	100.0
13.	If the child cries, then *dhuni*[1] should be given.	Yes	120	92.3	162	73.6	282	80.5	-	-
		No	10	7.7	58	26.4	68	19.5	35	100.0
14.	Applying *kajal*[2] in baby's eye is dangerous for eyes.	Yes	108	83.1	177	80.5	285	80.5	35	100.0
		No	22	16.9	43	19.5	65	18.5	-	-
15.	First and last chapatti should not be given to child.	Yes	24	18.5	113	51.4	137	39.1	-	-
		No	106	81.5	107	48.6	213	60.9	35	100.0

Source: Primary Surve

Table 5. Awareness among tribal and non-tribal mothers regarding hygiene and surrounding

Sr. No.	Query	Responses and observations	Tribal		Non-tribal		Total		Control	
			No.	%	No.	%	No.	%	No.	%
1.	Source of water	Tap	90	69.2	197	89.5	287	82.5	35	100.0
		Spring	37	28.5	0	0	37	10.0	-	-
		Bauri	3	2.3	23	10.5	26	7.5	-	-
2.	Do you have a separate room which is used as a kitchen	Yes	91	70.0	194	88.2	285	81.5	35	100.0
		No	39	30.0	26	11.8	65	10.5	-	-
3.	Frequency of cleaning the kitchen	Daily	36	27.5	22	10.0	58	16.5	35	100.0
		Once a week	38	29.0	120	54.5	158	45.1	-	-
		Once in 15 days	41	31.3	53	24.1	94	26.8	-	-
		Once a month	16	12.2	25	11.4	41	11.7	-	-
4.	Conditions of kitchen	Poor	49	37.4	44	20.0	93	26.5	-	-
		Satisfactory	58	44.3	115	52.3	173	49.4	-	-
		Good	24	18.3	61	27.7	85	24.1	35	100.0

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[1] A type of smoke usually created by burning some seeds or spices in fire and infants are made to inhale it. These seeds are usually obtained from priest and this is done to prevent the child from evil eye.

[2] It is black soot prepared by burning an oil lamp. This is applied in baby's eyes to prevent from evil eye.

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5.	Where you go to answer natural call	Toilet	74	56.9	154	70.0	228	65.1	35	100.0
		Outside	40	30.8	36	16.4	76	21.7	-	-
		Common toilets	16	12.3	30	13.6	46	13.1	-	-
6.	Type of family	Nuclear	101	77.9	137	62.3	239	68.2	19	54.3
		Joint	29	22.1	83	37.7	112	32.0	16	45.7
7.	Type of house	*Kuccha*	61	46.6	80	36.4	141	40.2	-	-
		Puccka	37	28.2	111	50.5	148	42.2	35	100.0
		Semi-*Puccka*	33	25.2	29	13.2	62	17.7	-	-
8.	Conditions of house	Poor	49	37.4	44	20.0	93	26.5	-	-
		Satisfactory	58	44.3	115	52.3	173	49.4	-	-
		Good	24	18.3	61	27.7	85	24.1	35	100.0

Source: Primary Survey

Socio-Cultural Significance of the Training of Physical Culture Activists in the Care of the Elderly in the Community

Lourdes María González Benavente[1], Milvia Carrera Sáname[2], Modesta Mayo Abraham[3]

SUMMARY: This article addresses the theoretical and contextual references, based on the epistemological characterization, in particular the training of Physical Culture activists in the care of the elderly in the community context; the essential theoretical considerations about the investigated problem are established; actions by which the process flows and the changes that mark historical standards that determine it are presented, based on the importance of the issue for the training of activists to confront this age group, a documentary analysis was carried out and the methods of analysis and synthesis and logical history.

KEYWORDS: Activist, Older Adult, Physical Culture, Training.

INTRODUCTION

In the new scenarios that draw the advancement of science and technology, the Cuban university works on the path of its social commitments engaged today in the process of resizing for greater quality of universalization, channeled from the production of science and technology of scope universal with territorial landing, towards the purpose of social appropriation of sustainable knowledge for the development of its territorial environments, (Núñez J.2006., 2007, 2008; Díaz - Canel, 2011 and Aguilera, 2016).

Starting from the previous theoretical position, what is addressed by Núñez is assumed, that when talking about science refers to an extraordinary social force with marked economic, ethical, political resonances, an issue that becomes evident fundamentally at the end of the 20th century and the beginning of the 21st.

Science has very diverse expressions in education, in industry, in services, in consulting and management tasks carried out by people who have a scientific education. In these and other areas, science has a relevant presence. The analysis of these contexts, not reducible to the laboratory environment, offers additional possibilities to grasp the science-society links. Science is an institutionalized professional activity that involves prolonged education, internalization of values, beliefs, development of styles of thinking and acting. Science is a whole culture and that is how it should be studied (Núñez, 2006).

It cannot be denied that science and technology have brought enormous benefits to the world, that humans have not known how to take advantage of them and that they have allowed the practice of knowledge that has given rise to great repercussions of socio-cultural, educational, economic impact. and political that help with development or development by making decisions about scientific and technological knowledge.

The current historical moment comes from prepared citizens and creators of new knowledge, appropriate to the scientific method, to use it according to society.

In this problem, Revolutionary Sport in Cuba has its bases in the activists, since there have been several sporting glories that have been discovered thanks to the tireless work carried out by these people, this being a reality, that is outside of any statement, of any slogan, of all speech. Its important role is closely linked to the new stage, for this it is necessary to achieve an adequate preparation of this movement and keep up to date on the problems and forms of organization of physical activity in general.

In the document on the Guidelines for the economic and social policy of the party and the revolution for the period 2016-2021, in chapter V. Science, Technology, Innovation and Environment Policy, it is stated:

Prioritize the comprehensive improvement of the Cuban sports system, adjusted to both national and international conditions. Continue promoting the development of Physical Culture and achieve the massive practice of sport that contributes to raising the quality of life of the population, having the school as a fundamental link. Maintain satisfactory results in international events. (line 134.).

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Later in chapter VI on social policy it is stated:

Promote the integral and full development of human beings. Continue consolidating the achievements of the Revolution, such as access to medical care, education, culture, sports, recreation, justice, citizen peace, social security and protection through Social Assistance to people who they need it. Promote and reaffirm the adoption of the values, practices and attitudes that should distinguish our society. (lin113).

At present, interest in the study of this topic is increasing based on the guidelines of the higher body, in correspondence with the development plans of the Revolution, in order to raise the quality of life of the population. The activists voluntarily contribute to the well-being of the people through the practice of physical exercise in the different spheres of sports action, leading the movement in the sports field that exists in the neighborhood and being an example to be followed by the inhabitants of a certain region.

The Voluntary Sports Councils (CDV) which are located in all the communities of the national territory, are organized in factories, cooperatives, units of the FAR and the MININT, communities, work centers and constituencies of the municipal councils of People's Power, place where there is a massive movement of sport for all.

The activists of the Community Physical Culture carry out a high level of responsibility in the fulfillment of their function, worker, medium technician or intellectual, who feels identified with Sport, Physical Culture or Recreation.
Taking into account the importance of this process, it was considered necessary to carry out a factual diagnosis that started from the application of different instruments, in the number one team Mártires del Barbados, which allowed us to verify the following manifestations:

- Insufficiencies in the deepening, expansion and updating of the contents of the activist in community work that limit their work.
- Scarce participation in actions to improve care for the elderly.
- Limited performance of community activists in training in sports science and technology related to care for the elderly.

From the assessment of the theoretical foundations and the factual diagnosis, it can be inferred that there are epistemological and praxiological restrictions that are expressed in the understanding, explanation and interpretation of the training of Physical Culture activists.

It is revealed as a scientific research problem: How to contribute to a better understanding of the need and importance of training Physical Culture activists in the care of the elderly in the community context?
From this epistemic consideration, which marks the imprint of this dialectical relationship, it is determined in the logic of scientific research, a causal assessment, where it is specified:
- Insufficient epistemological and methodological approach in understanding and explaining the training of the Physical Culture activist.
- Limited actions aimed at training physical culture activists in caring for older adults in their community performance.
- Limited praxiological procedures in the strategic order at the level of sports teams, based on training, of the Physical Culture activists, in the care of the elderly.

In this way, Community Physical Activity (AFC) aimed at the elderly and its methodological theoretical conception contributes in the community to counteract the tendency to incorrect eating habits that have a significant impact on the health status of the population through its education in how to maintain a responsible lifestyle in the social environment where they live. All this, combining the criteria that are related to the contextualization and the popular sense that is built in the locality, in correspondence with its characteristics and the training of the activists who work with this age group.

In Cuba, the indications, programs, agreements with agencies, organizations and institutions of INDER and the studies by Rivero (2014), Bequer, (2015) and Revilla, (2016) are an example of the process of building safe and sustainable opportunities in which Community Physical Activity (AFC) programs are projected, in the author's opinion theoretical and methodological inconsistencies are evident in the training procedures of Physical Culture activists to achieve growth in the lifestyle of older adults within of the community context that leads to suggest that until now a sufficient level of systematization has not been achieved to project its dynamics in the community context.
It is expressed as an objective: Propose actions that contribute to a better understanding of the need and importance of the training of Physical Culture activists, in the care of the elderly in the context of the community.

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In order to achieve the proposed general objective, the following specific objectives are formulated to guide the development of the research:

1. Specify from the conceptual point of view what is meant in this research by the training of Physical Culture activists.
2. Determine socio-cultural requirements that demonstrate the need and importance of training Physical Culture activists, in the care of the elderly in the context of the community.
3. Propose actions that contribute to a better understanding of the need and importance of training Physical Culture activists, in the care of the elderly in the context of the community.

DEVELOPING

Conceptual precisions on training raining is conceived as a social and cultural process that obeys the character of the integrity of the development of the human transforming capacity that occurs in the dynamics of relationships between subjects in society, in constant and systematic relationship, capable of empowering and transform their behavior into knowing, doing, being and living together.

This process allows each subject the deepening of the socio-cultural content, at the same time that it reveals itself contradictorily in the process of human development, whether in a totality, as in individuality, in the subject and his thought, which runs based on the continuity that allows qualitative leaps in human development, from the appropriation of culture (Fuentes, 2008).

The determining role of education in society and the dynamics of interrelationships that occur in it are not limited to education, but have socio-cultural significance in the conception of what should be, the perception and resolution of society's problems that transcend the immediate present.

These interrelationships encompass the person in particular and their contributions to the construction of society, give rise to new practices, new worldviews, specific ways of facing the challenges that are imposed by the emerging changes in their context, their history and culture from the interaction with their peers, given their potential as a particular and social subject.

A study of official documents from international political and academic organizations on the link education and society, although referring to higher education, analyzes the role that training plays for socio-economic development from a reduced vision of society, framed in powerful companies and interests. of the developed world, to the detriment of less developed countries; and a broader vision that recognizes the value of education for the construction and progress of society, based on human development and social inclusion. (Ortiz, 2016)

As a subject of education, the sports activist is a main actor for society, a transmitter of the culture that has preceded him and a facilitator of learning through the educational process, which, according to Vygotsky, must be "planned, organized and anticipated by the subject development. Vygotsky quoted by Martinez, (2015). That is, the training process is required.

The pedagogical task has become the center of attention of researchers, appearing as one of the most important aspects of society, to assume the challenges that are emerging from the situations in which social development is built, as Perrenoud affirms, (2001), must anticipate the transformations. The studies cover initial and continuous or permanent training, Pérez, (2010); Alvarado, (2013); Castro, (2014); UNESCO; (2014).

It is clear that training should not be accidental and spontaneous, nor is it limited to those who start as educators; it is fundamental for all the educational actors that participate in the processes of cultural development, of the type of human being and inclusive society that it wants to perpetuate

The university is the social institution that preserves, develops and disseminates universal, national and regional culture with the best characteristics. The influence of the university becomes more evident as societies become more developed, but the relevance, optimization and impact of the university as a preserver, developer and disseminator of culture is not achieved spontaneously nor does it depend only on subjective criteria, this is a consequence of the application of science to the study from inside and outside (Fuentes, 1999), is agreed when it is stated that social development needs robust universities (.Núñez, 2007). It must fulfill universally recognized functions such as teaching, research, management of human and material resources, technical and scientific support to companies, the creation, development and critical transmission of science, technology and culture, the extension of university culture to society and preparation for the exercise of professional activities that require the application of scientific knowledge and methods or for artistic creation. (Bozu, 2008). Quoted by conception.

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MAIN SOCIO-CULTURAL DEMANDS OF THE TRAINING OF PHYSICAL CULTURE ACTIVISTS IN THE COMMUNITY.

There are multiple investigations related to the training of Physical Culture activists, among them the works of Aguilera (2014); Soda, (2014); Betancourt, (2015); Alvarez,(2017); Cazeguene, (2018) and Cotelo; (2018) analyze it from the didactic training process of the community sports activist, Suarez, (2017), face it from the selection of talents, Suarez, (2018), from the voluntary female sports activism and this author in 2020 addresses it from the contents of the subject History of Physical Culture

The investigations carried out around the training of Physical Culture activists denote significant contributions in the conceptions, models and strategies to structure and dynamize the training process, however, regarding the problem of training the Physical Culture activist in the care of the elderly, there are still limitations in the theoretical constructs that hinder the understanding, explanation and interpretation of this process, based on the recognition of assumptions related to transformation, which respond to the demands of contemporary development.

In the document Methodological Indications for Community Physical Activity 2008-2030, the specific objective is: To improve the quality, effectiveness and growth of systematic practitioners in physical activity programs, with special attention to the aging process and non-communicable diseases, contributing for our communities and work centers to be more active for the health of the population expresses within its main guidelines; strengthen the systemic character of continuous improvement and training, prioritizing the differentiated character and developer of the methodological preparation of all human resources (managers, teachers and activists).

Further on, it refers to the action plan that must be developed among those indicated.

• Increase spaces, offers and systematic practitioners of physical activities in its various programs, to achieve permanence and quality of services.
• Reinforce training actions, reaching sports activists in the community.
From what is expressed in the documents and in correspondence with the stated objective, it is possible to infer four important ideas:
• The starting point should focus through the diagnosis of educational needs.
• The training of Physical Culture activists in care for the elderly must be comprehensive and systematic.
• For the training of Physical Culture activists in the care of the elderly, the permanent nature of individual improvement must be taken into account, regardless of the experience acquired.
• Knowledge, culture and identity of the community in which they are going to interact with the older adult.
Action plan for the training of the Physical Culture activist in the care of the elderly in the community

ACTIONS

1 Review the bibliography and search digital archives for activist information. (Libraries, digital archives, university campuses and faculties of Physical Culture) that serve as coordinators of actions related to the training of Physical Culture activists.
2 Incorporate training courses for the Physical Culture activist in the care of the elderly in the community in the overcoming of Physical Culture cadres and their reserves.
3 Encourage research that serves as theoretical and methodological support for the projection of educational and scientific-technological policies with the participation of various actors for the training of Physical Culture activists on scientific bases.
4 Design in the individual plans of the teaching department and combined sports actions that contribute to the training of Physical Culture activists towards the different programs for the elderly.
5 Encourage training commitments in the different areas of knowledge in sports teams to provide content that contributes to the care of the elderly in the community.
6 Invite national or foreign personalities with recognized prestige and results in the different spheres of society's life to courses, events, conferences, etc., at universities.
7 Promote the use of social networks, radio and TV programs as an active source of updated information to promote activities related to the elderly.
8 Permanent study of the articles approved in the new family code related to the treatment of the elderly.

CONCLUSIONS

Socio, economic and cultural development in recent decades has had varied consequences in society in general and in education in particular, this has raised as a need and demand the socio-cultural training of Physical Culture activists, what has remained

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evidenced both in the scientific literature and in the normative documents of the National Institute of Sport, Fiscal Education and Recreation.

The proposed actions consider sports teams and management teams as key actors, for the realization of the necessary actions to project educational policies or guidelines that support the training of Physical Culture activists in the care of the elderly.

The implementation of the proposed actions to contribute to a better understanding of the need and importance of the socio-cultural training of Physical Culture activists supported by a STS approach requires the creation of a multidisciplinary working group, which could be inserted into the Observatory of work on the care of the elderly in the community and under the advice of the sports teams, although they would not be the only ones, with sports science specialists and professionals (sociologists, psychologists, specialists and communicators) playing a significant role. Information in order to improve the quality of life of this age group.

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A Renewal Attempt at a Bill in Indonesia's Criminal Law: A Study of the Development in the Norm of Rejang Customary Law

Herlambang[1], Helda Rahmasari[2], Randy Pradityo[3]
[1,2,3] Fakultas Hukum Universitas Bengkulu, Jl. WR. Supratman, Kandang Limun, Kota Bengkulu

ABSTRACT: The inventory of Rejang Customary Law norm, specifically in Bengkulu Tengah regency, in line with the Indonesia's Law Renewal Policies. All of the way to strengthen the local wisdom, including the case resolution mechanism within National political Law, are all been stated in National Policies, started when it was stated in the Presidential Regulation of the Republic of Indonesia No. 7 Year 2005 concerning the National Medium term development plan (RPJMN) in 2004-2009, which already written to reform the law system and politic in the next five years. Therefore its necessary to conduct research on customary court, especially on customary law in Rejang community whose domiciled in Bengkulu Tengah. Some of the question that needed to be answered in this research is which forms, term, norms and reaction are there that of the Rejang Customary Law that still apply in the communities that occurs in Bengkulu Tengah regency that related to crimes against one's dignity and life. This research is an empirical law research, which examines the law as a fact and the application of law in the Rejang society in Bengkulu Tengah regency. Regarding to crimes agaiths the dignity and life of a person, there are several institution of Customary Law norm with respective reaction/sanction, namely *Menggomboa, Tekleseng, Tekabeak, Ngabeak, Iram Coa Berdaleak, Cido Celako, Upet, Johong Pemayo, Begaseak, Bangun Kenyayo, Cempalo Tangan, Bangun mayo, Kerineak*. While customary reaction to violation of customary norms relating to the dignity and the life of a person are *Minai Maaf and or Tentok Kambing, and or Tepunjung, and or kedendo, and or Tepung Tabea (Setawar Sedingin)*, expulsion, or signing a letter of Peace Agreement.

KEYWORDS: Criminal Law, Customary, Indonesia, Norms, Rejang, Renewal

BACKGROUND

Currently, the Rejang Ethnic Nation, apart from living in Rejang Lebong Regency, also makes up the majority of Citizen that lives in Lebong Regency, Bengkulu Utara Regency, Kepahiang Regency, as well as Bengkulu Tengah Regency in Bengkulu Province. [1] The area of Bengkulu Tengah Regency which is the research location is a new regency that established in 2008, based on "Undang-Undang Nomor 24 Tahun 2008" that is a division of Bengkulu Utara Regency. [2]

The importance of this research used with Theoretical research is to anticipate the ratification of the Draft of Criminal Code (RKUHP) as a positive law in Indonesia. Section 2 of the (RKUHP) that translated into english stipulates that;

1. The provision as referred in Section 1 Article (1) did not reduce the enactment of the Law that lives in society that determine a person deserves to be punished even though the act does not regulated in the Law.
2. The law that use in society as reffered to in Article (1) applies in the place where the law exists and as long as it is not regulated in this law and is in accordance with the values contained in Pancasila, the 1945 Constitution of the Republic of Indonesia, human rights, and general legal principles that had been recognized by the society.[3]

Based on the norms of Section 2 of RKHUP, every ethnic group that has its customary law should immediately prepare a compilation of customary law with regard to customary criminal law norms, or theoretically known as "*Adat Delicten Recht*". [4] In addition of needing an inventory of the norm of Law for Rejang Customary Law that related to *Delicten Recht Custom,* its also necessary to take a certain action to the violation of the custom with customary reaction. In the Law language of the state, the reaction itself are sanctions. The Customary Reaction/Customary Sanction serves to restore the balance that has been disturbed due to the violation of the custom. [5] In addition, an inventory of reactions/Rejang Customary Law witnesses is also needed as an attempt to anticipate the ratification of the RKUHP, especially with regard to the formulation of criminal sanctions. As regulated in Section 66 of the Draft Criminal Code.

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1. Additional penalties as referred to in Section 64 letter b consist of revocation of certain rights, confiscation of certain goods and/or claims; announcement of judge's decision; compensation payment; revocation of certain permits, and fulfillment of local customary obligations.
2. Additional punishment as reffered to in Article (1) may be imposed in event that the imposition of the principal sentence alone is not sufficient to achieve the purpose of the punishment.
3. Additional penalty as reffered to in Article (1) may dropped 1(one) type or more.
4. Additional penalty for probation and assistance are the same as additional penalties for criminal acts.[6]

Additional sanction for fulfilling customary obligation mus tbe adjusted to the provisions of the customaty law for ethnic group in Indonesia, for example in Bengkulu Regency if the perpetrator and/or victiom is a residenr of Rejang ethnic group, the fulfillment of customary obligations should be according to Rejang Customary Law.

The distribution of the Rejang ethnic group in Bengkulu Tengah Regency included, *Taba Penanjung* District, *Merigi Kelindang* District, *Merigi Sakti* District, *Bang Haji* District, and *Pematang Tiga* District. In addition, in other Sub-Districts such as *Talang Empat* and *Pondok Kubang*, the majority of the population comes from the *Lembak* ethnic group, while the *Karang Tinggi* Sub-District has the majority of the population from the *Serawai* ethnic group.[7]

The inventory of Rejang Customary Law also theoretically useful for finding alternative models of dispute resolution/criminal law violations, without the mean to use the state court facilities.[8] Developing alternate dispute resolution/traditional violations/violation of criminal law norm that are comparable to Rejang Customary Law Norms through customary court or outside state courts. Customary court are different from state courts, while the characteristic of customary court are;

By pulling the element of section 51 of Law Number 21 of 2001 above, the concept of customary justice is as follows:

1. Customary court is a judical system that lives in customary law community units in Indonesia;
2. Customary court are based on sutomary law;
3. Customary court are not part of the state court system;
4. Customary court have the authority to adjudicate the customary cases, both in the form of disputes and violation of customary law;
5. Customary court have the authority to adjudicate cases between members of the customary law community units.[9]

Customary courts are one of the alternative dispute resolution mechanisms other than state courts. Dean G Pruitt adn Jeffrey Z. Rubin, introduced a theory of dispute resolution called "The Theory of Dispute Resolution Strategies" namely *Contesting*, which is trying to apply a solution that is preferred by one of the oher parties. The second one namely *Yielding,* which is lowering one's own aspirations and being willing to accept the shortcomings of what is actually desired. Third namely *Problem Solving*, which is to find a satisfactory alternative for both parties. Fourth namely *Withdrawing*, whis is choosing to leave the dispute situation both physically and Psychologically. And then Fifth namely *Inaction*, which is doing nothing [10]

Inventory of Rejang Customary Law Norms, especially for those in Bengkulu Tengah regency, is in line with the policy of law reform in Indonesia. The direction to strengthen local wisdom – including the mechanism for resolving cases, already stated in the Presidentioal Regulation of the Republic of Indonesia Number 7 of 2005 in national legal policies concerning the National Medium Term Development Plan (RPJMN) of 2004-2009. In this Regulation, the policy direction formulated to reform the law system and politics for the next five years. In accordance with the identified problems, the policy direction to reforming the law system and politics focuses on the three problems that have been described, namely improving the Law Substance (material), Law Structure (institutional), and Law Culture. In relation to improvement of Law Substance, the improvement are made through effort to reorganize through review and rearrengement of laws and regulations by taking into account the general principles and hierarchy of laws; and respect and strengthen local wisdom and customary law to enrich the law and regulatory system through the empowerment of Jurisprudence as part of efforts to reform national law. [11]

PROBLEM

Regarding to the need of conducting research on customary law, especially on customary law in Rejang community whose domiciled in Bengkulu Tengah regency, several questions need to be answered in this study, namely what are the forms, term, norm, and customary law reaction of Rejang ethnic in Bengkulu Tengah regency that are still in effect in the society that related to crime toward one's dignity and one's life ?

METHODS

This research is an empirical law research, which examines the law as a fact and the application of law in society in Rejang ethnic in Bengkulu Tengah regency. The data used in this research is primary data that obtained and collected from the informants/

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respondents whose been selected adn determined. This people that have become sources of information are,

1. Customary Chief
2. Village Chief
3. Religious figures
4. Community Leader

In addition, secondary data also used from library resources, both literature and the result of research conducted by others as well as other's journal article. The primary data collection method was carried out by observation and in-depth interview with the informants. Meanwhile, secondary data collected by conducting a Law literature search. The data that has been collected then selected (editing) and the data that is still considered insufficient is re-collected. If the datais considered sufficient, then grouping is carried out according to the formulated problems. The conclusion which is the answer to the problem is formulated using inductive thinking.

DISCUSSION

Based on the result of research conducted in the regency, there are several Rejang Customary Law Norms regarding violations of one's body, which are still known, valid and obeyed by the Rejang ethnic community in Bengkulu Tengah regency. These norm are known by certain names, which is;

1. *Menggomboa*
2. *Tekleseng*
3. *Tekabeak*
4. *Ngabeak*
5. *Iram Coa Berdaleak*
6. *Cido Celako*
7. *Upet*
8. *Johong Pemayo*
9. *Begaseak*
10. *Bangun Kenyayo*
11. *Cempalo Tangan*
12. *Bangun mayo*
13. *Kerineak*[12]

Menggomboa is an act of customary violation that occurs when a group of people who attack other people causing injuries to the victim or leaving scars in the form of swelling/bump in the body. *Tekleseng*, is an act of customary violation that occurs when a person accidentally pushes and/or makes other person fall, causing abrasions to a certain body part. *Tekabeak* is an act of customary violation that occurs when someone swinging a sharp weapon in the form of a machete or in the local language called "Pitat" which accidentally hits another person's body, causing injury or causing disability. If the act was on purpose in other to injure someone, then it called "Ngabea". *Iram coa bedaleak* is an act of customary violation that occurs when someone hits other person using a blunt object in the form of iron or wood, in a fight or outside a fight, which causes bruises and rashes on the skin, causes forms a blood clots under the skin where the part that got hit. *Cido celako*, is an act of customary violation that occurs when someone beating other using a blunt object which results in a disability in one of the other's limb. *Kejujung tenggak*, is an act of customary violation that occurs when someone who hit other person using either sharp weapon or a blunt object, in a fight or not in a fight which result in defect in the five senses or scars that cannot be removed on the face. *Upet*, is an act of customary violation that occurs when someone has commited slander againts each other, resulting the other person get excluded from association in society or the loss of people's trust in him. *Johong pemayo*, is an act of customary violation that occurs when someone uses magic power, mainly black magic and curses to make someone sick or die. *Begaseak*, is an act of customary violation that occurs when a fight between people, whether usinhg tools or not, which causes bruises on the part that was hit. *Bangun Kenyanyo*, is an act of customary violation that occurs when someone is crashing other people with a motorbike or car causing injuries or dies. *Cempalo tangan*, this term is not only known in the Rejang ethnic community but is widely known as a customary violation in Southern Sumatra, this term is used in the traditional lawbook of Southern Sumatra which was compiled by the Dutch colonialists. One's is said to have done *Cepalo tangan* when using his/her hand to hurt/hit other people. *Bangun mayo*, is an act of customary violation that occurs when someone hitting, using a sharp weapon, blunt object or just his/her hands, which leaves

a rotting stab wound. *Kerineak*, is an act of customary violation that occurs when someone who is not known by a community or "*Kutei*" occurs because one's lives in a village without reporting to the village chief, and his/her behavior is suspicious.

The customary sanction or customary reaction [13] that are given to the perpetrators of an act violates customary law norms relating to the one's dignity and life in the Rejang ethnic in Bengkulu Tengah regency are; *Minai Maaf*, *Tentok Kambing*, *Punjung*, *Kedendo*, *tepung Tabea* (Setawar sedingin), expulsion from residence,signing a peace agreement. [14]

a. Apologizing (*Minai maaf*), this asking for forgivenessact is the lightest form of sanction. Perpetrators who violate the customary laws are obliged to apologize to the victim and to the village community for causing uneasiness in the community.

b. Tentok kambing (Butchering a goat). The sanction for slaughtering a goat includes sanction for violation of customary law which are quite severe, because if a goat subjected to *Tentok kambing* sanction, of course there is also a *Sedekeak* (entertaining community) sanction.

c. *Kedendo* (Fine), this sanction applies to all customary violations. The amount of which is determined depending on the violation that has been commited, starting from 2 Rielas, 4 Rials, 6 Rials, 24 Rials, 40 Rials, and 80 Rials, which if converted equals to Rp. 25.000 per 1 Rials.

d. *Punjung*, usually in the form of tumeric rice in a shape of cone, surrounded by side dishes according to the capabilities of the person concerned, usually thereis one fried chicken on top or it can be replaced with other. This traditional sanction is usually given to perpetrator that are quite severe and up to serious customary violation.

e. *Tepung Setawar* (*Tabea flour/Setawar Sedingin*) is a form of sanctions given to the perpetrator of customary violations with the aim of cooling back the hot situation due to the actions of the perpetrator with a ritual. This sanctions usually done by sprinkling water that has flower drowned in it, on places that are considered polluted or dirty, such as the scene, the house of the traditional leader, the village chief, or the other public places.

f. Customary law sanction in form of expulsion from the perpetrartor's place

g. Letter of agreement, is a mandatory sanction for perpetrator who commit every violation from mild to severe. This letter contains the promise of perpetrator that he/she will not repeat the same action/mistake and signed by the parties and known by the village official and *Syarak apparatus.*

CONCLUSIONS

Regarding to crimes againts the dignity and life of oneself, there are several institutions of customarylaw norms along with customary reactions/sanctions, namely;

1. *Menggomboa*
2. *Tekleseng*
3. *Tekabeak*
4. *Ngabeak*
5. *Iram Coa Berdaleak*
6. *Cido Celako*
7. *Upet*
8. *Johong Pemayo*
9. *Begaseak*
10. *Bangun Kenyayo*
11. *Cempalo Tangan*
12. *Bangun mayo*
13. *Kerineak*

Customary reaction to violation of customary norms relating to dignity and life of oneself are; *Minai Maaf*, and/or *Tentok Kambing*, and/or *Punjung*, and/or *Kedendo*, and/or *tepung Tabea* (Setawar sedingin), and/or expulsion from residence, and/or signing a peace agreement.

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4) Ahdiana Yuni Lestari. Traditional law teaching materials, Muhammadiyah University of Yogyakarta, Faculty of Law. 2017. page 32. http://repository.umy.ac.id. Downloaded on 3 Januari 2021, at 11.06. as it is known that the term criminal law is a translation of the Dutch term "adat delicten recht" or the law of customary violations. The definition of customary offense law, according to Ter Haar, shows that there is a unilateral act which the other party expressly or secretly declares as an act that disturbs the balance. According to Van Vollenhoven, customary offenses are actions that should not be carried out even though in reality the event or act is only a small mistake.

5) Ibid, page 33. Reaction or correction actions in resolving the consequences of events that disturb the balance can not only be taken against the perpetrator, but also can be held accountable to the family or relatives of the perpetrator or the indigenous peoples.

6) Ibid

7) https://bengkulutengahkab.go.id. Downloaded on Thursday 6 November 2021 at 12.13.

8) the meaning of justice. https://www.pn-tanahgrogot.go.id . The court is the official state body or agency that implements the judicial system in the form of examining, adjudicating, and deciding cases. The form of the judicial system that is implemented in court is an official public forum and is carried out based on procedural law applicable in Indonesia to resolve disputes and seek justice in civil, labor, administrative and criminal cases. Everyone has the same right to bring their case to court, both to settle disputes and to seek protection in court for parties accused of committing a crime. Meanwhile, the judiciary is everything or a process carried out in the Court related to the task of examining, deciding and adjudicating cases by applying the law and/or finding the law "in concreto" (the judge applies legal regulations to real things that are brought before him for trial. and decided) to maintain and ensure compliance with material law, using the procedural methods established by formal law.

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13) The customary reaction is a series of events that aim to restore (restore) the balance, which has been disturbed due to the act of violating the custom.

14) Loc. cit.

The Contribution of Sports Tourism to Sustainable Development Based on Sustainable Development Indicators – The Case of Greece

Panagiotis Panagiotopoulos[1], Roido Mitoula[2], Evangelia Georgitsogianni[3], Eleni Theodoropoulou[4]

[1]PhD Candidate Harokopio University, Department of Economics and Sustainable Development, Greece
[2,3,4]Professor, Harokopio University, Department of Economics and Sustainable Development, Greece

SUMMARY: Development in the sense of growth under pure economic perspective is now considered outdated and anachronistic. In recent years, if not decades, development is only meant to be sustainable. This is due to the fact that if it does not become sustainable it will soon cease to exist.

In this regard, there have been attempts to measure development and sustainability mainly by the United Nations but also by many scholars. This process resulted in the construction of 50 main and 46 secondary indicators for sustainable development in 2007, which differ from the indicators that determine the percentage of achievement of the 17 Sustainable Development Goals as set in 2015.

In this paper, an attempt is made to categorize the 96 Sustainable Development indicators of the U.N. according to Maslow's pyramid of needs and Bossel's indicator categories. This combination forms the pyramid of sustainable development in which the individual indicators are distributed. The purpose of this categorization is to investigate the contribution of sports tourism to sustainable development based on the individual indicators as well as its extent within the categories of the pyramid. Schematically, the pyramid helps to visualize the contribution of sport and tourism to sustainable development.

From the correlation of the above, it indeed emerges that there is a relationship between the elements of sports tourism (sport and tourism) and the indicators of sustainable development. In particular, the literature review and the correlation of the specific indicators show the contribution of sports and tourism to 12 of the 96 indicators of sustainable development or 12.5%. Correspondingly, tourism and sports respectively present a degree of contribution towards 8 of the 17 goals (47%) for sustainable development in 2030.

KEYWORDS: Sports, Tourism, Sustainable development, indicators, Sustainable development pyramid.

INTRODUCTION

While the concept of sustainability focuses mainly on the management of natural resources, Sustainable Development has applications in the fields of well-being and justice and concerns the economic, environmental as well as the social aspects of development within a society or a place (Wise, & Perić, 2017). With the term "development", we do not mean purely economic prosperity linked to absolute economic figures, continuous growth of economic indicators and GDP. The development of a place, a destination or a region, etc., involves economic progress on the one hand, but it must also aim at those qualitative characteristics, which will be able to provide the residents, visitors of this place with social, cultural and moral progress and overall optimization of their living conditions and quality of life, simultaneously with economic development. Such a thing, according to several researchers (Sartzetakis, Papandreou, 2002), seems to be particularly difficult in terms of its implementation at least, for this reason they consider that the concepts of development and sustainability are rather incompatible if there is no significant technological progress or substitution in the use of inflows. The same study, however, concludes that a shift towards sustainable development is necessary, emphasizing the importance of the three pillars of sustainable development as well as the broad thinking required for synergies between different sectors (Mingaleva, et al., 2017).

Development is directly related to evolution but mainly to the optimization of human quality of life. Development is considered the overall growth and expansion of the sectors of the economy and production but also qualitative parameters of human life,

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such as leisure, holidays, social and other issues that go beyond the narrow limits of the economy (Mitoula, Astara and Kaldis, 2008). However, this in many cases can produce negative results in the smooth operation of various sectors of a place or region. This can be the reduction of natural resources or the destruction of the natural environment and micro-environment, even the disruption of local traditions, customs and morals. In this way, development faces limits either in terms of economic growth and development or social and ecological limits (Mitoula, Astara and Kaldis, 2008[1]). These limits are determined by the endurance and tolerance of the natural environment to human exploitation, as well as by the capability of producing natural resources. There is a risk of over-exploitation of resources (natural or human), having as a result, to be no longer possible to exploit them either because they wither/aging or because they vanish. The limits of economic development-growth and the possibilities of a global catastrophe, presented for the first time in 1972 in the now classic "Limits to Growth", the work of a group of dynamical systems scientists (Meadows et al., 1972). In the same year, the Stockholm Declaration states that economic development cannot continue without the parallel protection of the environment.

The result of this marginal situation is the absence of quality of life despite the possible increase in growth rates which are measured by the GNP per capita. This happens due to the fact that development rates, ultimately result from values that cannot be measured in absolute terms but from qualitative characteristics that have a catalytic effect on the quality of human life such as food, quality at work, unemployment rates, the environment, free time and others. These qualitative characteristics compose along with the concept of development, the notion of sustainable development which includes the concepts of sustainability and viability. Thus, in 1987 for the first time was heard the term Sustainable Development and its definition (Brundtland, 1987) was given by the U.N.'s World Commission for the environment and Development. Also, at the Rio International Conference in 1992, the principles of Sustainable Development were for the first time formally formulated and the approximately 900-page document known as "Agenda 21" was composed, included economic and social recommendations for the 21st century, so that to achieve sustainable development while protecting the environment. This definition was a guide for local administration and by extension for the governments of each country, in order to achieve the element of sustainability in development (Mitoula, 2006). In "agenda 21", Sustainable Development is defined as: "development that provides long-term economic, social and environmental benefits while meeting the needs of present and future generations".

Sustainable Development

Although the term "sustainable development" or "sustainability" seem to relate only to the sustainability of the environment, and it is somewhat normal since as a term it comes from the environmental sciences, nowadays it has gone beyond the environmental framework itself and affects the ecosystems, the economy, the technological development as well as the society and culture (Mitoula, 2006). So, the term sustainability means the harmonious coexistence of the above factors in the present but also in the future in a sustainable form that allows the perpetual, lasting and balanced interaction of these factors and the triptych "economy - environment - society". By extension, sustainable development means to care for the protection of the environment, for the quality of life and social cohesion in order to progress and evolve in cultural and economic terms (Nilashi et al., 2019).
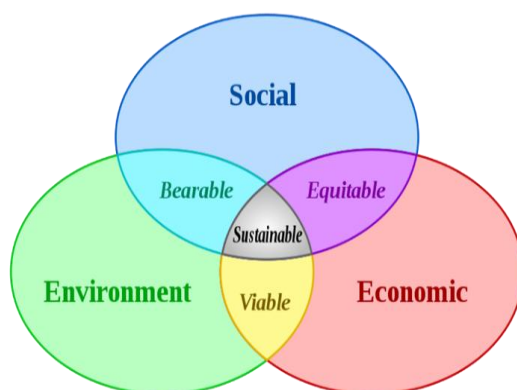
Figure 1. Key pillars of Sustainability

These concepts appear to be theoretical and without measurable and tangible way of representation, however finding appropriate ways to measure and compare the degree of development and sustainable development performance was of paramount importance in order to make it possible to assess and evaluate the environmental, social and economic indicators of a region and

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[1] As above pages 26-27.

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of a place in the present, as well as the possible prediction of probable interventions in an area (Rosati, & Faria, 2019). The types of measurement indicators are divided into three basic categories (Atkinson, 1996), environmental, economic and social. These categories are also supported by secondary indicators that refer to the three main categories (Spangenberg, 2004).

To find the most effective indicators for measuring sustainable development, efforts have been made, among others, by the OECD for the environment in 1993, by the World Bank for the economy in 1995-1997 and also by the United Nations Commission since 1992 and continuing to the present day while these efforts finally paid off in 2001 when the commission for sustainable development established by the United Nations announced the final framework of 58 indicators. In 2007, there was a revision of the indicators and their number, to 50 main indicators and 46 secondary indicators from a total of 96 (United Nations, 2007), which are present as a guide in conducting this research. The "turn", finally, towards sustainable development and its parameters, is now imperative and recognized both at a theoretical and institutional level (Sartzetakis, Papandreou, 2002). Thus, in 2012 at the Rio conference (United Nations, 2012), a framework for action towards sustainable development was created, laying the foundations and strengthening the positions of the member states of the United Nations in this direction by stepping on the principles of "Agenda 21" and the international Johannesburg Conference. In this 2012 Rio international conference called "Rio+ 20", the pillar of sustainable development "environment" is primarily addressed and the framework themes and cross-cutting themes for actions are recorded. These topics include, but are not limited to, poverty, sustainable tourism, sustainable cities, population health, work, seas, forests, biodiversity, education, gender equality, etc. and set targets for actions within this established framework. As it is observed, these topics draw their basis from the previously defined indicators for sustainable development (United Nations, 2007) something that demonstrates their particular importance for future strategies and specific goals.

Following the efforts of the United Nations that mentioned above concerning the establishment of sustainable development indicators and the institutionalization of the action framework, in 2015 the same organizations announced the 17 goals for sustainable development with the individual 169 goals-factors that must be met in order for these 17 main goals to become a reality. The road towards this direction was opened with the Council of the United Nations and the "Agenda 2030" (United Nations, 2015), where these 17 goals were set for the first time in order to achieve sustainable development in the year 2030 with a collective effort in a fifteen-year plan starting on January 1, 2016. The 5 axes on which the goals were structured were people, the planet, prosperity, peace and brotherhood. Taking into account all the above as well as the principles and the vision of the organization, in the declaration of 2015 the 17 sustainable development goals along the 169 individuals were recorded. For the evaluation of the above goals, of course, special indicators were created which refer to the individual 169 sub-goals. The number of those unique indicators (United Nations, 2017) is 231 (they are 247 but 16 of them are repeated) as they have been formed with the annual reforms until March of 2021. At this point it is worth noting that these indicators differ in use and purpose from the more general sustainable development indicators of 2007 and are specialized in the goals for sustainable development. In this way, in order for the theoretical contribution of sports and tourism to sustainable development to be shown, it is considered necessary to correlate the aspects of sports and tourism with the sustainable development indicators of 2007 instead of the evaluation indicators of the goals set for 2030.

Sustainable Development Indicators

Sustainability in an evolving world can only mean sustainable development (Bossel, 1999), and this is because when the rates of change of a system (economic, social or environmental) exceed its ability to react and adapt, then it ceases to be sustainable and becomes unstable. In order to achieve sustainability in development, development strategies and actions should be set in three main areas and in six individual operating systems of human social life. Always the main purpose is to satisfy the needs of people and its society with priority given to basic needs and moving towards the needs of secondary importance. This is the reason why in the present paper are correlated: a) Maslow's pyramid of needs, b) Bossel's categories of sustainable development indicators and c) the indicators for the sustainable development of the United Nations, in parallel with the triptych economy, society and environment that distinguishes the concept sustainability.

Thus, is formed a scheme that combines the three axes of sustainable development[2], to which the six subsystems of Bossel correspond (grouped into three), and by extension the inclusion of United Nations indicator groups in these subsystems. This way provides a creative visualization of the indicators in a model, which takes into account the aspects of sustainable development, groups the data and is based on the individual characteristics that distinguish the particularities of sustainability, alongside the nature of the society which characterized by the dynamic environment, which as a living system operates on the

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[2] Environment, Economy, Society

basis of needs that are ranked below according to Maslow's pyramid (Darabi et al., 2020). In this way, we have a model that serves as a tool that: categorizes, summarizes, prioritizes the needs and by extension the use of indicators and finally depicts the status quo for sustainable development, taking into account all the above-described parameters.
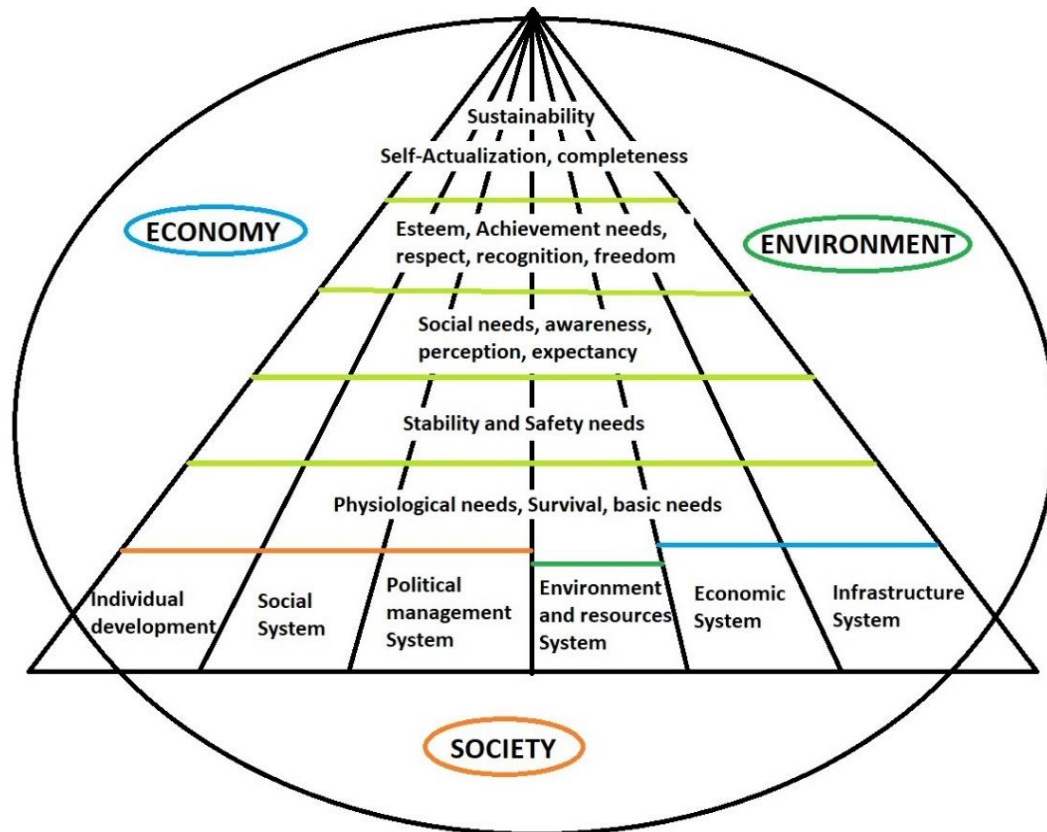
Figure 1. Three different colors orange, green and blue for the three pillars related to six subsystems

Thereafter, an attempt is made to correlate the five levels of needs, with social criteria, in relation to the 96 indicators (50 basic and 46 secondary) of sustainable development (United Nations, 2007) in order to achieve a hierarchical connection between them. The indicators and criteria are surrounded and supported by the three pillars of sustainable development while they act and operate within this framework (Figure 2). The concept of a dynamic environment of the sustainable development process is supported by several researchers, who emphasize that "Today, it is generally accepted that sustainability is a dynamic process based on three "pillars": the economy, society and the environment" (Andriotis, 2005, Sartzetakis, Papandreou, 2002) and they present twelve fundamental principles (Dekleris, 2000, 2005) that shape the general framework of sustainable development. In reality, these twelve principles are nothing more than the presentation of the elementary processes and tactics, which are necessary in order to move from growth to sustainable development, bringing together in twelve propositions the prerequisite elements for achieving sustainability in critical sectors that still develop such as tourism. Given these principles and in order to exist sustainable development in parallel in all the sectors of the pyramid which was presented above, should be laid the basis for categorizing the indicators of sustainable development as they were set by the United Nations in 2007, in 6 individual categories as presented in the figure and in order for the latter to complete. After coding the United Nations indicators3 for sustainable development, they were categorized according to Bossel's six-level categorization (1999) and the corresponding categories of Maslow's pyramid (1943). This mapping is illustrated in Figure 3.

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[3] The categorization is presented in the appendix where the 96 indicators are recorded in detail.
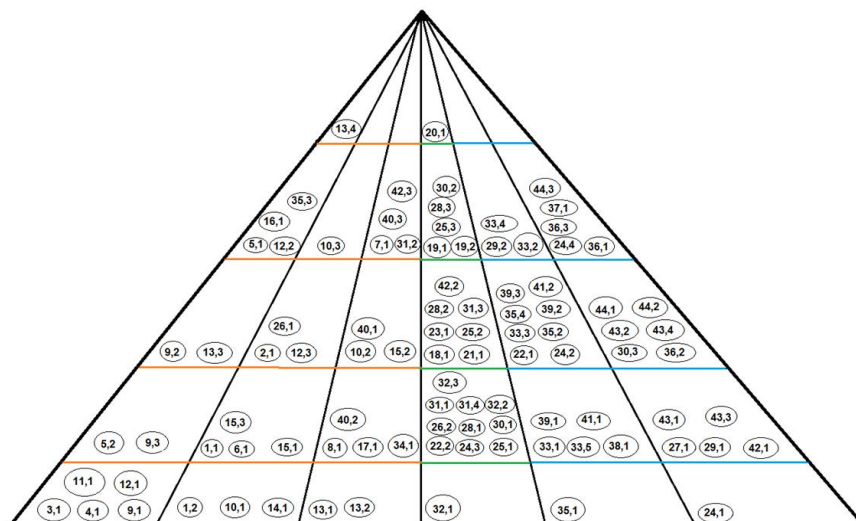
Figure 2 The indicators within the Bossel's six-level categorization

The numbers in each category represent the corresponding sustainable development indicator as listed in the appendix. Accordingly, the five levels of needs represent: 1) survival, psychological and basic needs, 2) stability needs, 3) social needs, awareness, perception and expectation, 4) needs for achievement of goals, recognition, respect and 5) Self-actualization, sustainability, integration for the individual and by extension for society respectively. In this way, the final shape of the pyramid of sustainable development is formed as below (Figure 4).
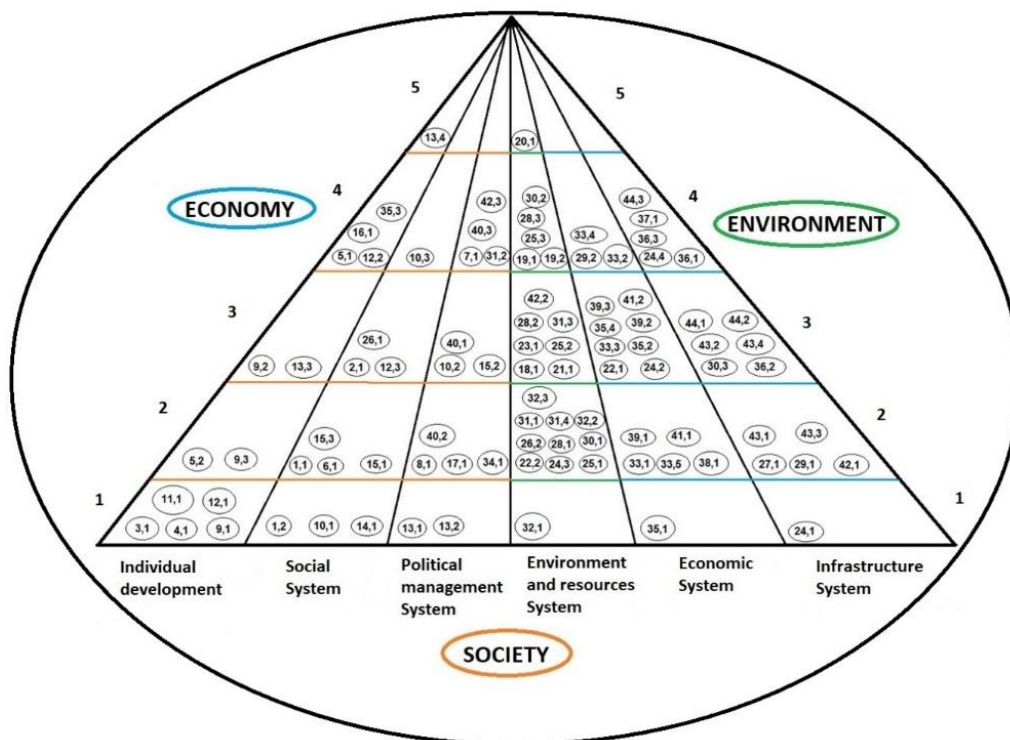
Figure 3. Sustainable development Pyramid

Pyramidal schematic representation of the categorization of indicators

The above pyramid diagram of indicator categorization aims at the gradual evolution of the development of individual indicator subjects in order to finally be optimized until bottom-up sustainable development occurs in each category or group which is under improvement.

Stages - Conditions for sustainable local development

During the analysis of the sustainability of a place, it is important to have an analysis framework which is governed by three important main axes (Nijkamp and Ouwersloot, 1997). These axes are: a) the identification of a group of indicators of sustainable

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development, b) the establishment of measurable reference values such as the carrying capacity or the critical load (critical threshold value) and others, and c) the development of a practical methodology of impact for assessing future achievements.

According to the above, sustainability is also part of the planning for the development of places, regions, spatial planning as well as setting policies, something that have also been seen in Greece since the end of the 90s (Delladetsimas, 1997), where while in several European countries it became a reality and a lever for development, in Greece it remained a concept in a form of a goal. However, the achievement of sustainable development at the global level requires that the states and primarily the regions have managed to be in a state of sustainable local development (Nijkamp, Laschuit and Soeteman, 1991), with the reverse being extreme and even utopic. All local societies are characterized as open systems because they are mutually influenced by other societies in various sectors. Such sectors are trade, agriculture, tourism and many more. In special cases there are local systems or societies which are self-sufficient, event these interact with others, with the only difference being their lesser degree of dependence. On this basis, the two-way form of "influence" of sustainability is justified as well as the existence of a closed self-sufficient local system is impossible. This is easily understood if, for example, we take states as regions and the international system as a super-region instead of local regions and the state as a super-region. Something similar was noticed in the 2007 – 2013 period, where the goal of the European Union was sustainability as well as social and economic development through strengthening specific urban centers, with sustainable development focusing on specific urban centers of each country, metropolitan and regional level (Mitoula, 2010). Since 2016, an intense and collective effort to achieve sustainable development takes place, under the umbrella of the United Nations, specifically through Agenda 2030 (United Nations, 2015) which sets goals, measurable reference values as well as proposes a methodology for measurement and information feedback regarding the extent to which it is being achieved through the 17 goals it established. In this direction, all UN member states are called upon to act in specific ways and in specific directions in order to achieve sustainability in development. As pointed out, such effort should indeed be collective and not individual. Such thing, recently (2016-2019) seems to be happening as shown in the review of National Reports of the department of economic and social affairs (DESA, 2016-2019) of the U.N. in which Greece also participated by sending a report in 2018.

It is worth mentioning some points of this review which shows that for the interested parties, information is increasing, priorities are being structured in the states, coordination and establishment of governmental structures towards the 2030 agenda, states are participating in the reviews and synergies are being established with non-governmental factors. Nevertheless, the way states report as well as the control of progress at a national level seem to be limited. The progress reporting in 2017 was 70% while in 2019 it was 32% with an upward trend in information through internet. In any case, from the above it appears that there is a clear intention of the states involved for a collective course towards sustainable development while specific procedures of actions and control of the conditions are followed. These procedures, are acted upon with quality criteria as the feedback of the results is collected and evaluated by a central organization.

As mentioned by MacKinnon, Clumbers and Chapman (2002), the undermining of national economic cohesion has reduced the state's control over investment flows, thus affecting the regions by leaving them exposed to international competition. According to Porter (1990), regions, and by extension nations, could maximize their competitive advantage by developing specialized clusters of interrelated industries. Analyzing the above sentence in terms of Greece, it is easy to understand that since tourism is one of the most important economic factors of the country along with shipping, the industries interrelated with it are the key for regional development and the development of the country respectively. In particular, linking the competitive advantage of a place in parallel with tourism, could maximize this competitive advantage aiming at economic growth. After all, sustainable development in one place is not necessarily sustainable in another (Nijkamp and Ouwersloot, 1997), but depends on the place itself and its state concerning its carrying capacity. What is certain is that local regional sustainable development must ensure good living conditions for the local population of the region in the present and maintain them in the future, as well as this development must not contradict sustainable development at supra-regional level (Nijkamp, Laschuit and Soeteman, 1991). The various regions as well as two places differ from each other on many levels and mainly on the level of natural resources, environment and productivity structure. These factors alone are enough for two different regions to need completely different sustainable development practices. As Nijkamp, Laschuit and Soeteman (1991) conclude, when it comes to regional development, a form of central authority is required to assign responsibilities and make regional policy. When something like this exists, just like in Greece that there is the intention for sustainable development as it has been put officially on the agenda of previous governments (Government Gazette 128 A), then the regional authority is the one that is called upon to carry out solutions and act in such way in order to achieve both regional and supra-regional sustainable development. Another example of central authority decision aiming to regional development, is the Urban program of 1994 and other programs of the European Union with anticipation for urban upgrade of Union's member countries. The specific programs of the E.U., beyond their obvious results,

protected the cultural heritage of the cities, set a goal for sustainable development mainly with JASPERS and Urban 2[4] programs (Mitoula, 2010), tourism and others (Mitoula, 2002), thus revealing the importance of such actions both at the European level but mainly at the level of a country or even a place.

Sustainable development pyramid

The sustainable development pyramid was depicted above after the correlation and combination of Maslow's pyramid of needs, Bossel's categories of sustainable development indicators and the United Nations indicators (Figure 4). In this specific correlation in the form of a pyramid, correspondences of certain indicators with aspects of tourism and sports activities are observed. Especially for Greece these matchings are of major interest since tourism sector competitiveness is particularly important, especially for those countries that their local or regional economy is based on the tourism sector (Gooroochurn & Sugiyarto, 2005). These indicators are:

1) Indicator 8.1 referring to crime. Through sports activities and their positive effect on physical and psychological level, a reduction in the tendency to crime has been observed. This is the conclusion of Jugl, Bender and Losel (2021), who found that sports programs are able to prevent crime and related behaviors as well as to reduce their reappearance, while at the same time having a positive influence on psychological factors.

2) Indicator 9,2 concerning life expectancy, since it has been proven that sports and physical activity contribute catalytically to its increase. To this conclude Ekelund, Tarp, Steene-Johannessen et. all (2019), who in their study, where they included 39 other similar studies, provide clear scientific data for the positive correlation between physical activity and life expectancy. Specifically, the longer the period of physical exercise, even of low intensity, the lower the chance of premature death.

3) Indicator 12.3 concerning suicidal rates, where a reduced tendency has been observed to those who do sports both for males and females as Sabo, Miller, Melnick, Farrell and Barnes (2005) concluded through a survey of a sample of 16,000 young Americans, through their participation in sports activities.

4) Indicator 16,1 which concerns the ratio of a tourist destination permanent residents in relation to the number of incoming tourists. This indicator is being satisfied at least in the case of Greece. At a national level, this ratio is almost 35% with 11 million residents[5] to 31 million inbound tourists in 2019[6], while similar figures recorded at local level which indicate a much higher ratio of tourists to permanent residents.

5) Major sporting events and large sports centers have been criticized for their negative impact to the environment. Tourism in the classical sense of the term as mass tourism, has a similar negative impact on the environment. Sports in the light of physical exercise and sports tourism as an alternative form of tourism, however, are two activities that can protect and preserve the environment in which they are carried out without altering it. Also, through sports tourism and the application of sports ideals, a more environmentally friendly way of life is promoted, such as the use of bicycle instead of motorized vehicles or the use of rowing boats instead of motorized in order to explore beaches and others. Through combined effort for alternative forms of tourism and green sports with investments in sustainable development and environmentally friendly buildings, there is a significant contribution to environmental protection and the indicator 22.2 that concerns non-degradation of the land as well as to other factors for sustainable development as recently highlighted by the World Tourism Organization (UNWTO, 2019).

6) Indicator 25.3 regarding forests. Sports and sporting activities such as mountain biking, walking tourism and others, contribute positively to forest protection and preservation, especially since they need them to take place. In this way, efforts should be made for their institutional protection and their promotion to protected areas and natural places for carrying out specific sports activities. Something similar has been pointed out by the Council of the European Union in the program 2021-2024[7] concerning green sports, which aims to develop sports in the light of climate change and conduct environmentally friendly sports activities and events, alongside education for sustainable sports. It is important to mention that there are references concerning investments in sports and physical exercise in order for them to contribute to regional development.

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[4]http://europa.eu/legislation_summaries/employment_and_social_policy/social_inclusion_fight_against_poverty/g24209_el.htm

[5] From the 2011 census, as presented on the statistics.gr, website of the Hellenic Statistical Authority in "Greece in numbers" edition (April-June 2021)

[6] With data from the Bank of Greece's border survey for the period 2010-2020, as presented on the insete.gr website of INSETE (Institute of the Association of Greek Tourism Enterprises)

[7] Resolution of the Council and of the Governments Representatives of the Member States, meeting within the Council, concerning the program for sport of the European Union (1 January 2021 — 30 June 2024), (2020/C 419/01) https://eur-lex.europa.eu/legal-content/EL/TXT/PDF/?uri=CELEX:42020Y1204(01)&from=FR

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7) Similar to the indicator mentioned above, conditions are formed so that certain sports activities such as open sea swimming and diving to become a lever towards the increase of marine protected zones (indicator 28.1), in accordance with what the Greek state defines as protected zone and the characterization of an areas as protected[8]. Such actions, in the form of protecting the seas and beaches of Greece, have started to happen within groups of volunteers gathering to clean beaches as a recreational activity with environmental awareness and through targeted actions by groups of divers to clean the seabed. In a research conducted by Kounanis, Scanavi, Koukoulis and Maripas (2017), it is found that diving tourism contributes to the sustainability of a place and has a responsibility to minimize its own effects but also the possibility of playing a positive role in the effort to solve global environmental problems.

8) The contribution of tourism and sports to the GDP per resident of a country (indicator 33.1 of the pyramid) is now a given, specifically for Greece, where tourism is one of the country's most important industries. In particular, the contribution of tourism to the GDP of Greece in 2019 amounted to 23.1 billion euros (INSETE, 2021) from the total GDP of 183.3 billion euros for the same year, which corresponds to a percentage of 12.6% of GDP and therefore per capita where the percentage remains the same.

9) Corresponding to the above, tourism and sports occupy a large part of the 33.2 indicator concerning the share of investments in GDP. Especialy with further investments in these sustainable industries, this could happen on an annual basis in order for the tourism product and the sports infrastructures to be constantly at a high level, as IOBE research shows, which was presented at an international conference of the "Kokkalis" foundation. According to the data of the research, in 2000 the participation of sports in the GDP of Greece amounted to two billion euros or 1.7%. The sector's consumer spending was 2.2 billion euros or 2.5% of total consumer spending, while 43,297 jobs were created. Accordingly, for the tourism sector as presented above, these figures are even bigger with the contribution of tourism to Greece's GDP being 12.6% and the investment expenditure amounting to 3.2 billion euros (INSETE 2021) while as a percentage of total GDP represents 1.75%.

10) Indicator 35.1, which concerns the employment rate of the population, is being satisfied to a significant extent through tourism as well as through sports. In particular, 12.4% of all employees in Greece work in tourism sector, meaning 572,400 employees. Accordingly, 0.7% of the population are employed in sports with 32,212 employees for 2020 according to the published data of the Hellenic Statistical Authority[9] (2021). The above figures highlight the opportunities and potentiality for employment provided by the specific sectors of economic activity.

11) Share of women in wage employment in the non-agricultural sector, as referred by the indicator 35.3. That share is already very high in the tourism sector and in sports as well compared to other sectors. Specifically, in the tourism sector of Greece, the percentage of female employees amounts to 48% compared to 40.8% in the other sectors for 2018, as shown by a study of INSETE (2019). Accordingly, in the sports sector, for 2017 among young people up to 34 years of age, employment for young women amounts to 44.3% and for young men to 55.7% of a total of 10,619 young workers, according to data shown by the Hellenic Statistical Authority for 2018[10]. The above figures satisfy indicator 35.3 since the corresponding percentages for employment in other sectors are 59.2% for men and 40.8% for women (INSETE 2019).

12) Indicator 38.1 which concerns the contribution of tourism to the GDP and as it has been seen from the present research and the literature, sport contributes positively to the development of the tourism product as it presents opportunities for new tourism activities, to the extent that there is the special category of sports tourism. It is also worth mentioning the fact that tourism in Greece already contributes directly to 12.6% of GDP for 2019 and in total (directly and indirectly) contributes more than 27.7% of GDP (INSETE 2021). The corresponding percentage for 2019 regarding the contribution of world tourism to global GDP is 10.4% (WTTC, 2021).

CONCLUSIONS

It is therefore directly noticeable that both tourism and sports contribute positively to 12 of the 96 indicators of sustainable development, constituting to 12.5% of a country's efforts in this direction. Specifically, 5 social indicators, 3 environmental indicators and 4 economic indicators are satisfied. Accordingly, 3 indicators concern the system of individual development, 1 the social system, 1 the political management system, 3 the resource and environment system, 4 the economic system and none the infrastructure system. Also, the contribution of sports and tourism to sustainable development concerning the individual

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[8] Article 46, concerning the Modernization of Environmental Legislation of the Ministry of Environment and Energy of Greece, http://www.opengov.gr/minenv/?p=10222
[9] https://www.statistics.gr/el/statistics/-/publication/SEL21/-
[10] https://www.statistics.gr/documents/20181/12044283/elstat_publication_young_2018_gr.pdf

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indicators, satisfy 1 indicator in the first layer of the pyramid, 5 indicators in the second, 2 indicators in the third and 4 indicators in the fourth, with no contribution in the fifth and last layer concerning self-actualization indicators. The figure below provides a schematic illustration of the indicators that are satisfied within the pyramid.
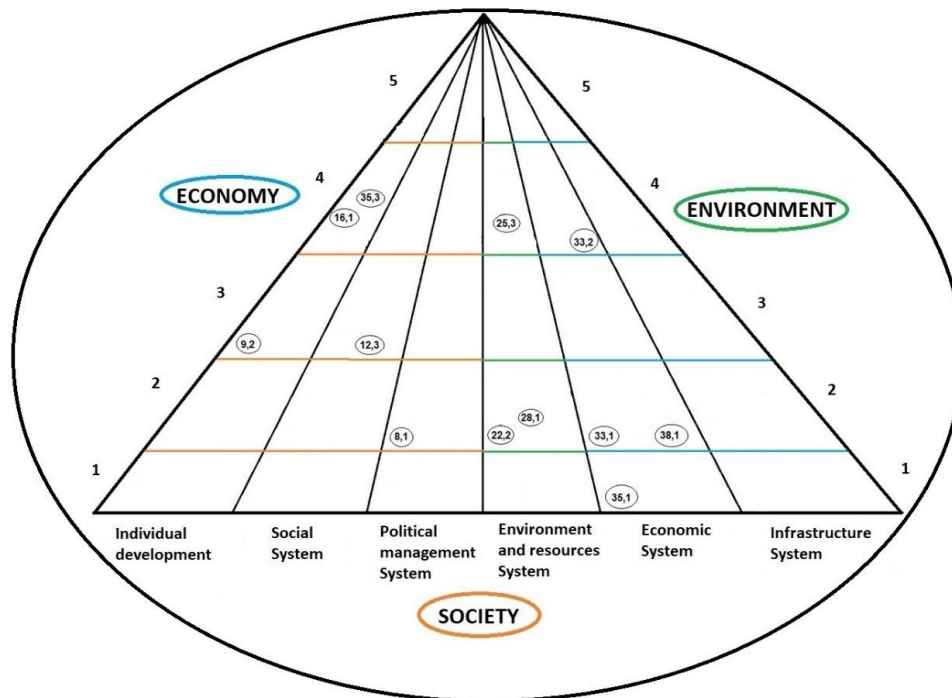
Figure 5. Sustainable development indicators which are satisfied by sports ant tourism

It is worth mentioning that according to the above, the activities of tourism and sports seem to contribute positively to the direction set by the 17 goals for sustainable development. This happens due to the fact that that these goals have largely come from the above predetermined[11] sustainable development indicators. The goals that seem to be satisfied, are those that are directly related to the 12 indicators analyzed above and included in the pyramid illustration. They are: Goal 3 regarding health (indicator 9.2) and through sports activities has shown the significant improvement of health for the people who participate in such activities as well as on a mental level as observed in the description of indicator 12.3 regarding suicides and therefore mental health. Goals 1,2,8 and 9 (indicators 33,1 / 33,2 / 35,1 and 38,1) with the contribution of both tourism and sports to the GDP, to the provision of work, to investments and by extension to the reduction of poverty and hunger as explained above in the corresponding description. Goal 5 concerning gender equality and the empowerment of women according to the description of the previously presented indicator 35.3. Also, to a degree, the direction of reducing the environmental footprint of tourism and sports respectively, it is observed a significant progress of these two activities towards the direction set by goals 14 and 15 corresponding to the description of indicators 22.2 / 25.3 and 28.1 which concern the environment and especially the forests, the sea and earth degradation. According to the above, tourism and sports, respectively, appear to have a degree of contribution towards sustainable development in 8 of the 17 goals set by the United Nations for 2030, which is of course very important since they appear to have a relation with the 47% of the goals. However, it is not of particular concern in the present research for the simple reason that the contribution of sports and tourism is interesting and essential to be researched on the basis of the result (indicators) and not the targeting of a purpose (goals). Nevertheless, sports and tourism on the one hand, contribute to the goals set for sustainable development by 47%, but on the other hand, they have a particularly important contribution to the individual indicators for sustainable development (by 12.5%), where their contribution becomes tangible and measurable, since the more indicators are satisfied, the closer to sustainable development is the objective under research.

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[11] The goals were set in 2015 after the indicators had been set in 2007, and were shaped taking into account those pre-determined indicators.

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APPENDIX

1) Income poverty (2 indicators) - Proportion of population living below national poverty line (1.1) and Proportion of population below $1 a day (1.2).

2) Ratio of share in national income of highest to lowest quintile (2.1).

3) Sanitation - Proportion of population using an improved sanitation facility (3.1).

4) Drinking water - Proportion of population using an improved water source (4.1).

5) Access to energy (2 indicators) - Share of households without electricity or other modern energy services (5.1) and Percentage of population using solid fuels for cooking (5.2).

6) Living conditions - Proportion of urban population living in slums (6.1).

7) Corruption - Percentage of population having paid bribes (7.1)

8) Crime - Number of intentional homicides per 100,000 population (8.1).

9) Mortality (3 indicators) - Under-five mortality rate (9.1), Life expectancy at birth (9.2) and Healthy life expectancy at birth (9.3).

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10) Health care delivery (3 indicators) - Percent of population with access to primary health care facilities (10.1), Immunization against infectious childhood diseases (10.2) and Contraceptive prevalence rate (10.3).

11) Nutritional status - Nutritional status of children (11.1).

12) Health status and risks (3 indicators) - Morbidity of major diseases such as HIV/AIDS, malaria, tuberculosis (12.1), Prevalence of tobacco use (12.2) and Suicide rate (12.3).

13) Education level (4 indicators) - Gross intake ratio to last grade of primary education (13.1), Net enrolment rate in primary education (13.2), Adult secondary (tertiary) schooling attainment level (13.3), and Life long learning (13.4).

14) Literacy – Adult literacy rate (14.1).

15) Population (3 indicators) - Population growth rate (15.1), Dependency ratio (15.2) and Total fertility rate (15.3).

16) Tourism - Ratio of local residents to tourists in major tourist regions and destinations (16.1).

17) Vulnerability to natural hazards - Percentage of population living in hazard prone areas (17.1).

18) Disaster preparedness and response - Human and economic loss due to natural disasters (18.1).

19) Climate change (2 indicators) - Carbon dioxide emissions (19.1) and Emissions of greenhouse gases (19.2).

20) Ozone layer depletion - Consumption of ozone depleting substances (20.1).

21) Air quality - Ambient concentration of air pollutants in urban areas (21.1).

22) Land use and status (2 indicators) - Land use change (22.1) and Land degradation (22.2).

23) Desertification - Land affected by desertification (23.1).

24) Agriculture (4 indicators) - Arable and permanent cropland area (24.1), Fertilizer use efficiency (24.2), Use of agricultural pesticides (24.3) και Area under organic farming (24.4).

25) Forests (3 indicators) - Proportion of land area covered by forests (25.1), Percent of forest trees damaged by defoliation (25.2) and Area of forest under sustainable forest management (25.3).

26) Coastal zone (δύο δείκτες) - Percentage of total population living in coastal areas (26.1) and Bathing water quality (26.2).

27) Fisheries - Proportion of fish stocks within safe biological limits (27.1).

28) Marine environment (3 indicators) - Proportion of marine area protected (28.1), Marine trophic index (28.2) and Area of coral reef ecosystems and percentage live cover (28.3).

29) Water quantity (2 indicators) - Proportion of total water resources used (29.1) and Water use intensity by economic activity (29.2).

30) Water quality (3 indicators) - Presence of faecal coliforms in freshwater (30.1), Biochemical oxygen demand in water bodies (30.2) and Wastewater treatment (30.3).

31) Ecosystem (4 indicators) - Proportion of terrestrial area protected, total and by ecological region (31.1), Management effectiveness of protected areas (31.2), Area of selected key ecosystems (31.3) and Fragmentation of habitats (31.4).

32) Species (3 indicators) - Change in threat status of species (32.1), Abundance of selected key species (32.2) and Abundance of invasive alien species (32.3).

33) Macroeconomic performance (5 indicators) - Gross domestic product (GDP) per capita (33.1), Investment share in GDP (33.2), Gross saving (33.3), Adjusted net savings as percentage of gross national income (GNI) (33.4) and Inflation rate (33.5).

34) Sustainable public finance - Debt to GNI ratio (34.1).

35) Employment (4 indicators) – Employment-population ratio (35.1), Labor productivity and unit labor costs (35.2), Share of women in wage employment in the non-agricultural sector (35.3) and Vulnerable employment (35.4).

36) Information and communication technologies (3 indicators) - Internet users per 100 population (36.1), Fixed telephone lines per 100 population (36.2) and Mobile cellular telephone subscribers per 100 population (36.3).

37) Research and development - Gross domestic expenditure on R&D as a percent of GDP (37.1).

38) Tourism - Tourism contribution to GDP (38.1).

39) Trade (3 indicators) - Current account deficit as percentage of GDP (39.1), Share of imports from developing countries and from LDCs (39.2), Average tariff barriers imposed on exports from developing countries and LDCs (39.3).

40) External financing (3 indicators) - Net Official Development Assistance (ODA) given or received as a percentage of GNI (40.1), Foreign direct investment (FDI) net inflows and net outflows as percentage of GDP (40.2) and Remittances as percentage of GNI (40.3).

41) Material consumption (2 indicators) - Material intensity of the economy (41.1), Domestic material consumption (41.2).

42) Energy use (3 indicators) - Annual energy consumption, total and by main user category (42.1), Intensity of energy use, total and by economic activity (42.2) and Share of renewable energy sources in total energy use (42.3).

43) Waste generation and management (4 indicators) - Generation of hazardous waste (43.1), Waste treatment and disposal (43.2), Generation of waste (43.3) and Management of radioactive waste (43.4).

44) Transportation (3 indicators) - Modal split of passenger transportation (44.1), Modal split of freight transport (44.2) and Energy intensity of transport (44.3).

Factors Affecting the Quality of Assessment of Learning Outcomes from the Perspective of Primary Education Students

Thuong T.N. Dinh[1], Nga T. Nguyen[2]

[1]Department of Education and Training & 08 Tran Phu st, Tam Ky, Quang Nam province, Vietnam

[2]Faculty General Education Research Center, Vietnam Institute of Educational Sciences, Vietnam & 101 Tran Hung Dao Street, Hoan Kiem District, Ha Noi, Vietnam

ABSTRACT: Assessment is one of the components of the teaching process. In education, the quality of assessing student learning outcomes is a criterion for the quality of education. With that role, assessment is expected to bring a lot of value to learners, but in reality, there are still many difficulties. The purpose of the study is to understand the factors affecting the quality of assessment of learning outcomes from the perspective of students in primary education. The exploratory factor analysis (EFA) method was used to extract the factors and was performed through SPSS software. The results from 893 students of 6 universities show that there are 8 main factors affecting the quality of assessment of learning outcomes including assessment principles, feedback methods, information-handling instructions, satisfaction levels, facilitating conditions, relationship with teaching elements, self-assessment and assessment process. The findings of this study enrich the theoretical framework and serve as a reference for educators and policymakers.

KEYWORDS: Assessment, learning outcomes, student, primary education, exploratory factor analysis

I. INTRODUCTION

The continuous development of science and technology has significantly changed the way people communicate and behave, especially in the current digital transformation context. The education sector is no exception to that influence. The presence of the covid pandemic has made this transition happen faster, from traditional teaching and learning methods to new ways of teaching and learning that we have not experienced as much as before [1-3]. Not only do we need to change our teaching methods, and communication with students, but even assessment methods need to be refined and reconsidered. Yet, assessment is a component of the educational process that helps students develop cognitive capacities, critical thinking skills, professional competence, and adaptability [4]. Furthermore, academic results are one of the measures that reflect students' learning and research capacity, as well as the teaching capacity of lecturers in universities [5]. As such, evaluating student learning outcomes is regarded as one of the fundamental activities that must be carried out correctly in order to assure quality in any university training facility [6]. Aside from influencing the quality of teaching and learning in schools, evaluation is also crucial in deciding prospects for scholarships, higher education, and future employment [7]. This requirement has a dual role in the process of training pedagogical students, serving both to evaluate the quality of training and serve as a prism for students to study so that after graduation, they can apply the important points, methods, and forms of organization flexibly in diverse pedagogical environments [8].

The reality demonstrates that there are several elements influencing the quality of students' learning results in terms of both teachers and students [1, 7]. It is vital to do study and learn about the elements influencing the quality of assessment in order for the information about learners obtained during the learning process to be substantial, adding to the measurement of their achievements [7]. Taking students' perspectives is another approach for determining what aspects are essential to the quality of learning. Recognizing the aforementioned issue, we conducted this study to determine the elements influencing the quality of evaluation of learning outcomes of students in Primary Education from their perspective. Much earlier research has been undertaken to answer this topic, however, those studies were conducted in different nations, where the factors discovered are likely only applicable to their areas. Thus, the current research is unique due to the nature of social changes. The rest of this paper is organized as follows: Section 2 provided a brief description of similar studies. Materials and methods for conducting the analysis

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were presented in Section 3. Section 4 reported findings with discussion. We concluded the paper with research direction in Section 5.

II. LITERATURE REVIEW

There have been several studies on student accomplishment, each with its own criteria and methods for measuring learning outcomes. Alos et al. [9] investigated factors influencing the academic performance of the nursing students at BSU. Their results reported that teacher-related aspects, study habits, school-related aspects, personal conditions, and home-relateaspectsct are the main four factors contributing to the success of fourth-year nursing students. Of these factors, the teacher-related aspect played the most important role in explaining the learning outcome, followed by student habits. Briones et al. [10] reported several factors that might affect the scholarly performance of students at SKSU – Laboratory High School including parenting style, characteristics of the students, level of internet effectiveness, teachers' effectiveness, lack of motivation, andstudents'ts'career choice. Among these factors, lack of motivation was considered one of the most influential variables affecting learning outcomes, followed by family status and teacher effectiveness. In another line of research, Mushtaq and Shabana [11] focused on communication, learning facilities, proper guidance, and family stress. Their experimental results reported that the first three factors positively affectst'dents'nts performance while the last one can not be explained through evidence from data. In line with previous research, Daniyal et al. [12] investigated eight factors influencing Pakistan students (i.e., family income, father education, mother education, size of family, motivation of parent, involvement in curricular activities, regularity of teacher, interest the in subject developed by concern teacher).

The aforementioned studies revealed that many factors were investigated at different levels spreading throughout the nations. It may be explained through cultural and economic conditions. Thus, each study has its unique contribution to the field. As such, interested readers can have a wide range of references applied to a specific context. Our study contributed to the body of knowledge by exploring factors attributed to primary students in Vietnam.

III. MATERIALS AND METHODS

A. Participants

The survey was designed and sent to 3rd and 4th-year students in Primary Education at 6 universities: Thai Nguyen University of Education, Hue University of Education, Da Nang National University of Education, Quang Nam University, Hung Vuong University, and Phu Yen University. The estimated number of users participating in the survey is 1100 people, the response rate is 84% (924 responses), the research team removed 7 responses that did not complete the survey, 24 invalid responses that did not valid due to selecting only one option. The final total data for inclusion in the analysis was 893 (81.18%). According to the results of data collection from the survey (see Table 1), the proportion of men accounted for 5.72%, while the proportion of women accounted for 94.28%. All survey subjects are 3rd and 4th-year students to ensure that respondents have more than 2 years of experience in the learning process and receive an assessment of learning outcomes, in which, 3nd-year students are 515 (57.67%) and 4th-year students 378 (43.33%). The percentage of students belonging to the surveyed schools includes Thai Nguyen University of Education (52.23%), Hue University of Education (28.57%), Da Nang University of Education (19.20 %), Quang Nam University, Hung Vuong University, and Phu Yen University. The results of this survey are also consistent with the ratio of local universities and key universities of pedagogy.

Table 1. General information of the participants (N = 893)

Variable	Number	Percentage
Gender		
Male	51	5.72
Female	842	94.28
Academic year		
3rd	515	57.67
4th	378	43.33
University		
Thai Nguyen University of Education	251	28.11
Hue University of Education	64	7.17
Da Nang National University of Education	68	7.61

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Quang Nam University		342	38.3
Hung Vuong University		85	9.52
Phu Yen University		83	9.29

B. Instrument and measurements

Scales and questionnaires are created and sent to students via Google Form (see Table 2). A five-point Likert scale (1 = Disagree, 2 = Tend to disagree, 3 = Neutral, 4 = Tend to agree, 5 = Totally Agree) was used to measure the degree of agreement for each question.

Table 2. Questionnaires used for survey participants (N=893)

Item No	Question
Q1	Assessment of learning outcomes has a strong relationship with goals
Q2	Assessment of learning outcomes has a close relationship with the teaching content
Q3	Assessment of learning outcomes has a close relationship with teaching methods and organizational forms
Q4	Assessment of learning outcomes has a close relationship with the means and conditions of teaching organization
Q5	Teachers need to conduct assessment of learning outcomes according to the principle of fairness
Q6	Teachers need to evaluate learning outcomes according to the principle of ensuring comprehensiveness
Q7	Teachers need to evaluate learning outcomes according to the principle of ensuring systematic
Q8	Teachers need to conduct assessment of learning results according to the principle of ensuring publicity
Q9	Teachers need to evaluate learning outcomes according to the principle of ensuring educationalness
Q10	Teachers should evaluate learning outcomes from the very beginning of the teaching process
Q11	Teachers should evaluate learning outcomes in the teaching process
Q12	Teachers should evaluate learning outcomes at the time of summarizing the teaching process
Q13	Teachers should provide feedback on learning outcomes by commenting on students' answers in class
Q14	Teachers should provide feedback on learning by commenting on assignments, student or group performance
Q15	The teacher should talk privately after class with some students/groups
Q16	Teachers should write comments on students' assignments
Q17	Teachers should write comments on assessment sheets designed by teachers themselves
Q18	Teachers should comment in online class/group
Q19	Students want to be guided by teachers to process information about learning results by guiding students to summarize the knowledge and skills gained.
Q20	Guide students to identify strengths in learning: motivation, effort, results, etc.
Q21	Students want to be guided by teachers to process information about learning outcomes by guiding students to identify deficiencies in learning/exercises.
Q22	Students want to be guided by teachers to process information about learning results by guiding students to identify ways to overcome deficiencies in learning/exercises.
Q23	Students want to be guided by teachers to process information about learning results by guiding students to identify ways to overcome deficiencies in learning/exercises.
Q24	Students want to be guided by teachers to process information about learning results by guiding students to comment on the results/exercises of friends/other groups.
Q25	Students expect to be guided by teachers to process information about learning outcomes by guiding students to respond to comments and assessments of teachers and classmates.
Q26	Students want to be guided by teachers to process information about learning results by guiding students to write summaries and draw necessary pedagogical conclusions.
Q27	Learning goals and interests affect students' learning outcomes

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Q28	Teachers' expertise affects learning outcomes
Q29	Tools teachers use in testing and assessment affect students' learning outcomes
Q30	Conditions of facilities serving teaching and learning affect learning outcomes
Q31	Information technology environment for teaching and learning affects learning results
Q32	The degree of concordance between the forms of tests/exams to assess the learning outcomes compared to the specifics of the subject
Q33	The degree of compatibility between the content of the test/exam with the course objectives
Q34	Reasonableness of test/exam time
Q35	Teacher marks and returns the test in a timely manner

C. Data Analysis

For data analysis, the current study used Exploratory Factor Analysis (EFA). EFA is a quantitative analysis approach that reduces a large collection of interdependent measurements into a smaller number of variables (called factors) while retaining the majority of the original set of variables' information content [13]. It attempts to determine the underlying structure of a set of related variables. Each index in a collection of indices is assumed to be a linear function of one or more common factors and a single factor in EFA. Common factors are unobservable, hidden variables that affect more than one indicator in a set of indicators. Unique factors are latent variables that are thought to affect only one indicator from a collection of indicators and do not take indicator correlations into consideration [14]. Before completing EFA, descriptive statistics were used to assess the measurement's applicability for the 35 survey questions. The study team determined the mean of all replies and the standard deviation (SD) on each item in the descriptive statistics table. If the mean of a statement was near 1 or 5, the team eliminated that response from the table since it may lower the quality of correlation among the remaining items [15]. Following this, the distribution's normality was verified by testing for skewness and kurtosis. After confirming the distribution's normality, exploratory factor analysis was performed using SPSS 26 (Statistical Package for the Social Sciences) software.

IV. RESULT AND DISCUSSION

The technique for exploratory factor analysis begins with the collection of eigenvalues for each factor. The Kaiser-Meyer-Olkin (KMO) scale was then used to determine if the data was suitable for factor analysis [16]. KMO values vary from 0 to 1, with levels greater than 0.5 being sufficient for EFA [29]. To assess if the correlation between the questions is high enough for the factor analysis to be statistically significant, the Bartlett technique is utilized [13]. Only if Bartlett's test is statistically significant will further analyses be performed (sig. 0.05).

Table 3. KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.927
Bartlett's Test of Sphericity	Approx. Chi-Square	13590000
	df	595
	Sig.	.000

EFA was performed on 35 questions with Varimax rotation. The analysis results from SPSS software allow the research team to extract the characteristic value for each factor. The Kaiser-Meyer-Olkin measurement verified the adequacy of sampling for analysis with a value of 0.927 (see Table 3), which is 0.6 higher than suggested by Kaiser [17] and 0.5 by Kim [18].

Bartlett's test of sphericity gives the result $\chi2$ (595) = 13590000, $\rho < 0.000$, indicating that the correlation between question items is large enough to conduct exploratory factor analysis.

A. Exploratory Factor Analysis

The data from

Table 4 show that there are eight main factors formed from 35 questions with an eigenvalue value greater than 1. In other words, these 35 questions contribute 61.951% of the importance of factors affecting to the quality of assessment of learning outcomes from the perspective of students in primary education, the rest is due to other factors. The percentages explained by each factor

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are: factor 1 (28.813%), factor 2 (9.889%), factor 3 (5.360%), factor 4 (4.154%), factor 5 (3.839) %), factor 6 (3.607%), factor 7 (3.367), and factor 8 (2.922).

Table 4. Eigenvalue, Total Variance Explained of factors

Total Variance Explained									
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.085	28.813	28.813	10.085	28.813	28.813	3.450	9.858	9.858
2	3.461	9.889	38.702	3.461	9.889	38.702	3.333	9.523	19.381
3	1.876	5.360	44.062	1.876	5.360	44.062	2.965	8.471	27.852
4	1.454	4.154	48.216	1.454	4.154	48.216	2.693	7.695	35.547
5	1.344	3.839	52.055	1.344	3.839	52.055	2.499	7.140	42.687
6	1.263	3.607	55.662	1.263	3.607	55.662	2.457	7.019	49.706
7	1.179	3.367	59.030	1.179	3.367	59.030	2.336	6.673	56.379
8	1.023	2.922	61.951	1.023	2.922	61.951	1.950	5.572	61.951
9	.904	2.582	64.533						
10	.841	2.402	66.935						

Table 5 reports the loadings for each variable corresponding to a factor. The factor loadings provide a description of each factor and the structure in the set of variables. For interpretation purposes, factor loadings of .30 and higher will be considered significant with a sample size greater than 350 [13]. Using this factor loadings criteria, it can be seen that that all of the loadings are reliable and significant. Moreover, experimental result from Table 5 indicated that each of the variables has a significant loading on only one factor. The first has 5 variables, the second factor includes 4 variables, factor 3 has 4 variables, factor 4 includes 4 variables, factor 5 has 4 variables, factor 6 contains 4 variables, factor 7 contains 4 variables and factor 8 includes 6 items.

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Table 5. Rotation Matrix

	Component							
	1	2	3	4	5	6	7	8
Q6	.789							
Q5	.772							
Q8	.760							
Q9	.739							
Q7	.722							
Q17		.815						
Q18		.724						
Q16		.719						
Q15		.683						
Q24			.809					
Q25			.771					
Q26			.703					
Q23			.702					
Q34				.748				
Q33				.744				
Q32				.695				
Q35				.692				
Q30					.697			
Q31					.691			
Q29					.673			
Q28					.668			
Q2						.723		
Q1						.702		
Q3						.687		
Q4						.472		
Q22							.689	
Q21							.669	
Q20							.554	
Q19							.518	
Q11								.584
Q14								.549
Q10								.536
Q12								.529
Q13								.511
Q27								.427

B. Naming the factors

As illustrated in Table 6, each factor can be named based on variables with significant loadings.

Table 6. Naming the factors

Assessment principles		
Q6	Teachers need to evaluate learning outcomes according to the principle of ensuring comprehensiveness	.789

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Q5	Teachers need to conduct assessment of learning outcomes according to the principle of fairness	.772
Q8	Teachers need to conduct assessment of learning results according to the principle of ensuring publicity	.760
Q9	Teachers need to evaluate learning outcomes according to the principle of ensuring educationalness	.739
Q7	Teachers need to evaluate learning outcomes according to the principle of ensuring systematic	.722
Feedback methods		
Q17	Teachers should write comments on assessment sheets designed by teachers themselves	.815
Q18	Teachers should comment in online class/group	.724
Q16	Teachers should write comments on students' assignments	.719
Q15	The teacher should talk privately after class with some students/groups	.683
Information-handling instructions		
Q24	Students want to be guided by teachers to process information about learning results by guiding students to comment on the results/exercises of friends/other groups.	.809
Q25	Students expect to be guided by teachers to process information about learning outcomes by guiding students to respond to comments and assessments of teachers and classmates.	.771
Q26	Students want to be guided by teachers to process information about learning results by guiding students to write summaries and draw necessary pedagogical conclusions.	.703
Q23	Students want to be guided by teachers to process information about learning results by guiding students to identify ways to overcome deficiencies in learning/exercises.	.702
Sastisfaction level		
Q34	Reasonableness of test/exam time	.748
Q33	The degree of compatibility between the content of the test/exam with the course objectives	.744
Q32	The degree of concordance between the forms of tests/exams to assess the learning outcomes compared to the specifics of the subject	.695
Q35	Teacher marks and returns the test in a timely manner	.692
Facilitating Conditions		
Q30	Conditions of facilities serving teaching and learning affect learning outcomes	.697
Q31	Information technology environment for teaching and learning affects learning results	.691
Q29	Tools teachers use in testing and assessment affect students' learning outcomes	.673
Q28	Teachers' expertise affects learning outcomes	.668
Relationship with teaching elements		
Q2	Assessment of learning outcomes has a close relationship with the teaching content	.723
Q1	Assessment of learning outcomes has a strong relationship with goals	.702
Q3	Assessment of learning outcomes has a close relationship with teaching methods and organizational forms	.687
Q4	Assessment of learning outcomes has a close relationship with the means and conditions of teaching organization	.472
Self-Assessment		
Q22	Students want to be guided by teachers to process information about learning results by guiding students to identify ways to overcome deficiencies in learning/exercises.	.689
Q21	Students want to be guided by teachers to process information about learning outcomes by guiding students to identify deficiencies in learning/exercises.	.669
Q20	Guide students to identify strengths in learning: motivation, effort, results, etc.	.554

Q19	Students want to be guided by teachers to process information about learning results by guiding students to summarize the knowledge and skills gained.	.518
Assessment Process		
Q11	Teachers should evaluate learning outcomes in the teaching process	.584
Q14	Teachers should provide feedback on learning by commenting on assignments, student or group performance	.549
Q10	Teachers should evaluate learning outcomes from the very beginning of the teaching process	.536
Q12	Teachers should evaluate learning outcomes at the time of summarizing the teaching process	.529
Q13	Teachers should provide feedback on learning outcomes by commenting on students' answers in class	.511
Q27	Learning goals and interests affect students' learning outcomes	.427

D. DISCUSSION AND LIMITATION

Perhaps, the most important contribution of this study is the number of factors extracted from 893 responses. These eight factors explain 61.951% of the degree of influence on the quality of students' learning outcomes in primary school. The rotation factor matrix table provides some useful information both theoretically and practically. From a theoretical point of view, it enriches the body of knowledge by identifying eight factors. Therefore scientists can take it as a reference in studying similar problems in their field. Of course, these factors must also be carefully considered and re-examined, because each region has its own characteristics in terms of economic, cultural and social conditions. Some factors may hold true for many different regions, but others may not. From a practical perspective, educators can rely on the influence of factors to make appropriate policies. The loading factor is an important indicator that helps educators prioritize processing items. Variables with large loading factors should be considered and processed first, especially variables with load factors greater than 0.7.

This study encountered some limitations as follows: The first limitation relates to the analytical method. Exploratory factor analysis is a statistical method used to test the structural validity and psychometric properties of a set of measures. However, EFA is not a powerful enough tool to test the theoretical foundations, so the Confirmatory Factory Analysis method should be used in subsequent studies to check the theoretical background (test the set of measures that our model proposes (seven factors)). The second limitation in this study is the bias in sample selection. The research team only sampled the students in three local colleges and three regional universities of Vietnam, so it greatly affects the generalizability of the research results. Scholars and managers need to consider carefully before applying the results of this research to their working environment. The final limitation is that other factors are not considered for the analysis. There may be many important factors that directly affect teachers that have not been observed and measured, such as cultural and social factors.

V. CONCLUSION

This study aims to find out the factors affecting the quality of assessment of learning outcomes from the perspective of students in primary education. The research team proposed 35 questions distributed to participants through social channels. Based on the evidence from 893 included subject, the results of exploratory factor analysis show that there are 8 main factors affecting the quality of assessment of learning outcomes from the perspective of primary education students including assessment principles, feedback methods, information-handling instructions, satisfaction levels, facilitating conditions, relationship with teaching elements, self-assessment and assessment process.These findings can be used as a reference in other research or in a comparable scenario by interested scholars. Educators can use these findings to advocate strategies that will provide a better education.

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Agricultural Development and Socio-Economic Profile of Farmers in Arunachal Pradesh: With Special Reference to Tawang District

Lobsang

Assistant Professor, Saint Claret College, Ziro

ABSTRACT: Arunachal Pradesh is an agrarian economy and it is the main source of earnings for people. In Arunachal Pradesh, the contribution of the agriculture sector to its GSDP is 44.78 percent. The present study is to analyze the trend and growth in production and productivity of food crops in Arunachal Pradesh. It also tried to examine the socio-economic profile of farmers in rural households. The study was based on both primary and secondary data. The secondary data were collected from NEDFI Data Bank and Statistical Abstracts of Arunachal Pradesh. The primary data were collected by conducting field surveys in Tawang District. The survey was based on a multi-stage sampling technique. In the first stage, the Tawang district was selected and in the second stage, *Namazing and Kharsa* villages of the Jang block were selected purposively. The sample size was 50 households. During the study, it was found that the overall production of food crops in the state was very low. The main issues of agriculture development in the state are limited arable land and low productivity. There has been a diversification of livelihood towards non-agricultural income sources. The socio-economic profile of farmers are found poor. People's dependency on the public distribution system for food grains has substantially increased. It is a indication of inadequate production of food grains in the district. There is a need to focus on improving the productivity of major crops as the income of farmers is low.

KEYWORDS: Growth Rate, Production, Household, Socio-Economic.

INTRODUCTION

Agriculture is the main source of earnings for the people of Arunachal Pradesh. The share of agriculture and allied activities to total Gross-State Domestic Product (GSDP) at a constant price is 44.78 percent in 2016-17 (Economic Survey of Arunachal, 2017). The state gets as much as 500 centimeters of rainfall and this accounts for the large numbers of rivers and lakes in the region apart from these, extensive forests which have to include the people to adopt the 'Jhum" form of cultivation in which a select area of the forest plot is burnt and used for cultivation.

Jhum or slash and burn cultivation is an old-age practice among the tribal groups throughout the tropics. It is largely viewed as an exploitative system where the land and natural resources are not managed optimally and are taken to be a major cause of deforestation and ecological instability. The difficult topography, inhospitable terrain, incessant rains, and harsh climatic conditions in the region leads the people to adopt this old-age practice. A large segment of the tribal population of the region and the majority of tribal groups have been traditionally practicing Jhum. Apart from Jhum, sedentary and terrace cultivation are also practiced by the people ((*BARTHAKUR, 1984*). The main issues of agriculture development in the state are limited arable land and low productivity, with this background, the present study aims to examine trends and growth in agriculture production in the state.

The study is based in Tawang district which is located in the northwest part of Arunachal Pradesh on the international borders with China and Bhutan. Tawang district occupies an area of 2172 Sq.km and it is situated at the height of 3500 meters from the sea level. Out of the total area of 2172 Sq.km of the district, about 1768 Sq.km is under forest cover. Most of the people depend on agriculture for a living, owing to Tawang's cold climate, farmers breed yaks and sheep, although in lower altitudes crops are also planted. In early, the people of Tawang depends mainly on breeding yaks and sheep because of difficult topography and inhospitable terrain, which people find very difficult to cultivate crops. In low-lying areas, farmers practice subsistence farming in which wheat is the major crop produced along with maize, millet, rice, and paddy. Other important crops of the district include potatoes, oilseeds, and vegetables.

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REVIEW OF THEORETICAL LITERATURE

The history of England is clear evidence that Agricultural Revolution preceded the Industrial Revolution there. In U.S.A. and Japan, also agricultural development has helped to a greater extent in the process of their industrialisation. Similarly, various under-developed countries of the world engaged in the process of economic development have by now learnt the limitations of putting over-emphasis on industrialisation as a means to attain higher per capita real income.

Lewis (1954) in his article "Economic Development with Unlimited Supplies of Labour"   envisages the capital accumulation in the modern industrial sector so as to draw labour from the subsistence agriculture sector. Schultz (1964) in his book "Transforming Traditional Agriculture" argued that agriculture remains as traditional if the art of cultivation do not change. He stated that there is a need to introduce new and improved inputs to raise productivity and transform traditional agriculture.

Mellor (1966) "The Economics of Agricultural Development" suggest ways to transform agriculture. According to him three phases of agricultural development; Traditional agriculture, Technologically dynamic agriculture-low capital technology, Technologically dynamic agriculture-high capital technology. He also argued that there is a need to encourage institutional changes and develop skills for smooth progress of agriculture.

REVIEW OF EMPIRICAL LITERATURE

Ahmed and Bhowmick (1991) attempted to examine the extent of variability in area, yield and price; the nature of price, productivity and acreage movement over a period in relation to technology and factors responsible for determining the area under the principle crops. The study was based on five principle crops; rice, rapeseed and mustard, jute, wheat and potato in Assam. Time series data were used and simple linear model was used for the purpose. The study concluded that acreage under the principle crops in Assam is influenced by the yield of the crop, lag acreage and area under irrigation. Farmers in Assam were not at all price responsive for the crops considered here with respect to allocation of acreage. It means that farmers in this area are yet to take farming as a business.

Rahul Mahanta (2003) An Analysis of Regional Disparities in Agricultural Development Assam. Regional disparity exists in agricultural development in Assam. The study assumes that there are three sources that is, input effect, spatial effect and temporal effect that cause variation in the level of agricultural development. The study is envisaged to the Assam state with 23 districts. Agriculture production is taken as indicator of agricultural development in Assam. Principal component analysis has been used to examine inter-regional disparity in agricultural development and other tools like balance ratio, index of inter-regional imbalances, index of inter-regional imbalances has been used. Applying above methodology and analysis, the study found that the variation in the agriculture production can be minimized by adopting appropriate strategy which combines both input and spatial factors. Such a strategy will help to make a balanced regional agricultural development in the state of Assam.

Sharma (1999) analysed the impact of mechanization and land productivity in the Jorhat district of Assam for 1991-92 covering the crops; rice, mustard and potato. Field level data was used and multiple-regression was run. The study found that mechanization improved productivity.

Borbora and Mahanta(2001) tried to identify inter-district disparities in agricultural sector in 23 districts of Assam. The period of study is 1998-99. Crops are not specified. Secondary data, cross-section was used for estimating land productivity. The method of analysis is principal component method used to determine factors influencing production. To measure inter-district disparity in agricultural development in the state 13 indicators were developed. The study found that inter-district disparity existed in proportion to the area under cultivation.

Surendra singh and Bimal Sharma (2007) analysed the "changing pattern of agricultural productivity in Brahmaputra valley". The Brahmaputra valley, in spite of favorable agro-ecological condition for agricultural development, the land used trends were being observed as stagnant and steady during the 1970s and 1980s. Based on homogeneous character, the entire Brahmaputra valley is divided into five agro-ecological zones, namely, the lower Brahmaputra valley, middle-lower Brahmaputra valley, central Brahmaputra valley, upper northern and the upper southern plains of Brahmaputra. The study concluded that the smoothness of general land use trends become fluctuating under the use of modern agricultural technology. As a result, intensification in agriculture practices has been started especially during the last decade of the century.

Kaul and Ram (Sept. 2010) "Impact of Urbanization on Agriculture production of India" The present paper deals with the impact of urbanization on agriculture sector in India. The main objectives of the study are to study the migration of labour and its implications for urbanization, factors affecting flow of migrants to urban centers, to investigate the effect of urbanization on agriculture production and to suggest the policy measures for agriculture production in the wake of urbanization. The study is based on state wise data for the year 2001. The data has been collected from secondary sources from various reports published from different agencies. Regression model has been used for examining the process. The study indicated that the migration of

people from relatively richer states is somewhat smaller. Also the flow of migrants from the states would reduce, if the states are more urbanised. Study further indicated that the extent of urbanization and migration of people from the states had a positive impact on agriculture production and development. Thus, it would have a positive implication for rural poverty.

The review of literature shows that there is a dearth of study on agricultural development in the hills of North East India. Hence, the present study was undertaken to fill the gap in knowledge.

MATERIALS AND METHODS

The study was conducted in Namazing & Kharsa village of the Tawang district of Arunachal Pradesh. It is located in the Jang subdivision of Tawang district, Arunachal Pradesh. Both villages have around 620 households with a population of 2434 of which 1425 are males while 1009 are females as per the population census 2011. Namazing and Kharsa villages have a lower literacy rate compared to Arunachal Pradesh. In the 2011 census, the literacy rate of Namazing and Kharsa was 43.35 percent and 61.8 percent compared to 65.38 percent in Arunachal Pradesh (Population Census, 2011). The villages are situated 5 km away from sub-divisional headquarter Jang and 37 km away from district headquarter Tawang. Tawang district occupies an area of 2172 Sq.km and is situated at the height of 3500 meters from sea level. The district is roughly located around latitude $70^045'$ N and longitude $90^0 15'$ E at the northwest extremity of bordering China. According to the 2011 census, the Tawang district has a population of 49950 with a sex ratio of 701 females for every 1000 males. The vast area of the district is under mountains, rivers, and forests. Annual rainfall in the district varies from 1500 mm to 2000 mm. The climate of the district is largely influenced by the nature of its terrain. The summer is moderate and extremely cold in winter. However, the mountain peaks are covered with perpetual snow. In winter, the temperature falls below the freezing point. The nature and properties of soil vary with the area. The soil of the valleys is clay alluvium and rich in organic content and the soil of mountains is relatively lacking in organic materials. Agriculture is the primary economic activity of the vast majority of its people. However, in recent years there has been a diversification of income sources in the district. The major crops grown in the district are maize, millet, wheat, pulses, potato, chili, and paddy.

The study was based on both primary data and secondary data. The secondary data were collected from NEDFI Data Bank and Statistical Abstracts of Arunachal Pradesh. The primary data were collected by conducting a field survey in the study villages. The survey was based on a multi-stage sampling technique. In the first stage, the Tawang district was selected and in the second stage, *Namazing and Kharsa* villages of the Jang block were selected purposively. However, the random sampling technique was applied to select the households for the collection of required data as this technique reduces biasness and ensures a representative sample. The required data were collected through the personal interview method. Adequate time was given to the respondent during the interview. The duration of each interview was around 15 minutes. The questionnaire was so designed to collect information on socio-economic characteristics, access to basic facilities, and asset holdings of the farm household. It was also designed to collect information relating to the area, inputs of production of the sample farms, other miscellaneous expenditure, and output of all crops cultivated both in value and quantitative terms. All these variables were measured per unit area. The sample size was 50 households. The unit of observation was farming households. The collected data were well tabulated and processed and analyzed using statistical techniques.

The compound annual growth rates (CAGR) of area, production, and productivity were calculated to examine the performance of the agriculture sector in the State.

The compound annual growth rate was calculated by applying the following formula:

$Y_t = Y_0 (1 + r)^t$

Where, Y_t = Value in year t

Y_0 = value in base year

t = time period

r is the compound annual growth rate

Taking log to both sides we have;

$LogY_t = LogY_0 + t Log (1 + r)$

Or, $Log Y_t = a + bt$ 　　　　　　　　　　[b = Log (1 + r)]

Where, b is the exponential growth rate

Therefore, r = [Anti-log b -1]

The statistical analysis was done by using statistical packages such as *MS Excel* and *SPSS.*

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RESULTS AND DISCUSSION

Changes in Land Use Pattern in Arunachal Pradesh:

The analysis of land use statistics reveals that the total operational area in the Arunachal Pradesh declined from 405878 in 1995-96 hectares to 384000 hectares in 2010-11. In terms of the State's geographical area, the operational area declined from 4.85 percent in 1995-96 which fell to 4.59 percent in 2010-11 (Table 1). The gross cropped area in the State has increased from 2.96 percent in 1995-96 to 3.32 percent of the geographical area in 2010-11.

Table 1. Changes in Land Use Pattern in Arunachal Pradesh (percent of geographical area)

Sl. No.	Category	1995-96	2000-01	2005-06	2010-11
1	Operational Area	4.85	4.70	4.32	4.59
2	Net area sown	2.43	2.39	2.07	2.54
3	Current fallow	0.34	0.27	0.44	0.48
4	Fallow land other than current fallow	0.72	0.76	0.62	0.84
5	Uncultivated land excluding fallow land	0.97	0.55	0.40	1.43
6	Cultivable waste land	0.51	0.33	0.34	0.76
7	Land not available for cultivation	0.40	0.39	0.44	0.76
8	Gross cropped area	2.96	2.57	2.57	3.32
9	Cropping intensity (in %)	121.82	107.42	124	130.5
10	Net irrigated area (as % of Gross cropped area)	15.46	20.68	21.93	NA
11	Average size of holdings	3.83	3.69	3.33	3.51

Source: Economic Survey of Arunachal Pradesh, 2017.

Among the North Eastern States in 2010-11, the net sown area as a percent of the geographical area was the lowest in Arunachal Pradesh (2.53 percent) followed by Nagaland (7.42 percent). This can be attributed to their difficult and inhospitable mountainous terrains as well as large forest covers.

Growth of Area, Production, and Productivity of Food Crops

The analysis of growth in the area, production, and productivity of food grains in the State during the period 2003-04 to 2019-20 revealed that food grains production in the State increased from 242.4 thousand tonnes to 495.6 thousand tonnes (Table 2). The compound annual rate of growth (CARG) of food grains in the State during this period was computed to be 9.35 percent. This was mainly on account of an increase in productivity which increased from 12.26 quintals per hectare in 2002-03 to 21.68 quintals per hectare in 2019-20 (Table 4). The compound annual rate of growth in the yield of food grains during this period was 7.38 percent.

Table 2. Trend and Growth in Production of Food Crops in Arunachal Pradesh

(Production in MT)

Year	Paddy	Maize	Millet	Wheat	Pulses	Total Food grains
2003-04	152500	56441	19411	6250	7793	242395
2005-06	146191	57898	22376	6140	8285	240890
2007-08	237219	57430	19425	5294	8618	327986
2009-10	215842	60144	18391	4770	9656	308803
2011-12	255000	68500	22000	6500	10500	362500
2013-14	276171	68978	23825	4470	11143	384587
2015-16	330537	72358	25689	5489	12163	446236
2017-18	350000	77216	27300	7742	13464	475722
2019-20	367125	49205	27460	7742	14151	495683
CAGR	**11.60**	**-1.70**	**4.43**	**2.71**	**7.74**	**9.35**

Source: Statistical Abstract of Arunachal Pradesh (Year Wise)

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However, the area under food grains increased marginally during this period. The area grew at CARG of only 1.83 percent (Table 3). The increase in food grains production during 2002-03 to 2019-20 was mainly contributed by the increase in the production of paddy, pulses, and millet.

During the same period, production of wheat registered a CARG of 2.7 percent, and production of maize registered negative growth. During this period the yield rates of maize, millet, and wheat grew marginally at CARG of 1.4 percent, 1.36 percent, and 3.30 percent respectively.

Table 3. Trend and Growth in Area under Food Crops in Arunachal Pradesh

(Area in Hectare)

Year	Paddy	Maize	Millet	Wheat	Pulses	Total Food grains
2003-04	124584	40548	21110	4114	7305	197661
2005-06	122267	41853	22802	3976	7720	198618
2007-08	124029	42736	22308	3558	8512	201143
2009-10	121468	43630	21373	3170	8818	198459
2011-12	123496	46500	22000	3700	9500	205200
2013-14	131989	47018	22744	2960	9672	214383
2015-16	131863	49563	24360	3056	10560	219402
2017-18	132000	50797	26765	3930	13200	226692
2019-20	133500	51100	26790	3930	13350	228670
CAGR	0.86	2.93	3.02	-0.57	7.82	1.83

Source: Statistical Abstract of Arunachal Pradesh (Year Wise)

Table 4. Yield rate of food grains in Arunachal Pradesh

(Yield in quintals per hectare)

Year	Paddy	Maize	Millet	Wheat	Pulses	Total Food grains
2003-04	12.24	13.92	9.2	15.19	10.67	12.26
2005-06	11.96	13.83	9.81	15.44	10.73	12.13
2007-08	19.13	13.44	8.71	14.88	10.12	16.31
2009-10	17.8	13.8	8.6	15	11	15.6
2011-12	20.6	14.7	10	17.6	11.1	17.7
2013-14	20.9	14.7	10.5	15.1	11.5	17.9
2015-16	22.5	15.2	10.5	17.3	11.2	19.3
2017-18	25.52	15.2	10.2	19.7	10.2	20.99
2019-20	27.5	15.61	10.25	19.7	10.6	21.68
CAGR	10.64	1.44	1.36	3.30	-0.08	7.38

Source: Statistical Abstract of Arunachal Pradesh (Year Wise)

Despite growth in the yield rate of food grains over the years, it is still low. For instance, in 2019-20, the yield rate of food grains in the State was 7.38 quintals per hectare which were lower than the national average of 21.20 quintals per hectare (NEDFI Data Bank). Hence, efforts must be made to raise the productivity of food grains in the State to ensure food security.

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Growth in Production and Productivity of Food Crops in Tawang District:

An analysis of the area under food crops in the Tawang district during the period 2003-04 to 2019-20 reveals that the total area under total food grains has declined from 5516 hectares to 4541 hectares (Table 5). This indicates that there has been a shift in the area towards the production of commercial crops which is an indication of agricultural transformation.

Table 5. Area under Food Crops in Tawang District of Arunachal Pradesh

(Area in Hectare)

Year	Rice	Wheat	Maize	Millet	Pulses	Total
2003-04	907	2290	880	885	554	5516
2005-06	777	1702	722	835	124	4160
2007-08	770	1662	710	835	179	4156
2009-10	760	1155	695	1000	152	3762
2011-12	777	1156	722	1015	172	3842
2013-14	835	986	700	1015	156	3692
2015-16	850	1013	856	1125	253	4097
2017-18	883	11,04	910	1261	333	4491
2019-20	917	1104	923	1262	335	4541
Average Annual Growth Rate	0.33	-7.67	1.14	4.82	6.23	-1.77

Source: Statistical Abstract of Arunachal Pradesh (Year Wise)

The annual average growth rate of food grains in the district during this period was found to be 2.91 (Table 6), which means that there is very low growth in the production of food grains in the Tawang district. The low growth in the production of food grains in the Tawang district is mainly due to a decline in the area under food crops. The average annual growth of area under the production of food grains registered negative growth of -1.77 during 2003-04 to 2019-20 (Table 5). It was mainly on account of a sharp fall in the area under wheat which registered negative growth of -7.67 percent on an average during the period.

Table 6. Production of Food Crops in Tawang District of Arunachal Pradesh

(Production in MT)

Year	Rice	Wheat	Maize	Millet	Pulses	Total Food Grains
2003-04	1210	3330	1654	948	610	7752
2005-06	1057	2601	1408	1002	133	6201
2007-08	1623	2535	1420	1002	213	6793
2009-10	1178	1739	1494	1200	192	5803
2011-12	1300	1952	1600	1331	227	6410
2013-14	1319	1409	1512	1218	197	5655
2015-16	1659	1506	1728	1308	295	6496
2017-18	2191	1,931	2090	1439	471	8122
2019-20	2625	1931	2180	1446	478	8660
Average Annual Growth Rate	12.77	-3.54	3.86	5.13	11.61	2.91

Source: Statistical Abstract of Arunachal Pradesh (Year Wise)

The analysis of trends and growth in production of food crops in the district during the period 2003-04 to 2019-20 showed that food grains production in the district increased marginally from 7752 tonnes to 8660 tonnes (Table 6). The annual average growth rate of food grains in the district during this period was computed as 2.9. It means that the production of food grains in the Tawang district has increased marginally which is not a healthy trend. The production of wheat in the Tawang district has declined from 3330 tonnes to 1931 tonnes which is negative growth of -3.54. The production of pulses has also declined from 610 tonnes to 478 tonnes. The decline in the production of wheat and pulses was due to a sharp fall in the area under production.

However, the production of other crops increased during 2003-04 to 2019-20. The production of rice increased from 1210 tonnes to 2625 tonnes, the production of millet rose from 948 tonnes to 1446 tonnes and the production of maize rose from 1654

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tonnes to 2180 tonnes during the period (Table 6). The increase in production of rice, millet, and maize was mainly due to an increase in yield rate which is an indication of improvement in efficiency. But the increase in production of these was due to both area expansion and an increase in yield rate.

An analysis of trends and growth in the yield rate of food crops in the district during the period 2003-04 to 2019-20 showed that the yield rate of total food grains in the Tawang district has increased from 14.05 quintals to 19.7 quintals (Table 7).

Table 7. Yield Rate of Food Crops in Tawang District of Arunachal Pradesh

(Yield in quintal/hectare)

Year	Rice	Wheat	Maize	Millet	Pulses	Total Food Grains
2003-04	13.34	14.54	18.8	10.71	11.01	14.05
2005-06	13.6	15.28	19.5	12	10.73	14.91
2007-08	21.08	15.25	20	12	11.9	16.35
2009-10	15.5	15.06	21.5	12	12.63	15.43
2011-12	16.73	16.89	22.16	13.11	13.2	16.68
2013-14	15.8	14.29	21.6	12	12.63	15.32
2015-16	20.32	15.6	22.5	12.3	13.6	16.86
2017-18	24.81	17.49	22.97	11.41	14.14	18.9
2019-20	28.63	17.49	23.62	11.45	14.27	19.07
Average Annual Growth Rate	**12.36**	**2.71**	**2.92**	**1.05**	**3.40**	**4.14**

Source: Statistical Abstract of Arunachal Pradesh (Year Wise)

The average annual growth of yield of food crops during the period under review was computed to be only 4.1 which is very low growth. This indicates that the level of resource use efficiency and technology of production in the district is poor.

Among the various food crops, the yield rate of rice has increased from 13.34 quintals in 2003-04 to 28.63 quintals in 2019-20 with an annual average growth of 12.36 percent. During the same period, the yield rate of maize, pulse, and millet grew at an annual average growth of 2.9 percent, 3.4 percent, and 1.05 percent respectively.

The percentage share of Tawang district in total production of food crops in Arunachal Pradesh in 2019-2020 showed that the district accounted for only 1.47 percent of the total food grains production in the State. This implies that its contribution to food grains production in the state is very low. This is because the hilly topography and rough terrain of the district do not favor the production of food crops except some coarse cereals.

Socio-economic Profile of Surveyed Households and Access to Basic Facilities:

Socio-economic characteristics play a profound role in determining one's accessibility to the common resources, livelihood patterns, household food & nutritional security, etc. They are also indicators of household well-being. Hence, an attempt was made to understand the socio-economic profile and households' access to basic facilities in the rural area of the district.

The analysis of the primary data showed that most of the respondents (68 percent) belong to the age group between 40-50 and 50-60. The minimum age of respondents is 37 and the maximum is 71, and the mean value is 50.28. The age distribution of the respondents showed that most of them belonged to the higher age group.

The level of educational attainment of the surveyed household found that 72 percent of respondents are illiterate. (Table 8).The number of respondents having education up to primary and middle level is 12 percent. The maximum year of schooling is only 12 years, the mean value is 2.16 and the standard deviation is high i.e. 3.86 This reveals that the education level of the people in the area is very low.

Table 8. Classification of Respondents based on Education (Year of Schooling)

Years of Schooling	Frequency	Percent
Illiterate	36	72
Upto 5 years	6	12
Upto 10 Years	6	12
Above 10 years	2	4
Total	50	100

Source: Fild Survey, 2021

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The occupation distribution of the farm household showed that most of the respondents are engaged in the service sector (28 percent). The increase in the service sector is mainly because of the expansion of public administration in the district. The percentage of respondents engage in agriculture is only 16 percent. This is mainly due to limited arable land and low productivity. Of the respondents engage in contract work are 16 percent. The respondents engage in another sector (including

casual labor) are 24 percent (Table 9). This shows that people in the area have adopted diversified livelihoods to overcome the limitations posed by limited arable land.

Table 9. Classification of Respondents based on Occupation

Occupation	Frequency	Percent
Agriculture/Herd	8	16
Labour	8	16
service	14	28
contract	8	16
Others	12	24
Total	50	100

Source: Fild Survey, 2021

The annual household income of the surveyed respondent showed that 36 percent of the respondent comes under the income group of less than one lakh (Table 10) and 40 percent of the respondents have an annual income of more than 3 lakh. Around 20 percent of the respondents have an annual household income between 1-3 lakh . So there is high-income inequality within the same village. This is mainly due to differences in education levels.

Table 10. Classification of Respondents based on Annual Household Income

Income group	Frequency	Percent
Less than 1 lakh	18	36
1-2 lakh	2	4
2-3 lakh	10	20
3 lakh and above	20	40
Total	50	100

Source: Fild Survey, 2021

The percentage share of agriculture in the total income of the farm household revealed that 64 percent of respondents have less than 30 percent share of agriculture in total income (Table 11). And 32 percent of respondents have around 90 percent of the share of agriculture in total income.

Table 11. Classification of Respondents based on Share of Agriculture in Total Income

Percentage Share of Agriculture in total Income	Frequency	Percent
Less than 30 Per cent	32	64
30- 50 Per cent	2	4
Above 90 Per cent	16	32
Total	50	100

Source: Fild Survey, 2021

There has been diversification toward non-agricultural income sources among the households in the surveyed villages.
The family size of the households showed that 20 percent of the households have a small family size. And 72 percent of the respondents have a medium family size. It means most of the respondents have a medium family size. And only 8 percent of respondents in the study village have a large family size.

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The share of agriculture in total annual household income is only 6.17 percent (Figure 1). The reason behind the less share of agriculture in total income is low productivity, as the village is located in a hilly and mountainous region. So the terrain is difficult, and incessant rains and harsh climate conditions in the region lead to low productivity. The share of livestock in the total annual household income of the surveyed households was 15.79 percent. As people of this region depend on breeding yaks and other milk and draught animals, and products of these animals have a good source of income for the people.
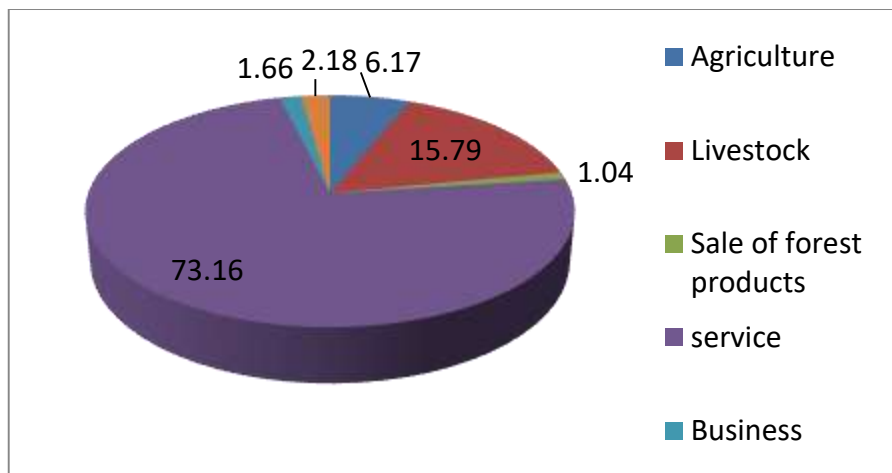
Figure 1. *Share of Different Sources in Total Annual Household Income of the Surveyed Households*
Source: Fild Survey, 2021

Access to basic facilities like drinking water, sanitation, electricity, housing, drainage, and others are crucial to well-being as they contribute to physical and mental comfort and quality of life. It was found that all the households have their own houses and there is no rented house in the village. There is no thatched house in the village and all the houses are found in pucca.

The source of drinking water in the surveyed households showed that 64 percent of the respondents have drinking water from the tap in the dwelling while 36 percent of the respondents have drinking water from a public tap (Table 12). Access to drinking water is found to be good.

Table 12. Classification of respondents based on the source of drinking facilities

Drinking water	Frequency	Percent
tape in dwelling	32	64
public tape	18	36
Total	50	100

Source*:* Fild Survey, 2021

The survey found that all the respondents have toilet facilities and most of the respondents use covered dry latrines (76 percent). It was found that only 24 percent of the households have septic tank toilets (Table 13). This indicates poor access to sanitary toilet facilities in the rural area of the district.

Table 13. Classification of surveyed respondents based on Toilet type

Toilet Type	Frequency	Percent
Septic Tank Toilet	12	24
Covered Dry Toilet	38	76
Total	50	100

Source*:* Fild Survey, 2021

An attempt was also made to study the sources of fuel of the surveyed households. The survey found that there are two main sources of fuel used in every household. These are LPG and firewood. It was found that 24 percent of the household used LPG as a main source of fuel and 76 percent of the households used wood as a main source of fuel for cooking and heating purpose (Table 14).

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Table 14. Classification of surveyed respondents based on the source of fuel

Source of fuel	Frequency	Percent
LPG	12	24
Wood	38	76
Total	50	100

Source*:* Fild Survey, 2021

During the winter season due to extreme cold people use firewood for heating purposes. But in summer LPG is the main source of fuel for cooking. The use of firewood during winter creates a huge demand for it. This has led to extensive felling of trees for firewood leading to large deforestation. Hence, there is a need to improve the supply of electricity and encourage people to adopt electric heaters. This is important to protect the environment and maintain ecological balance in the district.

It was found that all the respondent households have ration cards from PDS. It was found that 64 percent of the respondents were holding APL ration cards and 36 percent of them were holding BPL ration cards (Table 15). This indicates that there is a high incidence of poverty in the area. The dependence on PDS rice indicates inadequate production of food grains in the village.

Table 15. Classification of surveyed respondents based on the type of ration card

RC Type	Frequency	Percent
APL	32	64
BPL	18	36
Total	50	100

Source*:* Fild Survey, 2021

Policy Implications

Based on the above findings and discussion, the following policy implications can be suggested:

➢ There is a need to focus on improving the productivity of major crops. This may require the introduction of new inputs and better technology. The government may provide improved inputs to farmers at a subsidized rate as the income of farmers is low.

➢ Over the year people's dependency on the public distribution system for food grains has substantially increased. This is a clear indication of too much dependency on government aid**.**

➢ There is a need for support and encouragement for local products so that the income level of the farmers could rise.

➢ There is a need to encourage diversification toward plantation crops as the topography of the state is not very suitable for the production of food crops.

➢ Skill and training are essential to building up the capacity of the people to undertake plantation crops.

➢ The access to basic facilities particularly sanitary toilets was poor. So efforts must be made to encourage the people in the rural area to adopt proper sanitary toilets by providing incentives.

➢ There is a need to improve the electricity supply so that the dependency on firewood could be reduced.

CONCLUSION

Based on the above findings and discussion, it can be concluded that agriculture is the main source of earnings for the people of Arunachal Pradesh as well as the Tawang district. Over the years the production and productivity have increased but the increase in productivity was low. The main issues of agriculture development in the state are limited arable land and low productivity. The total operational area in the state has been declining mainly because of the increase in population. During the study, it was found that the overall production of food crops in the Tawang district was very low. This was mainly due to a fall in area under food crops. At the same time growth in productivity of major crops was very low. There has been a diversification of livelihood towards non-agricultural income sources among the households in the surveyed villages. This was mainly due to low productivity and limited arable land as the study village is located in the hilly and mountainous region.

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Organizational Identification Moderates the Relationship Between the Job Satisfaction and Job Performance- Evidence in University Lecturers in Vietnam

Nguyen Nghi Thanh[1], Nguyen Thi Quynh Trang[2], Le Phuoc Quang[3]
[1,2,3]Hanoi University of Home Affairs

ABSTRACT: Although the number of universities in Vietnam has expanded significantly in recent decades, the quality gap in the country's higher education has recently received much attention. Much qualitative research determined why more and more university graduates are out of work and university lecturers move to other jobs, which are the causes affecting job satisfaction, and work efficiency. However, there is still a lack of quantitative research to examine this issue. This study adds to the findings of previous studies. It enriches the research literature by examining Organizational definition as a variable detailing the relationship between job satisfaction and job performance among Vietnamese university lecturers. We conducted a cross-sectional survey (n = 200). Multiple linear regression and moderator regression analysis tested the proposed hypotheses. Research results show a positive and significant relationship between organizational identity, job satisfaction, and job performance of Vietnamese university lecturers. In particular, organizational identity functions as a moderating variable of the relationship between job satisfaction and job performance.

KEYWORDS: organizational identification, job satisfaction, work efficiency, university lecturer, Vietnam

INTRODUCTION

In 2019, Vietnam had 237 universities, with 172 public ones, 60 private ones, and 5 with 100% foreign capital. There are 74,991 university lecturers, with 59,232 in public universities and 15,759 in private ones. The number of Vietnamese students enrolling increased by nearly 40% between 2008 and 2020 (Nguyen & Pham, 2020). Yet, the number of lecturers available is insufficient to keep up with rapid growth. Besides teaching, many of them have to do too many other tasks. Many studies determined the factors affecting their job satisfaction and work efficiency to help them work more effectively, reduce stress, and improve the quality of higher education. There have been significant discoveries, such as in higher education, where education quality is affected by a variety of factors in which faculty serves as the foundation for determining and developing educational quality, organizational performance, and competitive advantage, particularly in terms of sustainable development (Tai, Singh, & Hieu, 2021). Many factors influence their job satisfaction and work efficiency, including coworker relationships, regulations, management policies, employment characteristics, professional development, salary, remuneration, benefits, students, promotion opportunities (Liem, 2016; Thao & Viet, 2017; Nghi et al., 2017; Tan & Hoa, 2018; Quang & Thao, 2018; Linh, 2018; Quan & Trang, 2015; Tai et al., 2016), student attendance, information, faculty orientation, reward and recognition, teamwork, innovation (Minh & Tuan, 2017) demographic characteristics such as ages, genders, marital status (Bang, Ha, & Huan, 2014).

There have been no empirical studies on the impact of organizational identification on Vietnamese university lecturers' work efficiency and job satisfaction. However, according to various studies in other disciplines, organizational identification is more effective in forecasting work efficiency (Ng, 2015; Blader, Patil, & Packer, 2017). It changes the relationship between employees and their organization. According to studies, employees with high organizational identification scores will blend their personalities with their organizational features, which improves their work efficiency (Blader, Patil, & Packer, 2017). Because the relationship between like-minded employees positively affects organizational identification (Sluss et al., 2012). Their identification with the organization will develop due to their values and beliefs aligning with the ones of the organization (Shim & Faerman, 2017; Pratt, 1998). Their solid organizational identification contributes to their compliance and job satisfaction (Mael & Ashforth, 1992; Pratt, 1998). Conversely, some studies uncover the dark side of organizational identification. The ones with a high degree

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of corporate identification may feel disconnected from their organizations (Ashforth & Mael, 1989). There is also controversy about the negative relationship of organizational identification with employee performance and job satisfaction (Naseer et al., 2019; Galvin et al., 2015; Ashforth, 2016; Conroy et al., 2017). Thus, the theory of the underlying mechanism of organizational identification still needs a lot of additional research (Blader, Patil, & Packer, 2017). There is still a lack of quantitative research on the role of organizational identity for university faculty. Therefore, this study aims to fill the theoretical gap in previous studies, examine the role of organizational identification in the job satisfaction of university lecturers and job performance of university lecturers, and test the moderator role of organizational identification in the relationship between job satisfaction of university lecturers and their job performance in Vietnam.

LITERATURE REVIEWS

Organizational Identification

Albert and Whetten (1985) define organizational identification as statements that organization members perceive to be central, distinctive, and enduring to their organization. The definition reveals three critical criteria: centrality, distinctiveness, and durability. Centrality means that the statement should include essential features of the organization. As a statement of central characters, it defines what is crucial and necessary to the organization. Organizational identification is a specific type of social identification in which people identify themselves as members of a group or organization (Schwarz, 2017). It is characterized by a psychological union between individuals and their organizations (Mael & Ashforth, 1992; Van Knippenberg & Sleebos, 2006; Mael & Ashforth, 1992). Organizational identification is an individual's values and beliefs similar to those of others within the organization (Pratt, 1998; Dutton & Dukerich, 1991). It expresses personal pride in being a member of an organization because its goals and values become it's own (Riketta, 2005; Tajfel, 1978). It is a combination of multiple personal and organizational identification formed through interactions with others within the organization (Stryker, 1980). Organizational identification identifies an individual with social categories within an organization due to a desire for security, reducing uncertainty, and enhancing self-esteem in the organization (Ashforth & Mael, 1989).

An individual's organization identification allows us to determine to what extent the individual participates in the success of a group whose performance exceeds their strength (Ashforth & Mael, 1989). Individuals with high scores on organizational identity believe that their fortunes are tied to their organization (Mael & Ashforth, 1992), consider themselves essential in the organization (Pratt, 1998), and classify people to arrange their social surroundings (Tajfel, 1978; Dutton & Dukerich, 1991). Organizational identification is a concept of identity-based corporate linkage (Pratt, 1998). People with high scores on organizational identitfication establish their definitions of social categories when they believe they belong to them (Tajfel, 1978, Ashforth et al., 2008; Liu & Perry, 2016).

Individuals form their organizational identification on the interaction between employees and their organizations. Therefore, people with a high score are viewed positively by the organization (Miao et al., 2014). People with a strong sense of organizational identification focus their attention on tasks that assist the organization in meeting its goals (March & Simon, 1958). Their social and historical backgrounds, goals, and qualities influence their organizational identification (Perry, 2000; Perry & Vandenabeele, 2008).

Lecturers' job performance

Each university faculty member has specific responsibilities, and several factors influence their job performance (Selvanathan, Yan, Supramaniam, Arumugam, & Suppramaniam, 2019). For decades, their degree of work efficiency and the reasons for increased or decreased productivity have been the subject of debate (Selvanathan, Yan, Supramaniam, Arumugam,& Suppramaniam, 2019; Butler, 2001). According to many studies, their work efficiency is affected by many factors. Therefore, they are not just about salaries and benefits but also about working conditions in institutions and classrooms (Karimi & Gitonga, 2017). Furthermore, student satisfaction with their assignments and tests, and grading methods, are essential determinants of faculty performance (Ghaffarian Asl & Osam, 2021). Colleagues, capital, and resources, among other factors, have a favorable impact on their work efficiency (Johnes & Yu, 2008). Ability, task knowledge, environment, and motivation are all factors that influence their work efficiency (Schraw, 2006). Teaching performance, research output, and job satisfaction in their employment positions are distinct (Brewer & Selden, 2000; Kim, 2005).

Lecturers' Job Satisfaction

The employees are satisfied with their jobs, expressed by their efforts to boost labor productivity (Reyes & Shin, 1995). Job satisfaction is a psychological condition that includes emotions, rewards, and all aspects of the work environment and having the job itself (Churchill et al.,1974). It determines their commitment to teaching and relates to their long-term retention in the

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teaching profession (Reyes & Shin, 1995). The right to make direct decisions about their work and hygiene considerations affects lecturers' job satisfaction in studies (Amazt & Idris, 2011; Moore, 1992). When teachers are more involved in decision-making, they have more autonomy in their work and are in better working conditions. As a result, they contribute to improved student achievement and job satisfaction (Ferguson, 2000; Jacobson, 2005; Mertler, 2002; Pearson & Moomaw, 2005; Harry, 2005), management style (Fenwick & Murlis, 1994), autonomy (Paul, 2003).

Relationship between Organizational Identification and Lecturers' job performance

Organizational identification, according to research, is the psychological link between an individual and an organization, which has a significant impact on work behaviors (Riketta, 2005), motivates people to associate with the group's influential figures (Tajfel & Turner, 1985), and has the closest link to task performance (Ng, 2015). Individuals with a high organizational identification score are more inclined to invest personally in the company and participate in beneficial activities (Simon, 1947). There is a link between organizational identification and job performance, according to studies, because people with high organizational identification scores not only profit from group affiliations but also have to follow particular group standards (Jones & Volpe, 2011). This interaction improves their self-discipline and motivates them to participate in group activities, ultimately elevating their status (Scott, 2007). It causes people to work harder for their organizations' and individuals' goals, and it causes them to become more unified with their organization's successes and failures. (Campbell, 2015). Because it improves lecturers' job motivation, the degree of organizational identification has a favorable effect on their work efficiency (Ugaddan & Park, 2017). Thus, many studies have found a relationship between organizational identification and job performance (Boyne, 2002; Brewer, 2006; Walker et al., 2011). Therefore, there is a significant relationship between organizational identification and faculty work efficiency. Consequently, we can conclude that they are linked based on these findings (Vogel, Homberg, & Gericke, 2016; Liu & Perry, 2016).

Relationship between Organizational Identification and Lecturers' Job Satisfaction

An individual with a low organizational identification score has negative psychological consequences, social rule-breaking, and unethical worker behavior (Irshad & Bashir, 2020). Those with a high organizational identification score, on the other hand, receive psychological benefits, follow the code of ethics, and their ethical behaviors have a positive impact on the organization, reflecting the employee's closeness to the organization to which they belong (Tarakci et al., 2018). They also show their greater attachment to the organization (Beyth-Marom, Harpaz, Bar-Haim, & Godder, 2006). The employees with high scores on organizational identification and job satisfaction exhibit a commitment to do what they expect to keep their jobs (Yam et al., 2017). These results show a relationship between organizational identity and lecturers' job satisfaction.

Relationship between Lecturers' Job Satisfaction and their Work efficiency

Organizational identification is a source of positive employee outcomes (Tarakci et al., 2018), and it facilitates the comprehension of worker behaviors. (Rho et al.,2015). Employees with a higher degree of organizational identification feel obliged to accomplish organizational goals due to a sense of togetherness and common aims (Yam et al., 2017). The faculty's job satisfaction is related to the ability of the teaching job to meet their expectations and improve their teaching performance (Ololube, 2006). It is a pleasant or positive emotional state that occurs due to job appraisal or work experience (Locke, 1976). Faculty commitment to the organization is influenced by job satisfaction and organizational trust (Tai, Singh, & Hieu, 2021), participatory decisions, and improved productivity (Dickson, 1982). As a result of these findings, there is a link between their job satisfaction and labor outcomes.

Hypotheses

H1. There is a positive and meaningful relationship between organizational identification and faculty job satisfaction.

H2. There is a positive and meaningful relationship between job satisfaction and job performance.

H3. Organizational identification moderates the relationship between faculty job satisfaction and job performance.

RESEARCH METHOD

We conducted the research at the Hanoi and Ho Chi Minh City universities in March 2021. These two cities account for 80% of the universities in the country. Survey participants are full-time university faculty. The research team used a qualitative method by in-depth interviews with educational researchers and psychologists to adjust the research scale and better the questionnaire to suit the characteristics of the surveyed area. Based on the results from the literature review and their comments, the questionnaire was adjusted. Accordingly, it consisted of two parts. Part 1 collects data about the participants' demographics, such as ages, genders, and occupations, whereas Part 2 collects data about work efficiency, job satisfaction, and organizational identification.

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Data on work performance were collected using part of a questionnaire developed by (White, Smith, & Cunningham, 1988), including five items. Next, data on job satisfaction were collected using a questionnaire developed by (Bérubé, Donia, Gagné, Houlfort, & Koestner, 2007), including five items. Finally, data on organizational identification were collected using part of a questionnaire developed by (Buchanan, 1974; Mowday, Steers, & Porter, 1979; Porter & Smith, 1970; Hall, Schneider, & Nygren, 1970, Cheney, 1982; Miller, Allen, Casey, & Johnson, 2000), including six items.

The English questionnaire has been translated into Vietnamese by two professional interpreters according to specific rules to accommodate a variety of Vietnamese cultures based on the comments of the language expert. It was then pre-tested on 40 participants selected to be demographically representative across age, sex, and education levels. In addition, minor edits made the questionnaire more straightforward to understand before being used for the official survey. Participating in the research is the selection of full-time university lecturers in Hanoi and Ho Chi Minh City. Ho Chi Minh. The questionnaire was sent directly to the respondents by the purposeful sampling method. We received 200 valid answer sheets (reaching 100%). Table 1 shows the demographic statistics (Table 1).

Table 1. Demographic characteristics of survey participants

	Occupation									
	Economics lecturer		foreign language lecturer		IT lecturer		Maths lecturer		Philosophy lecturer	
	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %	Count	Column N %
25-30 years	7	15.9%	10	23.8%	4	10.3%	6	16.7%	11	28.2%
31-35 years	7	15.9%	7	16.7%	6	15.4%	7	19.4%	4	10.3%
36-40 years	12	27.3%	4	9.5%	5	12.8%	6	16.7%	2	5.1%
41-45 years	6	13.6%	11	26.2%	10	25.6%	6	16.7%	10	25.6%
46-50 years	4	9.1%	3	7.1%	7	17.9%	6	16.7%	4	10.3%
above 50 years	8	18.2%	7	16.7%	7	17.9%	5	13.9%	8	20.5%
female	27	61.4%	25	59.5%	18	46.2%	16	44.4%	17	43.6%
male	17	38.6%	17	40.5%	21	53.8%	20	55.6%	22	56.4%
BA	16	36.4%	10	23.8%	15	38.5%	13	36.1%	9	23.1%
MA	16	36.4%	16	38.1%	11	28.2%	12	33.3%	19	48.7%
Ph.D	12	27.3%	16	38.1%	13	33.3%	11	30.6%	11	28.2%

RESEARCH RESULTS

Analyzing the Reliability of the Scales

Testing the scales using Cronbach's Alpha reliability coefficient aims to identify and remove junk variables to avoid misleading factors when analyzing exploratory factors. Cronbach's Alpha coefficient has a range of values between 0 and 1 $[0,1]$. A measurement variable meets the requirements if it has a Corrected Item - Total Correlation ≥ 0.3 (Cronbach, 1951; Taber, 2018). The verification criterion is that the Cronbach's Alpha coefficient must be greater than 0.6, and the correlation coefficient of the sum variable in each scale must be greater than 0.3 (Hair, Black, Babin, & Anderson, 2010). Table 2 reveals that the rankings of the factors are all standard. Therefore, they are reliable and used for the subsequent analysis and moderator regression analysis.

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Table 2. Summary of Reliability and Relative Minimum Variables of Scales

Scales	Number of variables observed	Reliability coefficients (Cronbach Alpha)	The correlation coefficient of the smallest total variable
performance	5	0.792	0.549
satisfaction	5	0.803	0.527
identification	6	0.826	0.520

After testing Cronbach's Alpha, we conduct exploratory factor analysis (EFA) to test the validity of variables about their unidirectional, concurrent, and discriminant by extracting the Principal Components Analysis and Varimax rotation in the research model. With a sample size of 200, the factor loading of the observed variables must be more than 0.5; variables converge on the same factor and are distinguishable from other factors. In addition, the Kaiser-Meyer-Olkin coefficient (KMO) is an index used to consider the suitability of factor analysis and must be in the range of 0.5 ≤ KMO ≤ 1 (Cerny & Kaiser, 1977; Kaiser,1974; Snedecor, George, Cochran & William, 1989).

Table 3 shows that all factor loading coefficients of the observed variables are higher than 0.5; Bartlett tested with Sig. = 0.000 and KMO = 0.889. All 16 items are extracted into three components with Eigenvalues > 1 and Cumulative variance percent = 55.326 %. As a result, a research model with two independent and one dependent variable for linear regression analysis and moderator regression analysis to test hypotheses.

Table 3: Exploratory factor analysis

Rotated Component Matrixª	Component		
	1	2	3
Identification6	.795		
Identification4	.724		
Identification1	.722		
Identification5	.709		
Identification2	.664		
Identification3	.594		
Satisfaction5		.788	
Satisfaction1		.727	
Satisfaction2		.708	
Satisfaction3		.676	
Satisfaction4		.657	
Performance3			.755
Performance5			.735
Performance4			.676

Performance1			.666
Performance2			.644
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.			
a. Rotation converged in 5 iterations.			

Pearson correlation analysis

The authors employ Pearson correlation analysis to examine the relationship between quantitative variables. As shown in Figure 2, with a significance of 5%, the correlation coefficient indicates that the relationship between the dependent and the independent variables is statistically significant (Sig.< 0.05). The magnitude of the correlation coefficients ensures that multicollinearity does not occur. Therefore, other statistics can be employed to verify the link between variables.
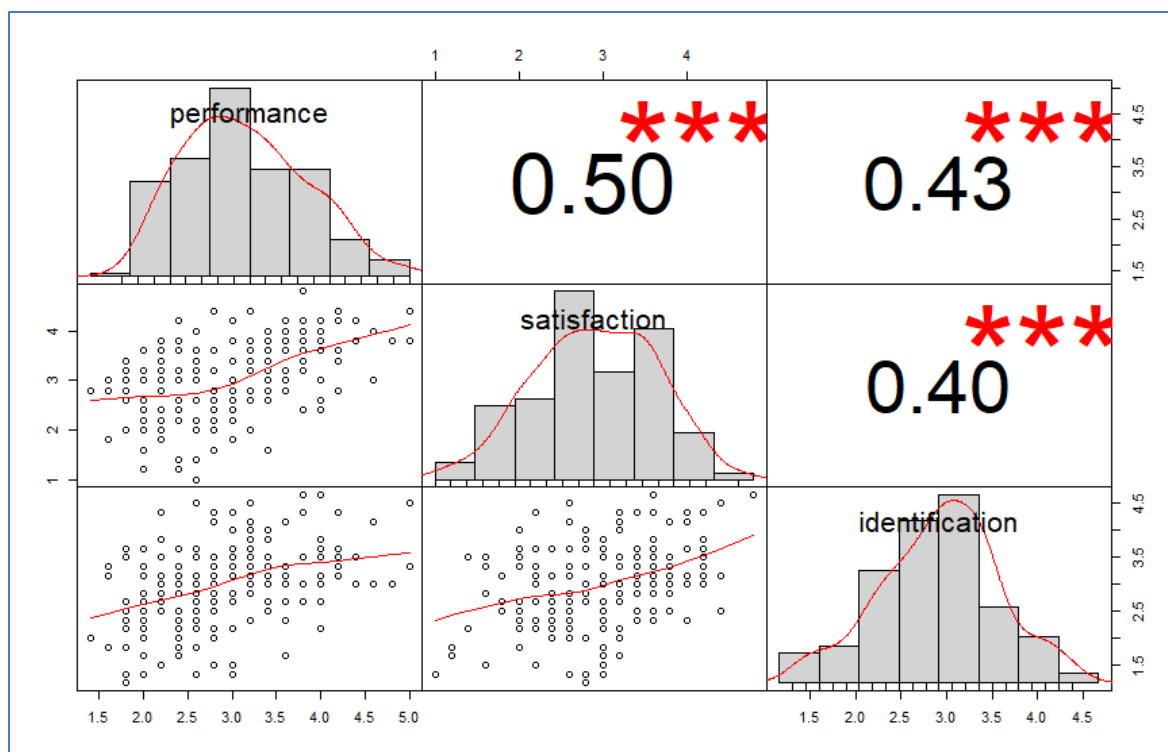
Figure 2 Pearson correlation analysis results

Moderation regression and linear regression analysis

The Multivariable linear regression is analyzed based on the relationship between two independent variables, namely *Identification* and *Satisfaction*, and one dependent one, *Performance* (model1), and Moderation regression Analysis is used to determine the *Identification* that moderates the relationship between *Satisfaction* and *Performance* (model 2). We centered the data on satisfaction and Identity variable before applying moderator regression analysis. Table 4 has shown model1 with R^2 = 0.304 and model2 with R^2 = 0.308. These results have indicated that the linear regression model was built to fit the data set Model 1 = 0.304 % and Model 2 = 0.308%. Both models show that the two independent variables have no statistical significance on the dependent variable. Both models show that the two independent variables have no significant impact on the dependent one and are not of statistical significance. Moderation regression Analysis (model2) reveals that the Midentification is a moderation variable that adjusts the relationship between the Xsatisfaction and Performance. That means the impact of Xsatisfaction and Performance depends on the decrease or increase of Midentification.

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Table 4. The results of multiple linear regression analysis

	Dependent variable:	
	Performance	
	(model1)	(model2)
Identification	0.279***	
	(0.066)	
Satisfaction	0.397***	
	(0.065)	
Satisfaction		0.365***
		(0.059)
Identification		0.258***
		(0.060)
Satisfaction:Identification		0.152**
		(0.064)
Constant	0.909***	2.925*** (0.048)
	(0.221)	
Observations	200	200
R2	0.314	0.304
Adjusted R2	0.307	0.293
Residual Std. Error	0.637 (df = 197)	0.643 (df = 196)
F Statistic	45.144*** (df = 2; 197) 28.496*** (df = 3; 196)	
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 4 shows that, with a 95% confidence level, the hypotheses proposed by the research team are acceptable. Specifically, model1 demonstrated that Satisfaction has the highest effect on Performance with β = 0.269. Model 2 has indicated that the Identification moderates the association between Satisfaction and Performance with β = 0.175, implying that as the Identification rises or falls, the relationship between Satisfaction and Performance rises or falls.

DISCUSSION AND CONCLUSIONS

Firstly, Table 4 results show that hypothesis H1 is accepted. There is a positive and meaningful relationship between organizational identification and job performance. It means that organizational identification has a positive and significant relationship with the performance of lecturers. This result is similar to previous findings by Jones & Volpe (2011), Campbell (2015), Ugaddan & Park (2017), and Scott (2007). They put forth more effort to achieve the organization's goals and are more aware of its successes and losses. It is similar to what was discovered by Boyne (2002), Brewer (2006); Walker et al. (2011), Vogel, Homberg, & Gericke (2016), Liu & Perry (2016), which found a link between the lecturers' organizational identification and their work performance.

Secondly, Table 4 indicates that hypothesis H2 is accepted. It suggests that job satisfaction among lecturers has a positive and meaningful association with their job performance. This result is similar to previous studies conducted in other fields Ololube (2006) and Locke (1976). Individuals with high scores on job satisfaction have psychological benefits. In addition, they follow the code of ethics. Their ethical behavior positively impacts their job satisfaction and ability to teach as desired and increases their teaching performance. This result implies that individuals with high scores on job satisfaction and organization trust have high scores on organizational identification (At, Singh, & Hieu, 2021).

Finally, the findings demonstrate that hypothesis H3 is accepted. That means organizational identification governs the relationship between the lecturers' job satisfaction and work efficiency. Thus, on the one hand, organizational identification has been considered a source of positive outcomes for employees (Yam et al., 2017; Rho et al., 2015; Tarakci et al., 2018) and related

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to the faculty teaching capacity attained as expected and hence increased teaching performance (Ololube, 2006). Those with high organizational identification scores demonstrate their pleasant or good emotional states due to job evaluations or work experience (Locke, 1976), which determines their participation and improves their work efficiency (Dickson, 1982). Therefore, from these above research findings, it is concluded that organizational identification impacts the relationship between lecturers' job satisfaction and work efficiency.

This study shows that the role of organizational identification is confirmed in higher education. Therefore, managers in higher education need to understand that it is a factor affecting the satisfaction and job performance of university employees. In addition, employee organizational identification is an essential factor in the change process of any higher education institution. This study further affirms that Organizational identity is defined as the statements that organizational members consider central, distinct, and enduring to their organization (Albert & Whetten, 1985). Therefore, it influences the behavior of both leaders and members in many aspects of an organization.

Limitations

Like other experimental studies, this study has some limitations that need considering when discussing its findings. First and foremost, our survey approach reflects the respondents' subjective perception of the questions investigated. Unfortunately, subjective data has some inherent flaws that are difficult to eliminate (Pakpour, Gellert, Asefzadeh, Updegraff, Molloy, & Sniehotta, 2016). Our data is collected over some time. Because cross-sectional data do not allow dynamic assessment of changes in intention and accompanying behavior, the usefulness of our findings may be limited (Xin, Liang, Zhanyou & Hua, 2019). The purposive sampling method also has certain restrictions and does not fully reflect the features of the population (Lin et al., 2016; Strong et al., 2018). Other studies will overcome these limitations with larger sample sizes, random sampling methods, and examination of demographic characteristics. Our survey was conducted in a Vietnamese cultural context. Consequently, more general statements should be put forward by applying more development research models and results from other countries and cultures (Sun et al., 2012). Furthermore, the R^2 of both models is low, which will reduce the significance of the models. In further studies, it is necessary to increase the sample size to improve them.

Conflict of interest
The authors declare that there is no conflict of interest.

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Restoration of Degraded Pasture Ecosystems of Dehkanabad Forestry

M.N. Norkulov[1], X.M. Talipov[2], M.I. Ruzmetov[3], R.A. Muradov[4], T.X. Mukimov[5], G.T. Parpiyev[6]

[1]Scientific researcher, State Scientific and Design Institute "Uzdavyerloyikha", Tashkent city, Uzbekistan
[2]Candidate of Agricultural Sciences, State Forestry Committee of the Republic of Uzbekistan, Tashkent city, Uzbekistan
[3]Doctor of Agricultural Sciences, senior researcher, Deputy Minister of Agriculture of the Republic of Uzbekistan, Tashkent city, Uzbekistan,
[4]Doctor of Economics, UNDP, Uzbekistan, Tashkent city, Uzbekistan
[5]Candidate of Agricultural Sciences, Samarkand State University. Samarkand city, Uzbekistan
[6]Doctor of Biological Sciences, Deputy General Director, State Scientific and Design Institute "Uzdavyerloyikha"

ABSTRACT: This article presents the current state of the pasture ecosystems of the foothill and mountain zones, the preservation of their biodiversity and ways to increase the productivity of degraded pastures ensure stable development of animal husbandry, methods of improving degraded pastures through the sowing of long-term drought-resistant forage plants.

KEYWORDS: pastures, ecosystem, yield, degradation, biodiversity, forage plants, grazing.

INTRODUCTION

The prevailing climatic and socio-economic conditions in the pasture land use of the foothill zone are not favorable. There is a global climate change and a reduction in precipitation, dry years have become more frequent, the conditions of water availability of pastures have deteriorated, overgrazing is taking place, there are no material incentives for the population to restore and protect pastures. These and a number of other reasons led to the degradation of soils and vegetation of pastures, a decrease in the yield of natural forage grasses, a decrease in the feed capacity of pastures, and a decrease in the productivity of grazed livestock.

These pastures are suitable for use throughout almost the whole year, are characterized by a variety of foot forage, its relatively high nutritional value and provide the cheapest feed [1]. Land degradation and desertification are becoming one of the main environmental problems threatening natural ecosystems and socio-economic development of the Republic of Uzbekistan.

Prolonged overgrazing has led to a decrease in pasture productivity, degradation of vegetation and soil cover, violation of the hydrological regime and desertification. Unsystematic, unregulated grazing, excessive concentration of livestock per unit area and inefficient extensive methods of keeping livestock are the main causes of degradation of pastures in the region. Currently, special attention is being paid to the problems of restoring natural phytocenoses of the arid zone and preserving biodiversity, while the issues of restoring degraded lands, due to their ecological orientation, are becoming particularly relevant. An increase in the number of sheep and an increase in the productivity of sheep almost completely depend on the state of pasture grass and the nutritional value of forage vegetation. In this regard, the development of a solution to the problem of livestock development and biodiversity conservation is one of the main tasks.

MATERIAL AND METHODS OF RESEARCH

Field research with the description of test areas by the traditional method, full-scale interpretation of satellite images. Identification of pasture types and determination of the yield of fodder mass on the test areas by seasons. Assessment of the degree of degradation of the vegetation cover of pastures. [1,2]

Description of the research methodology. The assessment of the pasture condition was carried out in areas typical of the composition of vegetation cover and relief characteristic of foothill pastures. Descriptions of vegetation cover were carried out on the selected pasture areas: cutting plants, the parameters of the projective cover and the number of dominant plant species were

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determined. In order to increase the productivity of degraded lands, the practices of sustainable land management were applied, in the direction of reproduction of pasture productivity by artificial seeding on degraded areas.

RESULTS AND DISCUSSION

The monitoring of pastures in Dehkanabad district in 2019-2021 revealed that the productivity of pastures is low and averages about 0,5- 4,5 kg/ha over the years. Dehkanabad State Forestry is located at an altitude of 800-2900 meters above sea level, there are 9 types of pastures and 14 pasture differences. Total area: 105,857.94 ha, pasture 14035.14 ha, other lands 4662.8 ha.

Figure 1. Juniper trees with wormwood and ephemeral plants

Figure 2. Natural pastures of Dehkanabad forestry

The productivity of pastures is 0.05-0.2, in good climatic years up to 0.45 t/ha. In the vegetation cover there are such valuable forage species as Poa bulbosa, Bromus tectorum in places there are Carex pachystulis, Agropyrum orientale. Pastures are narrow-zone forage lands used in the spring and summer period. From coarse-stemmed forage plants on pastures there are such species as - Alhagi pseudalhagi, Cousinia resinosa, Capparis spinosa, Ferula tadshikorum. However, their number in the herbage is rare, and the value of their forage increases in the summer season of the year.

Landscapes are erosive-tectonic surfaces composed of carbonate limestones and dolomites by subordinate interlayer's of sandstones, conglomerates, clays, shale's on brown soils.

1. Variously dissected slopes of medium steepness with combinations of grass-wheatgrass and wormwood-ephemeral-wheatgrass steppes with tipchak-almond or wormwood-almond woodlands on rocky areas and shrubs along riverbeds.

2. Hilly medium-jointed plateaus with numerous rocky outcrops, with a combination of series of typical steppes with low-grass, mixed-grass meadows and typical petrophytic communities on gravelly open slopes. The type of pasture is mixed grass and wheatgrass among juniper. The pasture difference is wormwood-wheatgrass-juniper [2]. The average yield of this type of pasture over the years in spring is 0.48 t/ha, feed units 260 kg per 1 ha, contains 25 kg/ha of protein. The seasonality of use is summer [2]. In the spring of 2021, the average yield was about 0,23 t/ha.

Table 1. Dynamics of changes in the projective coverage and yield of the Dehkanabad forestry in 2019-2021

№	Plant height, cm	projective coating, %	Yield, t/ha	Sheep capacity, head/ha,for 6 months
2019 years				
1	30	60	0,36	0,80
2	31	57	0,41	0,91
3	35	55	0,39	0,86
Average	32,0	57,3	0,39	0,86
2020 years				
1	41	65	0,51	1,13
2	42	60	0,46	1,02
3	45	65	0,48	1,07
Average	42,7	63,3	0,48	1,07
2021 years				
1	33	60	0,21	0,47
2	35	60	0,22	0,49
3	30	55	0,25	0,56
Average	32,7	58,3	0,23	0,50

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According to Table 1, the percentage of projective coating on various plots and types of pastures ranges from 55 to 60%, on average 58, 3%. The yield of pastures in the conditions of 2021 is significantly lower than in 2020 and varies from 0, 21 to 0, 25 t/ha. The sheep capacity based on grazing for 6 months, on average, is 0, 5 heads per 1 hectare of pasture territory. On good plots, you can keep up to 0,56 heads per 1 ha, these pastures are seasonal and intensively used by the local population for grazing animals, they are recommended for use in the summer and autumn periods of the year and for mowing sagebrush arrays for harvesting for the winter.

Table 2. Yield of pastures of Dehkanabad forestry by seasons, t/ha

Years	spring	summer	autumn	Seed yield, t/ha
2019	0,37	0,40	0,23	0,013
2020	0,41	0,48	0,41	0,017
2021	0,17	0,08	0,03	0,010
On average for 3 years	0,31	0,31	0,22	0,013

According to Table 2, the yield of pastures by season in the summer is slightly higher in the conditions of 2020, 0,48 t/ha, in the conditions of 2021 is slightly lower than in 2020 and averaged 0,17 t/ha in the spring, and 0,08 t/ha in the summer period. By the autumn season, from 0, 03 t/ha of fodder mass remains on pastures. Seed productivity also varies by year, the highest seed productivity was recorded in 2020 at 0,017 t/ha, the lowest in 2021 at 0, 01 t/ha. On average, over two years, the seed productivity was 0,014 t/ha.

Most forest pastures consist of three tiers - a mixture of grasses, semi-shrubs, shrubs and trees. The main threats to forest pastures are irregular and unsystematic grazing of animals, deforestation for fuel, collection of plant and medicinal raw materials, fires, drought, reduction of habitats, reduction of the volume of water sources, as well as the number and reproduction of plant and animal species. Intensive and unsystematic use of mountain pastures leads to degradation and loss of biodiversity.

The increase in the areas of degraded pastures, digression of pastures, deterioration of biotic communities (ecosystems), reduction of soil fertility, erosion and desiccation, aging of forests, reduction of biodiversity, illegal and haphazard cutting of shrubs and trees, haymaking, harvesting of fuel and medicinal herbs have led to the disappearance of many types of forage grasses from the herbage.

In order to avoid a high concentration of livestock on pastures, cattle must be placed on pasture plots in different seasons in accordance with the capacity of pastures. By planning and discussing the annual use of pastures, it is first necessary to identify problems regarding the condition of pastures, availability and appropriate use of limiting factors, as well as conflicts among users, taking into account the interests of the local population in the project areas.

CREATION OF NURSERIES OF PASTURE CROPS ON THE TERRITORY OF DEHKANABAD FORESTRY

Due to excessive load, pasture areas are partially degraded and it is necessary to intensify forage production on the ground. To do this, it is necessary to establish seed production of highly productive forage plants and the creation of multicomponent, highly productive artificial hayfields by sowing such types of forage grasses as Onobrychis chorossanica, species of Astragalus, Poa bulbosa.

To increase the productivity of pastures, the following types of shrubs and semi-shrubs are used: Kochia prostrata - a semi-shrub from the family of Chenopdiaceae, height 60-90 cm and above. Develops a deep penetrating (up to 5-6 m) root system of a universal type. Productive longevity of 15-20 years. The maximum yield of fodder mass and seeds is noted for 3-4 years of life of 1,2-1,4 t/ ha. 100 kg of absolutely dry feed contains 83,5 -45,9 feed units [3].

Ceratoides ewersmanniana is an ecologically plastic species. They are well eaten by animals, especially sheep and goats. 100 kg of feed contains 41-43 feed units. The growing season is 230-240 days. The yield of dry fodder mass is 1,12- 1,25 t/ha, the seed yield is 0,12-0,17 t/ha. Productive longevity is 17-23 years [3].

On degraded foothill pasture areas within the framework of the UNDP-GEF Project "Sustainable use of natural resources and forestry in key mountain regions important for globally significant biodiversity" In the Dehkanabad forestry, seeds of fodder plants were sown at the seed nursery on an area of 2 hectares. Complete agrotechnical measures were carried out (plowing, harrowing), after sowing, seed sealing was carried out by harrowing. Perennial pasture plants play a crucial role for a stable feed harvest. Within the framework of the project, a nursery of primary seed production of long-term drought-resistant forage crops has been created to increase the productivity of forest pastures and increase biodiversity and use in the system of rotational grazing.

Restoration of Degraded Pasture Ecosystems of Dehkanabad Forestry

Some species can be mowed 2 times during the year, in spring and autumn (Kochia prostrata) getting easily eaten feed on regrowth after mowing, the mowing can be driven with a conventional mower, or an aggregate. It is possible to graze sheep under a certain load in the spring and get easy-to-eat feed on regrowth after mowing by autumn, i.e. use the pasture twice. With a yield of 1,22 t/ha from 1 ha for the second 2020 year of vegetation, additional guaranteed feed stocks can be obtained from 2 hectares without purchasing on the market. The creation of plots of drought-resistant perennial fodder crops, using resource-saving technology, will allow obtaining about 200-240 kg of seeds for the 3 rd year of vegetation from 2 hectares.

The seeds of these plants will be used to restore degraded areas of pastures, and the plants are good fodder in the summer and autumn periods of the year and good hayfields to create a guaranteed supply of feed. Additionally, 3,0-3,2 tons of dry weight can be obtained from a plot of 2 hectares, which will allow you to have a stable feed base throughout the year. In the future, the site can be used in a rotational grazing system as year-round pastures or haymaking. Herbs are grazing in spring and in the first half of summer, Kochia prostrata and Ceratoides ewersmanniana in summer and autumn.

Plant height of Kochia prostrata a in the first year of vegetation for 4 months was 25 -150 cm, some individuals grew to 1,5 meters (Figure 6).

Seeds sown in and Kochia prostrata, Ceratoides ewersmanniana to create a seed plots is aimed at solving the problems of biodiversity conservation in the country, especially in mountain ecosystems

Figure 3. Seed delivery to the field

Figure 4. Seed sealing

Figure 5. Undergrowth Kochia prostrata

Figure 6. Kochia prostrata plants

There are a lot of small undergrowth of plants of Kochia prostrata and Ceratoides ewersmanniana, which will grow large in the next year of vegetation (Figure 5).

The density of standing plants thickened in many places of the plot, some plants in the autumn-winter season can be transplanted to other areas in the form of seedlings. In the third year, the fence can be moved to another site, the seeds of the same forage plants can be sown, and the original site can already be used as a primary seed production site and as pastures.

In the seed-growing area, the natural herbage consists of wormwood and ephemeral plants. In the future, the plot can be used as year-round pastures or haymaking. Herbs are cut in spring and in the first half of summer, Kochia prostrata and Ceratoides ewersmanniana in summer and autumn, and wormwood sprouting in the cenosis in autumn and winter.

Restoration of Degraded Pasture Ecosystems of Dehkanabad Forestry

CONCLUSIONS

1. Rational use of pastures, conservation of biodiversity, consistent increase in pasture productivity by sowing plants, the introduction of technologies to increase pasture productivity and the introduction of promising varieties of forage plants are the main tasks of phytomelioration.

2. The creation of a site of drought-resistant perennial forage crops, using resource-saving technology, will allow obtaining about 200-240 kg of seeds from 2 hectares in the 3rd year of vegetation and using them in the future to improve degraded pasture areas.

3. Additionally, 3,0-3,2 tons of dry weight can be obtained from a plot of 2 hectares, which will allow you to have a stable feed base throughout the year.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest regarding the publication of this paper.

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Telecommuting is the new way of work

Christine Reidhead

Navajo Technical University

ABSTRACT: Pandemic has created the new way of doing work which is now called the new normal. Earlier, the physical presence was mandatory all over the world for work. People used to travel for hours for work. Managing personal life and professional life was always a challenge. But now, the only positive side of this pandemic is the new way of doing work online. Remote working is the new normal and we are calling it Telecommuting. The process of transformation of business has increased its pace further during the last few months amidst the limited availability of resources and supply chain to manage the businesses. Business on all scales has tried to come up with a digital transformation helping their overall status and survival probability. This research would focus on the current business scenario, in the post COVID period. The work would highlight the transformation in businesses across the industries to cope up with the remote working style. The work would emphasise on the integration of online medium in the existing businesses for the long term growth and prosperity in the pandemic times. The article would analyse the Telecommuting in business in post corona period.

KEYWORDS: Telecommuting; COVID; Pandemic; New normal; Post COVID, Online work.

1. INTRODUCTION

COVID 19 has changed the face of businesses all over the world. It has created a huge dependency on online mediums for industries all over the world. The COVID-19 pandemic has impacted all businesses. People have been losing their jobs and the times have been difficult for industries. Everybody is worried about managing their finances along with their health in this testing time. After a huge setback in the industries all over the world, the businesses are now recovering with new strategies to cope up with the limited face to face interaction of their employees. The frequent lockdowns had led to the complete shutdown of businesses where on filed presence of employees was required. Losses have led to the major change in the way businesses have been running till now. The introduction of digital platforms to reduce the dependency on human interference has been proposed in all the possible areas across the industries.

The unexpected arrival of deadly corona virus has impacted the lives of people all over the world. The first wave of infection had created havoc and left the entire system on lockdown mode. Governments were not prepared to face this problem and the complete shutdown was the only solution. Economies got impacted and businesses were closed. People lost their jobs and managing finances became the problem of households. Medical system was also not ready to handle such huge number of patients and the approach to treat this infection was not in place. Under these circumstances it was very important to prepare and then fight against this problem. And then researchers started studying the reach and impact of the COVID infection. The COVID impact on the global business industry has been phenomenal and this work would cover the different aspects of that change brought by the pandemic situation. This paper discusses the relevant model for assessing the COVID impact on the business industry of the world by critically analysing the available literature review theoretically and empirically as shown in Figure 1.

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Activities with the highest potential for remote work include updating knowledge and interacting with computers.

Potential share of time spent working remotely for select activity categories in the United States, %

● Effective potential (no productivity loss)   ⊘ Task that can be done remotely
● Theoretical maximum   ⊗ Task that cannot be done remotely

Updating knowledge and learning	Interacting with computers	Thinking creatively	Communicating with and guiding colleagues or clients	Processing, analyzing, and interpreting information
82–91	70–75	43–68	43–63	54–61
⊘ Attend online seminar	⊘ Create electronic data backup	⊘ Design layouts for print publications	⊘ Discuss business strategies	⊘ Analyze industry trends
⊗ Attend surgical skills course	⊗ Set up computer hardware	⊗ Create physical prototypes	⊗ Direct fire fighting or prevention	⊗ Analyze crime scene evidence
Communicating and establishing inter-personal relationships	Performing administrative and organizational activities	Training, teaching, coaching, and developing others	Monitoring processes, surroundings, or use of resources	Selling to or influencing others

Figure 1. Potential of Telecommuting – the new way of work

Source:https://www.mckinsey.com/featured-insights/future-of-work/whats-next-for-remote-work-an-analysis-of-2000-tasks-800-jobs-and-nine-countries

The models relevant to effective business system are discussed in detail. The worldwide pandemic due to COVID-19 has put the industries on a halt and has caused the economic slowdown. Business system all over the world has been impacted heavily because of corona virus which spreads faster in densely populated areas. Businesses all over the world have been impacted and most of the impact is being seen in the remote areas consisting of employees who do not have the online medium for work. Business having a large chunk of employees falling in the remote and poor sector of society is affected the most. The employees in remote locations usually depend on face to face interaction for their business and they are the ones impacted the most with any environmental, social or political hiccups. The lockdown imposed due to these unforeseen circumstances has affected the lives of employees in the businesses and have put them in deep trouble. Their daily learning and peer interaction has come to a standstill and has made them loose their daily learning lessons. (N. Iivari, T. Molin-Juustila, M. Kinnula, 2016)

Post pandemic period has brought a lot of challenges to manage the supply of goods for small and medium scale industries. Vendors have been struggling with the manual system to cope up with the backlogs. The COVID-19 pandemic has impacted businesses all over the world. People have been losing their jobs and the times have been difficult for the industries. Everybody is worried about managing their finances along with their health in this testing time. The paper has focused on the pandemic impact in the business of all scales in this critical situation and has analysed the safety measures taken in this sector. The businesses are trying to bounce back with a lot of limitations and safety measures and there is not much audit and checks available to analyse the precautions taken at the work place, both in organized and unorganized sector. This paper would help in analysing the impact of digital integration on the businesses along with their life. The work has been conducted on different business platforms to gather data apart from the secondary research to conclude the situation existing in this industry. The work would help us in getting a detailed idea on the measures taken in this critical situation to maintain and manage the possible transformation of business when the industry is trying to recover back from this situation (S. Papagiannidis, J. Harris, D. Morton, 2020)

Most of the employees wanted to go back to their work during this lockdown as they did not have enough funds to bear the cost of their living. This has been a testing time for them and has put a lot of stress on their family by putting their future in uncertainty. Some of them tried to survive with the work from home scenario and some of them had the privilege to access the online work platforms. The circumstances were tough for everyone and there was no surety on the timeliness for things going back to normal. And hence going back to the basics was the most preferred decision amongst these employees. Now considering the digital transformation and integration of online platforms to digitize the business processes across the industries have been a

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beneficial scenario for the employees struggling to save their jobs during the lockdown. The attempt to digitize the manual systems and tasks has helped in saving millions of jobs for employees working on filed jobs. But, this change required a lot of training and facilities which is still taking time and are filled with challenges. The transformation will take time but in the long run it would be beneficial and would save the livelihoods. (P. Patil, K. Tamilmani, N.P. Rana, V. Raghavan, 2020)

2. RESEARCH AND DISCUSSION- TELECOMMUTING THE NEW WAY OF WORK

Telecommuting has brought a big change in the ways businesses used to work earlier. Frequent and unplanned lockdowns led to instant shutdown of businesses and no preparation and planning was done to cope up with such scenarios. People went on loss of pay and companies registered huge losses in their revenues. After a lot of struggle and misses, the industries have been making strategies to survive in this new normal scenario. A lot of research has been done in the field of digital integration and the research says that during this whole time, when there was so much awareness about online business in remote locations, the awareness programs and initiatives to bring the businesses from all scales on digital platform has helped a lot. Technology takes its own time to develop and grow. The health of people working on field was on compromise until then and their efforts to travel in groups to their hometown further added to the woes of this trouble. Many of them were infected while in transit and were quarantined as per the government norms. However, as we say it is very difficult to organize an unorganized sector. All the efforts to keep them distanced failed and the cases of infection increased. This unorganized sector was impacted the most in this pandemic. The health risk increased manifold during this COVID-19 period or we can say that the vulnerability of these people came out clear in this situation. And the health and safety was never an important topic of concern with both the business sector and the government involvement. The digital transformation and the platforms hosting it has been increased manifold in the last one year and the response towards it has been mixed. (A. Reyes-Menendez, J.R. Saura, S.B. Thomas, 2020)

Research has revealed the irony of this situation, which can be gauged with the fact that the health of the people is directly correlated with their work efficiency including the quality of work. Compromising their health would directly mean compromising on the quality of business and the learning outcome due to decreased efficiency. However, it is miserable to understand that none of these factors are taken into account while managing this business and digital transformation was the only way. Post lockdown, when the employees got back to work, the pressure on them got doubled as the full employees was not able to return at once due to the limitations in the means of transport dedicated for these special cases. The social distancing and other norms limited the capacity of the work. The work hours also increased to cope up with the loss due to the shutdown. There were leniencies to the deadline but that also came with some limitations. The industries were coming back to life with all the precautions mentioned by the health department of the country. Masks, sanitizers, gloves, thermal screening and social distancing were in place and employees coming back to work were made to follow that. Business employees found it very hard to manage with these new work guidelines. Working in new normal conditions with masks and gloves was a challenge for them. Working in online and offline combined mode further added to their existing problems and as a result their health was impacted. All these challenges led to the development of a necessary path leading to the online integration of channels for long term survival of businesses which is remote communication as shown in Figure 2. (R.C. Smith, O.S. Iversen, R. Veerasawmy, 2018)
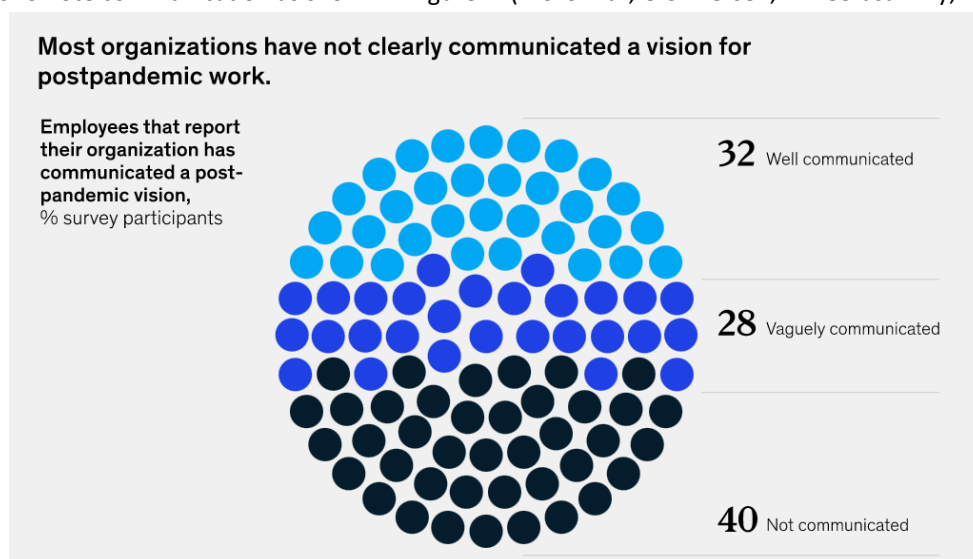

Figure 2. Online work style and communication

Source: https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/what-employees-are-saying-about-the-future-of-remote-work

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Small steps were taken to digitize the small tasks in the backend processes. Industries all over the world started operating in small scales with online presence. Social media helped a lot in getting clients and customers. In spite of all these efforts, the health of these employees took a big hit which was mainly due to the harassment with these uncertain times. Their sleep pattern got disrupted due to extra work pressure to meet the deadlines. The problem of sleep deprivation is now becoming common amongst the employees who is leading to fatigue and raising the concern for work impact and safety. This is directly impacting the efficiency at work and the future capability and impact of employees in the business sector. The digital transformation was slowly impacting the lives of people in a positive way but it needed more time and effort to establish the channel to have a sufficient revenue generation for the businesses to survive. (Z. Song, C. Wang, L. Bergmann, 2020) The research methodology selected for this work is comprised of collecting secondary data through research papers and online articles with the business sector in context. The approach that has been selected for identifying and discovering the effective strategies for online learning development is interesting to work. In the qualitative analysis, the subjective feedback has been studied from the employees all over the world, and based on that an analysis has been done to understand their opinion about digital transformation and online integration of manual systems to make most of the business processes online. (D. Vazquez, X. Wu, B. Nguyen, A. Kent, A. Gutierrez, T. Chen, 2020)

The research conducted with the different employees all over the world before and post the lockdown phase to understand the awareness amongst the employees about COVID 19. The safety measures at the work place were measured using their feedback on business in COVID scenario. The opinions and feedbacks were analysed before lockdown and post lockdown during the past one year. The analysis helped in finding the impact of the pandemic on the current scenario in the business industry. The project information was captured along with the demographics information of the employees from the business sectors all over the world. A detailed work was conducted on the employees' satisfaction and their expectations from the online platforms. In the analysis, the awareness about corona disease amongst the employees was captured and in the work and the safety measures taken at the business were analysed. (Drucker, 2021) The factors considered here were the awareness level about COVID-19 and the safety measures taken at the businesses. The subjective work about COVID was to measure the awareness about corona virus and to understand of the employees knew the impact and prevention measures to fight during this critical situation. The work targeted the safety level at their work place and analysed how the business has resumed post the lockdown and what are the measures business industry is taking in this situation. The aim was to measure the impact of COVID-19 on the lives of employees at the businesses and the necessity of digital transformation required in different industries.

Digital transformation has been happening in small steps by finding the scope of transforming each and every business process currently happening manually. The work revealed the preparedness of the business industry for online integration. The employees were asked if the training is given at the work place and what are the guidelines being given to them. The information regarding hygiene was also asked in detailed. They were also asked if any medical check up or insurance was provided to them or not. They were asked about the screening process for corona virus at their work place and the methods adopted for the screening process. The work was based on were asked about the reduction of employees strength in work during this pandemic and the new policies made with respect to that. The work emphasised if any training were conducted in the business sectors and the topics covered in those training programs along with the recommendations from the management. It was asked if they were aware about the impact of COVID 19 on the health. The employees were asked about their knowledge about using gadgets and digital platforms at their work place. They were also asked about the percentage of tasks done manually versus that automated recently. The overall analysis revealed that the process of online integration has started and it is going to take a lot of time for digital transformation which would be possible with the joint efforts of both the employees and the companies. (Daly, P.; Walsh, J.S., 2010)

3. RESULT AND CONCLUSION

Remote working is the new normal now, which is the globally accepted fact in today's era. Even before the word digital transformation could be used to the existing businesses, a very important step needs to be performed first. And that is the identification of all the manual links on which the systems operate, analyzing the scope of automation for each of those links and then automating all these links. Even after automation, a detailed training is required for the employees operating the new automated system. The research intends to use the work from the employees of all over the world, and its financial implications. The financial implications are used to assess the financial impact of the COVID19 pandemic on the profit/losses of the business sector. It is studied on the businesses that are used as representative for the business all over the world. The qualitative research methodology used to gather the financial implications from the business as a way of using secondary data to evaluate the financial losses incurred across the world. The qualitative analysis aims to verify and assess the financial implications and draw valid conclusions about the financial impact before and after COVID19 pandemic. Work is provided to employees to learn about the

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financial losses incurred by them especially in the form of extra investment on online learning platforms during the pandemic. The global view on Telecommuting has been captured in Figure 3. (Brown, A.; Fishenden, J.; Thompson, M, 2014)

Figure 3. Global view on Telecommuting

Source:https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/what-employees-are-saying-about-the-future-of-remote-work

The detailed research was done to analyse the current situation of the industries including secondary analysis of the existing work done in this area. Sampling method used is cluster random sampling to select different clusters of employees from various sectors of society in the business industry all over the world. In this work sampling method, these respondents are grouped as different clusters from different sectors in the world business industry. Detailed work through online survey work analysed and studied in business industry of world. Ethical concerns of the work are addressed by explaining about the work to all respondents before collecting the data. Their consent will be obtained for using the data in the research. The research focused on the training and automation of tasks in different businesses across the industries. The systems were studied for the changes in terms of online integration and the learning of employees to deal with the new systems was studied. (R M Anderson, H Heesterbeek, D Klinkenberg, T D Hollingsworth, 2020)

Now, the acceptance and satisfaction of employees towards the new system is equally important. So, the secondary research was conducted on the data and literature available for the effectiveness of online platforms in this pandemic situation. The employees' feedback from all over the world was analysed. This was to determine the employees' satisfaction towards the online platforms. This research focuses on the topic of COVID-19 in the business industry all across the world. It underlines the situation in this sense and highlights global problems as well as the financial effect on the business industry of this health crisis. The scale of the report includes the business sector globally and the financial effect of Covid-19 on a wide variety of industries and the global economy. The overall well being and employee productivity has increased as shown in Figure 4.

Figure 4. Remote working – Employee well being and productivity
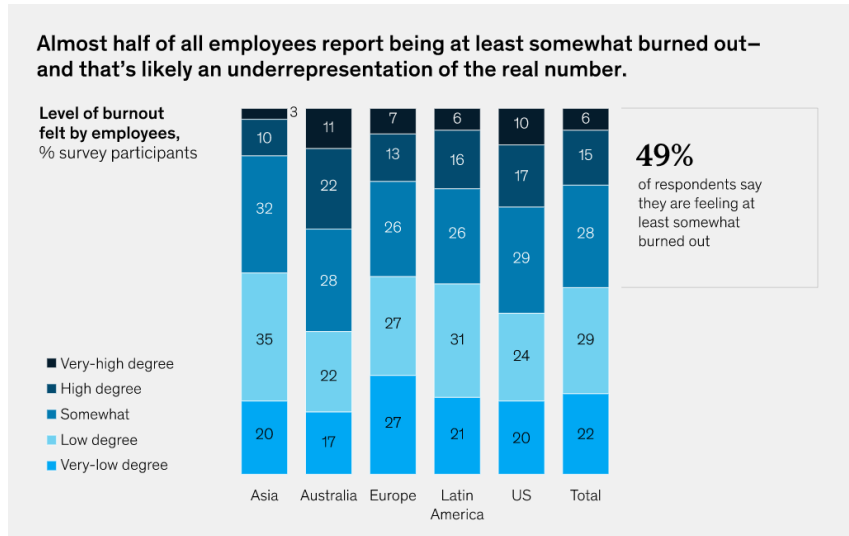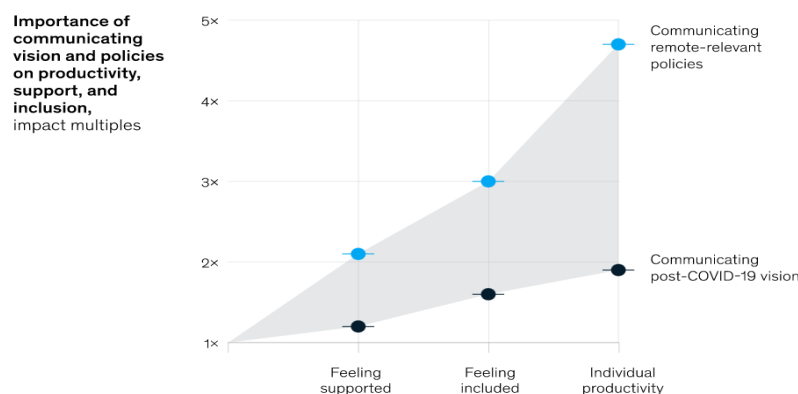
Source: https://www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/what-employees-are-saying-about-the-future-of-remote-work

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Further, the data collected also systematically analyses the financial impacts of the business sector in the world and its adaptive approach to the numerous external and internal challenges. This includes COVID-19-related factors such as interest of employees in online versus on filed jobs, availability and access of online learning platforms to the employees across the globe and the effectiveness and learning outcome of the new way of learnings. It also makes several short-term proposals, including introducing initiatives in the business sector to cope with the recession and to reduce detrimental financial effects and new market disruptions in the medium-term. (S Chou, 2019)

4.   FUTURE SCOPE

Online work has given a boost to the businesses. However, once the scope of automation was identified in each manual system, it was easier to integrate the entire business channel. The huge task of digital transformation depends on the small pockets automated. The identified efficient resources from the literature are evaluated in the current work and factual knowledge is observed by evaluating the impact of urban distribution strategies in improving the business infrastructure. The research approach that has been selected for the work is a deductive approach in which the general theory is tested to bring specific results or outcomes. The research strategy selected for this paper is a secondary research because of the nature of the work. In a secondary research, research data is gathered through research papers and journals known as the survey work and the responses are then analyzed through a qualitative work approach. In this work, the survey work is based on relevant questions that help in exploring the efficiency of infrastructure strategies with effective business management. Through testing and analysis, the efficiency of online integration of businesses will be identified. The survey strategy is also used because it involves the element of human knowledge integrated with practical knowledge in the field (Nuno Fernandes, 2020).

Based on the philosophy, approach and strategy, the research choice for this paper is mono-method which means that the data is analysed through a single approach that is a qualitative approach. In a qualitative approach, facts are collected in the form of a secondary data collection and then findings are discussed based on the statistical interpretation. Moreover, the work is cross-sectional which include looking into the data within the selected population at a specific point of time. The recent research will reveal information about the business channels and its distribution in the world industry in the current point of time.

The research revealed that the digital transformation has changed the paced of growth of the businesses, even in this pandemic situation. The revenue is slowly but steadily increasing towards the curve of stability. The situation all cross the world was studied and then business industry was analysed. Employees' opinions all over the world were studied, which revealed that those who had access to the online channels were happy to work online. Those who did not have internet access or the required gadgets struggled to keep up the pace with the other employees. The small sample is selected due to accessibility issues because of the current pandemic and the survey is to be conducted using online research used for large scale data collection and secondary analysis (S F Karabag, 2020.). The effectiveness of the employees' opinions from the business industry across the world helped in identifying efficient strategies and their impact on business management in this critical situation.

The data analysis has been performed statistically to verify the infrastructure models and their efficiency in the online management of business industry. The analysis has been performed in a qualitative manner keeping in view that the efficient strategies of urban distribution must fit within the business industry across the world. The data has thus been analysed with demographics, frequency analysis and descriptive (M Kodama, 2020). The participants were required to have a feedback on the existing digital status of the businesses. The closed-ended questions were inquired from the business managers globally in the business industry. The relevant feedback and opinions were used to define strategies globally in the business sector. The data has been studied and analysed qualitatively through which different data analysis techniques are applied.

The journey of digital transformation has been phenomenal till now and its scope is even brighter in future with the new training initiatives to the employees. In research studies where human participants are involved, it is vital for the researcher to assure that all aspects of ethics have been met while carrying out the research. These factors include the anonymity of the participants, confidentially of data, avoidance of academic misconduct and autonomy of the respondents to participate in the work. While collecting the data for the current work, the respondents have been informed about the purpose of research and also assured that there will be no harm to them. However, it is also informed that no financial or physical benefits are associated with the current work. Furthermore, the researcher has ensured that the personal information of respondents will not be revealed and their anonymity will be maintained throughout the research (M Nicola, Z Alsafi, C Sohrabi, A Kerwan, A Al-Jabir, C Iosifidis, Agha, R, 2020). Additionally, the participants had the autonomy to withdraw from the research at any point of time without prior notice. The employees' opinion were revealing a mixed response all over the world has been an eye opening factor and has given the scope in the modification of the strategy to make this facility accessible for all the employees of the world. The online integration projects were a great success in the industries across the world.

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Post corona period has got mixed responses in the field of business, as those who went ahead with the transformation survived and those who could not afford to change got shut down. The work conducted on the employees of business industry all over the world, financial impact due to COVID19 pandemic, and the impact on learning outcomes which affected the employees. The statement of problem clarified how the COVID19 global pandemic affected business industry of world, and employees' satisfaction with the online work channels. The qualitative research is the conceptual framework for the work. The scope of the work is set in the boundary of learning curve and the employees' response towards it. The work concluded with a mixed response of employees which revealed that those who had access to it were happy with it and those who did not have access were left back in this new normal scenario. Further, the peer learning was missing in the online platforms. The motivation factor was also decreased in the absence of real work. The digital transformation has indeed brought a huge change in the face of business and it will continue so. (S Scott., 2020)

5. CHALLENGES AND LIMITATIONS

Though the scope of telecommuting is huge, the process of digital transformation cannot be achieved in a day and it is a long and an ongoing process. The small links need to be fixed first to finish the bigger project. The scope of automation needs to be understood first and the employees comfort needs to be taken care of. The bigger picture needs a closer analysis without which the aim of transforming the existing businesses would not happen. The need of the hour is a detailed analysis of all the businesses and then start planning for the online integration. The limitations of the work are that there is limited data used in secondary research analysis conducted because the business industry is vast.

This negative financial impact on business sector is explained by the way they are organized and the measures imposed during containment that restricted economic activity. The secondary analysis used for research may not be comprehensive and any biases in all the peer-reviewed studies can affect the quality of the research work. The learning outcome through online platforms for computer skills courses and employees' satisfaction all over the entire world with different economic background has been analysed and studied. The satisfaction to this new way of learning was studied and analysed to understand the scope of change and development in this sector. The modifications would be proposed based on the employees' feedback and opinions to create a better infrastructure of business which would lead to a successful business transformation... (Saleh, F.I.M.; Karia, N, 2020)

The dream of digitally transforming businesses in post COVID period has been successfully started. The COVID-19 pandemic situation has shown the strengths and weaknesses of the entire world business industry. The industry has identified the processes and operations that could be improved. The corona virus crisis is leading to a profound rethinking of infrastructure management of business, online learning, testing the efficiency of courses across the globe. The research has filled the knowledge gap of averting COVID19 impact and helps the business sectors to regain financial strength. The business industries in the world can use the research to improve their online integration programs.

In the project of digital transformation, it is imperative to boost productivity, adjust and reduce costs, and make the business more flexible to adapt it to any new present. Changes are quick, essential, and far-reaching. After the pandemic and remain competitive, the entire infrastructure must be prepared to face unpredictable swings in product demand. Flexibility, adaptability, robustness, proximity, agility, speed, and precision are concepts integrated into new competitive strategies. In this rethinking of the processes, the implementation of technological solutions in the different business processes will be the most visible part of the transformation of the business sector. The present environment allows the business industry of the world to examine their vulnerability to the COVID-19 disturbance. They should also take steps to make an infrastructure resilient to potential future risks and interruptions. The digital transformation in business in post corona period has been beneficial and will remain so if done with proper planning. (Tavares, F.; Santos, E.; Diogo, A.; Ratten, V, 2020).

Covid-19 triggered a health emergency and has impacted infrastructures in the world, which are now under pressure because they are based on a global infrastructure. In this sense, the business sector in the world has been seriously impacted by business closures, airports, instability, and volatility. Other aspects that will have a clear financial impact on the business industry that should be considered after this crisis are block chain, artificial intelligence, and the disappearance of manual processes. It leads to another key aspect for the world business industry i.e., incorporating increasingly prepared professionals and promoting a change of mentality in the sector as well as the variables that govern it, especially about learning platforms and the learning outcomes through online platforms. Digital transformation is currently the key for the success of business in post corona period and needs to be planned and executed on a large scale for the long term growth. Telecommuting is the new way of work across the world and that is slowly leading to the growth of business which had become stagnant due to pandemic. Remote jobs are giving livelihood to the major section of society which will increase the employment rate going forward. (Raudeliuniene, J.; Albats, E.; Kordab, M, 2020)

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Stradivari's Violins, Market Economy and Contemporary Lutherie

Massimo de Bonfils[1], Mauro Fabretti[2]

[1,2]Lutherie Department, Santa Cecilia Conservatory, Rome, Italy
[1]ORCID: 0000-0002-7988-9468

ABSTRACT: Antonio Stradivari's violins are considered the best for aesthetics and sound. All the best violinists in the world would love to play one of those gorgeous instruments, but the Market problem is that there are now only 500 Stradivarius left in the world; not all of them are in good condition, and they are not eternal. Moreover, they are few and costly. The aim of contemporary Lutherie should be to produce violins (and other stringed instruments) with the same characteristics as the great Cremona's master but at reasonable prices. After 300 years, we could also aspire to produce better instruments than Stradivari. Using modern scientific instruments, we can understand every aspect of the construction technique of the great Stradivarius. Using the technology available today, we should be able to do even better.

KEYWORDS: Stradivari, economy, lutherie, violin, Santa Cecilia

I. INTRODUCTION

Building violins of the same level as Stradivarius has already been possible; several experiments have shown that the sound quality of the Stradivari is attainable and comparable to instruments of a few excellent contemporary luthiers. The challenge now is to spread their knowledge in the schools of the new generations of luthiers, overcoming the instinctive jealousy of knowledge.

II. METHOD

First of all, we will observe the situation of the violin market on the international market; then, we will see what the results have been achieved so far in the comparison between Stradivari violins and others made by contemporary luthiers. Then we will understand why violinists prefer Stradivarius and not modern instruments, since the sound can be the same or even better. We will see how much the narration of the mass media weighs against reality. We will observe why Stradivari violins should not be considered immutable models; historical, musical, and acoustic reasons have determined the modification of violins over time. These reasons still exist and call for an even more performing violin model. Rome's Santa Cecilia Conservatory of Music founded in 2011 a Lutherie course that is reaching this goal. We will present the result of an experiment conducted by the Lutherie Laboratory of the State Conservatory of Music in Rome, the new model of the Santa Cecilia violin.

III. RESULTS

Gold today is worth 55.58 euros per gram. In comparison, a Stradivari violin reaches 50 thousand euros per gram (a Stradivari viola was auctioned in June 2014 by Sotheby's and Ingles & Hayday in New York for 45 million euros dollars). With this simple calculation, we can no longer define the Violin as "just two pieces of wood, a coat of paint, and half a cup of glue." The economic interests, not only for a few experts but also for the mass media, are enormous. The musical instrument market is often out of the interest of the financial police in several wealthy nations who currently prefer to oversee graphic works of art (paintings, statues, antique prints). For this reason, investing money in buying and selling musical instruments becomes very interesting since it offers very high annual interest rates. The proof is that the fake industry has existed for centuries that exploit inexperienced customers.

Stradivari's violins are considered the best in the world[1]. The Stradivarius sound was the focus of a Massachusetts Institute of Technology study. The study, cited by Phys.org, indicates that that magnificent sound depends on the length of the harmonic "f" holes. Furthermore, the presence on the wood of an unknown substance may have determined the timbre of the sound.

The high cost of Stradivarius violins is not the only reason that has prompted many experts to try to reproduce those same characteristics in modern instruments. Contemporary luthiers live an existential drama that pushes them towards an unattainable goal: to equal their perfection. For these reasons, modern luthiers often copy Stradivari and often fail. But not all of them.

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Three different double-blind experiments conducted from 2012 onwards in Indianapolis, Paris, and New York have shown that experts and audiences have appreciated the sound of modern instruments more than the great Italian luthiers of the past, including Stradivari[2]. The modern violins involved in the experiments were built by some of the best living contemporary luthiers in the world, but the result remains.

Why do violinists prefer Stradivarius and not contemporary instruments, since the sound can be the same or even better? Are these artists obliged to conform to a must in the international concert world? Yes. If a concert player promises to perform with a real Stradivari, the Concert Societies invite him more easily because the audience will surely be more numerous. That's most important: fill empty seats and maximize the gain that evening, of course, due to good advertisement highlighting the true star of the evening: not the concert player but the instrument, a Stradivarius.

The confirmation comes from shrieking newspapers that attract the attention of the public; it is so sad to notice how much more often the name of the instrument is mentioned at the soloist's expense:

The "Stradivari" in a concert that touches the strings of the soul[3]

Young Spanish star will play 320-year-old Stradivarius cello at Philharmonic Novosibirsk State Orchestra[4]

Totenberg's stolen Stradivarius in concert[5]

A Stradivarius cello from 1725 is invited to a Pianos Folies concert[6]

Stolen 'Ames' Stradivarius violin returns to the stage[7]

Stradivarius violin worth $16M to be played at Rosza Centre tonight[8]

The mass media often offers contradictory and inaccurate articles. It is contradictory that some say that Stradivari's Secret remains unsolved. At the same time, other articles announce that they have revealed it for a series of always different reasons (the recipe of the varnish, the treatment of the wood, the mineral-based substrate, the geometry of the project, the length of sound holes, and so on):

The secret of the most famous violins? A bath, say researchers on the hunt for Stradivarius mystique[9]

The Secret of The Stradivarius Is (Partly) In the Wood[10]

Stradivari's secret could be 'brutal' woodworm treatment[11]

Stradivari's secret could be a drop of fungicide[12]

A Violin's Warm, Mellow Sound Comes from Its Varnish[13]

The secret of sound of Stradivarius violins is covered in secret preservative[14]

The secret of the Stradivarius would lie in small imperfections[15]

Stradivarius: Unsurpassed Artisan or Just Lucky?[16]

We want to repeat what all true lutherie experts have known for some time but prefer not to shout it from the rooftops: the Secret of Stradivarius does not exist, at least not anymore.

As we have already explained in our recent article on *Educational Alternative*[17], the studies dealt with over the years by many experts have discovered not only every aspect of the Lutherie but also specifically the most overlooked aspects of Antonio Stradivari's work.

Let us refer to the rich bibliography given in that article for the exhaustive list of 19 works cited only by example. Still, I think it would not suffice for ten more pages to indicate the army of genuine experts who have examined these arguments over the centuries.

However, Simone Fernando Sacconi wrote his book *The 'Secrets' of Stradivarius*[18] where we read: "The title of the book reads ... in the plural the word 'Secrets' which, usually associated with the singular of the name of Stradivari, is believed to measure the greatness of the Cremonese luthier. We, therefore, wanted to demythologize the refusal to reduce art to the material conception of a secret, which ultimately implies disclosure of the same, in this case, a recipe, a type of cuisine, or a pharmacy, if it is around paint above all who enjoyed popular imagination ".

Continuing to look for Stradivari's Secret has two different reasons. For experts, it is just a desire to waste time and drain resources. For journalists, it is just an opportunity to create tabloid articles to shout at the solution of the secret and then deny and reconfirm it.

Stradivari's violins should not be considered immutable models. Historical, musical, and acoustic reasons have determined the modification of violins over time. These reasons still exist today and call for an even more performing violin model:

The Sound of the Venues. In the Baroque era, chamber music was conceived for a performance in a room. Occasionally it was possible to perform such concerts in larger ballrooms. However, history has changed them in structure and size. The Vienna

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Musikverein Golden Hall was one of the largest concert halls conceived in the 19th century. Nowadays, however, modern concert halls have reached gigantic dimensions, such as in China at the Guangzhou Opera House built for 1,800 seats and so on in the USA, France, Germany, Russia, Denmark, Finland, and Japan.

   Size and type of the Musical Ensembles. The Violin reached its ultimate dimension in the 16th century, having been initially conceived for small ensembles. In the Baroque period, the violinist was primarily involved in small chamber ensembles where a large mass of sound was not required to be heard. In the Baroque era, even in the case of solo concerts, the violinist could quickly emerge on other string instruments. The maximum sound mass required by a violin was playing a soloistic concert with strings and basso continuo, but it was not a difficult thing to get. In Mozart's time, the first wind instruments (oboes and horns) began to be inserted into the orchestra. Therefore, in the case of solo concerts, the violinist found it more challenging to emerge; the sound volume began to be a problem that what solved with some structural changes that we will see later. The sound of the Violin as a project problem pushed the later baroque luthiers to modify the violins gradually; nowadays, if we directly compare a baroque violin with a classic/modern one, we notice notable and invisible differences. Here are some macroscopic ones: the bridge design and the fingerboard length. But other less visible differences are more important: the angle of the neck, the bridge's height, the fingerboard in different wood types, and a thicker and longer bass bar. The Beethoven violin concerto expanded the orchestra sound mass with many instruments: flute, oboes, clarinets, bassoons, horns, trumpets, and drums. Finally, in the Sibelius or Khachaturian violin concertos, the entire brass band is included with a piccolo, two flutes, two oboes, English horn, two clarinets, two bassoons, four horns, three trumpets, three trombones, tuba and harp and all percussion (timpani, bass drum, snare drum, suspended cymbals, tambourine). At this point, the sonic mass required for a solo violin becomes much more significant, and further modifications are needed.

   Another important theme is the way the music is written. The classical writing of music from Bach to Stravinsky in modern times is almost unobtainable; today, composers are looking for new sounds, and their scores increasingly resemble abstract paintings full of sketches, balls, arrows, and scribbles.

IV. RESULTS

For all these reasons, it is increasingly evident that the present time calls for a violin that meets current needs, more powerful and with a high-quality sound, but at much lower prices than Stradivari.

V. DISCUSSION

Over the centuries, many luthiers have decided to set themselves higher goals than those of Stradivari because they did not want to limit themselves to imitating him.

   The first to try to overtake Stradivari was himself. Visiting the Cremona Violin Museum demonstrates the remarkable study of innovation and research carried out by the great Antonio: at least 12 different forms of Antonio Stradivari's Violin have been found, all certainly made by him looking for the best aesthetic-acoustic performance. While copying the great Master for the common market, many of his contemporaries and successors continued to try to do something better or at least different. The musical needs of the time forced many luthiers not only to build modified instruments (compared to the best original Stradivari model, The Cremonese of 1715 or The Messiah of 1716, both made with the same shape, the PG) but also to significantly modify the instruments of the best luthiers of the past.

   At the time of the luthier Jean-Baptiste Vuillaume (1798-1875), it was already evident the work done by generations of luthiers to modernize all the instruments of the great ancient Italian luthiers, including Stradivari, to increase the power of sound given the new interpretative and acoustics needs.

   Many master luthiers from Stradivari to today have continued to pursue a sound capable of satisfying the musical need. A non-exhaustive but emblematic list of these innovative luthiers boasts, among others: François Chanot (1788-1825), Johann Georg Stauffer (1778-1853), Félix Savart (1791-1841) with his trapezoidal Violin, Nicholas Sulot (1780-1858) with his Violin from the "wavy" harmonic belly, Thomas Howell (1783-1870), Jean Baptiste Vuillaume (1798-1875) with his Contra-Viola, Thomas Zach (1812-1892) with his Viola-Harp, Alfred Stelzner (1852-1906) with his Violotta with great body and strong sound, Arthur Richardson (1882-1956), Igino Sderci (1884-1983) with his famous Futurist Quartet (Florence, 1947), Carleen Maley Hutchins (1911-2009) that using the researches of the German physicist Ernst Chladni (1756-1827), she made many instruments following various constructive logic; amongst the many, there was a violin with 65 holes in the ribs, closed or opened by plugs. This Hutchins violin was dubbed "The Groviera" in Paris (11th International Congress of Acoustics, 1983), where Hutchins played it by a violinist and removed or moved the caps to show during execution how the sound changed decisively, changing the internal resonances.

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Speaking of the current times: Joseph Curtin (renowned for his studies on the typical color directional tone of string instruments, on the use of alternative composite materials including synthetic materials and carbon fiber, and finally, his experimental model that recalls the Chanot violin-guitar), David L. Rivinus and Marty Kasprzyk.

VI. OUR VIOLIN

In Rome, at our Santa Cecilia Conservatory, we teach not only to play an instrument but also Lutherie, String Instruments' History, and Technology. Our Lutherie course was founded in 2011 by Massimo de Bonfils (teacher of history and technology of stringed musical instruments), Mauro Fabretti (laboratory teacher), and Massimo De Notti (laboratory assistant). Today, the Santa Cecilia Conservatory is the only 'University-Level' Institute in Italy that organizes a Violin Making Course. We have fifty students from twelve different countries. Over the years, we have also worked for a course in engineering in musical instruments in collaboration, first with the La Sapienza University of Rome and then with the Polytechnic University of Ancona.

Moreover, we promoted several Seminars on Lutherie in Italian Conservatories and Universities. We focus on the next luthiers to provide adequate training and culture. In two thousand sixteen, we also organized the first edition of the Santa Cecilia International Violin Making Competition, where we received more than one hundred instrument participants from twenty-four different nations. In October 2019, we opened our stand at the World Music China Expo in Shanghai

Fig. 1. Massimo de Bonfils and Mauro Fabretti at the Santa Cecilia Conservatory, Rome

Naturally, our course is not concentrated only on classical Lutherie but also on the experimental one. So, Maestro Fabretti designed the new model project, and our staff began to build it following the teacher's special instructions.

Fig. 2 The laboratory with our students

Fig. 3 - Massimo De Notti and Mauro Fabretti in our Laboratory

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Fig. 4. The Santa Cecilia new violin model

This new Violin is easier to play, powerful, and has better sound quality. It's easier to play because the ergonomic body helps the player in higher positions by pushing down his left shoulder. Moreover, we pulled up the right shoulder to recover the cubage of the sound box. We have a better sound quality because the player can choose, following the repertory to play, if using one or two or three sound posts simultaneously for a richer timbre. We have a more powerful sound because the sound comes out of 4 different harmonic holes. We preferred to use a longer and thicker bass bar for better transmission of acoustic vibrations. We are pleased to say that the International Press has already begun to notice our work starting with the celebrated English review Strad on the printed and digital editions and so on, with articles and news on the main specialized sites in Europe, America, and Asia.

It would be better to directly compare the sound of another violin, perhaps that of a great Italian luthier of the eighteenth century. Our next step will involve our Electronic Music Department in making acoustic measurements. We will compare our Santa Cecilia model with those of two famous violins kept in two different museums in Rome, the "Tuscan" Stradivarius of the Santa Cecilia Academy Museum of Musical Instruments and a David Tecchler violin of the National Museum of Musical Instruments of Santa Croce in Gerusalemme, ever in Rome. The measurement will be done by playing scales, starting on the open string without vibrato and using the same violinist, the same bow, and the same type of string on the violins. We will calculate the power of sound, projection, quantity, and quality of the harmonics. That's the subject of our forthcoming scientific publication.

VII. CONCLUSIONS

It is time to abandon old stories of secrets and scandalous announcements of new bizarre discoveries that reveal the same secrets. Modern Lutherie can produce string instruments of a level equal to or higher than the Stradivarius. This knowledge deserves to be disseminated to provide the musicians of today and tomorrow with instruments capable of playing today's music in today's theatres. The Santa Cecilia Conservatory of Rome participates in this aim by educating a new generation of luthiers.

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Removal of Remazol Brilliant Blue R (RBBR) by Absorbsion on Zeolit Cuo Catalyst

Indra Gunawan[1], Deswita[2], Yoki Yulizar[3] , Kandhi Puspa Melati[4]

[1,2]Research Center for Radiation Detection and Nuclear Analysis Technology, National Research and Innovation Agency, Kawasan   Puspiptek Serpong, Tangerang, Indonesia

[3,4]Department of Chemistry, University ogf Indonesia Kampus Baru UI, Depok, Indonesia

ABSTRACT: The pollution caused by dyestuffs has been a serious environmental problem for years. Within the overall category of dyestuffs, Remazol Brilliant Blue R (RBBR) is an <u>anthraquinone dye</u> used in textile industries. This paper concerns the study of the different experimental parameters which affect the decolorization efficiency of the RBBR mixture. Thermal degradation is done by carried out with 4 mL of 10 ppm RBBR solution into the reaction flask. Added a number of H_2O_2 and CuO zeolite catalyst. The reactor was heated in oil bath glycerin and stirred for 90 minutes. The optimum catalyst weight was obtained at 100 mg, which was able to decrease the reaction time 50 minutes compared to the reaction without catalyst. The percentage of dye removal on this catalyst loading was 96.26%. The micro pores of CuO zeolite is about 20 nm, which shows formation of nanoCuO particles in zeolite structure. This structural feature may be important since it increases the total surface area. The diffusion into such pores can explain the absorption capacity.

KEYWORDS: Dyestuffs pollutant, Absorption capacity, Remazol Brilliant Blue R, Zeolite, CuO, Catalyst.

INTRODUCTION

Natural zeolites comprise significant amount of iron cations embedded naturally in cavities. When the natural zeolites are treated by high temperature calcination or steaming, the iron species move into the extra framework of the zeolite as found for iron containing zeolites prepared by hydrothermal methods [1]. Thereafter, the resulting zeolite can be used as a catalytic material in N_2O decomposition and oxidation of hydrocarbons with N_2O such as hydroxylation of benzenin into toluene, oxidative dehydrogenation of propane and epoxidation of propene. An additional feature of practical attractiveness is that the promoting effect of SO_2 was found independent on the zeolite framework, preparation method, and iron content, suggesting that the reaction is not highly sensitive to the iron speciation [2]. However, the use of natural zeolites as catalytic materials is much less studied compared with synthetic materials due to the difficulty in obtaining homogenous material, the reproducibility of samples obtained from natural ores, the thermal and hydrothermal instability. Therefore, to allow them to be used, the characteristics of natural zeolites have to be improved by various methods such as ion exchange with simple inorganic salts and alkali bases, acid leaching (typically HCl or HNO_3), steaming and high temperature calcination[3]. Recently, core/shell composite zeolites have been paid many attentions due to their synergistic performance in catalytic reactions [4]. Due to the optimum performances as solid acid catalysts, more and more consideration has been given to zeolite catalysts to investigate the applicability for the destruction of chlorinated compounds in last years.

Environmental pollution has increased more and more public concern nowadays. Aromatic compounds specially their sulfo, nitro, amidocyanogen or chloro series, are present in industrial wastewater, and are counted an important source of the environmental pollution [5]. Among the many organic compounds found in wastewaters, the pollution caused by dyestuffs has been a serious environmental problem for years[6]. Synthetic dyestuffs are used by several industries such as textile, dyeing and printing industries. Within the overall category of dyestuffs, Remazol Brilliant Blue R (RBBR) is an <u>anthraquinone dye</u> used in textile industries. It is a harmful dye and can damage aquatic life and also vegetative life if the contaminated water is used for irrigation. Recent years have seen a biological approach to this solving problem. Use of microorganisms to degrade it has seen faster and better results than the chemical method. Thus, the treatment of effluents containing such compounds is important for the protection of waters and environment in general [7]. Especially, decontamination of polluted water and air by photocatalysis

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has been attracting a lot of attention for its efficiency and promising economy. Semiconductor photocatalysis, as one of the advanced physicochemical processes, was extensively studied for solving existing environmental problems[8].

Different methods such as: flocculation, the chemical oxidation including Fenton's reagent, O_3 etc., air floatation processes, adsorption processes, anaerobic–aerobic two stage biochemical process, advanced oxidation process (AOP) and other methods have been used to remove different pollutants from water and especially wastewaters [9]. Heterogeneous photocatalysis has already been investigated and successfully applied to the degradation of different organic pollutants[10]. Adsorption is a process that occurs when a fluid (liquid or gas) is bound to a solid and finally forms a film (thin layer) on the surface of the solid. In contrast to absorption, where the fluid is absorbed by other fuids to form a solution. Photocatalysis is a combination reaction between photochemical and catalyst. Process Photochemical reactions involving a light (photo). Photocatalysis itself is a process that is assisted by the presence of light and catalyst material. Catalyst is a substance that affects the reaction rate process without changing it chemically. The catalyst can accelerate photoreaction by interacting with the substrate in either the ground or excited state or with the main photoproduct, depending on the photoreaction mechanism. Copper oxide (CuO) as an important p-type semiconductor with low cost, toxicity, and narrow band-gap (1.2–1.7 eV) absorbs visible light to generate electron–hole pairs (e^-–h^+) with enough life-time to let chemical reactions occur. There are some reports in the literature on the synthesis and applications of the CuO as a catalyst in the photo degradation processes of different organic pollutants [11][12][13]. Ameta et al. reported comparative studies on the photocatalytic activity of the copper(II) and nickel(II) oxides in the removal of rose Bengal [14]. On the basis of the rate of the reaction, photocatalytic activity of the CuO semiconductor was higher than NiO. Among the various methods, a great deal of attention has paid to the AOP for the treatment of air and water streams[15]. AOP can generate free radicals, such as hydroxyl radicals (OH^*) which are strong and nonselective oxidant species that react with the majority of organic pollutants. Free radicals such as HO_2^* and O_2^* may also be involved in the degradation process, but these radicals are less effective than the hydroxyl radicals [12][16].

Metal-loaded zeolites are efficient catalysts for direct N_2O decomposition into N_2 and O_2. A number of metals (i.e., Fe, Co, Ni, Cu, Mn, Ce, Ru, Rh, Pd, Pt) deposited in various zeolite structures (especially ZSM-5, but also ZSM-11, beta, mordenite, USY, ferrierite, zeolites A, and X) has been reported as active components for this reaction [17]. Noble metal supported zeolites catalysts show an enhanced catalytic performance for the deep oxidation of Chlorinated Volatile Organic Compounds, CVOCs (benzene, toluene, methyl chloride, etc.) with respect to the pure protonic zeolites, but the major drawback for the application of these catalysts is the halide poisoning of volatile metal oxychlorides as well as the formation of polychlorinated compounds, which are more toxic and recalcitrant than the starting material. It has been reported in previous literature that transition metal (Cr, Mn, Co, Cu, etc.) modified zeolite catalysts exhibit good catalytic activity for the destruction of CVOCs in spite of relatively less active than noble metal modified catalyst [18]. In the past two decades, photocatalytic degradation organic pollutant by semiconductor oxide such as TiO_2, ZnO, NiO, SnO_2, Cu_2O, and In_2O_3 has attracted public concern due to their high photocatalytic efficiency, low cost and low toxicity, high physical and chemical stability, especially, strong ability of fully decomposing organic pollutant into harmless species (e.g. CO_2, H_2O, etc.) [19].

This paper concerns the study of the different experimental parameters which affect the decolorization efficiency of the RBBR mixture. We are choosing dyes mixture because of good solubility in water, as well as its similarity to a real wastewater sample. According to the obtained results, the mixture containing RBBR was chosen as our object and investigated in more details.

EXPERIMENTAL SECTION

Materials

The materials used in this experiment are natural zeolite (CV Transindo Citra Utama), Remazol Brilliant Blue R, RBBR (PT Dyestar Indonesia), H2O2 30% (Merck), HCl (Merck), NaOH (Merck), $Cu(NO_3)_2.3H_2O$ (Merck), aquadest (PT IkapharmindoPutramas) and 87% glycerin (Merck).

Instrumentation

To determine the crystal phase composition of the CuO zeolite catalyst powders, X-ray powder diffraction (XRD) analysis was carried out at room temperature using a Rigaku D/max-2550PC diffractometer (Rigaku Industrial Corporation, Japan) with Cu Kα radiation (λ = 0.15406 nm), over the 2θ collection range of 5–80°. The accelerating voltage of 40 kV, emission current of 300 mA and the scanning speed of 4°/min were used. The particle size of the CuO zeolite catalyst powders was measured using Scanning Electron Microscope (SEM). The FTIR spectra of WS and MWS were obtained with a Bruker IFS 66/S IR Spectrophotometer. The scanning range was 450–4000 cm^{-1}. The absorption study was conducted at different concentrations of RBBR aqueous solutions ranged from 2 to 10 ppm. The absorption behaviors were employed by UV-Vis spectrophotometer.

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Procedure

First zeolites are physically and chemically activated. Physically zeolite activation is done by washing zeolite with aquadest, then stirring for 1 hour at 70° C. Colloid formed then precipitated and dried at 105° C. Chemical activation is done by adding HCl 0.05 M and 0.05 NaOH M into the zeolite and heated at 70° C and stirred for 1 hour. The precipitate formed was dried at 105o C. The dried zeolite was then uniformed with 1M NaCl and then heated at 70°C and stirred for 6 hours. To prepare the copper exchanged zeolite, Na zeolite added 1E-3 $Cu(NO_3)_2$ then stirred and heated at 80° C for 4 hours. The obtained solid zeolite@Cu^{2+} was filtered, washed with water, and finally dried at 60° C for 30 min in an air oven. Zeolite@Cu^{2+} was formed and then mixed with 1E-4 M NaOH solution so that it was pH 8 and heated at 80° C. The obtained Cu(II)-exchanged zeolite was calcined at 350° C for 2 hours. Thermal degradation is done by carried out with 4 mL of 10 ppm RBBR solution into the reaction flask. Added a number of H2O2 and CuO zeolite catalyst. The reactor was heated in oil bath glycerin and stirred for 90 minutes.

RESULTS AND DISCUSSION

Characterizations

XRD was used to investigate the phase structures of the CuO zeolite catalyst powders. Fig.1 shows the XRD patterns of the CuO zeolite catalyst powders. The diffraction peaks of the sample can be indexed with the CuO phase. From the characterization results with XRD there is a peak with weak intensity at angles 31, 35.75 and 38.93 indicating CuO according to JCPDS 45-0937 that has good agreement with the literature [8]. The peaks between 2Θ =35 and 39 show formation of copper oxide. The intensity of peaks at 2θ values of 25.5° and 36.5° in the XRD pattern of CuO zeolite sample, indicate the incorporation of Cu^{2+} in the zeolite structure. In addition, some differences such as: broadening of peaks, changing the intensity of some peaks and also the slightly shifts in positions of peaks can be observed in the spectra. In fact, changing in the intensities of peaks in the host–guest composite materials with respect to the Na zeolite can be related to presence or incorporation of CuO as a semiconductor inside the zeolite structure [12][20].
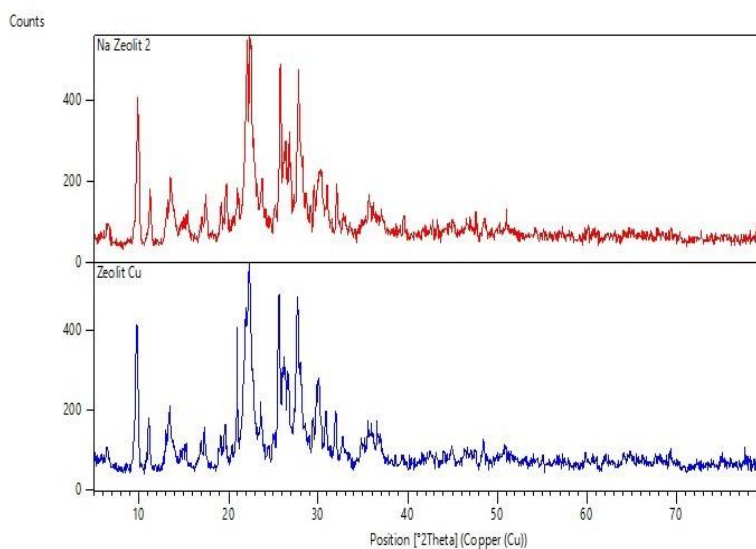
Figure 1. The XRD patterns of the Na zeolite and CuO zeolite catalyst powders.

The morphology of bulk Na zeolite and CuO loaded on zeolite samples are presented in Fig. 2. The image of the loaded indicates the zeolite crystallites are affected by the Cu^{2+} and CuO loading. The average particle sizes of Na zeolite samples is about 25 μm and decrease to 5 μm at bulk CuO loaded. The average particle size of CuO zeolite is about 20 nm, which shows formation of nanoCuO particles in zeolite structure. A SEM micrograph of unloaded zeolite is shown in Fig. 2(a), and indicates the ball shape structure of the Na zeolite. The particle has irregular pores with a diameter of about 3 μm, which indicates that the parent zeolite has a porous structure. This structural feature may be important since it increases the total surface area. Fig. 2(b) shows an SEM micrograph of the Na zeolite loaded with CuO. The structure upon cation exchange had a tendency to form agglomerates of small crystals and also an observed decrease in particles and pore sizes[21].
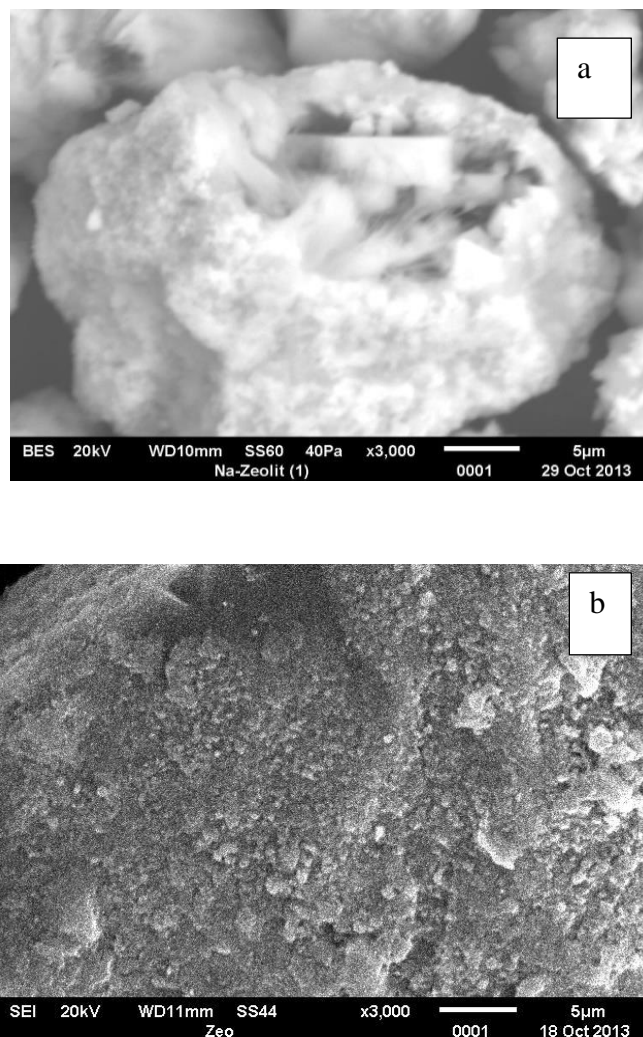
Figure 2. The SEM photographs of Na zeolite (a) and CuO zeolite (b).

FT-IR spectra of the parent zeolite Na and CuO zeolite are shown in Fig. 3. Ion exchanged zeolite (CuX zeolite) shows a band about 1388cm^{-1} after ion-exchange process, which is attributed to the C-H bending vibration (1380cm^{-1}) [3]. This confirms that the compound $Cu(NO_3)_2$ is converted to CuO after heat treatment. Because of the copper nitrate $Cu(NO_3)_2.3H_2O$ undergoes decomposition at elevated temperature and copper oxide is generated. Furthermore, a broad band is observed in the range of 3200–3700 cm^{-1}, corresponding to per- turbid OH groups. The presence of a specific band at 3625 cm^{-1} which is attributed to –OH stretching vibrations suggests the existence of CuO in the zeolite structure. In addition, the shift of bands from 986 to 995, 761 to 767, 680 to 684, 571 to 567, and 496 to 463cm^{-1}, which can be seen in the Fig. 3, suggests the existence of structural defects in the zeolite structure. Such structural defects can be interpreted by distortions caused by the presence of occlusions, likely Cu precipitates, in the zeolite structure and generation of new bonds such as Cu–O–Si and Cu–O–Al with surface O of zeolite [8]. The peak at 950 cm^{-1} corresponds to silanol nests [22].

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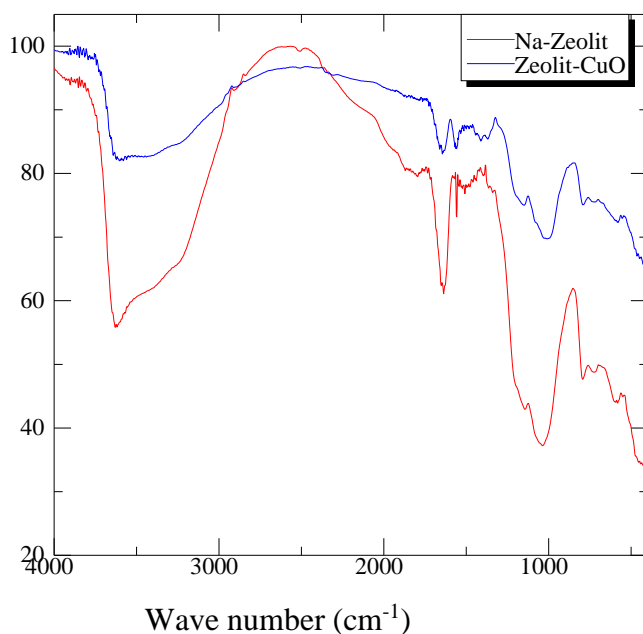
Figure 3. FT-IR spectra of the parent zeolite Na and CuO zeolite.

The results of powder XRD and framework IR clearly indicate that the modification by ion-exchange technique does not change in framework composition (Si/Al ratio), phase purity and crystallinity of parent NaX and its exchanged forms.

Catalyst loading

To determine the effect of the catalyst loading, a series of experiments were carried out by varying the amount of catalyst i.e. 20, 50, 100 and 150 mg. The absorption spectra of thermal degradation due to the catalyst loading and the dye removal are depicted in Fig. 4 and 5. The graph show trends and they are maximized at the same catalyst loading of about 100 mg. The optimum catalyst weight was obtained at 100 mg, which was able to decrease the reaction time 50 minutes compared to the reaction without catalyst. The percentage of dye removal on this catalyst loading was 96.26%. The percentage of dye removal to the catalyst loading is shown in Fig. 5 or Table 1. This extreme point results from the conflicting effects of this parameter on the photocatalytic process; at lower loading levels, such as 50 mg, photonic adsorption azo dye is approximately 58 minutes at the end of which a noticeable increase in dye removal rate occurs; various naphthalene and benzene derivatives intermediates, generated during initial steps, are further degraded progressively to di-carboxylic acid derivatives (saturated or unsaturated), simple carboxylic acids such as acetic acid, formic acid, and finally to H_2CO_3 (liq) or CO_2 (gas) [10].
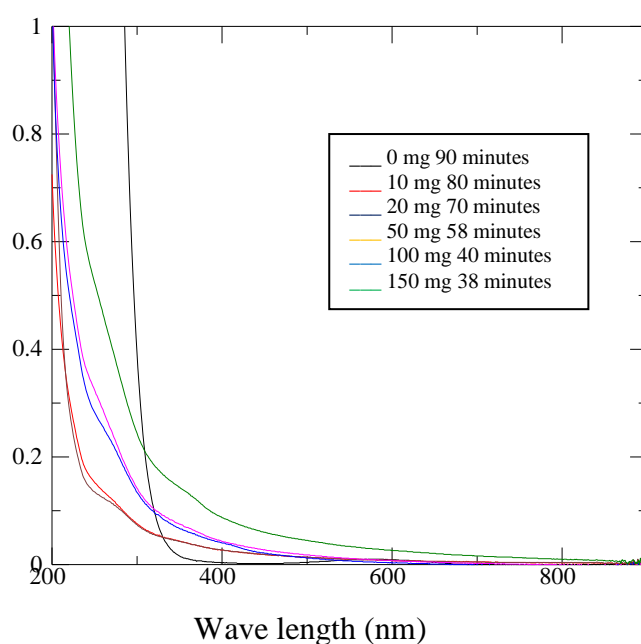
Figure 4. UV–vis absorption spectra of CuO zeolite suspensions.

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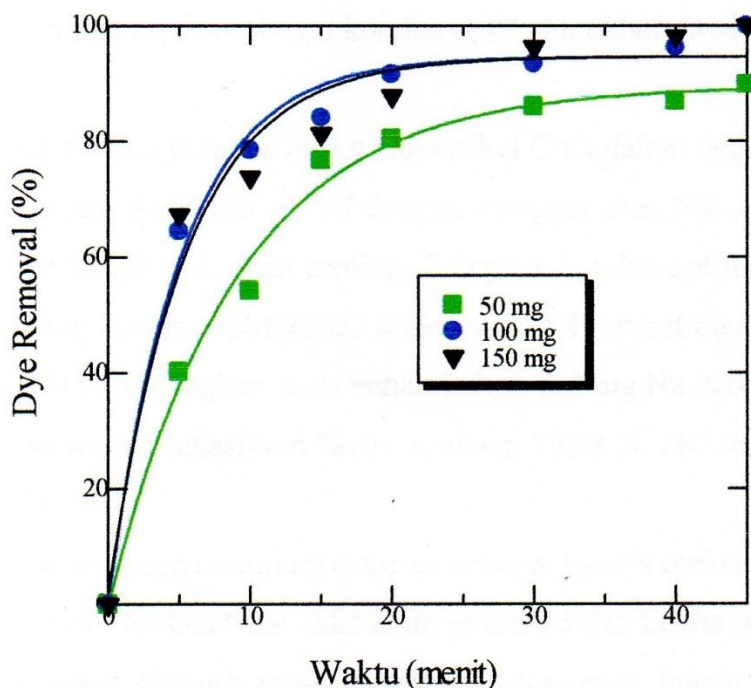
Figure 5. Effect of reaction time todye removal in various catalysts loading.

CONCLUSION

This work shows that Cu zeolite catalysts could be considered as potential low cost absorbents for dye removal from aqueous solutions. The Cu zeolite has the optimum absorption capacity for Remazol Brilliant Blue R. The optimum catalyst weight was obtained at 100 mg, which was able to decrease the reaction time 50 minutes compared to the reaction without catalyst. The percentage of dye removal on this catalyst loading was 96.26%. The structure upon cation exchange had a tendency to form agglomerates of small crystals and also an observed decrease in particles and pore sizes. The micro pores of CuO zeolite is about 20 nm, which shows formation of nanoCuO particles in zeolite structure. This structural feature may be important since it increases the total surface area. The diffusion into such pores can explain the absorption capacity.

CONFLICT OF INTEREST

I state that the authors have no conflict of interest.

AUTHOR CONTRIBUTIONS

Kandhi Puspa Melati conducted the experiment, Deswita conducted the SEM measurement, Indra Gunawan and Yoki Yulizar wrote and revised the manuscript. All authors agreed to the final version of this manuscript.

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Substituting Locally Sourced Carbon Nano Particle with the Conventional Additives

Ekeinde, Evelyn Bose[1], Okujagu, Diepiriye C[2] , Dosunmu Adewale[3]

[1,3]Department of Petroleum and Gas Engineering, Federal University Otuoke Federal University Otuoke Bayelsa State, Nigeria
[2]Centre for Petroleum Geosciences (CPG), University of Port Harcourt University of Port Harcourt Choba Rivers state, Nigeria

ABSTRACT: Nanoparticle drilling fluids have the potential to minimize wellbore instability problems. There is a need for the development of a new generation of drilling fluids to handle wellbore instability problems especially in lost circulation zones and shale problems. A rheological model is needed to accurately describe the rheology of nano base drilling fluid because limited experimental data are currently available for using carbon nano particles in water base mud and Inability of current methods to address shale strength with increased open hole time reduction of critical mud weight to prevent hole collapse in challenging environment like depleted formation, narrow margin, HPHT wells. The study attempted to produce nano particles locally where the in-situ formation of floating catalyst was used. It involved the floating of catalyst particles by thermal decomposition of organometallic where argon, acethelene and nitrogen gas were used. The CNP WBM formulation was compared with the conventional base mud. Result Show that the CNP mud gave a better result for the fluid loss which can be used as a fluid loss property in the study mud, CNP gave 6.2mls while soltex gave 8.2mls and also CNP gave a thin and firm filter cake of 0.18cm as compared to the soltex formulated mud. Therefore, CNP is a good fluid loss additive and enhances the rheological properties of mud, also helped to improve and add value to local content in the oil and gas industry and save us the cost through the application of locally sourced drilling fluid   and save foreign exchange and It has export potentials in the Gulf of Guinea and other oil provinces

KEYWORDS: CNP, Soltex, Drilling fluid, Water base mud, fluid loss.

INTRODUCTION

There has been a shift in drilling methods from horizontal to rotary in terms of square footage drilled. Drilling to extreme depths is impossible without it. At all times, it's called "drilling mud," and it's there to keep the drill bit in place. There are numerous uses for drilling fluids. Drilling requires a large amount of fluid to ensure that the job is done correctly. Drilling fluids must meet certain standards in order to ensure the safety of the well and a successful completion (Sedaghatzadeh et al., 2012). Conventional macro and micro types of fluid additives often cannot be used for certain important tasks in difficult drilling operations because they lack the right physical, mechanical, chemical, thermal, and environmental properties.

To put it another way, the chemical and polymer industries are on the lookout for environmentally friendly, biodegradable, and chemically stable products. Oil and gas exploration and extraction can benefit greatly from the use of smart fluids made from these materials. Nanomaterials are thought to be the best material for designing smart fluids in oil and gas field applications. Because of their many unique properties, nanomaterials can interact with a wide variety of other materials and are therefore distinct from their parent materials (Amanullah, Sedaghatzadeh et al., 2011). Because of their high surface-to-volume ratio, nanoparticles have a large amount of surface area. As a result, they're able to engage with the world around them. Thus, fewer nanoparticles are required for each application, resulting in cost savings. People in the drilling engineering field believe nanotechnology could be a big help in solving some of the most common issues they face. Most of the nanoparticles used in drilling fluids are intended to enhance the fluid's rheological properties, such as lubricity and gel strength. This demonstrates the importance of using high-quality ingredients when making mud.

Mud systems can benefit from the addition of nanoparticles to improve lubrication and reduce the likelihood of drill string jams during drilling (Sedaghatzadeh et al., 2012). The stuck pipe's recovery could be greatly aided by the nano-based fluid. Drilling mud containing nanomaterials could theoretically reduce the stickiness of mud cakes by depositing a thin nano-adhesive nanofilm on the drill string's surface. To prevent the drill pipe from sticking, this would be beneficial. It's estimated that drilling mud exposure

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to shale results in billions of dollars in lost revenue each year (or mud invasion in shale). Nanoparticle drilling fluids could reduce the risk of wellbore instability. Using nano-fluids can reduce the amount of exposure that shales have to drilling mud, which can cause them to swell and make it difficult for the wellbore to remain in place. An unstable wellbore can be avoided by using this method. Friction between the drill string and the hole wall exacerbates torque and drag issues when drilling with a long reach. In order to reduce torque and drag on the drill bit, various types of drilling muds have been developed. Nanofluids can significantly reduce frictional resistance between the pipe and the borehole wall because nanomaterials can form very small and very thin films. This is because the ability of nanomaterials to form extremely small and thin films causes a thin lubricating film to form at the pipe-wall interface (Nabhani and Emami, 2012). In comparison to their volume, nanoparticles have a large surface area, which makes it easier for them to interact with the mud and matrix that surrounds them. These bonding sites could be used to form bonds with functional groups, influencing chain entanglement and thus creating distinct matrix properties from this surface area, as a result (Abdul Razak et al., 2014).

As the world's demand for oil and natural gas grows, deep well exploration is becoming increasingly important. Drilling fluids lose their rheological properties under high pressure and temperature, according to research. Both deepwater drilling and offshore operations are affected by this (Abdul Razak et al., 2014). A number of variables influence the efficiency with which an oil or gas well can be dug. It becomes increasingly difficult to select drilling fluid and its additives over time, as more products with different functions are introduced to the market. Additives and heat transfer properties are essential for a drilling fluid to perform well.

Nano-Based Drilling Fluid

A new type of nano-based drilling fluid has been developed that has excellent rheological and filtration properties as well as the ability to produce high-quality mud cakes. When commercial nano-materials were combined with a nano-stabilizer, it was created. Stabilizing formations and cleaning the borehole wall with an ultra-thin, tightly packed, and uniformly dispersed mud cake has been demonstrated in highly permeable formations. This mud cake has also been shown to reduce differential pipe sticking. A nano-based drilling fluid may also help reduce torque and drag during deviated drilling operations like horizontal drilling, as there may be less frictional resistance between a drill pipe and the borehole wall.

Drilling can be safer and more efficient thanks to the high surface area to volume ratio of nanoparticles. Thermal conductivity has been increased, making it easier to cool the drill bit. As a result, the drill bit has a much longer lifespan.

The Fluid Loss Additives

Soltex

Soltex Additive is a water-soluble sodium asphalt sulfonate that has been sulfonated in an unusual way. There are numerous applications for this mud conditioner, ranging from shale formation stabilization to lubricity enhancement. It is possible to use Soltex Additive in combination with other Soltex additives to improve the filter cake properties of both oil and water-based muds. When it comes to making muds that are both water and oil-based look fantastic, Soltex Additive has been around for over 50 years. During the drilling process, a large amount of Soltex Additive is used on both the drilled solids and the well bore itself. One day after the first treatment, increase the amount of Soltex Additive by 50%.

There are a lot of positive aspects to Soltex. Water and oil solubility can be controlled to achieve optimal chemical and physical performance and minimize damage to productive formations. Environmentally friendly, too, because of the reaction it has with shales to slow or halt the process of sloughing and swelling

Carbon Nano Particles

One of the most distinctive features of nanotechnology is the way in which its properties change as the size of the nanomaterials decreases. A number of nanostructured materials, including carbon nanoparticles (CNTs), have received a lot of attention in recent years. Pure carbon is what it's known as a "fullerene." As with graphite, each atom is linked to three other atoms in the same way. When it was first exhibited in the 1970s, the public was largely uninterested in it. In 1991, it was discovered by Iijima, and Smalley synthesized it for the first time (1993). In addition to arc discharge and laser ablation, chemical vapor deposition can also be used to create these components (Rafique & Iqbal, 2011). In accordance with the principles governing the assembly of atoms.

LITERATURE REVIEW

Nanoparticle-rich fluids could improve wellbore stability significantly. Wellbore stability control can be improved by adding specially designed nanoparticles to water-based mud (Sedaghatzadeh et al., 2012). The small particle size of nano-fluid makes it easier to keep shale from swelling and causing instability in the wellbore. Using nano-fluid particles, which are smaller than the shales' pore throat length, a bridge and a plug can be constructed. When Nabhani and Emami collaborated on a paper in 2012, it was part of their research. The use of nanoparticles in water-based drilling fluids has also been examined by Ismail et al. (2014). These materials

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were added to the water-based drilling fluid along with MWCNTs and nanometals like titanium dioxide (TiO_2) and aluminum oxide (AlO_3) (CuO). Increased MWCNT nanoparticle concentration resulted in reduced filtration loss.

It's been a failure to use materials of micro and macro materials to keep circulation going in these areas, according to Abdo and Haneef (2012). Experiments were conducted by Nasser et al. (2013) in order to see how drilling mud nanoparticle performance as nanoparticles. Researchers have discovered that when drilling mud nanoparticles are subjected to greater pressure and temperature, they have better maintenance characteristics. There are claims that nanotechnology can be used to improve the properties of drilling fluids. Because of this, standard drilling mud loses its ability to flow as a result of a decrease in pressure.

Nanoparticles can be used to reduce differential pipe sticking in Iranian oil fields, according to Abouzar et al. (2008). Adding nanoparticles to drilling mud can alter the mud's properties in a variety of ways, according to recent research. Drilling mud was spiked with carbon black nanoparticles for a variety of purposes in this study. The mud cakes aren't as thick as they used to be due to the presence of carbon black particles in the mud. Vikas and Rajat were tasked with finding out how fly ash affected water-based drilling fluids' properties (2013a, 2013b). The filtration properties of fly ash improved as the concentration of fly ash increased, according to the results of the experiments. A smaller cake thickness and lower filter loss were the results of the drilling fluid system's improved ability to bridge together smaller particles.

Using nano-clay and nanosilica to stabilize invert emulsion model drilling fluids for HTHP drilling was studied by Agarwal et al. (2011). A stable emulsion can be maintained by either of the nanomaterials by themselves, but combining them yielded optimal results. It was discovered that the nanoparticles' composition and hydrophobic or hydrophilic nature were critical factors in determining plastic viscosity. Process synthesis and optimization can speed up the creation of carbon nanostructures, according to Iyuke and his colleagues. Carbon nanotubes can be made in two different ways, according to his research (CNTs). The first step is to heat organometallics to create floating catalyst particles. "In-situ formation of floating catalyst particles by the thermal decomposition of organometallics" was used in their research to produce positive outcomes. It was in Nature Communications in 2013 that Ogolo and co-authors explained how nanofluids keep sand particles from moving away from each other. Ogolo et al., (2012) worked on the enhancement of oil recovery using nano particle.

According to Sedaghatzadeh et al., (2012) CNT can be produced as Multi-wall carbon nano-tube (MWCNT). MWCNTs were created through chemical vapour deposition. Hydrophobicity is a common property of MWCNTs, making it difficult for them to disperse in water. Nanotubes with hydrophilic functional groups were created by treating them with acid. MWCNTs were treated with nitric acid to improve their performance (69 percent). One gram of MWCNTs and 40 mL of nitric acid boiled and refluxed for four hours together. In order to remove the acidity, the sample was diluted with deionized water, filtered, and rinsed over and over again until it was completely neutral.

Nanoparticles have been studied by Onyekonwu and Ogolo (2010) to see if they can help with oil recovery. Using polysilicon nanoparticles of three different types (lipophobic, hydrophilic, and hydrophobic NP), they improved oil recovery by 50%. CNTs: Researchers Ghorbani et al. developed a new method of making CNTs, which could withstand being squeezed, in 2014. The rheological and filtration properties of water-based drilling fluids can be studied using nanomaterials. To accomplish this, Salih et al. (2016) used nanomaterials. Adding aluminum oxide, nickel oxide, zirconium oxide, and silica silicon oxide to other nanoparticles can help keep clayey fines from moving and sticking to sand grains, as well as other nanoparticles. It was in Nature Communications in 2013 that Ogolo and co-authors explained how nanofluids keep sand particles from moving away from each other. Ogolo et al., (2012) worked on the enhancement of oil recovery using nano particle.

Sedaghatzadeh and colleagues (2012) found that carbon nanotubes can be transformed into multi-wall carbon nanotubes, according to their findings (MWCNT). MWCNTs were created through chemical vapour deposition. Hydrophobicity is a common property of MWCNTs, making it difficult for them to disperse in water. Nanotubes with hydrophilic functional groups were created by treating them with acid. MWCNTs were treated with nitric acid to improve their performance (69 percent). One gram of MWCNTs and 40 mL of nitric acid boiled and refluxed for four hours together. In order to remove the acidity, the sample was diluted with deionized water, filtered, and rinsed over and over again until it was completely neutral.

Nanoparticles have been studied by Onyekonwu and Ogolo (2010) to see if they can help with oil recovery. In order to increase oil recovery, they applied three different types of polysilicon nanoparticles (hydrophilic, lipophilic, and hydrophobic NP) to rocks. Nanoparticles improved oil recovery, according to the researchers. Carbon Nanotubes were studied in a similar way by Ghorbani et al. (2014). Carbon Nanotubes with Enhanced Squeeze Lifetime Carbon Nanotubes were studied using this technique.

In 2016, Salih and his team of researchers investigated how nanomaterials affected the rheological and filtration properties of water-based drilling fluids.

Substituting Locally Sourced Carbon Nano Particle with the Conventional Additives

Fig.1 Carbon nano particles/powder

METHODOLOGY

This study is to use locally sourced additives in their nano scale and carbon nano particle (CNP) materials in formulating a water base mud of nano-base muds that will improve rheological performance at drilling conditions. From a theoretical as well as a practical perspective, investigating nano-base mud and the applications it may have is an intriguing subject. This mud system will enhance wellbore instability, depleted reservoir and stress caging issues.

The carbon nano particles were used to formulate a water base mud and the rheological properties analyzed comparing with API standard, Comparison of CNP mud formulation with the Conventional water base mud and also an economic comparison of the carbon nano particles with the conversional drilling additives

The extraction of carbon nano particles

The carbon nano particle was obtained from the fabricated equipment by injecting nitrogen into the vaporizer periodically without a catalyst. The catalyst was vaporized using a mixture of acetylene and argon gas. After that, the catalyst was heated in a reactor. Inside the reactor, a smoky substance was discovered. Condenser-cooled carbon nanoparticles are collected in the reactor's cyclones by this product after reacting with carbon nanoparticles.

RESULT AND DISCUSION

Experimental measurements for water-based mud fluid loss agent were conducted with respect to API standard. Two mud samples were formulated with the same measurement of additives

Table 1 present the quantities of additives used during the water mud formulation process. API filter press assembly and filter paper were used for the fluid loss test.

Table 1. The Water Base Mud Formulation Kcl/Polymer Mud Comparing Soltex and CN

ADDITIVES	SAMPLE 1(SOLTEX)	SAMPLE 2 (CNP)
H2O (mls)	322	322
SODA ASH (g)	0.25	0.25
CAUSTIC SODA (g)	0.25	0.25
KCL (g)	25	25
PAC R (g)	1	1
PAC L (g)	2	2
SOLTEX/CNP (g)	1	1
BARITE (g)	77	77

Substituting Locally Sourced Carbon Nano Particle with the Conventional Additives

Table 2. Rheological Result Comparing   Soltex and CNP

PROPERTIES	SAMPLE 1(SOLTEX)	SAMPLE 2 (CNP)
PLASTIC VISCOSITY (cp)	19	17
YEILD POINT (100ft^2)	16	31
FLUID LOSS (mls)	8.2	6.2
CHLORIDE CONTENT (mg/l)	40,000	41,000
SIZE OF FILTER CAKE (mm)	1.9	1.8
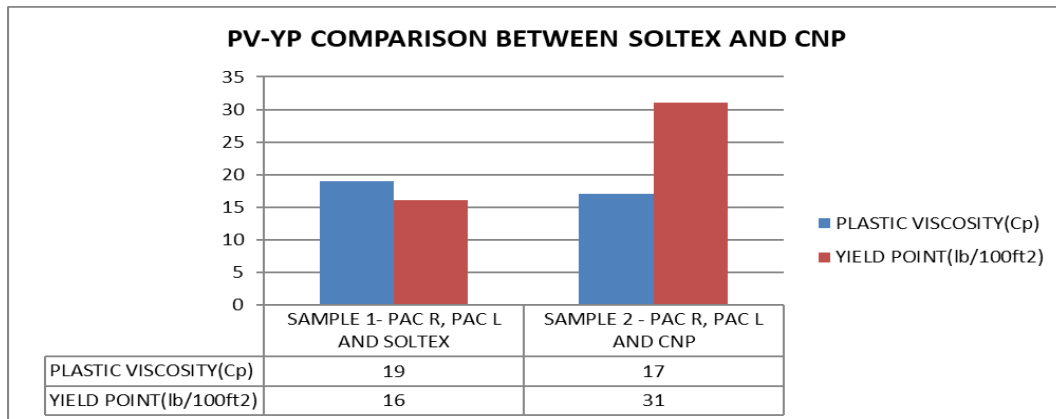
Figure 2. A Plot Comparing Soltex and CNP in Water Base Mud Formulation Kcl/Polymer
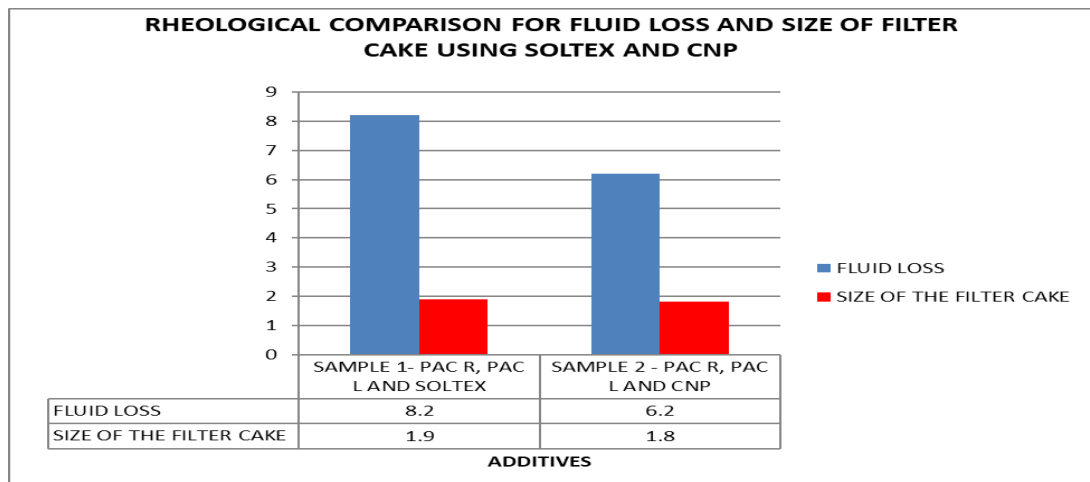
Figure 3. Comparing Fluid loss and filter cake for Soltex And CNP In Water Base Mud Formulation Kcl/Polymer

The result in figure 2 and 3 where the plot shows the comparison of the soltex and CNP in water base mud formulation where CNP is partially soluble in water base mud which does not contribute to the PV of our mud as compared to soltex which has a higher PV of 19 to CNP 17 showing soltex did not dissolve in the mud compared to CNP also CNP gave a better result for the fluid loss which can be used as a fluid loss properties in our mud. (Sample 1 and 2 where the CNP gave 6.2mls while soltex gave 8.2mls)

For sample 2 using CNP mud gave (0.18cm) and sample 1 (0.2) which shows using CNP gave a thin and firm filter cake as compared to soltex mud which is the conventional additives

Effect of Locally Formulated Mud on Shale Stability

The effect of shale (Smectite) which is one of the shale clay materials that swells more in terms of the shale types we have in the Niger Delta. The shale sample was obtained from one of the fields in Niger Delta (A field) and was analyzed using local formulated sample for eighteen hours to determine its swelling characteristics. It was observed that that the local formulated mud i.e., carbon nano particles and other local additives inhibits the swelling tendencies of shales as there was minimal effect on the shale sample. The shale was weighed before immersion in the formulated mud and was also weighed after eighteen hours to see the swelling effect and the result is shown in Table 3 below

Substituting Locally Sourced Carbon Nano Particle with the Conventional Additives

Table 3. Effect of the mud on shale reactivity

	SAMPLE1 PAC-R, PAC-L & SOLTEX	SAMPLE2 PAC-R, PAC-L & CNP	SAMPLE3 PAC-R& PAC L	SAMPLE4 PAC-R& CNP
WEIGHT BEFORE AGING	48.1	45.2	49.2	42
WEIGHT AFTER AGING	49.2	46.5	51.7	43.9

	PAC R, PAC L AND SOLTEX	PAC R, PAC L AND CNP	PAC R, PAC L	PAC R, CNP
WBA	48.1	45.2	49.2	42
WAA	49.2	46.5	51.7	43.9
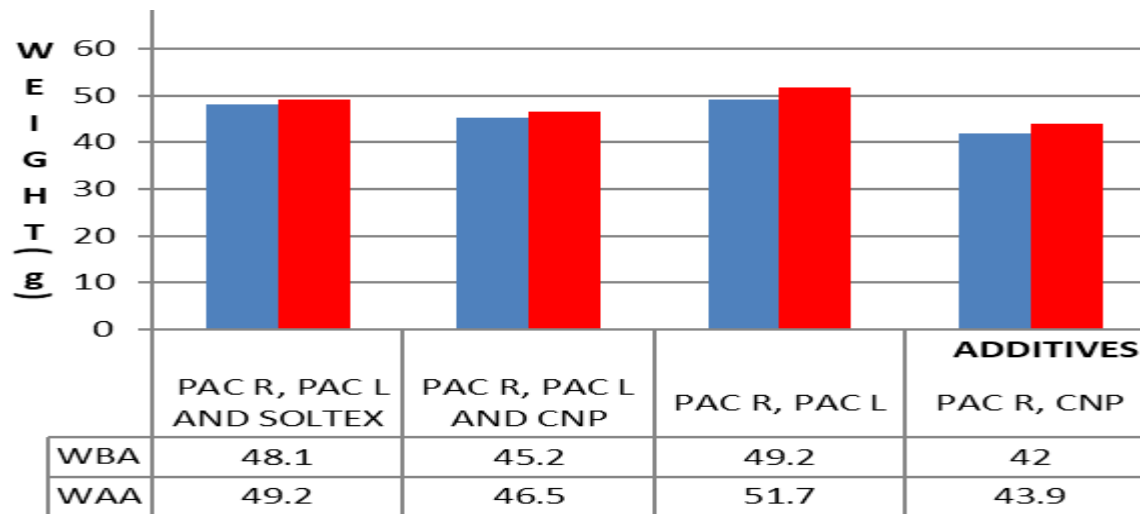
Figure 4. Effect of Shale Reactivity on Mud before and After Aging

Drilling Fluid Cost Analysis

When the section gets deeper, the cost of the fluid goes up because more fluid is required. Prices are determined by the cost of building and maintaining a specific mud weight. The total cost of constructing a mud system includes the price of all the components, the time it takes to mix them, and the estimated cost of the additives and chemicals used. An oil and gas company provided the information used in this study.

Table 4. Material Estimation per well of WBM Formulation for a 16" hole size 10ppg Kcl/polymer mud using Soltex

PRODUCT	UNIT SIZE	UNIT	COST/UNIT (USD)	TOTAL (USD)
CAUSTIC SODA	25kg	13	45.00	585
SODA ASH	25kg	13	25.00	325
KCL	Imt	46	1200	55200
PAC R	25kg	105	90.00	9450
PAC L	25kg	105	126.00	13230
SOLTEX	50lb	230	104.00	23920
BARITE	1mt	201	350.00	70350
TOTAL				173060

Table 5. Material Estimation per well for WBM formulation for a 16" hole size 10ppg Kcl/polymer mud using CNP

PRODUCT	UNIT SIZE	UNIT	COST/UNIT(USD)	TOTAL(USD)
CAUSTIC SODA	25kg	13	45.00	585
SODA ASH	25kg	13	25.00	325
KCL	Imt	46	1200	55200
PAC R	25kg	105	90.00	9450
PAC L	25kg	105	126.00	13230
CNP	50lb	230	25.00	5750
BARITE	1mt	201	350.00	70350
TOTAL				154890

Substituting Locally Sourced Carbon Nano Particle with the Conventional Additives

Table 6. Comparison per well of the mud cost analysis for WBM formulation

FORMULATION USING DIFFERENT ADDITIVES	TOTAL(USD)
SOLTEX	173060
CNP	**154890**

CONCLUSION

From the result of the experimental, we can say carbon nano particles can be used to substitute soltex which is the conventional additives for water-based mud as a fluid loss agent i.e. improve the fluids rheological and also optimizes viscosity, enhanced fluid loss control and stabilizes shale and they exhibit higher thermal conductivity

It also shows that the locally sourced CNP is a good shale inhibitor (particles inhibit the swelling tendencies of shales and helps reduce drilling problems). It can serve local substitution and save foreign exchange and improve local content in the oil and gas industry and it has export potentials in the Gulf of Guinea and other oil provinces

NOMENCLATURE

SBM	Synthetic base mud
OBM	Oil base mud
WBM	Water base mud
PV	Plastic viscosity
YP	Yield point
oF	Degree Fahrenheit
0C	Degree Celsius
MW	Mud weight
OWR	Oil water ratio
PPG	Pounds per gallon
CNP	Carbon nano particles
CNT	Carbon nano tube
MWCNT	Multiwalled carbon nano tube
WBA	Weight before Aging
WAA	Weight after Aging

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Extradition Law in Indonesia And its Urgency in Fighting International Crime

Graha Dwi Wijaya [1], Aries Isnandar[2], Alfalachu Indiantoro[3], Faisal[4], Jamal Hi Arsad[5],
Nuria Siswi Enggarani[6], Septarina Budiwati[7]

[1,2,3]Universitas Muhammadiyah Ponorogo
[4,5]Universitas Khairun Ternate
[6,7]Universitas Muhammadiyah Surakarta

ABSTRACT: The legal instrument for extradition has been regulated in the Republic of Indonesia Law no. 1 of 1979 in general, extradition is a result of asylum rights, namely the right to obtain political asylum, but at this time extradition is used to penetrate state boundaries in the sense of applying national criminal law for criminals who flee the country abroad, and to To create a civilized international civil society that upholds the truth, it is necessary to implement the law which is a manifestation of justice and truth itself.

KEYWORDS: extradition, asylum rights, civil society.

INTRODUCTION

Extradition according to Law No. RI. 1 of 1979 is the surrender by a country requesting the surrender who is suspected or convicted of committing a crime outside the territory of the country that submits it and within the jurisdiction of the territory of the country requesting the surrender because it has the authority to try and punish him. Extradition is carried out on the basis of an "agreement" (treaty) between the Republic of Indonesia and other countries whose ratification is carried out by law. If there is no agreement, extradition can be carried out on the basis of good relations and if the interests of the Republic of Indonesia so desire (Article 2 paragraphs 1 and 2). [1]

According to JG Starke, the term extradition refers to a process whereby, based on a treaty or on the basis of reciprocity, a country surrenders to another country at its request, against a person accused or convicted of committing a crime committed against the law of the requesting country. The country requesting extradition has the competence to try the accused perpetrators of the crime.

Rational considerations that determine the law and practice of extradition, namely:

1. The common will of all States, to ensure that serious crimes will not go unpunished. A country whose territory is sheltering a perpetrator of a criminal act, is often unable to prosecute or punish him only because of the technical rules of criminal law or because it does not have jurisdiction. To close this gap, international law provides the argument "aut punire aut dedere", namely that the perpetrator of a crime must be punished by the country where he seeks protection or be handed over to a country that can and wants punishment against him.

The state in whose territory a crime occurred is the most capable of prosecuting the perpetrators of the crime, because more expanded evidence is available there, and that the state has the greatest interest in punishing the perpetrators of the crime, and has adequate facilities. at most to confirm the truth. So the most correct and most appropriate thing is that it is to the territorial state that the perpetrators of criminal acts who seek protection in other countries must be handed over.[2]

Extradition can also be interpreted as a formal surrender, either based on a pre-existing extradition agreement or based on the principle of reciprocity or good relations, on a person accused of committing a crime (suspect, defendant, accused) or someone who has been sentenced to a criminal sentence that has been convicted. has definite binding force (convict, convict), by the

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[1] I Wayan Parthiana (2003) Hukum Pidana Internasional dan Ekstradisi. Bandung: Yrama Widya.

[2] Maringka, J. S. (2018) Ekstradisi dalam Sistem Peradilan Pidana. Jakarta: Sinar Grafika.

country where he is located (the requested country) to the country which has jurisdiction to try or punish him (the requesting country), at the request of the requesting country, with the aim of trying and or implementing the sentence.[3]

From the brief formulation on extradition, several elements can be drawn, namely:

1. Subject elements, namely the requested country and the requesting country/countries;

2. The object element, namely the person requested, who can have the status of a suspect, accused, defendant, or convicted person;

3. Elements of procedures or procedures, which must be carried out according to certain procedures or procedures or formalities and;

4. The element of purpose, namely for the purpose of prosecuting and or punishing.

Among the four elements that should be highlighted here is element number 3, namely elements of certain procedures or procedures or formalities. It has been stated above that in order for the surrender or extradition of the requested person to be carried out, there must first be a request to hand over the person concerned from the requesting country to the requested country. Without a prior request from the requesting country to the country where the person concerned is located (the requested country), the latter country may not hand over the person concerned.

Requests to surrender must be made through diplomatic channels. Likewise, if the requested state approves or rejects the request of the state- the order must notify the requesting state- through diplomatic channels. Regarding the decision to grant or reject a request from the requesting country, high-ranking officials from the requested country such as the Attorney General, the Chief of Police, the Minister of Justice, and the Minister of Foreign Affairs are involved in providing considerations, for which a decision is ultimately taken by the competent authority. From the requested state.

It is very possible that a case concerning extradition has previously involved lower-level law enforcers, for example during arrests, detentions, guarding their security, and so on. This means that the issue of extradition is a state and inter-state problem. As an internal matter of the state, its implementation must comply. The country's national laws or regulations regarding extradition and other relevant national laws and regulations, such as criminal procedural law. Meanwhile, as a matter between countries, its implementation must be based on international treaties or customary international law on extradition.[4]

As an internal matter between countries and between countries, the decision to submit or reject the request for extradition of a requested person, of course, rests with high-ranking state officials who are authorized to represent or act for and on behalf of the state in matters of international relations. If the requested person is decided to be handed over by the requested state to the requesting state, his surrender must also follow certain procedures or procedures. For example, where and when the person concerned will be handed over, the vehicle used, what goods are also handed over, as well as the minutes of the handover, and so on.

From the above background, the problem can be formulated, how are the parameters in determining someone to be extradited, what are the conditions for extradition?

DISCUSSION

AZAS-AZAS EKSTRADISI

1. Azas kejahatan ganda (double criminality principle);

Menurut azas ini, kejahatan yang dijadikan sebagai alasan untuk meminta ekstradisi atas orang yang diminta, haruslah merupakan kejahatan (tindak pidana) baik menurut hukum negara-peminta maupun hukum negara-diminta. Hal ini tidak perlu Nama ataupun unsurnya Sama, mengingat sistem hukum masing-masing negara yang berbeda-beda. Sudah cukup jika hukum kedua negara sama-sama mengklasifikasikan kejahatan itu sebagai kejahatan atau tindak pidana.

2. Azas kekhususan (principle of speciality);

If the requested person has been handed over, the requesting state may only try and/or punish the requested person, only on the basis of the crime that is the reason for requesting his extradition. So he may not be tried and/or convicted of any other crime, other than the crime that is used as a reason for requesting his extradition.[5]

3. The principle of not surrendering the perpetrators of political crimes (non-extradition of political criminals);

If the requested State is of the opinion that the crime that is used as a reason for requesting extradition by the requesting State is classified as a political crime, then the requested State must refuse the request. Because it is difficult to determine objective

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[3] Atmasasmita, R. (1995) Pengantar Hukum Pidana Indonesia. Bandung: PT. Eresco.

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criteria for political crimes, countries, either in treaties or in their extradition legislation, use a negative system, namely by stating explicitly that certain crimes are not declared political crimes, or are declared as crimes that can be committed. Be used as a reason to request or extradite the requested person (extraditable crime).[6]

4. The principle of not surrendering citizens (non-extradition of nationals);

If the requested person turns out to be a citizen of the requested country, then the requested country can refuse the request from the requesting country. This principle is based on the idea that the state is obliged to protect its citizens, and citizens have the right to obtain protection from their state. If the requested state refuses the request of the requesting state, the requested state is obliged to try and or punish its nationals based on its national law.

5. The principle of non bis in idem;

According to this principle, if the crime that is used as a reason for requesting the extradition of the requested person, turns out to have been tried and/or sentenced that has definite binding force, the request of the requesting country must be rejected by the requested country.

6. The principle of expiration.

The request of the requesting state must be refused if the prosecution or execution of a sentence for the crime which is used as a reason for requesting the extradition of the person requested has expired according to the law of one or both parties.

EXTRADITION STAGES

Seeing the extradition process starting from the beginning until the handover of the perpetrators of crimes from the requested country to the requesting country, there are three stages that must be passed, namely:

1. Phase I : Pre-Extradition;
2. Phase II: Extradition Process;
3. Phase III: Execution of Extradition;

The pre-extradition stage is the initial step taken before a request for extradition is submitted by obtaining information about the whereabouts of the wanted criminal. After knowing his whereabouts, a request for arrest and provisional arrest was submitted. The search, arrest and detention of criminals are generally carried out in cooperation through INTERPOL, but there are also countries which, in accordance with the legal provisions of their country, require that the request be submitted through diplomatic channels.

The extradition process begins with a request from the requesting country which has jurisdiction to try and or punish a person (the requested person) either in his legal status as a suspect, accused, accused, or convicted, to the requested country which is the country where the requested person resides. Or take refuge. The request must be through diplomatic channels, for example submitted by the head of state, prime minister, or foreign minister of the requesting country, to the head of state, prime minister or foreign minister of the requested country, either directly or through the ambassadors of each party. . The request must be accompanied by related documents, such as a document regarding the personal identity of the person requested, a description of the crime that is used as the reason for the request for surrender accompanied by articles of the alleged criminal law, and supporting evidence that is considered relevant. Then the requested state will decide whether to accept or refuse extradition under its domestic law. The decision must also be communicated through diplomatic channels.

The implementation of extradition can be carried out after there is a notification letter regarding the granting of extradition from the requested country. The notification letter must be accompanied by the place and time the person requested will be submitted by the requested country to the requesting country. Along with the surrender of the requested person, it can also be accompanied by the surrender of his movable property, goods used to commit the crime, and goods which are the result of the crime. More technically, the issue of the delivery of people and goods must be regulated in more detail by both parties.

The extradition procedures and mechanisms are standardized and have been recognized as customary international law, with legal principles outlined in legal rules so that extradition is now independent. In practice, even though extradition has become customary international law that is generally accepted, countries still need stricter and clearer arrangements in the form of bilateral and multilateral international agreements.[7]

Provisions regarding requests for extradition and the conditions that must be fulfilled by the requesting country are regulated in articles 22-24 of Law No.1 of 1997.

Extradition requests will only be considered, if they meet the following conditions:

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[6] Anwar, K. (2011) Hukum Internasional II. Bandar Lampung: Universitas Lampung.

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(1) A request for extradition must be submitted in writing through diplomatic channels to the Minister of Justice of the Republic of Indonesia to be forwarded to the President.

(2) A request for extradition for a person whose extradition is requested to serve a sentence must be accompanied by:

a. The original sheet or an authentic copy of the Court's decision in the form of a transfer that already has definite legal force;

b. Information required to establish the identity and nationality of the person whose extradition is requested;

c. The original or authentic copy of the arrest warrant issued by the competent authority of the requesting country.

(3) A request for extradition for a person suspected of committing a crime must be accompanied by:

a. The original or authentic copy of the arrest warrant issued by the competent authority of the requesting country;

b. A description of the crime for which extradition is requested, stating the time and place of the crime being committed, accompanied by the necessary written evidence;

c. The text of the legal provisions of the requesting country which are violated or if this is not possible, the content of the applicable law;

d. Statements of witnesses under oath regarding their knowledge of the crimes committed;

e. Information required to establish the identity and nationality of the person whose extradition is requested;

f. Request for confiscation of evidence, if any and required.

If according to the consideration of the Minister of Justice of the Republic of Indonesia the submitted documents do not meet the above requirements or other conditions stipulated in the agreement, then the officials of the requesting country are given the opportunity to complete the documents, within a period of time deemed sufficient by the Minister of Justice of the Republic of Indonesia. After the requirements and documents have been fulfilled, the Minister of Justice of the Republic of Indonesia shall send a letter of request for extradition along with its attachments to the Chief of Police of the Republic of Indonesia and the Attorney General of the Republic of Indonesia for examination.

SUBMISSION OF PEOPLE REQUESTED FOR EXTRADITION

If the request for extradition is approved, the person requested for extradition is immediately handed over to the official concerned from the requesting country, at a place and time determined by the Minister of Justice of the Republic of Indonesia. If the person whose extradition is requested is not taken on the specified date, then he can be released after 15 (fifteen) days have passed and in any case he must be released after 30 (thirty) days have passed.

Subsequent extradition requests for the same crime, after the 30 (thirty) days have elapsed, may be rejected by the President. If the situation is beyond the capacity of the two countries, both the requesting country to take the person and the country requested to hand over the person concerned, the said country is obliged to notify the other country and the two countries will jointly decide on another date for the said collection or delivery.

B. Important matters in extradition treaties between Indonesia and other countries

The signing of the extradition agreement on April 28, 2007 at the Tampak Siring Palace, Bali, is a new chapter to open relations between Indonesia and other countries after a long and dynamic process of more than 30 years. both parties and in line with the national legal framework. This extradition is essentially one of the implementations of the International Anti-Corruption Convention (UNCAC) which Indonesia has ratified, while Singapore has just signed but has not ratified it.

The RI-Singapore extradition treaty is essentially an agreement in which each party agrees to extradite to the other party, wherein any person found in the territory of the Party is requested and sought by the requesting party for the purpose of prosecution (which means investigation) or the implementation of punishment for a crime which may be extradited acts within the jurisdiction of the Requesting Party.[8]

The points that are very important in this agreement are:

- The types of crimes that can be extradited are crimes that carry a penalty of at least 2 years and meet the criteria of "double criminality" (crimes recognized by the laws of both countries). There are 30 types of crimes that meet these criteria. (list of types of crimes is attached). -

- From a number of extradited criminal acts, including economic crimes, namely corruption, bribery, counterfeiting money, banking crimes (acquisition of credit or property through fraud against banks), violations of company law, bankruptcy and money laundering resulting from corruption. -

- Apart from the 30 types of crimes, this agreement also adheres to a limited "open system". This means that the thirty-one lists are not closed in nature and allow for the addition of a new list of crimes, particularly new types of crimes.

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[8] Peter Mahmud Marzuki (2005) Penelitian Hukum. Jakarta: Kencana.

Extradition Law in Indonesia And its Urgency in Fighting International Crime

- Both parties agree not to question the difference in the qualifications of the crime or the elements of the crime as long as the overall nature of the crime is recognized by the laws of the two countries. -

- This treaty is retroactive and may include extraditable crimes 15 years before this treaty enters into force after the ratification process is carried out by the parliaments of both countries.

- This agreement can reach the perpetrators of the crimes of the two countries who fled from the jurisdiction of the two countries. In this regard, it is agreed that the determination of the nationality of the perpetrator of a crime is determined at the time the crime is committed.

The treaty stipulates that the requested state can refuse the request, if the fugitive is a national of its own country. However, this does not apply to crimes of terrorism and bribery and other crimes related to corruption. In certain circumstances (urgent cases), temporary arrests can be made at the request of the requesting country as long as there is sufficient evidence to arrest the wanted fugitive.

CRIMES THAT CAN BE EXTRADICTED
Extradition shall be granted for an extraditable offense which is an offense which is included in the following list of offenses and which is punishable under the laws of both Parties with a penalty of imprisonment of not less than 24 months, or a heavier penalty:
(i) murder;
(ii) take the life of another person or because of his negligence causes another person to die;
(iii) a crime that violates the provisions on abortion;
(iv) intentionally injuring or causing serious injury;
(v) Persecution;
(vi) rape;
(vii) having sexual intercourse with a woman against the law.
(viii) criminal acts of decency;
(ix) the purchase, or trafficking of women or children for immoral purposes;
(x) kidnapping, abducting persons or depriving persons of liberty, or engaging in slavery;
(xi) the abduction, neglect, exploitation or unlawful detention of a child;
(xii) bribery and other acts of corruption;
(xiii) burning;
(xiv) criminal acts related to currency counterfeiting;
(xv) crime against the law related to counterfeiting;
(xvi) theft, embezzlement, fraud related to conversion, fraud related to falsification of books, acquisition of property or credit through fraud, receipt of stolen property or other crimes related to property through fraud,
(xvii) robbery;
(xviii)) extortion or blackmail using threats or by abuse of power;
(xix) criminal acts that violate bankruptcy law and company law;
(xx) intentionally damage property;
(xxi) an act committed with the intention of endangering a vehicle, ship or aircraft, including the people in it;
(xxii) criminal acts that violate the laws on psychotropics, dangerous drugs or narcotics.
(xxiii) Piracy
(xxiv) rebellion against the authority of the captain of the ship or the captain of the pilot of the aircraft;
(xxv) piracy and other acts that endanger the safety of aircraft and actions that endanger the safety of international airports;
(xxvi) criminal acts of financing terrorism;
(xxvii) piracy of ships, destruction or destruction of ships, other acts that endanger or can endanger the safety of navigation and criminal acts related to threats to do these things;
(xxviii) criminal acts that violate the law relating to profits derived from corruption, illicit drug trafficking and other serious crimes;
(xxix) perjury or perjury under oath or conspiring to impede the proceedings;
(xxx) theft by weight or similar crime;
(xxxi) other offenses which may be extradited by the extradition laws of the two Parties and the laws that ratify the obligations under international conventions to which both parties are parties.

In the relationship between Indonesia and other countries, we are certainly no stranger to the issue of the Extradition Agreement between the two countries. The issue is a topic that often heats up relations between the two neighboring countries.

Extradition Law in Indonesia And its Urgency in Fighting International Crime

The extradition agreement between the two countries is indeed an urgent need for one party, especially the Indonesian government. Many perpetrators of crimes from Indonesia fled to other countries, including perpetrators of corruption. They fled to other countries other than because of their proximity, also because there has been no realization or implementation of an extradition treaty, so that they can walk freely, without fear of threats from the law in that country, to return them to their country of origin, because they have been caught in a legal case in that country. own country of origin.

In fact, the extradition treaty between Indonesia and other countries has been sought and greatly fought for by the Indonesian government, so that it will soon become a reality and be properly realized.

The desire to make extradition treaties between Indonesia and other countries has been highly desired by the Indonesian government since the 1970s, when Indonesia pioneered extradition treaties with several neighboring countries, including the Philippines, Malaysia, Thailand, Australia, Hong Kong, and South Korea. Meanwhile, the government of other countries did not respond on the grounds of differences in the legal system. According to other countries, extradition treaties are difficult to implement. Other countries have shown a change in attitude since late 2004. In a bilateral meeting between the two heads of state from other countries and Indonesia in Tampak Siring, Bali on October 4, 2005, a mutual understanding emerged that the negotiation process for an extradition treaty and a new cooperation agreement in the defense sector would be carried out. in parallel.

After going through a long and dynamic negotiation process for more than 30 years, on April 27, 2007 in Tampak Siring, Bali, Indonesia and other countries have agreed on a defense cooperation agreement. The agreement was signed as a package with an extradition treaty. The signing of the agreement is a new chapter to open relations between Indonesia and other countries. Previously, other countries only entered into extradition treaties with British Commonwealth countries and interacted with allied countries. The extradition treaty of Indonesia and other countries is a positive signal given by other countries to Indonesia.

Defense cooperation between Indonesia and other countries (Defence Cooperation Agreement) is a form of bargaining power or bargaining power of Indonesia's diplomacy in establishing bilateral cooperative relations with other countries. Bargaining power used by Indonesia in approving cooperation in defense and extradition agreements is the idea that DCA will be able to become an effective tool to pressure other countries to implement extradition agreements, where other countries are obliged to pursue and extradite suspects of corruption crimes who fled Indonesia and went to Other countries. As a consequence, Indonesia will grant permission to other countries to use the territory of the Unitary State of the Republic of Indonesia (NKRI) for military training of the soldiers of other countries.

Indonesia and other countries have agreed on the DCA agreement which was signed in a package with an extradition treaty. However, since it was signed until now, there have been pros and cons. These pro and con conditions have made Indonesia and other countries squeezed by a very serious dilemma. The criticism directed at the contents of the agreement was not only at the socialization process. One of them is about several areas that have been agreed to be used as military training sites. Regarding this, several parties argue that the determination of Indonesia's territory as a joint military training site is a violation of the sovereignty of the Republic of Indonesia.[9]

The emergence of the Pros and Cons of the Extradition Agreement that is in the same package with DCA, also interferes with the realization of extradition agreements between Indonesia and other countries. Other countries show an uncooperative attitude towards the realization of an extradition treaty, if the extradition agreement is not in the same package with DCA, while according to many circles the Extradition Agreement that is in agreement with DCA will be detrimental to Indonesia.[10]

Extradition agreements between Indonesia and other countries are still apparent in the clarity of regulations and the implementation or implementation of extradition agreements. Until now, there are still many perpetrators of crimes that are included in the points of the extradition treaty regulations, who have fled to other countries but the governments of other countries have not handed over the perpetrators of these crimes to Indonesia according to the extradition agreement. other countries are used as a stopover for perpetrators of crimes in Indonesia to hide and escape because it is so easy for the perpetrators to be free from legal snares because there are no legal rules that can ensnare them in these other countries.

The issue of corruption is only one of the points of the agreement, the rest about 30 points contain other issues. Other issues that are regulated include money laundering, white-collar crime, and so on. Although the contents of the extradition agreement that will be signed by the Indonesian government and other countries are not yet clear, the public's hope is still there for the return of the corruptors and their assets to the country. However, until now this has not been implemented because this agreement will be paralyzed if the 2003 UN international convention on anti-corruption is not ratified by other countries. By ratifying this convention, it is guaranteed that other countries will no longer be able to seek to detain the assets of corruptors from Indonesia. This

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[9] Starke, J. G. (1989) Pengantar Hukum Internasional. Jakarta: Sinar Grafika.
[10] Widyawati, A. (2014) Pengantar Hukum Pidana. Jakarta: Sinar Grafika.

convention states that a country that has committed to dealing with the difficulties experienced by other countries since Indonesia banned the export of land sand last January-following the ban on the export of sea sand some time before. Strict policies and supervision by the Indonesian security forces on the smuggling of sand to other countries also influence the decision of other countries to ratify the decision of the UN international convention on anti-corruption. Other countries really need sand from Indonesia for territorial expansion and reclamation in their country, but since the entry of sand from Indonesia has stopped, other countries have experienced problems in their efforts to expand their territory. Because of this,

Extradition agreements between Indonesia and other countries are considered to be very necessary for both parties to resolve various cases of transnational crimes. For Indonesia, the signing of the extradition agreement is expected to be able to repatriate corruptors from Indonesia who roam freely in other countries and recover assets resulting from corruption. Not only corruption cases, but also other types of crimes, it is hoped that they can be charged with the regulations resulting from the extradition treaty which was signed in 2007. Meanwhile, other countries have the advantage that other countries will get permission to carry out military training in Indonesia, because of the extradition treaty between Indonesia and Indonesia. other countries agree with the DCA (Defence Cooperation Agreement).[11]

CONCLUSIONS AND SUGGESTIONS

According to the description above, extradition is part of the implementation of Indonesian law and constitution which promises justice and equality before the law and is an obligation for a country to carry out justice and not allow criminals in their country. Which is an obligation for every State to enter into an extradition treaty with another State. For the sake of upholding justice to create an international civil society that upholds law and truth. Instead of only being concerned with profit and profit from international corruptors and criminals, which in the end will only bring problems in the future.

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11) Widyawati, A. (2014) Pengantar Hukum Pidana. Jakarta: Sinar Grafika.

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[11] Sunarso, S. (2009) Ekstradisi Dan Bantuan Timbal Balik Dalam Masalah Pidana Instrumen Penegakan Hukum PidanInternasional. Jakarta: Rineka Cipta.

Identification of Nucleotide Variants to Analyse Quantitative Trait Loci (QTL) in Drought Resistant Mulberry Cultivars.

Chaitra[1], Vidya Niranjan[2]

[1]Research Scholar, Department of Biotechnology, R V College of Engineering, Bangalore.
[2]Professor and Head, Department of Biotechnology, R V College of Engineering, Bangalore.

ABSTRACT: Mulberry (Morus Indica) leaves have gained commercial and economical importance in India by domesticated sericulture practices. Genetic engineering has paved way to enhance the breeding adroitness in developing transgenic plants. Multifarious approaches are being carrying out by researchers to increase yield of mulberry leaves throughout fluctuating climatic conditions followed by differing biotic and abiotic stress. Identification of genetic markers and mapping genetic markers within the genus for a target specific yield growth are challenging and so far they have substantiated the complications effectively. Significance of allelic variants distinguished by various Genetic markers like RADP, RFLP, AFLP, ISSR, SSR, and SNPs regulates in characterization of each genus and Genetic linkage mapping in relevance with Linkage disequilibrium score across GWA Study, Association mapping, QTL mapping are investigated with emphasis on crop yield amelioration. A concise account on applications of genetic markers in understanding morphological changes in accordance with genotypic and phenotypic characteristics.

KEYWORDS: Mulberry, Genetic markers, SNP, Abiotic Stress.

I. INTRODUCTION

Morus Indica is a flowering plant associated with the family Moraccea, habitually known as mulberry. Mulberry plants have potency to grow as a tree certainly decreases moisture content in leaf in-turn reduces the leaf yield. Mulberry leaves possessing vigorous moisture content are prerequisite for nutrified silkmoth (Bombyx Mori) rearing to produce high quality natural silk. Morus Indica has a wide variety of species such as Kanva-2, Mysore local, Victory-1 (V1), S-36, RFS-175, Bilidevalaya, Bombay Piasbari, etc., (K Vijayan et al.,) adopted to different climatic conditions. Phenotypic characters of mulberry plant can be distinguished by size of the bark, number of branches, leaf lobation patterns, height of the plant, leaves per branch and so on. To analyse phenotypic characters with respect to genotype and their morphological changes genetic markers specific to mulberry plants have developed by researchers. Sustaining moisture content in mulberry leaves under different climatic conditions is being challenging for farmers to adopt irrigation plants with high water use efficiency (WUE). To enhance breeding adroitness of Morus Indica for high WUE researchers have developed genetic markers by evaluating available genetic databases within the genus Morus and few characteristics among the family of Moraccea. Moisture content of mulberry leaf suitable for silkmoth feeding is determined on the basis of dry weight. Moisture Content and retention capacity of mulberry leaf can be calculated by using the formulae (M Shivashankar et al.,):

$$\text{Percentage of Moisture Content} = \frac{(\text{Fresh leaf weight} - \text{Dry leaf weight})}{\text{Fresh leaf weight}} \times 100$$

$$\text{Percentage of Moisture retention} = \frac{(\text{Leaf weight at different intervals} - \text{Dry leaf weight})}{\text{Percentage of Moisture content at different level}} \times 100$$

Mulberry leaves moisture in Morus Indica varieties varies from 65 to 75% whereas Morus Alba, Morus notabilis, Morus Lavigata exhibit 75 to 85% of leaf moisture. According to Darwin theory of survival of the fittest, plants constantly experiencing stress either adopt to surrounding conditions or abandon themselves to despair, by altering genotypic and phenotypic characters through mutation. Mutation can effect both positively and negatively, positive mutations upregulate the gene expression and supportive

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towards yield quality but most of the negative mutations downregulate the gene expression and have destructive impact on yield quality. Though leaf yield quality can be enhanced through conventional breeding within natural selection which demands many generations to procure succeeding generation adapted to resist stress, have least probability of acquiring qualitative breeds in defined specification. Identification of positive mutation and insertion in transgenic plants as well as identification of negative mutation and deletion in transgenic plants are achieved through genetic markers like RADPs, RFLPs, AFLPs, ISSRs, SSRs, and SNPs. Plant breeding based on markers can be broadly classified into Biochemical markers, Cytological markers, Morphological markers and Genetic markers. Biochemical markers reveal allelic variation information from diversification of plant proteins based on amino acid sequences. Cytological markers reveal information on chromosome from one plant species to another based on difference in chromosome number, size, shape and ploidy types. Genetic markers assist in identification of species based on the known chromosome location for a specified DNA sequence. Plant genetic markers can be categorized into Polymorphic markers, Tandem repeat markers, Single variant markers.

II. MATERIALS AND METHODS

Plant material

The 22 mulberry germplasms adopted to different climatic conditions having variant level of resistant towards drought were analysed. *M.indica, M.serrata, M.laevigata, M.rotundiloba, M.multicaulis, M. multicaulis, M. alba, Assama Bola, Punjab Local, Thailand male, DD, S1, S13, S34, S145,Kanva-2, Mysore local, Victory-1 (V1), S-36, RFS-175, Bilidevalaya, Bombay Piasbari.* Both wild and cultivated mulberry species were collected for the analysis.

SNP analysis

Single Nucleotide Polymorphism (SNP) are the molecular markers which compares two DNA sequences on the basis of substitution in single nucleotides. The next generation sequencing approach to identify SNPs in mulberry cultivars subjected to drought condition, compares the drought resistant and drought susceptible DNA sequences. The raw sequences were downloaded from NCBI for the mulberry cultivar Morus alba (M. alba). The raw sequences were in SRA file format which were converted to fastq file format using the tool SRA toolkit. The converted fastq files were then checked the quality of DNA sequence using FASTQC. After checking the quality of the sequences, the low quality reads were trimmed using Trimmomatic. The trimmed sequences were aligned with reference genome using BWA. The aligned reads were sorted using Samtools. Finally, SNPs were extracted using SNPeff. The steps followed are as shown in Figure 1.
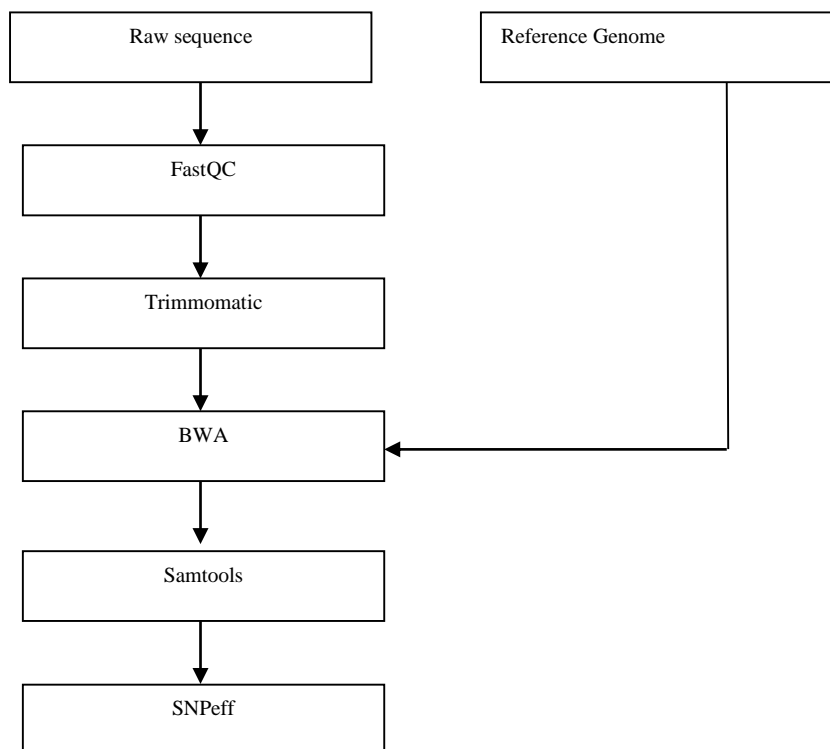
Figure 1. Steps Followed For Analysis

III. RESULTS

All the 22 mulberry germplasm varities were aligned to the reference genome M.alba . SNPs were identified for each genome sequences. The transitions (Ts) vs transversion (Tv) ratio for all sequences were found to be above 1.5.

Base changes (SNPs)

	A	C	G	T
A	0	2,662	8,377	3,440
C	2,719	0	2,386	9,461
G	9,353	2,444	0	2,761
T	3,331	8,479	2,639	0

Ts/Tv (transitions / transversions)

Transitions	55,425
Transversions	35,327
Ts/Tv ratio	1.5689

Number variants by type

Type	Total
SNP	58,072
MNP	0
INS	0
DEL	0
MIXED	0
INV	0
DUP	0
BND	0
INTERVAL	0
Total	58,072

Number of effects by impact

Type (alphabetical order)	Count	Percent
HIGH	42	0.013%
LOW	7,381	2.255%
MODERATE	2,284	0.698%
MODIFIER	317,833	97.036%

Number of effects by type and region

Type				Region		
Type (alphabetical order)	Count	Percent		Type (alphabetical order)	Count	Percent
3_prime_UTR_variant	1,974	0.602%				
5_prime_UTR_premature_start_codon_gain_variant	78	0.024%				
5_prime_UTR_variant	575	0.175%				
downstream_gene_variant	34,944	10.649%		DOWNSTREAM	34,944	10.675%
initiator_codon_variant	1	0%		EXON	9,377	2.865%
intergenic_region	19,255	5.868%		INTERGENIC	19,255	5.882%
intragenic_variant	1,083	0.33%		INTRON	107,386	32.806%
intron_variant	108,066	32.933%		SPLICE_SITE_ACCEPTOR	7	0.002%
missense_variant	2,284	0.696%		SPLICE_SITE_DONOR	9	0.003%
non_coding_transcript_exon_variant	547	0.167%		SPLICE_SITE_REGION	779	0.238%
non_coding_transcript_variant	117,478	35.802%		TRANSCRIPT	118,561	36.22%
splice_acceptor_variant	7	0.002%		UPSTREAM	34,395	10.507%
splice_donor_variant	9	0.003%		UTR_3_PRIME	1,974	0.603%
splice_region_variant	790	0.241%		UTR_5_PRIME	653	0.199%
start_lost	1	0%				
stop_gained	25	0.008%				
stop_retained_variant	1	0%				
synonymous_variant	6,623	2.018%				
upstream_gene_variant	34,395	10.482%				

"Identification of Nucleotide Variants to analyse Quantitative Trait Loci (QTL) in Drought Resistant Mulberry cultivars"
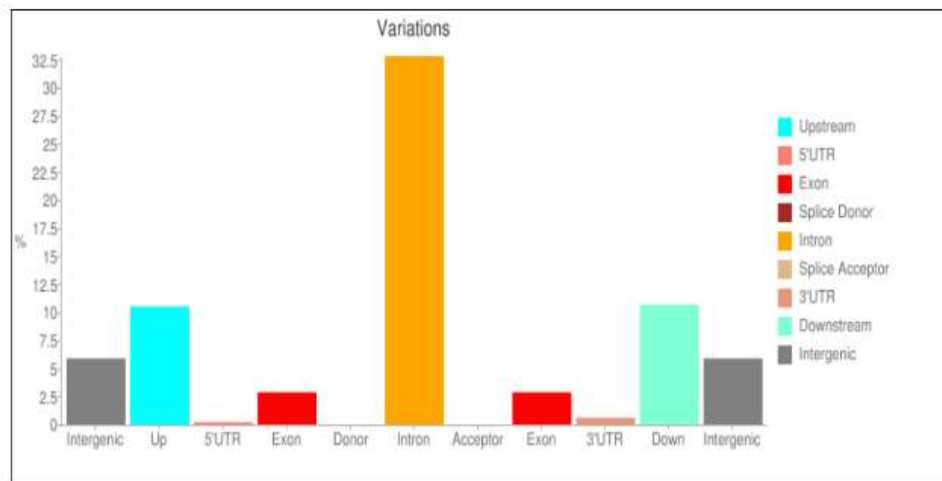
Figure 2. SNPeff results

IV. CONCLUSION

The 22 mulberry germplasms namely *M.indica, M.serrata, M.laevigata, M.rotundiloba, M.multicaulis, M. multicaulis, M. alba, Assama Bola, Punjab Local, Thailand male, DD, S1, S13, S34, S145,Kanva-2, Mysore local, Victory-1 (V1), S-36, RFS-175, Bilidevalaya, Bombay Piasbari,* were analysed and identified SNPs for each sequneces. Base change, Transition vs Transversion, Variants effect by impact and variants effect by type and region are identified for each sequences. These SNPs identified plays an important role in QTL identification in drought resistant mulberry.

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The Effect of External Debt, Net Exports on Exchange Rates and Indonesia's Economic Growth

Rosyadi [1], Pierre Johnathan Hutagaol [2], Windhu Putra[3]

[1,2,3]Faculty of Economic & Business, Tanjungpura University, Indonesia

ABSTRACT: This study aims to determine the effect of Foreign Debt (X_1) and Net Exports (X_2) which describe exports and imports on the movement of the Rupiah exchange rate (IDR) against the US Dollar (USD) (Y_1) and economic growth (Y_2) in Indonesia throughout 1988-2019. This study uses multiple linear regression analysis using path analysis to determine the direct or indirect effect. The results showed that simultaneously, all dependent variables had a significant effect on the exchange rate (Y_1) and economic growth (Y_2). While partially, Foreign Debt (X_1) and Net Exports (X_2) have a positive and significant effect on the Exchange Rate (Y_2). Foreign Debt (X_1) has a positive and significant effect on Economic Growth (Y_2), Net Exports (X_2) have a positive and no significant effect on Economic Growth (Y_2), and the Exchange Rate (Y_1) has a significant and negative effect on Economic Growth (Y2). Based on path analysis, Foreign Debt (X_1) and Net Exports (X_2) show a stronger direct effect on Economic Growth (Y2), compared to the indirect effect through the exchange rate mediating variable (Y_1).

KEYWORDS: Foreign Debt, Net Exports, Exchange Rates and Economic Growth.

I. INTRODUCTION

The success of a country can be measured by various levels of measurement, one of the most popular is the level of economic growth. In general, economic growth can be measured by the value of Gross Domestic Product (GDP). The value of GDP can be estimated by calculating how many goods or services a country can produce in one period of time. Indonesia's economic growth over the last 20 years has fluctuated in the range of 4-5 percent per year and experienced an economic recession in 2020 due to the Covid-19 pandemic with negative growth at -2.07 percent. One of the causes of the economic contraction experienced by Indonesia is due to the closure of factories and offices due to the massive transmission of the Covid-19 virus and the implementation of the Large-Scale Social Restrictions (PSBB) policy or what is now the Enforcement of Restrictions on Community Activities (PPKM) which causes restrictions on community mobility. so that household or community consumption that supports the economy must be restrained from declining (Alwandi & Muchlisoh, 2021).

The state budget plays an important role during the Covid-19 pandemic to protect the people of Indonesia and drive the economy as long as the Emergency PPKM is in effect until the community slowly adapts to new habits (new normal), and returns to work, school, meetings, shopping, and other activities. Others online or online. BPS noted that in the first quarter of 2021 economic growth was still contracting 0.71% (year on year / yoy), then it grew significantly in the next period in the second quarter of 2021 to 7.07%, while in the third quarter of 2021 due to an increase in cases The daily Covid-19 variant of the Delta variant of economic growth slowed by 3.51% due to the implementation of the Emergency/Level PPKM which resulted in a decline in mobility, investment and public demand. One of the steps taken by the government to overcome the problem of the economic recession and efforts to deal with the impact of the Covid-19 pandemic is to increase foreign debt.

In carrying out national development, there are three sources of financing, namely, voluntary public savings, government savings, and forced public savings (Sukirno, 1978). However, gaps in domestic savings and investment indicate that the economy has not been able to accumulate sufficient savings to facilitate growth in domestic investment. This gap in savings and investment will be filled with foreign loans. In addition to using foreign debt, other alternatives can be used by the government, namely, encouraging foreign investors to invest in the form of foreign investment. Debt Service Ratio is the level of a country's ability to pay off foreign debt and with the agreed interest at the time of making foreign loans.

Indonesia's economic growth rate since the Covid-19 pandemic has stagnated and has a downward trend, while foreign debt continues to increase. The Rupiah exchange rate against the US Dollar also depreciated the most since October 2015, this triggered

The Effect of External Debt, Net Exports on Exchange Rates and Indonesia's Economic Growth

concerns over the government's ability to pay off its increasing foreign debt. The weakening Rupiah exchange rate will increase Indonesia's foreign debt. However, the rupiah exchange rate will depreciate even more when foreign debt increases, thus creating a cycle that will continue to increase the amount of foreign debt that occurs.

The weakening of the Rupiah exchange rate will increase the amount of foreign debt that needs to be repaid, both in terms of principal and interest payments. Payment of foreign debt will use foreign currency so that the foreign exchange held will decrease, this will increase the demand for foreign currency and will depreciate the domestic currency. This has been proven empirically in several previous studies.

Research by Saheed et al., (2015) analyzed the influence of foreign debt on the exchange rate in Nigeria with a paper entitled "Impact of Public External Debt on Exchange Rate in Nigeria", while in Indonesia it has been studied by Yudiarti & Mustika (2018) in a paper entitled "The Effect of Foreign Debt, Interest Rates and the Current Account Balance on the Exchange Rate of the Rupiah Against the United States Dollar," the two studies found that the exchange rate was positively and significantly influenced by foreign debt. This finding means that when a country increases its foreign debt, the currency exchange rate of the country concerned will depreciate (decline).

The reason developing countries receive aid is because the aid is the main and important ingredient in the development process (Todaro & Smith, 2011). Foreign aid complements domestic resource shortages, helps structurally transform the economy, and contributes to economic growth. Indonesia's goal of increasing its foreign debt during the pandemic is to cover the government's budget deficit which has swelled, especially in the health and social protection budget. Finance Minister Sri Mulyani said foreign debt is a tool that a country can use to save its economy (kompas.com).

Previous studies that have been conducted to examine the effect of foreign debt on economic growth have varied results and conclusions. First, research finds that foreign debt will increase economic growth (positive effect). Quazi (2005) concluded that in Bangladesh from 1973 to 1999, foreign debt had a positive and significant effect on GDP growth. Bhattarai (2008) also draws the same conclusion that Nepal's foreign debt from 1983 to 2002 had a positive effect on real GDP per capita. Bearce & Tirone (2010), also concluded that in Sub-Saharan countries, Central America, South America, Asia, the Soviet Union, Eastern Europe, and North Africa from 1975 to 2000 the foreign debt of these countries had a positive effect. And significant to the economic growth of each of these countries respectively.

Second, foreign debt lowers the rate of economic growth or has a negative effect on economic growth. This is similar to the conclusion of research by Metwally & Tamaschke (1994), on Algeria, Morocco,an d Egypt in the period 1975-1989 which states that the increase in foreign debt of these countries has a negative effect on economic growth. This is very possible because the government's policy-making is not right so foreign debt is increasingly making it difficult for the economy to rise and finally there is no other way but to increase debt again. The economic downturn in this country is also very strong, it is suspected that it is closely related to the deteriorating global economy. Samnang (2004) research on Cambodia for the 1982-2002 period also gives the same conclusion, namely that Cambodia's foreign debt has a negative and significant impact on economic growth in the short term and long term. This is very strongly suspected because the security situation in Cambodia is not conducive after the Cambodia-Vietnam war period 1977-1979. Although Vietnam legally left Cambodia in 1989, the situation in the country which is still raging in conflict between the government and the rebels is still a strong reason for foreign debt not being able to have a positive influence on Cambodia's economic growth.

Salvatore (1990) asserts that exports are a means of boosting economic growth. Analysis by Salvator on developing countries found that to increase economic growth developing countries need to export, this because exports for developing countries are one of the main activities that can increase economic growth. Developing countries increase exports and investment in order to encourage output to increase economic growth. The increase in exports will finance the import of production factors used in domestic production, by obtaining foreign exchange from increased export activities.

The fluctuating value of Indonesia's exports in the last five years. Fluctuations in the value of exports move in tandem with fluctuations in the value of imports. The value of imports in 2018 decreased by 5% although in 2016 and 2017 they increased by 7.29% and 9.18%, respectively. According to Fauziah & Khoerulloh (2020), in 2019, Indonesia was more dominated by import activities than export activities.

According to Kholis (2012), economic growth is positively influenced by imports. This means that when imports are carried out more and more, the economic growth that occurs is increasingly accelerated. In fact, in Indonesia, production from foreign investment companies still produces a lot of goods using production materials originating from abroad (imports) so it is necessary to increase imports to carry out production. Foreign investors have not explored the potential of using domestic production factors as raw materials for their production. This is due to raw materials originating from within the country which have a price that is more expensive/higher than the price of imported raw materials (imported from abroad), or imported raw materials are of better quality than domestic (domestic) raw materials.

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In international trade, the difference in currency values between countries is created by the need for cross-border payment instruments using money (Ismanto et al., 2019). Exchange rate movements have two effects. First, if the value of the rupiah depreciates, or experiences a decrease in value against the value of foreign currencies, it can cause an increase in exports so that the impact on the money trade balance increases. Second, comparatively, it can increase Indonesia's economic growth because Indonesian products are more competitive than competing countries (Ismanto et al., 2019)

The global impact of the Greek crisis, economic recovery, the cessation of quantitative easing in the United States, and the increase in domestic fuel prices in 2015 weakened the rupiah exchange rate (Fauziah & Khoerulloh, 2020). The value of the rupiah which strengthened by 0.48% in 2016 and weakened again by 0.26% and declined by 3.14% in 2017 and 2018. The weakening of the rupiah in 2017 and 2018 is the effect of the trade balance the deficit, the global impact of the emerging market crisis in Turkey, Iran, Argentina, and South Africa, the escalation of the trade war between America and China and the strengthening of the American economy (Astuti & Ayuningtyas, 2018). The increase in supply of currency, the stability of lower interest rates, and low inflation in 2019 again strengthened the value of the rupiah by 0.48% (Fauziah and Khoerulloh, 2020).

Indonesia's foreign debt is increasing every year. Indonesia's foreign debt has an average growth rate of 7.52 percent per year, while real GDP in the last five years has only grown by around 5 percent per year and in 2020 experienced a recession due to the Covid-19 pandemic. The value of Indonesia's exports in the last five years has fluctuated in value and has tended to decline, and since 2012, data shows that there is a trade balance deficit, in other words, the value of imports is greater than the value of exports.

The Rupiah exchange rate in the last five years also showed a weakening against the United States Dollar. The government's efforts to restore the economy through maintaining a stable currency exchange rate and also increasing economic growth through accelerating GDP growth are closely related to the three variables already mentioned. Several alternatives to overcome this problem include applying for foreign loans, increasing exports, and reducing dependence on imports. The government's policy to maintain the stability of the rupiah exchange rate and to save the economy is interesting to study amid the current Covid-19 pandemic.

II. LITERATURE REVIEW

External Debt and Economic Growth

Indonesia, has a trend of foreign debt that continues to increase from year to year. This increase occurred in by increasing need for development funds, besides the increase in debt became higher after the implementation of deregulation which resulted in the debt structure being dominated by private debt, so that it would have an impact on economic growth. Accumulated external debt is a common phenomenon in developing countries. External debt occurs when a country's economy has a shortage of domestic savings, and has a trade balance deficit, and has a need for imports of tal goods to increase domestic resources (Todaro & Smith, 2011). This is in line with what Kuncoro (2010) said that to carry out the development of a country, investment is needed that is financed by sufficient funds. (Karagol, 2009) states that the relationship between economic growth and economic external debt is not just a one-way relationship.

Export and Economic Growth

According to Apridar (2009) exports are the main determinant of a region in increasing the economic growth of the region. Therefore, exports have an important role in building the economy, for that, an economic development strategy is needed because an increase or decrease in exports can affect domestic products. According to Dizaji & Badri (2014) exports are a component of aggregate expenditure so that when exports increase, regional or state income will also increase, and vice versa when exports decrease, regional or state income will decrease as well. This theory is in accordance with the analysis conducted by Ramanayake & Lee, (2015) who found that export activities are very important activities in increasing economic growth.

Import and Economic Growth

In meeting domestic needs, a country can import (activities carried out by buying goods or services from abroad into the country). Large import activity will weaken the domestic currency, this happens because when there is a large import, it will increase the demand for foreign currency. Sedyaningrum et al., (2016) states that high import activities will increase unemployment, this happens because if there is a large import, domestic production will decrease because people will prefer to buy imported goods that often have better prices or quality.

Imports affect economic growth. According to Fatmawati (2015); and Fitriani, (2019) imports will reduce Indonesia's economic growth in the long and short term. However, Astuti & Ayuningtyas (2018) show that imports only affect economic growth in the short term. On the other hand, Asbiantari et al., (2018) say that Indonesia's economic growth is influenced by imports of capital goods in the long term.

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Exchange Rate and Economic Growth

The exchange rate is the rate of exchange for the currency between two or more countries that is agreed between two or more countries to conduct trade (Mankiw, 2012). The exchange rate is the amount of a country's currency needed to obtain a foreign currency. In the international economy, the exchange rate is an important variable, which affects other variables such as the balance of payments, current account, prices, and interest rates.

An increase in the exchange rate in the Mundell-Fleming theory on (Obstfeld ,2001) will negatively affect economic growth. When the rupiah strengthens, then exports will be lower, this is because export goods become more expensive in the eyes of international buyers from other countries. The decline in exports will reduce output so that economic growth that occurs will experience a decline because the amount of GDP revenue is reduced due to a decline in exports.

The frequent weakening of the rupiah will affect the performance of export activities. The weakening of the exchange rate will reduce imports that occur because imported goods will be more expensive when the price of imported goods is converted into the domestic currency (rupiah). However, the opposite occurs in exports, when there is a depreciation of the domestic currency against foreign exchange, Indonesian export goods will have more competitive prices according to the importing country so that these goods will be more in demand. In addition, exporters will get higher profits because transactions are carried out using foreign currencies.

Conceptual Framework and Hypothesis

This research is based on theory and several previous studies which say that the trade balance and foreign debt are related to economic growth and the exchange rate, using the following conceptual framework:

Figure 1. Conceptual Framework
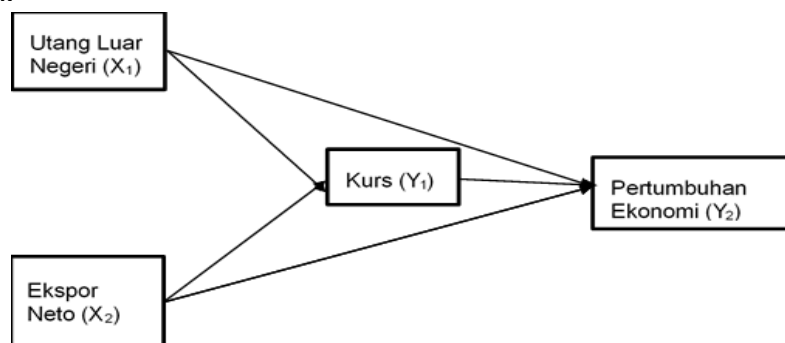
From the theories and empirical studies that have been described, the following research hypotheses were designed:

H_1 : External Debt has a negative and significant effect on the Exchange Rate
H_2 : Net Exports have a negative and significant effect on the Exchange Rate
H_3 : Foreign Debt has a positive and significant effect on Economic Growth
H_4 : Net Exports have a positive and significant effect on Economic Growth
H_5 : Exchange rate has a negative and significant effect on Economic Growth

III. RESEARCH METHODOLOGY

The approach used in this research is quantitative. Quantitative research is a method for testing certain theories by examining the relationship between variables (Creswell, 2009). Furthermore, this research uses comparative research, namely research conducted to compare the value of a variable with other variables in different periods.

The data used in this study is time-series data with observation time from 1988 to 2019 by issuing outliers in 1998 and 1999 because during that period Indonesia experienced an economic crisis so the value of the rupiah fell and debt swelled. Abroad to be repaid. To test the effect of the independent variable on the dependent variable, we used linear regression or Ordinary Least Square (OLS) with secondary data obtained from World Bank publications. The regression model formed is as follows

$$ER_t = \beta_1 FD_t + \beta_2 NE_t + e_t \quad \text{... (1)}$$
$$EG_t = \beta_1 FD_t + \beta_2 NE_t + \beta_3 C_t + e_t \quad \text{.. (2)}$$

Where:
t = Time Period
β_1- β_2 = Regression Coefficient
ER = Exchange Rate
FD = Foreign Debt/External Debt

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NE = Net Exports

EG = Economic Growth

e = *error term*

IV. RESULT AND DISCUSSION

To statistically test the effect of External Debt and Net Exports on Exchange Rate and Economic Growth, multiple linear regression (OLS) estimation was performed. But before that, the Classical Assumption Analysis was tested so that the regression results obtained could be accounted for and were Best Linear Unbiased Estimator (BLUE). After doing the Classical Assumption Test, it was found that the model has passed the Normality test, Hetercodastisity Test, Autocorrelation Test, and Multicollinearity Test. The next estimation results obtained are as follows.

$$ER = -429,008 - 0,04\,FD\,t + 0,12\,NE\,t + e\,t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

$$EG_t = 6,82 - 0,0003\,C\,t + 0,000009\,FD\,t + 0,00001\,NE\,t + e\,t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

The results of the recapitulation of the estimation results of the two models that have been carried out can be seen in the tables below.

Table 1. Partially Test Result (*t-test*)

Variable	Equation I (Exchange Rate)		Equation II (Economic Growth)	
	T-Statistic	Prob.	T-Statistic	Prob.
Exchange Rate (Y_1)	-	-	-4,721303	0,0001*
External Debt (X_1)	9,507407	0,0000*	2,292503	9,507407
Net Export (X_2)	3,468276	0,0018*	0,986798	3,468276

Table 2. Simultaneous Test Result (*f-result*)

Simultaneous Test	F-statistic	Prob.
Equation I (Exchange Rate)	53,10151	0.000000*
Equation II (Economic Growth)	12,63881	0.000000*

Table 3. Coefficient of Determination Test Results (R^2)

Coefficient Determination	R-squared	Adjusted R-squared
Equation I (Exchange Rate)	0,797302	0,782287
Equation II (Economic Growth)	0.593219	0,546283

Significant at 5% level

Source. Data Processing Result, Eviews10. 2022

The Effect of External Debt on Exchange Rate

Foreign debt is a loan received from abroad in the form of goods and services, or in the form of foreign exchange, whether converted into rupiah or not, which must be repaid along with previously agreed terms. These loans can be in the form of project loans consisting of soft loans, export credit facilities, commercial loans, and mixed loans. In theory, when the fiscal or monetary stimulus is liquidated through foreign loans, the number of dollars in circulation will certainly increase, this should make the US dollar weaker, but in the current condition when the US dollar is under pressure, it turns out that the rupiah has not been able to strengthen significantly. significant.

Foreign debt can make the Rupiah fall even more (depreciate) because this is related not only to a large amount of money in circulation, ut there are always other factors that make the Rupiah depreciate considering that foreign debt is always converted to other currencies, so it can be influenced by fluctuations. the value of the foreign currency. Foreign debt always uses the currency of another country which at the time of settlement needs to be converted from rupiah into the previously approved foreign currency, so that when the Rupiah weakens (depreciates) against the US Dollar, the amount of foreign debt that needs to be repaid will become increasingly large. large, not to mention external factors globally and domestically, also if there are fluctuations such as cuts and restrictions on bond purchases by the Fed to stabilize the economy of the United States to make the rupiah exchange rate and the Composite Stock Price Index (JCI) fluctuate sharply, trade wars between America and China made China slow down its economy so that China's demand for products originating from developing countries tended to decline, this resulted

in weakening exports, which is one of the foreign exchange income in developing countries such as Indonesia, to be reduced, not to mention foreign investment Russia over Ukraine which increased the price of non-oil and gas commodities such as crude palm oil and coal.

The results showed that the exchange rate was positively and significantly influenced by foreign debt. The increase in foreign debt will increase the exchange rate (the exchange rate of the US Dollar increases and the Rupiah depreciates) in Indonesia. Theoretically, a country in making foreign debt payments will increase the demand for foreign currency so that it tends to affect a country's exchange rate. This is in line with previous research by Yudiarti & Mustika (2018) in their research explaining that foreign debt has a positive and significant effect on the exchange rate or the rupiah exchange rate.

The Effect of Net Exports on Exchange Rate

Net exports have a positive and significant effect on the exchange rate, this is by the balance of payment theory, where net exports are often a factor that can push up and down the exchange rate of a country's currency so that the exchange rate will be largely determined by supply and demand against the US dollar. When there is a trade balance surplus, the demand for the rupiah becomes higher, this is due to obtaining Indonesian export commodities, foreign countries will need to exchange their currency into rupiah so that the purchasing power of the rupiah exchange against the US dollar will appreciate.

On the other hand, when there is a trade balance deficit, the rupiah exchange rate will depreciate because the demand for the rupiah is lower than the demand for the US dollar. This indicates that the Rupiah exchange rate weakened due to increased exports so that although the net export surplus was able to increase the availability of the US Dollar, it also strengthened the US Dollar, which was caused by the composition of Indonesia's exports which were dominated by raw materials, and exports of goods containing goods. Imports from the US as material so that it will increase demand for the US Dollar because exports goods as raw materials (import content). Meanwhile, on the export side, the increase was due to mineral fuel commodities such as coal, precious metals and also CPO.

The import movement data by category of goods based on data published by BPS are as follows.
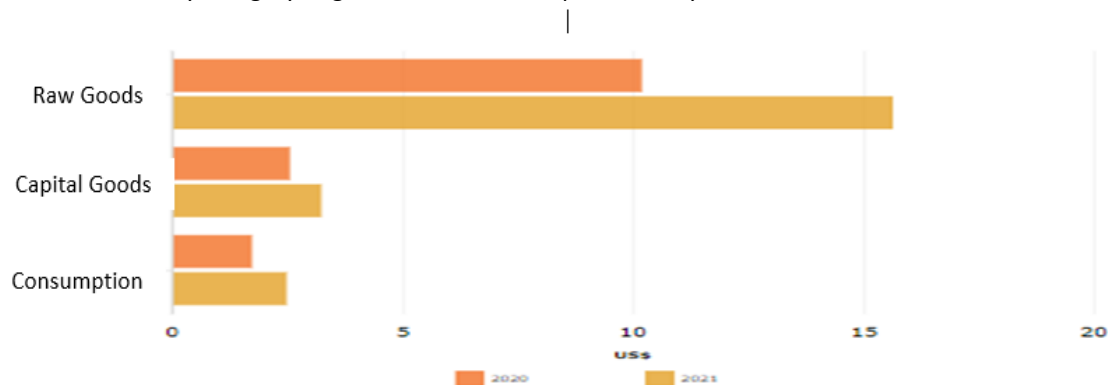
Figure 2. Import Value by Use of Goods (December 2020 and 2021)
Source. Indonesia's Central Bureau of Statistics

According to the BPS report, imports in April 2022, imports of raw materials and auxiliary goods experienced the fastest increase of 25.51% (yoy) to US$15.54 billion compared to imports of other categories of goods in line with increasing business activity in Indonesia, such as imports of consumer goods which only contributed to the growth of 4.2% (yoy) to US$1.7 billion. This indicates that the high import of auxiliary raw materials indicates that the demand in the industrial world is starting to increase and move faster.

The findings in this study are in line with the findings of previous research by Mustika et al., (2015) which stated that net exports had a positive and significant effect on the rupiah exchange rate per US dollar.

The Effect of External Debt on Economic Growth

Developing countries, one of which is Indonesia, need massive development in many fields, so they are in dire need of funding. To accelerate the implementation of development, one of the sources of funding comes from foreign debt, because funding from domestic sources is also very limited.

Foreign debt in the short term will be very helpful to cover the APBN deficit, but in the long term it will cause economic problems, so there must be a policy that allows Indonesia to reduce its foreign debt, or if it has to make foreign loans then the loans should be used. wisely, such as for productive expenditures such as infrastructure development, health, education, and social security for

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the community, so that in the future it is expected to provide benefits and can bring in foreign exchange due to the multiplier effect.

The findings in this study indicate a positive and significant influence of foreign debt on Indonesia's economic growth. Indonesia's economic growth which is positively and significantly influenced by foreign debt shows that the government has managed its foreign debt well, by building infrastructure and public advice in Indonesia. The private sector uses these loans to increase potential businesses and invest in businesses that have potential in the Indonesian economy, to create a multiplier effect so that economic growth in Indonesia will be encouraged. Foreign loans made by Indonesia have been able to facilitate the Indonesian economy in encouraging the economy to better utilize Indonesia's resources for production. The findings in this study are supported by Keynesian theories but contradict Neoclassical theories. According to Keynesian theory, the budget deficit is covered by using foreign debt, which means it will have a positive influence on the economy through the occurrence of a multiplier process. The findings in this study are supported by previous research by Khair & Rusydi (2016); and Putra & Sulasmiyati (2018) where Indonesia's economic growth is positively influenced by foreign debt.

The Effect of Net Exports on Economic Growth

Net exports in the theory of economic growth are components obtained from the expenditure side in the form of exports and imports. Net exports will make a positive contribution to national income if exports are higher in value than imports.

The findings in this study indicate that there is a positive and significant effect of net exports on Indonesia's economic growth, but the effect is not significant. The positive effect of net exports on economic growth shows that this is in line with the Keynesian Cross theory and the achievement of balance, namely, the size of national income growth is determined by the high level of consumption, government spending, the amount of investment and net exports, so that if exports increase, economic growth will also increase. . The insignificance of exports indicates that the contribution of exports to economic growth is still lacking, it can be seen that exports in Indonesia are still dominated by exports of primary goods, whose added value and productivity are low, so that they have not been able to move the economy significantly, especially in the absorption of labor, exports that are also dominated by products that use imported capital goods, so that the ability to export will be influenced by the ability to import.

Indonesia's main export destination countries are still in the last five years are still dominated by Asian countries outside ASEAN in the top position. It can be seen based on BPS data that the value of exports to Asian countries reached 71.79% of the total value of Indonesia's exports, and the largest was China at 27.9 million US$. The graph of Indonesia's export value by the destination country is as follows.
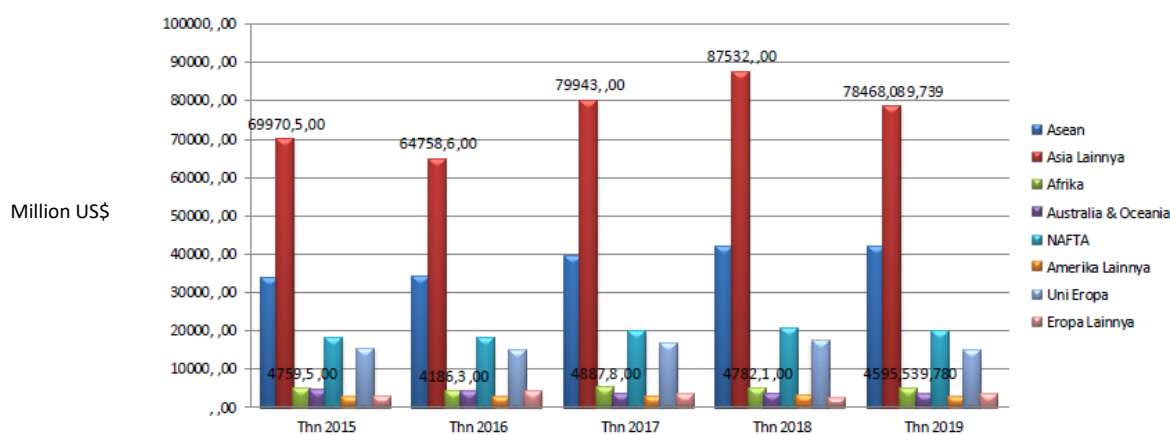
Figure 3. Indonesia's Export Value in 2015-2019 Based on Destination Countries
Source. Indonesia's Central Bureau of Statistics

The Covid-19 pandemic has also had an impact on exports and the global economy. This is because many countries are in lockdown and so shipping activities from and to abroad are hampered and take a long time and increase logistics delivery costs. This condition of uncertainty has also made several countries prohibit or close the export of certain commodities, such as health and food, resulting in disruption of supply and demand chains. The Covid-19 condition made Indonesia's exports decline in 2020. China as Indonesia's largest trading partner recorded an export value of 16.7% smaller than imports of 26%. The graph of Indonesia's export value for 2016-2020 is as follows.

The Effect of External Debt, Net Exports on Exchange Rates and Indonesia's Economic Growth
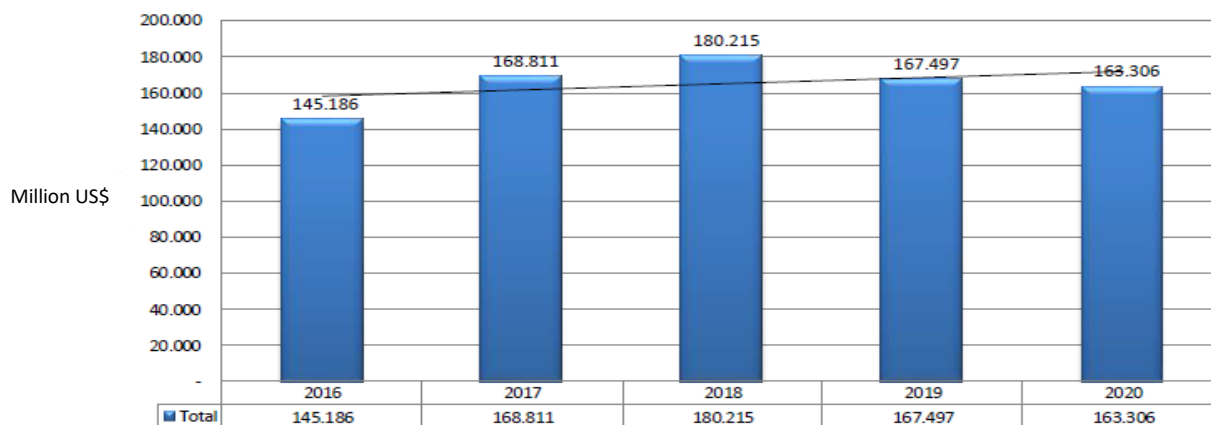
Figure 4. Indonesia's Export Value in 2016-2020
Source. Indonesia's Central Bureau of Statistics

Indonesia's exports are also still very oriented toward the trade-in raw materials, such as exports of Crude Palm Oil (CPO) (Rifin, 2010), forest wood and plywood (Lin, 1996); agricultural products (Sugiharti et al., 2020), and so on. This condition is to research by Asbiantari et al., (2018); and Wulandari & Zuhri (2019) which based on their research results show that economic growth is not significantly affected by net exports. This needs to be corrected by the government so that exports can contribute significantly to economic growth.

The Effect of Exchange Rate on Economic Growth
The exchange rate will greatly affect economic growth in Indonesia, it can be seen that when the exchange rate increases (the Rupiah depreciates) economic growth will also decline. Indonesia was in a slump due to the 1998 economic crisis, plus at that time Indonesia's political condition was also very unstable after President Suharto was ousted after 32 years in power. At that time 1998-1999 where the Rupiah depreciated badly which resulted in minus Indonesia's economic growth. The Indonesian economy began to improve in early 2000 when in October 1999 Abdurrahman Wahid (Gus Dur) was inaugurated as President replacing President B.J Habibie where economic growth was at minus 3 at that time to grow 4.9% in 2020 and the Rupiah appreciated slowly. This could not be separated from Gus Dur's efforts to keep the Unitary State of the Republic of Indonesia from being divided after the 1998 reform by visiting 50 countries on five continents just to lobby and acknowledge other countries and convince these countries that Indonesia's conditions are conducive. The graph of the comparison of the exchange rate and economic growth is as follows.
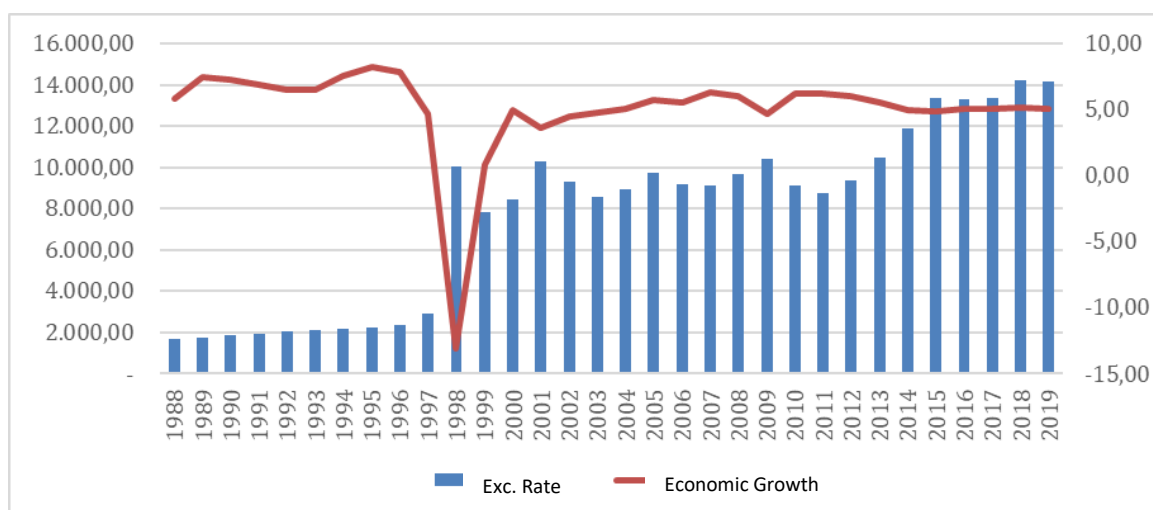
Figure 5. Comparison of Exchange Rates and Economic Growth in Indonesia in 1988-2019
Source: World Bank (data processed)

The findings in this study are supported by the Mundell-Fleming theory where economic growth is negatively affected by the exchange rate, besides the findings in this study are also supported by previous research by Pridayanti (2013); and Yazid (2018) where economic growth in Indonesia is influenced by negatively by the exchange rate, as well as research by Ismanto et al., (2019) that the exchange rate has a significant influence on economic growth.

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V. CONCLUSION

Foreign Debt affects the increase in the Exchange Rate (Rupiah depreciates). The higher Indonesia's foreign debt, the higher the exchange rate so that the Rupiah will increasingly depreciate, this is because foreign debt is always converted to other currencies, creating a risk from the movement of the exchange rate. Foreign debt always uses the exchange rate of another country's currency which must be purchased by exchanging the Rupiah into another country's currency, so that when the Rupiah weakens (depreciates) against the US Dollar, the burden of foreign debt will also increase, plus the external condition factor. Globally and domestically.

Net Exports affect the increase in the Exchange Rate (Rupiah depreciates). The increase in Indonesia's net exports also made the US Dollar stronger, this was because Indonesia's net export goods tended to still use and rely on raw materials (raw materials) and materials imported from imports to make these export products so that the demand for the US Dollar will also be higher

Foreign Debt affects Economic Growth in Indonesia. The increase in foreign debt has led to an increase in economic growth in Indonesia. Foreign debt is very helpful in covering the APBN deficit, and for this foreign debt, the Indonesian government has managed loans well, by building infrastructure that will stimulate economic growth, such as infrastructure development, education, health, and social security. The private sector in Indonesia has also used foreign debt in investing and developing its business in a sector that has the potential to build the Indonesian economy.

Net Exports affect Economic Growth but not significantly. The increase in net exports will also increase economic growth in Indonesia although not significantly, this is because economic growth in Indonesia is still dominated by the consumption sector plus Indonesia's exports which are dominated by primary commodities which have added value and low production values so that they are unable to move the economy significantly, especially in the absorption of labor, and exports carried out also still have components of imported goods so that the ability to export will be influenced by the ability to import.

The exchange rate has a negative and significant effect on Economic Growth. With an increase in the exchange rate (The rupiah depreciates), the economic growth in Indonesia will decline. Improved economic growth will help support the Rupiah so that the Rupiah appreciates. Therefore, it is important to increase exports and reduce imports and dependence on raw materials from abroad. The increase in the exchange rate (the Rupiah depreciates) will also increase the burden of foreign debt, not to mention the world oil price which is entirely purchased using foreign currencies, where every weakening of the rupiah will greatly affect the Indonesian economy.

The findings in this study are used by the authors through input and suggestions to interested and concerned parties to be taken into consideration, including: (1) The government must maintain the fiscal policy and the APBN deficit by applicable laws and regulations, especially amid the current global situation. uncertainty, lest the large debt burden cause Indonesia be trapped in debt (debt trap). There must be a limit on the payment of principal and interest on foreign debt; (2) The current management of Indonesia's foreign debt should not be carried out arbitrarily. The importance of foreign debt loans to support project financing as well as for additional budget deficit financing requires the Government to carry out careful management starting from planning, implementation, administration, reporting, monitoring, evaluation, and supervision; (3) Cooperating with state-owned companies must try to use existing resources from within the country which will increase dividends as well as tax revenues; (4) The government should implement policies that can further increase the value of exports. Cessation of exports that are oriented towards raw materials (raw materials) and focus on increasing exports of semi-finished goods or finished goods that have higher added value in the form of royalties, foreign exchange, and non-tax state revenues. Furthermore, the Indonesian government and its ranks should always play an active role in maintaining the balance of exports and imports on an ongoing basis so that there is no trade balance deficit which ultimately has an impact on economic growth in Indonesia. In addition, the government is expected to maintain the debt-to-GDP ratio and prudent debt management; (5) The Indonesian people should assist the Government of Indonesia in increasing and maintaining the rupiah exchange rate such as not taking advantage of the weak condition of the Rupiah by buying US Dollars to gain profits by exchanging their Dollars when the Rupiah is depreciating, buying domestic products, investing in the country, entrepreneurship with export orientation, sing public transportation to reduce the fuel that the must be imported from abroad; and (6) For researchers who will conduct research in the future, it is expected to increase the period of observation and research variables so that more complete results are obtained.

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Flexural Strength Models for Normal Laterised and High Strength Laterised Concretes at Optimum Mix Proportions

Dr. Udeme Hanson Iron

Lecturer, Department of Civil Engineering, Faculty of Engineering, University of Uyo, Nigeria.

ABSTRACT: This study develops mathematical models for obtaining optimum flexural strengths of normal laterised(NLC) and high strength laterised concretes (HSLC). The models can be expressly used to evaluate the indirect tensile strengths of both types of concretes without going through the traditional methods of mix design. Optimum mixing ratios and optimum flexural strengths predicted are also supplied by the models. The three point load method was adopted for testing for the flexural strengths. Laterite, has been widely used to partially or wholly replace sand in concrete with resultant low strengths. The production of HSLC using superplasticiser was achieved in this study. Scheffe's simplex theory based on (5, 2) simplex lattice (for NLC) and (6, 2) simplex lattice (for HSLC) was used to optimize the mix proportions for the flexural strengths of each respective laterised concrete. Conplast SP 430 superplasticiser (a sulphonated naphthalene formaldehyde admixture) was used to obtain the high strength laterised concrete. Mathematical models were developed for the mix proportioning of the laterised concretes and all strengths predicted by the models agreed with their corresponding experimentally observed values. Using the model, the optimum flexural strength and the corresponding mix proportions for the targeted strength of laterised concrete could be easily evaluated with the help of the written Q-BASIC computer programme.

KEYWORDS: Laterised concrete, simplex lattice, Flexural strength, Optimisation, Superplasticise, Q-Basic.

1.0 INTRODUCTION

Laterised concrete has found immense use of recent for the construction of low-cost buildings. The use of this material is known to reduce the cost of structures due its abundance within the tropics and sub tropics (Udoeyo et al, 2006). Studies on laterite usage as concrete aggregate have shown very encouraging results (Orangun 1981). Although used, its usage has hitherto been limited to structures of lower strengths. Moreover, the traditional mix design methods with its cumbersome nature are still utilized in achieving its strengths. The need to produce laterised concretes of higher strengths and also eliminate the errors and cumbersome nature of the traditional mix design methods informed the will to embark on this study in order to develop mathematical optimization models for accurate proportioning to achieve optimum flexural strengths. The flexural strength of concrete is a function of the proportions of the ingredients that make up the concrete. The task of accurate proportioning still remains a problem to concreters and eliminating this problem is the focus of this study.

The flexural strength (f_s), which tests the ability of unreinforced concrete beam or slab to withstand failure, is optimized in this study. It is evaluated using:

2.0 LITERATURE REVIEW

2.1 Concrete Strength Prediction Models: Researchers have attempted to provide optimization models for various types of concretes and most of the models concentrate on optimizing the strengths of the conventional sand concretes.

Ortiz, *et al* (2006) provided optimization models for ready-mix concrete for hot weather climates with a view to developing industrial applications that will optimize the manufacture of ready-mix concrete in adverse weather. Their project aimed at identifying the influence that each component had on the resulting effect of temperature on the workability and compressive strength of concrete. They simulated variable thermal cycles (temperature and relative humidity) as a function of time in order to ascertain and quantify the influence of temperature on the concrete's compressive strength.

Maruyama, *et al* (1992) also presented a method of optimizing concrete mixture proportions and stated that since various qualities are required of concrete, proportioning problem should be categorized as multi-criteria optimization problem. They dealt with

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the notion of Pareto optimality to derive the optimum solution and applied it to a genetic algorithm. Two proportioning problems were solved by the genetic algorithm: a request of delayed setting time and high flow ability in hot weather and the other of accelerated setting and high flow ability in cold weather. They finally provided a Genetic algorithm system integrating the concept of Pareto optimality, which is named MixGA for solving the multi-criteria optimization problem in concrete mix proportioning.

Shilstone (1990) also produced concrete mixture optimization models. According to him concrete mix proportions for a given need can be optimized using coarseness factor, mortar factor and aggregate particle distribution. The coarseness factor chart was developed during an investigation conducted under contract with the United States Army Corps of Engineers, Mediterranean Division, for Construction of the Saudi Arabian National Guard Headquarters, Riyadh, Saudi Arabia. The Mortar Factor is an extension of the Coarseness Factor Chart. Both charts are adapted for optimizing concrete mixtures.

3.0 MATERIALS AND METHODS

3.1 Materials: The experiments in this research utilized laterite fine aggregate to partially replace sand in concrete. Other ingredients were coarse granite aggregates and Portland limestone cement. The high strength laterised concrete incorporated Conplast SP 430 superplasticiser.

Cement: The cement used for all the experiment was UNICEM Brand of Portland limestone cement conforming to Type 1- cement specified in BS 12: 1991. It is manufactured in Cross River State of Nigeria.

Water: Water used was portable, clean and free from deleterious substances. It was obtained from the Civil Engineering laboratory of the University of Uyo, Nigeria and conformed to the requirements of BS 3148: 1959.

Fine Aggregate (sand): Sand was obtained from Ikpa River in Uyo, Nigeria. The sand was prepared to comply with the requirements of BS 882: 1992 and BS 812: 1975.

Fine Aggregate (Laterite): Laterite was collected from a burrow pit located in Uyo, Nigeria. It was collected in bags and transported to the laboratory where it was sieved to exclude the clay contents as well as the coarse aggregate contents of lateritic soils.

Coarse Aggregates: The coarse aggregate was crushed granite with size range between 10 and 22mm. The aggregates conformed to the requirements of BS 882: 1992.

All the aggregates were spread and air-dried in the laboratory for a week to ensure that they were in a saturated surface-dry condition before use. They were all sieved and analysed respectively. The specific gravity, average impact value and average crushing value of the coarse aggregates were also determined.

Superplasticizer

The high performance Conplast SP430 superplasticizing admixture belonging to the sulphonated naphthalene formaldehyde (SNF) class was used for this work. It is marketed by Al Gurg Fosroc LLC International Limited, Dubai and has a specific gravity of 1.18 at a temperature of $22^0C + 2^0C$ with alkali content typically less than $55g.Na_2O$ equivalent/litre of the admixture. It is a brown solution that is chloride free, water based and non-flammable. Conplast SP430 does not fall into the hazard classifications of current regulations. It disperses the fine particles in the concrete mix, enabling the water content of the concrete to perform more effectively. The very high level of water reduction possible allows major increases in strength to be obtained. It conforms to the requirements of BSEN 934 – 2, BS 5075 Part 3 and ASTM C494 as type A and type F, depending on dosage used.

3.2 Methods

The base mix proportions were selected based on trial mixes and the following mix proportions were chosen for the five points A_1 (0.55:1:2:0:5), A_2 (0.60:1:1.5:0.5:4), A_3 (0.55:1:1:1:3), A_4 (0.5:1:0:1:1.5) and A_5 (0.65:1:1:2:6) for normal laterised concrete; the proportions representing water/cement ratio, cement, sand, laterite and coarse aggregate.

Similarly for the high strength laterised concrete the following points were chosen: A_1 (0.36:1:0.5:0.5:2.5:0.035), A_2 (0.38:1:1:0.5:3:0.03), A_3 (0.4:1:1.2:0.8:4:0.025), A_4 (0.42:1:0.5:1:3.5:0.02), A_5 (0.45:1:0.5:1:3:0.015) and A6 (0.35:1:1.2:0.6:3.6:0.04). The last proportion represents the superplasticizer content.

3.3 Preparations and Testing of Concrete Specimens

Batching and Mixing of Specimens

The ordinary laterised concrete was obtained from the pre-determined mix proportions of water – cement ratio, cement, sand, laterite and coarse aggregate shown in Table 1 while the high strength laterised concrete was obtained from the predetermined mix proportions of water-cement ratio, cement, sand, laterite, coarse aggregate and superplasticizer shown in Table 2. Batching of the constituents was done by weight and mixing was manually executed using a shovel and trowel. For the high strength laterised concrete, the predetermined quantity of superplasticizer was added to the mix while the mixture was about ready for use and the mix was stirred to a homogeneous state before moulding.

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Tests on Fresh Concretes: Slump tests were performed on all fresh concretes to determine their workabilities. The tests were performed in conformity to BS 1881: Part 102:1983.

Preparation and Curing of Flexural Strength Test Beams

Flexural test beams were prepared in conformity with BS 1881: Part 108:1983 and BS1881: Part3: 1970 requirements. The mould used was 150 x 150 x 500mm beam size. After oiling the inside of the mould lightly with mineral oil, it was filled with the mixed concrete in three layers. Each layer was evenly rammed 150 strokes with a steel bar 380mm long weighing 1.8kg and having a ramming face 25mm square. The surface of the concrete was then towelled as smooth as practicable levelled with the top of the mould. Each beam was identified and kept in a damp environment for 24 hours before demoulding. After 24 hours the beams were removed from the mould and cured in a water bath for 28 days before testing. The flexural beam specimens are shown in Fig. 1.

3.4 Testing of flexural beams

Testing of flexural beams was carried out using CONTROLS testing machine in accordance to the requirements of BS1881: part118: 1983. The symmetrical two-point loading (at third points of the span) was adopted as shown in Fig.2 and Fig. 3. The beams were tested on their side in relation to the as-cast position. The load was applied without shock at a rate of increase in stress in the bottom fibre of about $12N/mm^2$ per minute. In all the specimens, fracture occurred within the middle one-third of the beam. The flexural strength (or modulus of rupture) was therefore calculated on the basis of ordinary elastic theory using eqn. 1 and recorded to the nearest $0.1N/mm^2$.

Fig. 1. Flexural Specimen Samples
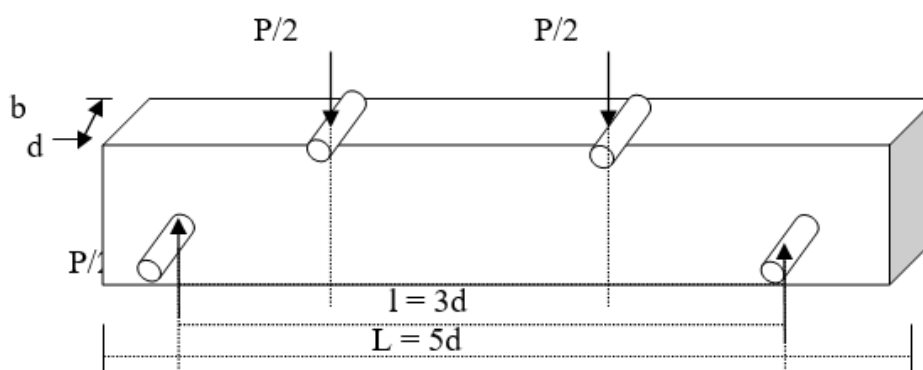
Fig. 2. Loading arrangement for flexural specimen testing.

Fig. 3. Testing of Concrete Beams in Flexure.

$$\mathbf{fs} = \frac{PL}{bd2} \dots \dots \dots \dots \dots .. \qquad [1]$$

Where

   fs is the flexural strength (N/mm^2)
   P is the maximum load at failure (N)
   L is the span of the beam specimen (mm)
   b is the breadth of the beam (mm)
   d is the depth of the beam (mm)

3.5 Development of the Model Equations

The Simplex optimization theory developed by Scheffe (1958) was used in developing the model equations. According to Jackson (1983), simplex is the structural representation (shape) of the lines or planes joining the assumed positions of the constituent materials (atoms) of the mixture.

In adopting the simplex method, Scheffe (1958) considered experiments with mixtures of which the properties studied depend on the proportions of the components present and not on the quantity of the mixture (Akhanzarova and Kafarov, 1982). An example of such studies is a study of the relationship between the strengths (compressive, flexural, or split-tensile) of concrete and the proportions of concrete constituents such as water-cement ratio, cement, sand, coarse aggregate, superplasticiser, etc.

According to Scheffe (1958), when studying the properties of a   q-component mixture, the studied properties depending on the component ratio only, the factor space is a regular (q - 1) dimensional simplex, and for the mixture, the relationship in equation [2] holds.

If X$_i$ is the proportion or concentration of the i-th component in the mixture such that X$_i$ ≥ 0 (i =1, 2, 3…q) then assuming the mixture to be a unit quantity, the proportions of the components must sum up to unity.

That is:

$$\sum_{i=1}^{q} X_i = 1 \; , \; \text{Or} \quad X_1 + X_2 + X_3 + \text{----} X_q = \dots\dots\dots\dots\dots\dots\dots\dots\dots [2]$$

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Simplex Lattices

In a (q - 1) - dimensional simplex, for binary system, (q = 2) the simplex is a straight-line segment having only two points of connectivity and for q = 3, the regular 2-simplex is an equilateral triangle with its interior. Each point in the triangle corresponds to a certain composition of the mixture system, and conversely each composition is represented by one distinct point. For a four-component (q = 4) mixture, the regular simplex is a tetrahedron where each vertex represents a binary system. In all, the composition might be expressed as molar, weight or volume fraction, or percentage.

Scheffe's simplex-lattice designs provide a uniform scatter of points over the (q - 1) simplex. The points form a (q, n) - lattice on the simplex where q is the number of mixture components, n is the degree of polynomial. Simplex-lattice designs are saturated. For each component there exist

(n + 1) similar levels from 0 to 1; i.e. $X_i = 0, 1/n, 2/n, ---, 1$ and all possible combinations are derived with such values of component concentrations.

Scheffe (1958) also showed that the property studied (e.g. flexural strength of concrete) is assumed to be a continuous function of certain arguments and with a sufficient accuracy it can be approximated by a polynomial. Moreover, he proved that a polynomial of degree n in q variables has C^n_{q+n} points on the lattice but by using the relationship in eqn. [2], the number of points can be reduced to C^n_{q+n-1}.

This implies that the number of points for a (5, 2) and (6, 2) experiments which this study experiments are based are as follows:

(i) For a (5, 2) lattice, equals:

$$C^n_{q+n-1} = \frac{q(q+1)--(q+n-1)}{n!}$$

$$= \frac{5(5+1)}{2*1} = 15$$ And (ii) for a (6, 2) lattice, equals: $= \frac{6(6+1)}{2*1} = 21$

Simplex Canonical Polynomials

Scheffe (1958) described mixture properties by reduced polynomials obtained subject to the condition in equation [2]. The properties studied in the assumed polynomial are real-valued functions on the simplex referred to as "RESPONSES". In this study, either the targeted flexural strength of the concrete or the proportions of the concrete ingredients (variables) would be the response depending on which one is being sought at a time. It is also shown that a polynomial function of degree n in q variables $x_1, x_2, x_3, ... x_q$ subject to equation [2] will be called a (q, n) polynomial. Accordingly if the response (ŷ) is a function of the components (or variables) $x_1, x_2, x_3, x_4, ...x_q$, then the polynomial is of the form;

$$\hat{y} = b_0 + \sum_{1 \leq i \leq q} b_i X_i + \sum_{1 \leq i \leq j \leq q} b_{ij} X_i X_j + \sum_{1 \leq i \leq j \leq k \leq q} b_{ijk} X_i X_j X_k + \sum bi_1 i_2 ---i_n X i_1 X i_2 X i_n \text{ [3]}$$

Where all *b*s are constant coefficients. The number of coefficients in eqn [3] is given by C^n_{q+n} corresponding to the number of points (or experiments). These coefficients can be reduced to C^n_{q+n-1} when the condition in eqn. [2] is applied. For example if from eqn. [2], we let

$$X_q = 1 - \sum_{i=1}^{q} X_i$$ ……………………………………………………….. [4]

Then substituting the value of X_q into eqn [3], the number of coefficient b_i will reduce to C^n_{q+n-1} implying that the number of the coefficients equals to a (q, n) lattice. Another implication is that the values of a (q, n) polynomial can be assigned arbitrarily on a (q, n) lattice and its values on the simplex [2] are then uniquely determined.

In order to have a manageable number of coefficients, Scheffe (1958) avoided high-degree polynomials and also showed that the general low-degree polynomial of degree n and q variables subject to eqn. [2] may be written as:

1. if n = 1; $\hat{y} = \sum_{1 \leq i \leq q} b_i X_i$ …. ……………………………………………… [5]

2. if n = 2; $\hat{y} = \sum_{1 \leq i \leq q} b_i X_i + \sum_{1 \leq i \leq j \leq q} b_{ij} X_i X_j$ …………………………………………………. [6]

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Equations [5] and [6] are known as Scheffe canonical forms of the polynomials of degree 1 and 2 respectively. Other forms of the polynomial exist depending on the degree. This study is based on a (5, 2) and (6, 2) simplex lattice hence the usable form of the equations was developed as follows:

The response (ŷ), for example the flexural strength of laterised concrete, is a function of the five variables X_1, X_2, X_3, X_4, and X_5 representing the proportion of water/ cement ratio, cement, sand, laterite and coarse aggregate respectively, for normal laterised concrete. That is:

$$\hat{y} = f(X_1, X_2, X_3, X_4, X_5)$$

$$\hat{y} = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_{12} X_1 X_2 + \beta_{13} X_1 X_3 + \beta_{14} X_1 X_4 + \beta_{15} X_1 X_5 + \beta_{23} X_2 X_3$$

$$+ \beta_{24} X_2 X_4 + \beta_{25} X_2 X_5 + \beta_{34} X_3 X_4 + \beta_{35} X_3 X_5 + \beta_{45} X_4 X_5 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots[7]$$

Written in compact form [7]

$$\widehat{y} = \sum_{1 \le i \le q} \beta_i X_i + \sum_{1 \le i \le j \le q} \beta_{ij} X_i X_j \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad [8]$$

It can be observed that [8] is synonymous with [3]. The coefficients in [3] have been reduced to fifteen (15) in [7] thereby requiring fifteen (15) experimental points. Eqn [7] is the polynomial equation for the 5-component normal laterised concrete.

Similarly for the 6-component high strength laterised concrete containing cement, sand, laterite, coarse aggregate, superplasticizer and water-cement ratio, the model equation is as shown in [9]:

$$\hat{y} = \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \alpha_{12} X_1 X_2 + \alpha_{13} X_1 X_3 + \alpha_{14} X_1 X_4$$

$$+ \alpha_{15} X_1 X_5 + \alpha_{16} X_1 X_6 + \alpha_{23} X_2 X_3 + \alpha_{24} X_2 X_4 + \alpha_{25} X_2 X_5 + \alpha_{26} X_2 X_6 + \alpha_{34} X_3 X_4$$

$$+ \alpha_{35} X_3 X_5 + \alpha_{36} X_3 X_6 + \alpha_{45} X_4 X_5 + \alpha_{46} X_4 X_6 + \alpha_{56} X_5 X_6 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad [9]$$

The Coefficients of a (5, 2) and a (6, 2) Polynomial

Let the response function be denoted by ŷ, and let it take the form of [8]. The coefficient β_i (i = 1,2,3,4,5) or α_i (i = 1,2,3,4,5,6) can be interpreted in terms of the response to pure component i. β_{ij} or α_{ij} may also be interpreted in terms of the response to binary mixture of component i and j.

If the response to the pure component is denoted by y_i and the response to a 1:1 binary mixture of components i and j by y_{ij}, then:
From [5] if $X_i = 1$ ($\ge X_j = 0$ for $j \ne i$) therefore $\beta_i = y_i$ .... [10]
Similarly, for the six component mixture; $\alpha_i = y_i$
This implies that the coefficients β_i are the responses to the pure components. From [6] it can easily be seen that:

$$\sum_{i=1}^{5} \beta_i X_i = \sum_{i=1}^{5} y_i X_i \qquad\qquad \ldots\ldots\ldots\ldots [11]$$

$$\text{And} \quad \sum_{i=1}^{6} \alpha_i X_i = \sum_{i=1}^{6} y_i X_i$$

The excess of the response y over this linear mixing or blending is termed SYNERGISM. To evaluate β_{ij}; let $X_i = X_j = \frac{1}{2}$ (because $\Sigma X_i + \Sigma X_j = 1$) and let $y = y_{ij}$ and from [11] we obtain that $y_{ij} = \frac{1}{2} \beta_i + \frac{1}{2} \beta_j + \frac{1}{4} \beta_{ij}$, but from [10], $\beta_i = y_i$ and similarly $\beta_j = y_j$.

Therefore

$$y_{ij} = \frac{1}{2} y_i + \frac{1}{2} y_j + \frac{1}{4} \beta_{ij}$$

Hence

$$\beta_{ij} = 4y_{ij} - 2y_i - 2y_j \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots[12]$$

Similarly, $\alpha_{ij} = 4y_{ij} - 2y_i - 2y_j$

Testing the Fit of the Quadratic Polynomial

For testing the agreement or otherwise of the assumed quadratic polynomial model and the actual experimental observations would be tested using the student's t-test. For a t-test statistic, adequacy is tested at each control point. The equation as given by Akhnazarova and Kafarov (1982) is

$$t = \frac{\Delta y}{\sqrt{S_y^2 + S_y^2}} = \frac{\Delta y \sqrt{n}}{S_y^2 \sqrt{1 + \varepsilon}} \qquad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots[13]$$

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Where

$$\Delta y = [y_{\text{experiment}} - y_{\text{theoretical}}] \quad .... \quad [14]$$

n = number of parallel observations at every point.

The t – statistics has the student distribution and is compared with the tabulated value of $t_{\alpha/L}$ (V_e)

Where

α = Significant level (taken as 0.05)

L = number of control points

V_e = number of degrees of freedom for the replication variance.

Actual and Pseudo–Components for the (5, 2) Concrete

The requirement of simplex lattice designs that $\sum_{i=1}^{q} X_i = 1$ makes it impossible to use the conventional mix ratios such as 1: 2: 4, 1: $1^1/_2$: 3, 1:1:2, etc at a given water/cement ratio. This necessitates the transformation of the actual components (ingredients) proportions to meet the above criterion. Such transformed ratios, say $X_1^{(i)}$, $X_2^{(i)}$, $X_3^{(i)}$, $X_4^{(i)}$, $X_5^{(i)}$ for the i-th experimental points are called "pseudo – components" (or coded components). The following arbitrary prescribed mix proportions were chosen for the five points of the normal laterised concrete, A_1 (0.55:1:2:0:5), A_2 (0.60:1:1.5:0.5:4), A_3 (0.55:1:1:1:3), A_4 (0.5:1:0:1:1.5) and A_5 (0.65:1:1:2:6). The proportions represent water/cement ratio, cement, sand, laterite and coarse aggregate respectively. In order to satisfy the requirement that $\sum x_i = 1$, the design matrix with actual and pseudo components for a (5, 2) lattice is as presented in Table 2.

Table 2. Pseudo and Actual components for points 1-21 of the (5, 2) mixture

No	Pseudo Components					Response y	Actual Component				
	X_1	X_2	X_3	X_4	X_5		Z_1	Z_2	Z_3	Z_4	Z_5
1	1	0	0	0	0	y_1	0.55	1	2	0	5
2	0	1	0	0	0	y_2	0.60	1	1.5	0.5	4
3	0	0	1	0	0	y_3	0.55	1	1	1	3
4	0	0	0	1	0	y_4	0.50	1	0	1	1.5
5	0	0	0	0	1	y_5	0.65	1	1	2	6
6	0.5	0.	0	0	0	y_{12}	0.575	1	1.75	0.25	4.5
7	0.5	0	0.5	0	0	y_{13}	0.55	1	1.5	0.5	4
8	0.5	0	0	0.5	0	y_{14}	0.525	1	1	0.5	3.25
9	0.5	0	0	0	0.5	y_{15}	0.60	1	1.5	1	5.5
10	0	0.5	0.5	0	0	y_{23}	0.575	1	1.25	0.75	3.5
11	0	0.5	0	0.5	0	y_{24}	0.55	1	0.75	0.75	2.75
12	0	0.5	0	0	0	Y	0.625	1	1.25	1.25	5.0
13	0	0	0.5	0.5	0	y_{34}	0.525	1	0.5	1	2.25
4		0	0.5	0	05	y_{35}	0.60	1	1	1.5	4.5
15	0	0	0	0.5	05	y_{45}	0.575	1	0.50	1.5	3.75
	CONTOL POINTS										
16	0.2	0.2	0.2	0.2	0.2	C_1	0.57	1	1.1	0.7	3.9
17	0.25	0.25	0.25	0.25	0	C_2	0.55	1	1.13	0.63	3.38
18	0.2	0.2	0.6	0	0	C	0.56	1	1.3	0.7	3.6
19	0.4	0.4	0.2	0	0	C_4	0.57	1	1.6	0.4	4.2
20	0.2	0	0	0.4	0.4	C_5	0.57	1	0.8	1.2	4
21	0.25	0	0.25	0.5	0	C_6	0.525	1	0.75	0.75	2.75

$C^n_{q+n-1} = \dfrac{5(5+1)}{2*1} = \dfrac{5 \times 6}{2} = 15$

3.10.9 Actual and Pseudo–Components for the (6, 2) Concrete

In order to satisfy the requirement that $\sum x_i = 1$, the design matrix with pseudo and actual components for the (6, 2) lattice is presented in Table 3.

Table 3. Pseudo and Actual components for points 1-30 (6, 2) mixture

S/No.	Pseudo Components						Res.	Actual Components					
	X_1	X_2	X_3	X_4	X_5	X_6	y	Z_1	Z_2	Z_3	Z_4	Z_5	Z_6
1.	1	0	0	0	0	0	Y_1	0.36	1	0.5	0.5	2.5	0.035
2.	0	1	0	0	0	0	Y_2	0.38	1	1	0.5	3	0.03
3.	0	0	1	0	0	0	Y_3	0.4	1	1.2	0.8	4	0.025
4.	0	0	0	1	0	0	Y_4	0.42	1	0.5	1	3.5	0.02
5.	0	0	0	0	1	0	Y_5	0.45	1	0.5	1	3	0.015
6.	0	0	0	0	0	1	Y_6	0.35	1	1.2	0.6	3.6	0.04
7.	0.5	0.5	0	0	0	0	Y_{12}	0.3	1	0.7	0.5	2.5	0.0325
8.	0.5	0	0.5	0	0	0	Y_1	08	1	0.85	0.65	3.25	0.03
9.	0.5	0	0	0.5	0	0	Y_{14}	0.39	1	0.5	0.75	3	0.0275
10.	0.5	0	0	0	0.5	0	Y_{15}	0.405	1	0.5	0.75	2.75	0.025
11.	0.5	0	0	0	0	0.5	Y_{16}	0.355	1	0.85	0.55	3.05	0.0375
12.	0	0	0	0	0	0	Y_2	0.39	1	1.1	0.65	3.5	0.0275
13.	0	0.5	0	0.5	0	0	Y_{24}	0.4	1	0.75	0.75	3.25	0.025
14.	0	0.5	0	0	0.5	0	Y_{25}	0.415	1	0.75	0.75	3	0.0225
15.	0	0.5	0	0	0	0.5	Y_{26}	0.365	1	1.1	0.55	3.3	0.035
16.	0	0	0.5	0.5	0	0	Y_{34}	0.41	1	0.85	0.9	3.75	0.0225
17.	0	0	0.5	0	0.5	0	Y_{35}	0.425	1	0.85	0.9	3.5	0.02
18.	0	0	0.5	0	0	0.5	Y_{36}	0.375	1	1.2	0.7	3.8	0.0325
19.	0	0	0	0.5	0.5	0	Y_{45}	0.435	1	0.5	1	3.25	0.0175
20.	0	0	0	0.5	0	0.5	Y_{46}	0.385	1	0.85	0.8	3.55	0.03
21.	0	0	0	0	0.5	0.5	Y_{56}	0.4	1	0.85	0.8	3.3	0.0275
Control Points													
22.	0.2	0.2	0.2	0.1	0.2	0.1	C_{11}	0.395	1	0.81	0.72	3.21	0.027
23.	0	0.3	0.2	0.3	0	0.2	C_{22}	0.39	1	0.93	0.73	.47	0.028
24.	0.1	0.1	0.1	0.4	0.2	0.1	C_{33}	0.4	1	0.69	0.84	.31	0.024
25.	0.3	0.3	0.3	0	0.1	0	C_{44}	0.387	1	0.86	0.64	3.15	0.0285
26.	0	0	0	0.3	0.3	0.4	C_{55}	0401	1	0.78	0.84	3.39	0.0265
27.	0.2	0.4	0	0	0.2	0.2	C_{66}	0.84	1	0.84	0.62	3.02	0.03
28.	0.2	0	0.2	0.3	0.1	0.2	C_{77}	0.393	1	0.78	0.78	3.37	0.0275
29.	0.1	0.1	0.5	0.1	0.1	0.1	C_{88}	0.396	1	0.97	0.76	3.56	0.0265
30.	0.2	0.2	0.2	0.2	0	0.2	C_{99}	0.382	1	0.88	0.64	3.32	0.03

4.0 RESULTS AND ANALYSIS

Physical Properties of Materials used

Table 4.1 presents a summary of the physical properties of the materials used for this study. The laterite was reddish – brown in colour and had a specific gravity of 2.62, particle sizes range of between 63µm and 2.36mm in diameter with a fineness modulus of 2.33, and a coefficients of uniformity of 2.4. The laterite was suitable as fine aggregates according to ASTM C 33 – 93 which stipulates that a fine aggregate should have a fineness modulus of between 2.3 and 3.1. With reference to BS 882 – 103.1:1985 grading, the laterite fell in zone 3 grouping.

The sand had a specific gravity of 2.65, a fineness modulus of 2.37 and a coefficient of uniformity of 2.83. Its grain sizes ranged between 63µm and 5mm. The sand could be described as being well graded. With reference to BS882 – 103.1:1985 grading, the sand fell into zone 2 grading.

Flexural Strength Models for Normal Lateralised and High Strength Lateralised Concretes at Optimum Mix Proportions

The coarse aggregate was coarse granite having a specific gravity of 2.71, impact value of 13.15% and a crushing value of 21.43 with particle sizes ranging between 5 and 22mm.

Workability of the Lateralised Concretes

The slump of the normal lateralised concretes ranged between 15mm and 175mm. The mean slump for all the mixes stood at 62mm. On the whole, it was generally observed that concretes containing a greater amount of laterite had the workability reduced which implied that more water was needed to make the concrete more workable. This agreed with the works of Adepegba (1976). All high strength lateralised concretes were flowing concretes.

Table 4. Physical Properties of Materials Used

Material	Property	Value
Laterite	Specific gravity	2.62
	Fineness Modulus	2.33
	Coefficient of uniformity	2.40
Sand	Specific gravity	2.65
	Fineness Modulus	2.37
	Coefficient of uniformity	2.83
Coarse aggregate	Specific gravity	2.71
	Average Impact Value	13.15%
	Average Crushing Value	21.43
Cement	Specific Gravity	3.15
	Initial Setting Time	53 minutes
	Final Setting Time	90 minutes
	Soundness	0.50 mm
Concrete	Workability	15 – 175mm
	Density	2280 – 2430kg/m3
	Water absorption	0.63 – 1.89%

Flexural Strength of Normal Lateralised Concrete (f_b)

Table 5 presents the results of two replications of each of the fifteen (15) design points and the six (6) control points of the (5, 2) simplex lattice for the flexural strengths of NLC as determined using eqn. [1].

Considering Table 5, the replication variance and replication error for NLC were determined as follows:

Replication variance, $S_y^2 = 1/V_e [\Sigma S_i^2] = 1.526/21 = 0.073$ and Replication error, $S_y = \sqrt{S_y^2} = \sqrt{0.073} = 0.270$

Regression Equation of NLC - Flexural

Using equations [11] and [12] and Table 5, the coefficients of the second degree polynomial for the flexural strength of normal lateralised concrete were determined as follows:

$\beta_1 = y_1 = 3.23$, $\beta_2 = y_2 = 3.18$, $\beta_3 = y_3 = 3.35$, $\beta_4 = y_4 = 3.56$ and $\beta_5 = y_5 = 2.39$

$\beta_{12} = 4(3.26) - 2(3.23) - 2(3.18) = 0.22$

$\beta_{13} = 4(3.18) - 2(3.23) - 2(3.35) = -0.44$

$\beta_{14} = 4(2.95) - 2(3.23) - 2(3.56) = -1.78$

$\beta_{15} = 4(3.82) - 2(3.23) - 2(2.39) = 4.04$

$\beta_{23} = 4(3.80) - 2(3.18) - 2(3.35) = 2.14$

$\beta_{24} = 4(3.30) - 2(3.18) - 2(3.56) = -0.28$

$\beta_{25} = 4(3.31) - 2(3.18) - 2(2.39) = 2.10$

$\beta_{34} = 4(3.02) - 2(3.35) - 2(3.56) = -1.74$

$\beta_{35} = 4(2.65) - 2(3.35) - 2(2.39) = -0.88$

$\beta_{45} = 4(3.96) - 2(3.56) - 2(2.39) = 3.94$

Table 5. Analysis of Flexural Strength of NLC

Exp. No.	Max. Load (kN)	Response y_r (N/mm²)	y_r^2	Σy_r	$\bar{y}$ (N/mm²)	Response symbol	Σy_r^2	S^2
1A	32.9	3.22	10.35	6.46	3.23	Y_1	20.89	0.000
1B	33.2	3.25	10.54					
2A	31.6	3.09	9.55	6.36	3.18	Y_2	20.21	0.015
2B	33.4	3.27	10.67					
3A	33.7	3.30	10.86	6.71	3.35	Y_3	22.50	0.007
3B	34.9	3.41	11.64					
4A	43.4	4.24	18.01	7.12	3.56	Y_4	26.27	0.937
4B	29.4	2.87	8.26					
5A	24.3	2.38	5.65	4.78	2.39	Y_5	11.43	0.000
5B	24.6	2.41	5.79					
6A	33.4	3.27	10.67	6.51	3.26	Y_{12}	21.20	0.000
6B	33.2	3.25	10.54					
7A	33.5	3.28	10.73	6.37	3.18	Y_{13}	20.28	0.017
7B	31.6	3.09	9.55					
8A	31.2	3.05	9.31	5.90	2.95	Y_{14}	17.40	0.021
8B	29.1	2.85	8.10					
9A	38.9	3.80	14.47	7.64	3.82	Y_{15}	29.16	0.000
9B	39.2	3.83	14.69					
10A	38.7	3.78	14.32	7.61	3.80	Y_{23}	28.93	0.001
10B	39.1	3.82	14.62					
11A	34.3	3.35	11.25	6.59	3.30	Y_{24}	21.72	0.007
11B	33.1	3.24	10.47					
12A	32.5	3.18	10.10	6.62	3.31	Y_{25}	21.94	0.035
12B	35.2	3.44	11.85					
13A	33.0	3.23	10.41	6.04	3.02	Y_{34}	18.34	0.084
13B	28.8	2.82	7.93					
14A	26.9	2.63	6.92	5.30	2.65	Y_{35}	14.04	0.001
14B	27.3	2.67	7.13					
15A	41.0	4.01	16.07	7.93	3.96	Y_{45}	31.44	0.004
15B	40.1	3.92	15.37					
16A	37.1	3.63	13.16	6.83	3.42	C_1	23.44	0.088
16B	32.8	3.21	10.29					
17A	33.6	3.29	10.79	6.38	3.19	C_2	20.34	0.019
17B	31.6	3.09	9.55					
18A	33.4	3.27	10.67	7.11	3.55	C_3	25.43	0.166
18B	39.3	3.84	14.77					
19A	32.9	3.22	10.35	6.76	3.38	C_4	22.88	0.052
19B	36.2	3.54	12.53					
20A	39.2	3.83	14.69	7.67	3.83	C_5	29.38	0.000
20B	39.2	3.83	14.69					
21A	29.2	2.86	8.15	6.08	3.04	C_6	18.56	0.069
21B	33.0	3.23	10.41					
Σ								1.526

Thus from eqn [7]

$$y_{fa} = 3.23x_1 + 3.18x_2 + 3.35x_3 + 3.56x_4 + 2.39x_5 + 0.22x_1x_2 - 0.44x_1x_3 - 1.78x_1x_4 + 4.04x_1x_5$$
$$+ 2.14x_2x_3 - 0.28x_2x_4 + 2.1x_2x_5 - 1.74x_3x_4 - 0.88x_3x_5 + 3.94x_4x_5\ldots\ldots\ldots\ldots\ldots [18]$$

Flexural Strength Models for Normal Laterised and High Strength Laterised Concretes at Optimum Mix Proportions

Equation [18] is the mathematical model for the flexural strength of NLC based on the 28th - day strength.

Test of the Adequacy of the flexural Strength Models using t-statistic (NLC)

Using the six control points' experimental results the flexural strength model equation was tested for adequacy using the t-statistic distribution. By substituting the values of x_i from Table 5 in the equations the theoretical predictions of the flexural strength response ($\hat{y}_i$) were obtained. These theoretical predictions were compared with the experimental results. At the Significance level, $\alpha = 0.05$, that is: $t_{\alpha/L}(V_e) = t_{0.05/6}(21) = t_{0.008}(21)$ the tabulated value of $t_{0.008}(21)$ is 2.95. This is greater than all the t-values calculated in Table 15; hence the model equation is adequate.

Table 15. t – Statistics for NLC

S/No.	Control point	X$_1$	X$_2$	X$_3$	X$_4$	X$_5$	y$_{exp.}$	ŷ$_{theory}$	ΔY	t
1.	C$_{11}$	0.2	0.2	0.2	0.2	0.2	3.42	3.43	-0.01	-0.27
2.	C$_{22}$	0.25	0.25	0.25	0.25	0	3.19	3.21	-0.02	-0.59
3.	C$_{33}$	0.2	0.2	0.6	0	0	3.55	3.50	0.05	1.57
4.	C$_{44}$	0.4	0.4	0.2	0	0	3.38	3.41	-0.03	-0.98
5.	C$_{55}$	0.2	0	0	0.4	0.4	3.83	3.84	-0.01	-0.33
6.	C$_{66}$	0.25	0	0.25	0.5	0	3.04	2.96	0.08	2.57

Flexural Strength of HSLC Data Analysis

Table 6 presents the results of two replications of each of the twenty-one design points and the nine control points of the (6, 2) simplex lattice for the flexural strengths of the high strength laterised concrete. Considering Table 6, the replication variance and replication error for HSLC were:

Replication variance, $S_y^2 = 1/V_e [\Sigma S_i^2] = 1.2980/30 = 0.043$ and Replication error, $S_y = \sqrt{S_y^2} = \sqrt{0.043} = 0.208$

Table 6. Analysis of Flexural Strength of HSLC

Exp. No.	Max. Load (kN)	Response y$_r$ (N/mm^2)	y$_r^2$	Σy$_r$	ȳ (N/mm^2)	Response symbol	Σy$_r^2$	S$_i^2$
1A	46.6	4.14	17.16	8.85	4.43	y$_1$	39.35	0.1618
1B	53.0	4.71	22.19					
2A	48.6	4.32	18.66	8.87	4.44	y$_2$	39.38	0.0267
2B	51.2	4.55	20.71					
3A	45.2	4.02	16.14	8.44	4.22	y$_3$	35.74	0.0836
3B	49.8	4.43	19.60					
4A	46.0	4.09	16.72	8.26	4.13	y$_4$	34.10	0.0032
4B	46.9	4.17	17.38					
5A	43.8	3.89	15.16	7.96	3.98	y$_5$	31.73	0.0158
5B	45.8	4.07	16.57					
6A	47.0	4.18	17.45	8.55	4.28	y$_6$	36.58	0.0191
6B	49.2	4.37	19.13					
7A	52.4	4.66	21.69	8.95	4.48	y$_{12}$	40.13	0.0664
7B	48.3	4.29	18.43					
8A	48.7	4.33	18.74	8.76	4.38	y$_{13}$	38.41	0.0057
8B	49.9	4.44	19.67					
9A	49.5	4.40	19.36	8.57	4.28	y$_{14}$	36.74	0.0267
9B	46.9	4.17	17.38					
10A	49.5	4.40	19.36	8.66	4.33	y$_{15}$	37.49	0.0101
10B	47.9	4.26	18.13					
11A	46.8	4.16	17.31	8.75	4.37	y$_{16}$	38.34	0.0910
11B	51.6	4.59	21.04					
12A	47.4	4.21	17.75	8.44	4.22	y$_{23}$	35.58	0.0000
12B	47.5	4.22	17.83					

Flexural Strength Models for Normal Laterised and High Strength Laterised Concretes at Optimum Mix Proportions

13A	44.7	3.97	15.79	8.51	4.25	y_{24}	36.34	0.1568
13B	51.0	4.53	20.55					
14A	44.9	3.99	15.93	8.14	4.07	y_{25}	33.16	0.0128
14B	46.7	4.15	17.23					
15A	50.6	4.50	20.23	8.63	4.32	y_{26}	37.31	0.0664
15B	46.5	4.13	17.08					
16A	46.9	4.17	17.38	8.23	4.12	y_{34}	33.88	0.0057
16B	45.7	4.06	16.50					
17A	44.0	3.91	15.30	8.20	4.10	y_{35}	33.65	0.0697
17B	48.2	4.28	18.36					
18A	47.8	4.25	18.05	8.55	4.28	y_{36}	36.56	0.0014
18B	48.4	4.30	18.51					
19A	46.2	4.11	16.86	7.92	3.96	y_{45}	31.41	0.0430
19B	42.9	3.81	14.54					
20A	49.3	4.38	19.20	8.37	4.19	y_{46}	35.13	0.0765
20B	44.9	3.99	15.93					
21A	46.5	4.13	17.08	8.46	4.23	y_{56}	35.82	0.0191
21B	48.7	4.33	18.74					
22A	44.3	3.94	15.51	8.42	4.21	C_{11}	35.58	0.1470
22B	50.4	4.48	20.07					
23A	46.8	4.16	17.31	8.38	4.19	C_{22}	35.13	0.0019
23B	47.5	4.22	17.83					
24A	48.7	4.33	18.74	8.35	4.17	C_{33}	34.88	0.0484
24B	45.2	4.02	16.14					
25A	47.4	4.21	17.75	8.70	4.35	C_{44}	37.90	0.0380
25B	50.5	4.49	20.15					
26A	44.8	3.98	15.86	8.6	4.18	C_{55}	35.06	0.0800
26B	49.3	4.38	19.20					
27A	49.0	4.36	18.97	8.60	4.30	C_{66}	37.02	0.0057
27B	47.8	4.25	18.05					
28A	47.5	4.22	17.83	8.50	4.25	C_{77}	36.11	0.0014
28B	48.1	4.28	18.28					
29A	46.9	4.17	17.38	8.49	4.24	C_{88}	36.04	0.0114
29B	48.6	4.32	18.66					
30A	47.6	4.23	17.90	8.53	4.27	C_{99}	36.41	0.0025
30B	48.4	4.30	18.51					
Σ						1.2980		

Determination of the Regression Equation of HSLC - Flexural

Using equations [11] and [12] and Table 6, the coefficients of the second degree polynomial for flexural strength of high strength laterised concrete were determined as follows:

$\alpha_1 = y_1 = 4.43$, $\alpha_2 = y_2 = 4.44$, $\alpha_3 = y_3 = 4.22$, $\alpha_4 = y_4 = 4.13$, $\alpha_5 = y_5 = 3.98$ and $\alpha_6 = y_6 = 4.28$.

$\alpha_{12} = 4(4.48) - 2(4.43) - 2(4.44) = 0.18$

$\alpha_{13} = 4(4.38) - 2(4.43) - 2(4.22) = 0.22$

$\alpha_{14} = 4(4.28) - 2(4.43) - 2(4.13) = 0.00$

$\alpha_{15} = 4(4.33) - 2(4.43) - 2(3.98) = 0.50$

$\alpha_{16} = 4(4.37) - 2(4.43) - 2(4.28) = 0.06$

$\alpha_{23} = 4(4.22) - 2(4.44) - 2(4.22) = -0.44$

$\alpha_{24} = 4(4.25) - 2(4.44) - 2(4.13) = -0.14$

$\alpha_{25} = 4(4.07) - 2(4.44) - 2(3.98) = -0.56$

Flexural Strength Models for Normal Laterised and High Strength Laterised Concretes at Optimum Mix Proportions

$$\alpha_{26} = 4(4.32) - 2(4.44) - 2(4.28) = -0.16$$
$$\alpha_{34} = 4(4.12) - 2(4.22) - 2(4.13) = -0.22$$
$$\alpha_{35} = 4(4.10) - 2(4.22) - 2(3.98) = 0.00$$
$$\alpha_{36} = 4(4.28) - 2(4.22) - 2(4.28) = 0.12$$
$$\alpha_{45} = 4(3.96) - 2(4.13) - 2(3.98) = -0.38$$
$$\alpha_{46} = 4(4.19) - 2(4.13) - 2(4.28) = -0.06$$
$$\alpha_{56} = 4(4.23) - 2(3.98) - 2(4.28) = 0.40$$

Thus from equation (3.21c)

$$y_{fsa} = 4.43x_1 + 4.44x_2 + 4.22x_3 + 4.13x_4 + 3.98x_5 + 4.28x_6 + 0.18x_1x_2 + 0.22x_1x_3$$
$$+ 0.0x_1x_4 + 0.5x_1x_5 + 0.06x_1x_6 - 0.44x_2x_3 - 0.14x_2x_4 - 0.56x_2x_5 - 0.16x_2x_6 - 0.22x_3x_4 + 0.0x_3x_5 + 0.12x_3x_6 - 0.38x_4x_5 -$$
$$0.06x_4x_6 + 0.4x_5x_6 \ldots\ldots\ldots [19]$$

Equation [19] is the mathematical model for optimizing the flexural strength of high strength laterised concrete based on the 28-day strength.

Test of the Adequacy of the HSLC Flexural Strength Model using t-statistic

Using the nine control points experimental results the model equation, was tested for adequacy using the t-statistic distribution. At the Significance level, $\alpha = 0.05$, that is: $t_{\alpha/L} (V_e) = t_{0.05/9} (30) = t_{0.006} (30)$, the tabulated value of $t_{0.006} (30)$ is 2.97. This is greater than any of the t-values calculated in Table 16; hence the equation is satisfied.

Table 16. t – Statistics for HSLC

S/No.	Control point	X_1	X_2	X_3	X_4	X_5	X_6	$Y_{experiment}$	$\hat{Y}$	ΔY	t
1.	C_{11}	0.2	0.2	0.2	0.1	0.2	0.1	4.21	4.24	-0.03	-1.39
2.	C_{22}	0	0.3	0.2	0.3	0	0.2	4.19	4.21	-0.02	-1.00
3.	C_{33}	0.1	0.1	0.1	0.4	0.2	0.1	4.17	4.14	0.03	1.33
4.	C_{44}	0.3	0.3	0.3	0	0.1	0	4.35	4.32	0.03	1.59
5.	C_{55}	0	0	0	0.3	0.3	0.4	4.18	4.15	0.03	1.61
6.	C_{66}	0.2	0.4	0	0	0.2	0.2	4.30	4.31	-0.01	-0.49
7.	C_{77}	0.2	0	0.2	0.3	0.1	0.2	4.25	4.23	0.02	0.94
8.	C_{88}	0.1	0.1	0.5	0.1	0.1	0.1	4,24	4.22	0.02	0.85
9.	C_{99}	0.2	0.2	0.2	0.2	0	0.2	4.27	4.28	-0.01	-0.48

Computer Programme and Test Results

Programme 1: A-Q-Basic programme that optimises the flexural strength of NLC.

```
100 REM A Q - BASIC PROGRAMME THAT OPTIMISES LATERIZED CONCRETE MIX
    PROPORTIONS
110 REM VARIABLES USED ARE
120 REM X1, X2, X3, X4, X5, Z1, Z2, Z3, Z4, Z5, ymax, yout, yin
130 REM MODEL USED: FLEXURAL STRENGTH MODEL, EQN (4.11)
140 REM
150 REM MAIN PROGRAMME BEGINS
160 LET COUNT = 0
170 CLS
180 GOSUB 210
190 END
200 REM END OF MAIN PROGRAMME
210 REM PROCEDURE BEGINS
220 LET ymax = 0
230 PRINT
240 REM
250 PRINT "A COMPUTER MODEL FOR COMPUTING LATERIZED CONCRETE MIX PROPORTIONS"
260 PRINT "CORRESPONDING TO A REQUIRED FLEXURAL STRENGTH"
270 REM
280 REM
290 PRINT
```

Flexural Strength Models for Normal Laterised and High Strength Laterised Concretes at Optimum Mix Proportions

```
300 INPUT "ENTER DESIRED FLEXURAL STRENGTH"; yin
310 GOSUB 550
320 FOR X1 = 0 TO 1 STEP .01
330 FOR X2 = 0 TO 1 - X1 STEP .01
340 FOR X3 = 0 TO 1 - X1 - X2 STEP .01
350 FOR X4 = 0 TO 1 - X1 - X2 - X3 STEP .01
360 LET X5 = 1 - X1 - X2 - X3 - X4
370 LET yout = 3.22 * X1 + 3.18 * X2 + 3.28 * X3 + 3.52 * X4 + 2.41 * X5 + .25 * X1
        * X2 - .17 * X1 * X3 - .52 * X1 * X4 + 3.12 * X1 * X5 + 2.01 * X2 * X3 -.45
        * X2 * X4 + 1.78 * X2 * X5 - 1.6 * X3 * X4 - .36 * X3 * X5 + 3.8 * X4 * X5
380 GOSUB 600
390 IF (ABS (yin - yout) <= .001) THEN 400 ELSE 420
400 LET COUNT = COUNT + 1
410 GOSUB 630
420 NEXT X4
430 NEXT X3
440 NEXT X2
450 NEXT X1
460 PRINT
470 IF (COUNT > 0) THEN GOTO 480 ELSE GOTO 520
480 PRINT "THE MAXIMUM FLEXURAL STRENGTH PREDICTABLE"
490 PRINT "BY THIS MODEL IS"; ymax; "N/SQ.MM."
500 SLEEP (2)
510 GOTO 540
520 PRINT "SORRY! DESIRED STRENGTH OUT OF RANGE OF MODEL"
530 SLEEP 2
540 RETURN
550 REM PROCEDURE PRINT HEADING
560 REM
570 PRINT "COUNT X1 X2 X3 X4 X5 Y Z1 Z2 Z3 Z4 Z5"
580 REM
590 RETURN
600 REM PROCEDURE CHECK MAX
610 IF ymax < yout THEN ymax = yout ELSE ymax = ymax
620 RETURN
630 REM PROCEDURE OUT RESULTS
640 LET Z1 = .55 * X1 + .6 * X2 + .55 * X3 + .5 * X4 + .65 * X5
650 LET Z2 = X1 + X2 + X3 + X4 + X5
660 LET Z3 = 2 * X1 + 1.5 * X2 + X3 + X5
670 LET Z4 = .5 * X2 + X3 + X4 + 2 * X5
680 LET Z5 = 5 * X1 + 4 * X2 + 3 * X3 + 1.5 * X4 + 6 * X5
690 PRINT TAB(1); COUNT; USING "###.##"; X1; X2; X3; X4; X5; yout; Z1; Z2; Z3; Z4; Z5
700 RETURN
```

Programme 2: A-Q-Basic programme that optimizes the flexural strength of High Strength Laterised Concrete.

```
100 REM A Q - BASIC PROGRAMME THAT OPTIMISES SPLC MIX PROPORTIONS
110 REM VARIABLES USED ARE
120 REM X1, X2, X3, X4, X5, X6, Z1, Z2, Z3, Z4, Z5, Z6, ymax, yout, yin
130 REM MODEL USED: SPLC FLEXURAL STRENGTH MODEL, EQN (4.23)
140 REM
150 REM MAIN PROGRAMME BEGINS
160 LET COUNT = 1
170 CLS
180 GOSUB 210
190 END
200 REM END OF MAIN PROGRAMME
```

```
210 REM PROCEDURE BEGINS
220 LET ymax = 0
230 PRINT
240 REM
250 PRINT "A COMPUTER MODEL FOR COMPUTING SPLC MIX PROPORTIONS"
260 PRINT "CORRESPONDING TO A REQUIRED FLEXURAL STRENGTH"
270 REM
280 REM
290 PRINT
300 INPUT "ENTER DESIRED STRENGTH"; yin
310 GOSUB 570
320 FOR X1 = 0 TO 1 STEP .02
330 FOR X2 = 0 TO 1 - X1 STEP .02
340 FOR X3 = 0 TO 1 - X1 - X2 STEP .02
350 FOR X4 = 0 TO 1 - X1 - X2 - X3 STEP .02
360 FOR X5 = 0 TO 1 - X1 - X2 - X3 - X4 STEP .02
370 LET X6 = 1 - X1 - X2 - X3 - X4 - X5
380 LET yout = 4.42 * X1 + 4.38 * X2 + 4.19 * X3 + 4.16 * X4 + 4.01 * X5 + 4.28 * X6 +
    .15 * X1 * X2 + .31 * X1 * X3 + 0 * X1 * X4 + .46 * X1 * X5 + .05 * X1 * X6 - .44 *
    X2 * X3 - .15 * X2 * X4 - .49 * X2 * X5 - .15 * X2 * X6 - .23 * X3 * X4 + .02 * X3
    *X5 + .19 * X3 * X6 - .34 * X4 * X5 - .08 * X4 * X6 + .38 * X5 * X6
390 GOSUB 620
400 IF (ABS(yin - yout) <= .001) THEN 410 ELSE 430
410 LET COUNT = COUNT + 1
420 GOSUB 650
430 NEXT X5
440 NEXT X4
450 NEXT X3
460 NEXT X2470 NEXT X1
480 PRINT
490 IF (COUNT > 0) THEN GOTO 500 ELSE GOTO 540
500 PRINT "THE MAXIMUM FLEXURAL STRENGTH PREDICTABLE"
510 PRINT "BY THIS MODEL IS"; ymax; "N/SQ.MM."
520 SLEEP (2)
530 GOTO 560
540 PRINT "SORRY! DESIRED STRENGTH OUT OF RANGE OF MODEL"
550 SLEEP 2
560 RETURN
570 REM PROCEDURE PRINT HEADING
580 REM
590 PRINT "COUNT X1 X2 X3 X4 X5 X6 Y Z1 Z2 Z3 Z4 Z5 Z6"
600 REM
610 RETURN
620 REM PROCEDURE CHECK MAX
630 IF ymax < yout THEN ymax = yout ELSE ymax = ymax
640 RETURN
650 REM PROCEDURE OUT RESULTS
660 LET Z1 = .36 * X1 + .38 * X2 + .4 * X3 + .42 * X4 + .45 * X5 + .35 * X6
670 LET Z2 = X1 + X2 + X3 + X4 + X5 + X6
680 LET Z3 = .5 * X1 + 1 * X2 + 1.2 * X3 + .5 * X4 + .5 * X5 + 1.2 * X6
690 LET Z4 = .5 * X1 + .5 * X2 + .8 * X3 + X4 + X5 + .6 * X6
700 LET Z5 = 2.5 * X1 + 3 * X2 + 4 * X3 + 3.5 * X4 + 3 * X5 + 3.6 * X6
710 LET Z6 = .035 * X1 + .03 * X2 + .025 * X3 + .02 * X4 + .015 * X5 + .04 * X6
720 PRINT TAB(1); COUNT; USING "###.##"; X1; X2; X3; X4; X5; X6; yout; Z1; Z2; Z3; Z4;
    Z5; Z6
730 RETURN
```

Flexural Strength Models for Normal Laterised and High Strength Laterised Concretes at Optimum Mix Proportions

OUTPUT RESULT 1: A COMPUTER PROGRAMME FOR COMPUTING NLC MIX PROPORTIONS CORRESPONDING TO A TARGET FLEXURAL STRENGTH

COUNT	X1	X2	X3	X4	X5	Y	Z1	Z2	Z3	Z4	Z5
1	0.00	0.00	0.00	0.73	0.27	3.97	0.54	1.00	0.27	1.27	2.72
2	0.00	0.01	0.00	0.58	0.41	3.97	0.56	1.00	0.43	1.41	3.37
3	0.00	0.02	0.00	0.63	0.35	3.97	0.55	1.00	0.38	1.34	3.13
4	0.00	0.02	0.00	0.64	0.34	3.97	0.55	1.00	0.37	1.33	3.08
5	0.01	0.00	0.00	0.57	0.42	3.97	0.56	1.00	0.44	1.41	3.43
6	0.01	0.01	0.00	0.66	0.32	3.97	0.55	1.00	0.36	1.31	3.00
7	0.02	0.00	0.00	0.58	0.40	3.97	0.56	1.00	0.44	1.38	3.37
8	0.03	0.00	0.00	0.60	0.37	3.97	0.56	1.00	0.43	1.34	3.27
9	0.03	0.00	0.00	0.61	0.36	3.97	0.56	1.00	0.42	1.33	3.23
10	0.03	0.00	0.00	0.62	0.35	3.97	0.55	1.00	0.41	1.32	3.18
11	0.03	0.00	0.00	0.63	0.34	3.97	0.55	1.00	0.40	1.31	3.14

THE MAXIMUM FLEXURAL STRENGTH PREDICTABLE BY THIS MODEL IS 3.996 N/SQ.MM.

OUTPUT RESULT 2: A COMPUTER PROGRAMME FOR COMPUTING HSLC MIX PROPORTIONS CORRESPONDING TO A REQUIRED FLEXURAL STRENGTH

COUNT	X1	X2	X3	X4	X5	X6	Y	Z1	Z2	Z3	Z4	Z5	Z6
2	0.38	0.62	0.00	0.00	0.00	0.00	4.43	0.37	1.00	0.81	0.50	2.81	0.03
3	0.44	0.54	0.00	0.00	0.00	0.02	4.43	0.37	1.00	0.78	0.50	2.79	0.03
4	0.52	0.44	0.00	0.00	0.00	0.04	4.43	0.37	1.00	0.75	0.50	2.76	0.03
5	0.54	0.42	0.00	0.00	0.00	0.04	4.43	0.37	1.00	0.74	0.50	2.75	0.03
6	0.56	0.40	0.00	0.00	0.00	0.04	4.43	0.37	1.00	0.73	0.50	2.74	0.03
7	0.56	0.40	0.02	0.00	0.00	0.02	4.43	0.37	1.00	0.73	0.51	2.75	0.03
8	0.58	0.38	0.02	0.00	0.00	0.02	4.43	0.37	1.00	0.72	0.51	2.74	0.03
9	0.60	0.36	0.02	0.00	0.00	0.02	4.43	0.37	1.00	0.71	0.51	2.73	0.03
10	0.60	0.36	0.04	0.00	0.00	0.00	4.43	0.37	1.00	0.71	0.51	2.74	0.03
11	0.62	0.34	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.68	0.51	2.70	0.03
12	0.62	0.34	0.04	0.00	0.00	0.00	4.43	0.37	1.00	0.70	0.51	2.73	0.03
13	0.64	0.32	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.67	0.51	2.69	0.03
14	0.64	0.32	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.67	0.52	2.70	0.03
15	0.66	0.30	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.66	0.51	2.68	0.03
16	0.66	0.30	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.66	0.52	2.69	0.03
17	0.68	0.28	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.65	0.51	2.67	0.03
18	0.68	0.28	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.65	0.52	2.68	0.03
19	0.70	0.26	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.64	0.51	2.66	0.03
20	0.70	0.26	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.64	0.52	2.67	0.03
21	0.72	0.24	0.00	0.00	0.00	0.04	4.43	0.36	1.00	0.65	0.50	2.66	0.03
22	0.72	0.24	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.63	0.51	2.65	0.03
23	0.72	0.24	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.63	0.52	2.66	0.03
24	0.74	0.22	0.00	0.00	0.00	0.04	4.43	0.36	1.00	0.64	0.50	2.65	0.03
25	0.74	0.22	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.62	0.51	2.64	0.03
26	0.74	0.22	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.62	0.52	2.65	0.03
27	0.76	0.20	0.00	0.00	0.00	0.04	4.43	0.36	1.00	0.63	0.50	2.64	0.03
28	0.76	0.20	0.00	0.00	0.02	0.02	4.43	0.37	1.00	0.61	0.51	2.63	0.03
29	0.76	0.20	0.02	0.00	0.00	0.02	4.43	0.36	1.00	0.63	0.51	2.65	0.03
30	0.76	0.20	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.61	0.52	2.64	0.03
31	0.76	0.22	0.00	0.02	0.00	0.00	4.43	0.37	1.00	0.61	0.51	2.63	0.03
32	0.78	0.18	0.02	0.00	0.00	0.02	4.43	0.36	1.00	0.62	0.51	2.64	0.03
33	0.78	0.18	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.60	0.52	2.63	0.03
34	0.78	0.20	0.00	0.02	0.00	0.00	4.43	0.37	1.00	0.60	0.51	2.62	0.03

35	0.80	0.16	0.02	0.00	0.00	0.02	4.43	0.36	1.00	0.61	0.51	2.63	0.03
36	0.80	0.16	0.02	0.00	0.02	0.00	4.43	0.37	1.00	0.59	0.52	2.62	0.03
37	0.80	0.16	0.04	0.00	0.00	0.00	4.43	0.36	1.00	0.61	0.51	2.64	0.03
38	0.82	0.14	0.04	0.00	0.00	0.00	4.43	0.36	1.00	0.60	0.51	2.63	0.03
39	0.82	0.16	0.00	0.00	0.00	0.02	4.43	0.36	1.00	0.59	0.50	2.60	0.03
40	0.84	0.12	0.04	0.00	0.00	0.00	4.43	0.36	1.00	0.59	0.51	2.62	0.03
41	0.84	0.14	0.00	0.00	0.00	0.02	4.43	0.36	1.00	0.58	0.50	2.59	0.03
42	0.84	0.14	0.00	0.00	0.02	0.00	4.43	0.36	1.00	0.57	0.51	2.58	0.03
43	0.86	0.12	0.00	0.00	0.02	0.00	4.43	0.36	1.00	0.56	0.51	2.57	0.03
44	0.86	0.12	0.02	0.00	0.00	0.00	4.43	0.36	1.00	0.57	0.51	2.59	0.03
45	0.88	0.10	0.02	0.00	0.00	0.00	4.43	0.36	1.00	0.56	0.51	2.58	0.03
46	0.90	0.10	0.00	0.00	0.00	0.00	4.43	0.36	1.00	0.55	0.50	2.55	0.03

THE MAXIMUM FLEXURAL STRENGTH PREDICTABLE BY THIS MODEL IS 4.44016 N/SQ.MM.

5.0 CONCLUSIONS

The following conclusions have been established based on this study:-

The flexural strength of laterised concrete depends on the proportioning of the ingredients (water, cement, sand, laterite and coarse aggregate with or without superplasticizer).

The flexural strength model for NLC predicted a maximum flexural strength of 3.996 N/mm^2 while the flexural strength model for HSLC predicted a maximum flexural strength of 4.446 N/mm^2. These strengths are quite comparable to those of normal sand concretes.

The problem of having to go through a rigorous mix-design procedure for a target strength has been reduced by utilizing the models.

HSLC show enormous increases in slump without any significant segregation and the concretes are flowing. This suggests that high-strength concretes can be placed in heavily reinforced and inaccessible areas without mechanical compaction.

The trial and error method of mix proportioning is overcome by using the written programme.

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Understanding Cybercrime and the Phenomenon of "Broutage" (Grazing) For a Media Education of Pupils and Students in Côte d'Ivoire

Okon Marguerite KOFFI – DJAH[1], Benoît Kouakou Oi KOUAKOU[2]

[1,2]Department of Information and Communication Sciences, UFR Information, Communication and Arts (UFRICA)
Felix Houphouet-Boigny University of Abidjan

ABSTRACT: This article analyzes some understanding outlines of cybercrime considering its complexity and its practice by the youth population in Côte d'Ivoire for media education. On the basis of conventions, guides and scientific publications on the phenomenon, a thematic content analysis was conducted in order to identify the axes that structure the study in response to the research objective. This problematic is based on the socio-ecological model of Sallis and Owen (1998). According to the Preamble of the Council of Europe's Convention on Cybercrime, known as the "Budapest Convention" of November 23, 2001, which entered into force on July 1, 2004, cybercrime is crime in cyberspace. In the absence of a legal definition of the phenomenon, there is confusion between crimes germane to cybercrime and cybercrime itself. The Internet, a channel of cyberspace, is presented as a web, a mesh on a planetary scale that limits the control mechanisms and reveals the difficulties of quantifying the phenomenon. Through a vicarious learning among young people in Côte d'Ivoire, cybercrime colloquially called "broutage" (grazing) is a social malaise, despite the response of the Ivorian state. The use of ICTs requires education to make each user responsible for understanding, using, defending and enjoying them, because the media world is experiencing an unprecedented shock.

KEYWORDS: Communication, cybercrime, media education, ICTs, youth.

INTRODUCTION

Most of the scientific literature on cybercrime opens with an attempt at a definition. The term remains difficult to conceptualize, as it is not the subject of any legal definition. Cybercrime is a protean reality which is still unclear and undefined (Robert, 2014). The necessary evolution must take into account the lessons of comparative law, the expectations of public opinion, actors and victims, as well as the requirements concerning the protection of fundamental freedoms. This choice of the legislators has led the doctrine to multiply the definitions of this term, thus contributing to the complexity of legal analyses. One must consider the conception of cybercrime contained in the Preamble of the Council of Europe's Convention on Cybercrime, known as "The Budapest Convention" of November 23, 2001, which entered into force on July 1, 2004. According to the provisions of the Preamble, cybercrime is crime in cyberspace[1]. The absence of a legal definition of cybercrime, as mentioned above, is a source of confusion regarding the fields of thinking and analysis or regarding the appropriate terminology. These confusions led us to analyze the understanding outlines of the phenomenon in its general sense and its practice in a precise context by a defined target. Undoubtedly, the practice of cybercrime by young people in Côte d'Ivoire reflects a social malaise, hence the need for media education.

The study is based on the socio-ecological model, which we believe, is more robust and fruitful for the comprehensive analysis of the social, technological, and organizational interactions that shape the digital risk environment. Conceiving the cybercrime ecosystem as the convergence of criminals, and security and organizational actors following unique respective rationalities will help to overcome the confusion created by the complexity of this new criminal architecture. This is done by simultaneously taking

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[1] Convention on Cybercrime of the Council of Europe issued in the European Treaty Series n°185, published in the Official Journal of the French Republic n°1239 of May 24, 2006, page 7568 text n°2 thanks to the decree n°2006-580 of May 23, 2006, promulgating the Convention on Cybercrime, made in Budapest on November 23, 2001.

into account the cooperative, competitive and predatory relationships that characterize this ecosystem. Based on its onion-like structure, this ecosystem considers knowledge, motivation, and capacity building, in which change occurs (Sallis and Owen, 1998). A thematic content analysis was conducted from the conventions, guides, and scientific publications on cybercrime in order to identify the axes that structure the study in response to the research objective.

I. CYBERCRIME AND CRIMES RELATED TO IT: A CONFUSION BETWEEN THEM

In the absence of a commonly accepted definition of crime in cyberspace, the terms cybercrime, computer-related crime or high-tech crime are often used interchangeably.

In the classification of cybercriminal offences, it is common to see that infringements are grouped according to whether they concern property, people or computer systems themselves (Quemener, 2010). This is why the laws against cybercrime must also cover these particular areas. However, their enforcement from one State to another does not follow the traditional nomenclature of offences. A distinction related to legal terms is then necessary.

1. Cybercrime and computer-related crime

Totty and Hardcastle (1986, p. 169) posits that computer-related crime covers *crimes in which a computer has played an active rather than a passive role*. Hacking includes not only fraudulent actions mainly on the computer system itself (software) but also the theft of computer data and works. According to Article 7 of the Budapest Convention, computer forgery and fraud are considered computer offences. These practices are parts of several offences. As a matter of fact, hacking in itself is not an isolated practice. It is the beginning of the execution of acts such as illegal interception. It is also related to computer forgery, the offence to which it is closer in terms of constituent acts.

Some authors put several offences together under the term computer-related crime. This is the case of the Council of Europe, which lists in its *Final Activity Report on computer-related crime* the offences that European law must punish. These are: fraud, forgery, sabotage, unauthorized reproduction of a protected computer program, espionage, alteration of computer programs and data and damage to data and programs[2].

MARTIN (1999, p. 13) thus defines computer-related crime as any illegal action in which a computer is the instrument or object of the crime; any crime whose means or purpose is to influence the function of a computer; any intentional act, associated in one way or another with computer technology, in which a victim has suffered or could have suffered harm and in which the perpetrator has made or could have made a profit.

Cybercrime, in its strictest definition, refers to all offences committed with the help of or against a computer system connected to telecommunications network. It has a wider scope since, in addition to offences against computer property that can be committed via the Internet, computer-related crime and cybercrime have a common branch when computer offences are committed through the use of the telecommunications network. But not every computer crime is committed by means of a telecommunication network. And not every offence committed by means of a telecommunication network is systematically a computer offence. This confusion of the object of cybercrime in the legal sense of the term is evident from one border to another. Outside of European borders, the United States Department of Justice defines cybercrime as "any violations of criminal law that involve a knowledge of computer technology for their perpetration" (Tano-Bian, 2016). The author however believes that the American conception of cybercrime is questionable because it does not take into account all potential cybercriminals including the fence or accomplice to cybercriminal acts. As for the Swiss Federal Office of Police, it considers cybercrime as the set of new forms of crime specifically linked to information technologies, and known crimes that are committed with the help of computers rather than with conventional means[3].

2. Cybercrime and high-tech crime: international dimensions of anonymous communications

Basic pieces of equipment like hardware, software and Internet access are enough to commit cybercrime. To limit the risk of identification, most cybercriminals do not subscribe to the Internet. They rather prefer using free access (without registration with checking procedure).

"Wi-Fi hacking" is a classic method of gaining network access. It consists in scanning wireless networks using one's car in search of access. The most common means of network access used by cybercriminals to gain relatively anonymous network access are

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[2] Council of Europe: Final Activity Report on Computer-Related Crime (European Committee on Crime Problems), [April 1989] pp. 27-55.

[3] Report 2003 of the Swiss Federal Office of Police, Federal Department of Justice and Police, Bern, June 2003

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public Internet access terminals, free (wireless) networks, hacked networks, and prepaid services without registration (Telecommunications Development Sector Report, 2012).

Cybercriminals use fake email addresses as a means to hide their identity. Many providers offer free e-mail accounts. However, personal information, when requested, is not always verified. It is therefore possible to create e-mail addresses without revealing your identity. The anonymous address has an advantage: it allows, for instance, an Internet user to join a political discussion group anonymously. On the one hand, anonymous communication can encourage anti-social behavior; on the other, it gives Internet users greater freedom. It is clearly necessary, in view of all the traces left by users on the Internet, to prevent, through legislative instruments, the profiling of activities on the network.

Indeed, ICTs have a considerable advantage by making certain processes automatable. Automation has several important consequences: it increases the speed of processes, their scope and impact and, finally, it helps to limit human intervention. Through automation, cybercriminals can intensify their activities: sending spam emails, hacking attempts, etc. The distributed nature of the network, as well as the availability of some Internet services, which creates uncertainty about the origin, is an obstacle to identifying cybercriminals.

These apparent manifestations of cybercrime interact with high-tech crime. According to Martin (2001), high-tech crime is the crime that includes all the illegal acts related to computers and telecommunications, both in terms of hardware and software. It concerns computer crime as such and forgery, cloning of electronic components capable of creating malfunctions in information and telecommunications systems or allowing fraudulent use. From this point of view, high-tech crime can cover two categories:
- Offences related to computer systems that are not connected to telecommunication networks,
- Offences related to computer systems that are connected to telecommunication networks.

Only the second category of offences committed via telecommunications networks are considered as cybercrime according to the definition given by the Budapest Convention. However, not all high-tech crimes are cybercrime. How then can the control mechanisms of cyberspace be analyzed?

II. LIMITATIONS OF INTERNET CONTROL MECHANISMS AND THE ISSUE OF QUANTIFYING CYBERCRIME

1. Limitations of control mechanism

A report by the Telecommunication Development (2012) states that all mass communication networks, from telephone networks for voice communication to Internet networks, require central management and technical standards that ensure good operability. Ongoing studies regarding Internet governance tend to indicate that this network is no different from other national or even transnational communication infrastructures. The Internet too must be governed by laws. However, it should be emphasized that the Internet is not in space, it is space (Levi, 1995, p. 17). Thanks to the interconnection of numerous premises, the Internet appears as a web, a mesh on a planetary scale. This vast so-called distributed architecture explains its decentralized organization. What is there between a phenomenon that ignores borders, and entities that only exist and have jurisdiction within given borders? Its regulation is already affected by a pathogenic law (Viviany, 1996, p. 226). On this point, doctrine as well as governments agree to recognize the gap between the fiction of the omnipresent State and the reality of the network because of its transnational feature. The Internet is not a space where the heterogeneous group of Internet users organize themselves hierarchically in respect of a State at the top of the pyramid.

Originally, the Internet was set up as a military network based on a decentralized architecture in order to keep the main functionality intact and operational, even in case of an attack on certain network elements. And as Bechillon (1997, p. 10) would say the object of any rule resides from the outset in the squaring of human conduct, in this sort of measure that humanity gives itself to regulate its relational affairs. With its infrastructure, the Internet then resists any external attempt to taking control of it. In the initial specifications, it was not foreseen to facilitate investigations for infringement nor to prevent attacks from inside the network.

Furthermore, the ubiquity of the Internet in the civilian sector remains a problem. The report by the Telecommunication Development notes that this evolution from the military to the civilian sector is accompanied by an evolution in the demand for control instruments. Because the network is based on protocols designed for military purposes, such instruments do not exist at a central level and are difficult to implement a posteriori without a major rethink of the overall design. The lack of these control instruments makes it very difficult to investigate cybercrime.

Due to the lack of control instruments, Internet users can bypass filtering techniques by using encrypted anonymous communication services. Normally, it is impossible to connect to Internet sites with illegal content if the Internet Service Providers (ISPs) have blocked access to them. Yet, by using an anonymous communication server that encrypts transfers between Internet

users and the central server, it is possible to bypass the blocking of contents. Indeed, since the requests are sent in encrypted form, the ISPs are not able to read them and, consequently, to block them.

2. Quantification problem

Never before has a criminal phenomenon been the subject of so many peremptory assertions. These assertions also coming from official international organizations are about the importance of the phenomenon and the harm it causes. However, if all the actors agree on this importance and seriousness, the sources of information seem fragmented and approximate. In all countries, the quantification of the phenomenon comes up against comparable difficulties. The apprehension of cybercrime must first be based on the legal definition of offences (Report of the Inter-ministerial Working Group on the Fight against Cybercrime, 2014).

Thus, the first challenge is for the courts to base their statistical system on the concept of offence, which is not possible with existing enforcements. Yet, the legal definition of offences is, in most cases, insufficient to take into account cybercrime when it is only the means to commit an ordinary offence: the law does not include any distinctive element regarding their perpetration by means of an information system. Therefore, the second challenge for police and judicial statistical systems is to consider, even when the law is silent, the specific modus operandi[4] of cybercrime, when it exists; this can only be done on the basis of the findings of investigators. In such a context where the State cannot be the main guarantor of digital security, it is not surprising that it does not keep any usable records. In the field of cybercrime, Wall (2015) supports that no one can claim to be exhaustive or even hope to be exhaustive. The State intervenes essentially on the repressive side since it does not have a monopoly on a reliable source of information. The private sector of protection solution sales (anti-phishing or anti-virus software for example) is in a better position, but its counting possibilities remain partial. The author proposes to compensate for the shortcomings of police counts with general population victimization surveys and with national or local instruments that ask people about crimes they have allegedly experienced over a given period. How do young people in Côte d'Ivoire appropriate the practice of cybercrime? What is the response from the Ivorian state?

III. "BROUTAGE" (GRAZING), A VICARIOUS LEARNING PROCESS AMONG YOUNG PEOPLE: WHAT IS THE IVORIAN STATE'S RESPONSE?

1. Origin and explanatory factors

Since the onset of the military and political crises in Côte d'Ivoire, Ivorian youth have been characterized by exponential delinquency, as many of them have become adept at the art of cybercrime colloquially known as "broutage" (grazing). The phenomenon has taken over from the practices initiated by female students in the early 2000s who easily obtained money transfers from their European correspondents (Yaya, 2017). The cultural movement called the "coupé décalé", born out of swindling, is said to be at the origin of the dance of the "brouteurs" (grazers), and has participated in the development of "broutage" in Côte d'Ivoire (Gbadamassi, 2003). Adored and courted, many of the "brouteurs" recruit other young people because they succeed in seducing them through their dandyism and their "travaillement[5]". In Ivorian slang called Nouchi, "couper" means to swindle and "décaler" means to run away (Kohlhagen, 2005). Hence the expression "couper l'herbe sous les pieds" (to cut the grass under the foot) gives all its meaning to deception. These youth criminal organizations carry out the most sophisticated and targeted attacks. Individuals are paying a heavy price for this expansion of "broutage." This phenomenon has not only taken on a significant proportion in the world but has also taken on particular forms in Africa ("Yahooboys" in Nigeria; "feymens" in Cameroon; "gays mans" in Benin; "brouteurs" in Côte d'Ivoire). It is an appropriation or even an "Ivorianization" of the Nigerian-style scam (Adou, 2022), and therefore a new, more astute form of criminality called "broutage 3G." This terminology refers to the adage that the sheep grazes everywhere. In other words, commercial, banking, and financial transactions taking place on the web and across the cyber world provide multiple criminal opportunities for these "brouteurs" (Akadjé et al, 2017). This criminal activity highlights the mechanism of vicarious learning among youth. It is a "contagious" phenomenon. The "brouteurs" are organized networks with leaders who recruit. They roam cybercafés, their favorite working places.

General explanatory factors stem from the precarious socio-economic context, the development and the ecosystem of the Internet and ICTs and the weakness of the legal framework for ICTs. Like any social phenomenon, the explanatory causes of cybercrime in the youth population are diverse and varied: the pressure of unemployment of young graduates lured by easy gain,

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[4] Latin expression formed from "modus" (way) and "operandi" (to operate), it designates the way of realizing and building something.

[5] Colloquial word of the local slang Nouchi: the "brouteurs" are prodigal children who ostensibly redistribute in bars and night clubs the sums of money they have amassed.

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the school crisis, the lack of parental authority, etc. have as an inevitable consequence the loss of values that are essential to education, development and citizenship of young people.

2. Ideology and modus operandi

The practice is supported by a particular mechanism that stimulates its ideology and modus operandi. The practice is also based on an argument structured around the notion of social justice and the belief in a European land of plenty. On the internet, they construct in parallel the social and professional "black mask" of the "Brouteur" by modulating themselves in the virile standards of extortion and power of control. According to their ideology, the time has come to pay back the colonial debt. According to Wintjens (2020), the colonial debt is an ancestral robbery, a legalized plunder. The economic implications of debts imposed on colonized States have led to social disasters that are still observed today in many countries. In response, the brouteurs' favorite targets are the "peaux grattées" (Ivorian slang for white Europeans). They are supposed to pay this debt. The modus operandi is then varied and innovative.

The Nigerian method consists in sending emails to addresses previously retrieved from sites through the use of adapted software, with content that arouses empathy for scams of all kinds.

Asking for help; here, religions and companies are victims. Fraudsters create Internet sites pretending to be religious associations seeking funding for the construction and renovation of religious buildings in order to swindle potential donors.

Romance scam: With this practice, the "brouteur" uses the bond of trust with male or female victims from Europe to lend himself to a certain erotic practice in front of his webcam. This is followed by a real blackmail in terms of financial gain to which the victims succumb, devastated by the shame and fearing to kill themselves, if these images are published worldwide. The new trend consists in an infiltration in the networks of online pimps. The story of the Ivorian "Yoyo la gazelle" is creating the buzz of social networks. A fearsome young girl who has emptied the accounts of her suitors.

Ritualistic method: The practice of black magic includes mystical processes carried out in the shadows. For Bazare et al (2017), all cybercriminals engage in this practice but for different purposes. Most of them want to bewitch their target in order to annihilate any will of resistance and refusal of the potential victim. For others, in their understanding, these mystical rituals help them to escape the police and justice.

Bazare et al. (op. cit.) identify four categories related the profile of cybercriminals. The **Novices** constitute the first category. They are young males between 13 and 17 years old. Most of them are high school students and learning begins with this category. The second category is composed of **Amateurs**, aged between 18 and 23. They know about computer tools and they always work under the supervision of older youth, masters of the domain. The third category includes the **Professionals**, aged between 24 and 29. They are students and they are able to penetrate the security zones of the most protected networks, unknown to all, except ICT experts. And finally, the **Experts** form the last category. They are between 30 and 34 years old. They are passionate about computers and are generally called "Hackers."

The search for easy money seems to be the only concern of the majority of these crooks coming from disadvantaged backgrounds (Gueu, 2018).

3. Response from the Ivorian State

Securing cyberspace is a requirement to support digital transformation. To counter cyberattacks that have long tarnished the image of Côte d'Ivoire, the government created in 2011 the *Plateforme de lutte contre la cybercriminalité* or PLCC (Platform for Combating Cybercrime). A commando 2.0 that tracks threats of publication of sexual images and sexual harassment on social networks (Facebook, Instagram, Twitter, Snapchat, WhatsApp), fraud on electronic transactions, fraudulent use of identification elements of natural persons, damage to image and honor, online scams, etc.

According to the Director of Computing and Technological Traces of the Ministry of the Interior and Security, the Platform registers an average of 4,500 to 5,000 complaints per year. Composed of investigators, engineers and technicians in the fight against cybercrime, the PLCC carries out judicial investigations and organizes the tracking down of cybercriminals. The intensification of the fight and the reinforcement of the means deployed have helped the structure to increase the tracking. Thus, the number of cases taken in charge is clearly increasing, 5,000 cases in 2021, against 2408 complaints in 2017 and 150 in 2011. The resolution rate of cybercrimes is 50%. The Ivorian cyberspace, once undermined and avoided like the plague, tends to be cleaned up. In addition to tracking and repression, the PLCC is also an instrument of awareness. It educates more than 25,000 students a year about the evils of cybercrime. Experts advise them, for example, to be careful on social networks and warn them against publishing fake news. After the creation of the Platform in 2011, the government strengthened in 2013 the legal arsenal by adopting the law No. 2013-451 of 19 June 2013 on the fight against cybercrime. The fight against cybercrime will be further strengthened in March

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2019 with the ratification of the Budapest Convention on Cybercrime of the Council of Europe. This convention allows Côte d'Ivoire to benefit from international collaboration in its fight, for greater effectiveness (CICG, 2022).

Beyond alternative messages and repression that are closer to the real issues, it is imperative to oppose this vicarious learning with media education for the autonomy of young people.

IV. OF THE NECESSITY OF MEDIA EDUCATION FOR THE AUTONOMY OF PUPILS AND STUDENTS

The "brouteurs" are brilliant at social engineering. Philippe Breton and Serges Proulx (2012) find that, depending on the contexts of analysis and the theoretical frameworks mobilized, the notion of *usage*, which is otherwise quite complex, refers to a continuum of definitions, ranging from the pole of simple "adoption" (purchase, consumption, expression of a social demand with respect to an industrial offer) to the pole of "appropriation." In the latter case, they consider that we can speak of "appropriation" when three social conditions are met. First, the user must demonstrate a minimum of technical and cognitive mastery of the technical object. Secondly, this mastery must be integrated in a significant and creative way into the daily practices of *usage*. Thirdly, appropriation opens up possibilities for misuses, bypasses, reinventions or even direct participation of users in the design of innovations.

The usage of the Internet for fraudulent purposes by a large segment of the youth population has extremely harmful consequences on the country's image, on its economy and education, since cybercriminals are young people.

The current evolution of ICTs increases crucial societal issues. Their usage requires more than ever an education aiming at making each user responsible to understand them, use them, defend themselves from them and take advantage of them, because the world of the media undergoes an unprecedented shock. This learning process draws its legitimacy from the discourses on the protection of children and young people and on education for citizenship. Media education is positioned within a triangulation between school, media and democracy. To this end, for Frau-Meigs (2011), Chomsky (2012), media education poses a major issue: its capacity to prepare the learner to face a complex and changing media universe. This produces concrete knowledge aimed at developing not only a praxis of critical thinking in learners but also a plethora of cognitive, technical, behavioral and ethical skills.

Indeed, each learner receives and understands a media reality according to his or her own experience, beliefs, etc. There are, therefore, biases that have an influence on their reception, dissemination and judgment. These are: the anchoring effect and the weight of our a priori ideas, the cost of abandoning our beliefs (Gauvrit, 2019).

For the European Commission (1989), media literacy is the ability to access the media, to understand and critically appreciate different aspects of the media, their contents and to communicate in various contexts. Learners should be introduced to the structures, mechanisms and messages of the media; in particular, they should develop an independent capacity to think critically about media content.

Vize (2010) supports that media do not present reality, they represent it. Thus for Charaudeau (2005), if the media are a mirror, they are only a distorting mirror. Each of the media has its own way to testify of an amplified, simplified, stereotyped parcel of the world. Consequently, in the context of the construction of a free and responsible citizenship, it is only those of the publics that possess the keys of a critical and distanced reading that will be able to understand "how", "by whom" and "why" the media elaborate the messages that they broadcast, and that will be able to avoid consuming ethically, politically and culturally questionable media contents.

Thus, for these authors, it is important to use a critical spirit to deconstruct any media message or content. To deconstruct a media message means to decipher the codes of representation, as one learns to read and write, not to be illiterate.

DISCUSSION AND CONCLUSION

Cybercrime is a broad and artificial concept with a significant dimension in terms of the variety of illicit acts committed, its internationalized nature, and the damage caused to states, businesses and individuals (UNODC, 2013). It is clear that the Internet poses new and multiple problems for the law. The network is the result of the deregulation of the telecommunications sector, which introduces a certain normative autonomy of actors. States now partially share their sovereignty through a negotiated law that is characterized by its relativity, its heterogeneity and its fluidity (Diebolt, 2000). Notwithstanding the apological speeches on the messianic power of the Internet, the fact is that this tool remains nowadays a criminogenic tool.

The appropriation of the practice of cybercrime, particularly by young people in Côte d'Ivoire, suggests a North/South dialogue between two parties who evolve in a different digital environment, one connected from a private space and the other from a public space. This Ivorian-style open space has a theatrical dimension (Yaya, Op.cit).

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The gradual constitution of a class of citizens who are more informed and educated, critical, skeptical and reflective about the processes of production, dissemination and reception of media information and media culture would be an asset. It is assumed that this could contribute to a strengthening of democratic foundations and a mitigation of inequalities and social injustices (Landry and Basque, 2015).

The fear of innovation or the hasty and/or misguided adoption of ICTs is the result of a lack of anticipation with regard to educational or security realities. However, in this digital age, it is unthinkable that it can be done without ICTs, even though it is problematic. This is the basis for the place to be given to media education in the construction of an African information society in order to meet this social, cultural, economic and political challenge.

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Energy Factor in Iraqi Kurdistan: Opportunities and Geopolitical Problems

Fotima Nazarova

Student, Tashkent State University of Oriental Studies

ABSTRACT: Today, new trends are emerging in the world political arena, which will open up new means of influencing the regions. Iraqi Kurdistan, especially in the Middle East, is attracting the attention of domestic and foreign political forces with its surface and underground resources. Kurdish control of the region's most oil-rich regions is helping to shape regional tensions as a tool for foreign policy forces. This requires countries in the region to pursue deep and multi-faceted policies. In particular, it is becoming increasingly clear that the existing energy factor in Iraqi Kurdistan can create geo-economic opportunities for the region, as well as create geopolitical problems.

This article examines in detail the energy factor in Iraqi Kurdistan, a geostrategically and geoeconomically important region in the Middle East, as well as the opportunities and geopolitical challenges it poses.

KEYWORDS: Middle East, Iraqi Kurdistan, Kurdistan Regional Government, Kirkuk, Zagros, US Geological Survey (USGS), International Development Finance Corporation (IDFC), ISIS, Masrur Barzani.

GOALS AND OBJECTIVES

The purpose of the article is to reveal the potential of the energy factor and geopolitical problems in Iraqi Kurdistan. With this in mind, a comprehensive study of the region's potential in regional and global oil markets has been identified.

METHODS

The article used historical, structural-logical, content and event analysis methods.

RESULTS AND FEEDBACK

It is known that in the world geopolitical scene, the Middle East region is of great geostrategic importance due to its richness in natural resources, as well as its geostrategic location connecting Asia, Africa and Europe, the ethnic and religious diversity of the population, the unresolved democratic problems, and the existence of authoritarian regimes have long made the region a hotbed of conflict compared to other regions. The main target of internal and external forces in the geopolitics of this region is natural resources. Acquisition or direct control of natural resources is a key component of geopolitical processes by domestic and foreign policy actors.

Indeed, the Middle East is a region rich in energy resources. The region accounts for 37% of world oil production and 35% of natural gas production. It is Iraqi Kurdistan that has enormous wealth. Rich coal deposits have been discovered in Maden, Kigi, Kemax and Harput. Large amounts of coal are extracted from Iraqi Kurdistan and limestone from Sulaymaniyah. Sarchinar has been producing 350 tons of cement per day since 1958. Sulfate reserves have been identified in Shino and Amadia. The Revanduz and Sulaymaniyah regions are ore-rich lands located in the surface layer. Barzan and Diyarbakir produce 270,000 tons of chrome a year. There are lead deposits in Keban, Elazig and Makuda, gold deposits in the south of Ergu and Kermanshah, and silver deposits in Kemakh. But the real wealth of Kurdistan is oil and gas. According to the U.S. Geological Survey (USGS), Iraq's Zagros Burma region (mostly Iraqi Kurdistan) has 41 billion barrels of undiscovered oil and 54 trillion cubic feet of gas reserves. Iraqi Kurdistan's Ministry of Natural Resources estimates oil reserves at 45 billion barrels, while proven oil reserves at 10 billion barrels (Karimov, F. 2020, p.112-113). Iraq's proven oil reserves are estimated at 143.1 billion barrels, making it the sixth largest country in the world. As for Iraqi Kurdistan in northern Iraq, the region has strong potential reserves of "black gold" - about 45 billion barrels. In addition, drilling new wells could increase that to 115 billion barrels (Касаев, Э. 9 февралья, 2013).

Energy Factor in Iraqi Kurdistan: Opportunities and Geopolitical Problems

Iraqi Kurdistan's vast natural resources in the region, especially its vast oil and gas reserves, are attracting the attention of foreign political forces and becoming a tool in their hands. It is natural that the high energy potential of Iraqi Kurdistan will provide several opportunities for the region, as well as create geopolitical problems. It is known that Kurdistan is important in the region due to its important location - borders with Iran, Syria, Turkey and Iraq. Ever since the Kurds lost their state after World War I, they have focused on self-determination. The main Kurdish influence is oil. Kurdistan has about a third of Iraq's total oil reserves, much of it under the sands near the city of Kirkuk, once a stronghold of the Islamic State (ISIS) in Iraq and Syria. Kurdistan's neighbors are deeply concerned about the troubled Kurdish minority. They argue that oil will strengthen the Kurds 'aspirations for independence from Iraq and that Kurdish autonomy will upset the pre-existing imbalance in the region (Janine di Giovanni, Oct. 8, 2018).

Demand for oil is growing at a rate of 2-2.5% per year. This will require 105 million barrels of oil per day by about 2030. The main consumers of oil are the United States, China, India and the European Union. Many researchers predict that demand for oil and gas will not decline until 2050 (IEA, Outlook ... 2018). This, in turn, will make the region, where Kurdistan's oil and available natural resources are located, more attractive to other actors. As a result, Iraqi Kurdistan faces a number of opportunities, as well as geopolitical threats. In this regard, the following options should be considered:

First, the US, Russia, whose main economies depend on oil and gas, China and India, the second largest consumers of oil and gas, have also been participating actively in oil and gas-related geopolitical processes in the region. For example, Russian oil and gas companies are actively developing oil and gas fields in Iraqi Kurdistan, Iran, and today in Syria and Libya. At the same time, given the geopolitical and geoeconomic interests of bordering Turkey and Iran, the strategic and attractive importance of Iraqi Kurdistan will increase. This, in turn, requires the Iraqi Kurdistan leadership to make effective and efficient use of external forces.

Second, although the Iraqi central government has large natural gas resources, it is losing a significant amount of its potential supply and is therefore severely dependent on neighboring countries for energy needs. It is the gas resources in Iraq's Kurdistan region that will play an important role in finding a solution to this problem. This in itself will allow the Iraqi government to generate more energy for domestic consumption, as well as export to Turkey and other neighboring regions, as well as economic integration between Iraqi Kurdistan and the Iraqi central government.

Third, the United States, which is struggling for the region, emphasizes the importance of energy cooperation with Iraqi Kurdistan. This partnership can be seen in the support of the International Development Finance Corporation (IDFC) for American oil and gas companies working on projects in the region (Gas in Iraqi Kurdistan… Jan. 21, 2021).

GEOPOLITICAL PROBLEMS AND THREATS

The available natural resources and energy potential of Iraqi Kurdistan are likely to pose a number of geopolitical challenges and threats. Including:

1. One of the most pressing issues is the existence of disagreements between the Iraqi central government and the regional government of Iraqi Kurdistan over the natural resources in Iraqi Kurdistan, especially oil and gas. According to the Iraqi central government's constitution, "available oil and gas belong to the people of all regions and provinces of Iraq" (The Oil and… Nov. 3, 2021). However, the two sides have not yet reached a final decision on the ownership and sale of oil and gas, and disagreements continue;

2. Attacks on natural resource areas by certain terrorist groups in Iraq and Syria (such as ISIS) are the serious concern to Iraqi Kurdistan and the central government;

3. The fact that Iraqi Kurdistan is the most oil-rich region in the region will intensify geopolitical competition between foreign political forces. This can be seen in the speech of the Prime Minister of Iraqi Kurdistan Masrur Barzani to the Atlantic Council: "We will become a net exporter of gas to the rest of Iraq, Turkey, and Europe in the near future, and help meet their energy security needs. Already we have an export oil capacity which acts as an essential economic lifeline for us and a vital potential supply for our partners. I've also had talks with the federal government of Iraq, Turkey, and the Gulf countries about the regional railway network. I believe that this could be transformational for Iraq and the region, creating new trade routes and another window for regional cooperation". (The Kurdistan Region… March 28, 2022).

CONCLUSION

In general, the study of the energy situation in Iraqi Kurdistan leads to the following conclusions:

The region will continue to have geostrategic and geoeconomic significance in the near and medium term. This is because the factor of military conflict in world politics is driving the growing demand for oil and gas. Such conditions are indicative of the expansion of the energy factor of Iraqi Kurdistan in the Middle East;

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The vast reserves of available surface and underground natural resources could accelerate competition between internal and external forces, changing not only the balance between Iraqi Kurdistan and the central government, but also the geopolitical balance of the region;

As a result of the serious interference of external forces in the Iraqi energy factor, the independent energy policy of Iraqi Kurdistan is being formed. This may accelerate the foundations for the region to become a separate independent state in the future.

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Pregnant Women's Perception of Corona Virus Pandemic, and the Precautionary Measures they adopt toward Curtailing the Pandemic in South-South Nigeria

Chiejina Edith Nkechi[1], Kanikwu Phoebe Nwamaka[2]

[1]Department of Nursing Science, Faculty of Health Sciences and Technology, Nnamdi Azikiwe University Awka (Nnewi Campus), Anambra State Nigeria.

[2]Department of Nursing Science, Faculty of Applied Health Sciences, Edo State University, Uzairue, Edo State, Nigeria.

ABSTRACT: The decreased immunologic competency during pregnancy calls for intensified precautionary measures against corona virus disease among pregnant women. This Cross-Sectional study focused on pregnant women's perception of corona-virus pandemic and the precautionary measures they adopt toward curtailing the pandemic. The objectives of the study were to determine pregnant women's view/beliefs about Covid-19 pandemic, the extent of their compliance with wearing of face masks and maintenance of social distancing. Multistage sampling technique was used to select 144 pregnant women from the primary, secondary and tertiary health facilities in Edo State out of the six States that constitute South-South Nigeria. The instrument used for data collection was a self-developed Questionnaire on pregnant women's Perception and the precautionary measures they adopt for corona-virus pandemic (QPWPPMCP). The reliability of the instrument was conducted using internal consistency test for reliability, and the Cronbach alpha yielded coefficient of 0.711. Data collected were analysed using frequencies, percentages, mean and Spearman Rank Order correlation. Majority of the respondents indicated that Covid-19 is real (87.5%) and is existing (86.1%). 63.9% indicated that Covid-19 is caused by germ, 68.1% indicated that they always wore face masks, and 73.6% maintained physical/social distancing. There was significant relationships between pregnant women's view about existence of Covid-19 and their compliance with wearing of face masks (rho = 0.334; p-value = < 0.001), as well as between belief about cause of Covid-19 and wearing of face masks (rho = 0.173; p-value = 0.038).

KEYWORDS: Pregnant women, Perception, Precautionary Measures, Corona-virus Pandemic, Face mask, Social distancing.

INTRODUCTION

Immunologic competency decreases during pregnancy (Gennaro and Fehder, 1996). Also the immunological changes that take place during pregnancy subject the expectant mother to the risk of infections (Pillitteri, 1999). Presence of any pandemic will further compromise this risk of infection among pregnant women. Coronavirus disease (COVID-19) has played havoc worldwide (Omer, Ali & Babar, 2020). As at 11th June 2020, active cases were 3,270,599 out of 7,495,828 infected people globally (Covidvisualizer.com).

Pregnant women are at greater risk of getting sick from other respiratory viruses than people who are not pregnant, and sometimes this causes adverse outcome for the mother (Center for Disease Control and Prevention (CDC), 2019). Omer et al (2020) indicated that pregnant women have a high propensity to acquire COVID-19 due to their altered physiological and immunological functions. COVID-19 causes extensive alveola damage, which in turn, increases the risk of secondary bacterial infections (Liang and Acharya, 2020). Studies have indicated that severe acute respiratory syndrome (SARS) during pregnancy is linked with high risk of spontaneous miscarriage, preterm birth and intra-uterine growth restriction (Wong, Chow, Leung et al, 2020). Also, studies in pregnant women with COVID-19 have indicated maternal and neonatal complications (Zhu, Wang, Fang et al, 2020). WHO(2020) have indicated that COVID-19 is spread by person-to-person contact, and that the route of transmission is primarily via respiratory droplets from infected person into the air which are then deposited onto nearby surfaces. Also the virus could potentially transfer to individuals within a distance of <2m (6feet) of the infected person (Medline Plus, 2020). It is important to note that vaccine is now available to add to protection against the virus that causes COVID-19. It is against this background that the researchers

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conducted this study to determine pregnant women's perception of corona-virus pandemic, and the precautionary measures they adopt toward curtailing the pandemic in South-South Nigeria.

Research Questions
1. What is the view of pregnant Women in South-South Nigeria about the existence of Corona-Virus Pandemic?
2. What is the belief of pregnant women in South-South Nigeria about the cause of Covid-19 disease?
3. To what extent do pregnant women in South-South Nigeria comply with wearing of face masks as protective measure against contacting Covid 19 infection?
4. How do pregnant women in South-South Nigeria maintain physical distancing as protective measure against contacting COVID-19?

Hypotheses
1. View of pregnant women in South-South Nigeria about existence of Covid-19 pandemic is not significantly related to their compliance with wearing of face masks as protective measure.
2. Belief of Pregnant Women in South-South Nigeria about the cause of COVID-19 is not significantly related to their compliance with wearing of face masks as protective measure.

MATERIALS AND METHODS

Design and Sampling.
The study was a cross-sectional research design. Multistage sampling technique was used for the study. Out of the six States (Akwa-Ibom, Bayelsa, Cross-River, Delta, Edo, Rivers) that constitute South-South Nigeria, simple random sampling technique was used to select Edo State for the study. Simple random sampling technique was used to select one tertiary, one secondary and one primary health facility in Edo State. 50 pregnant women were selected from each of the primary and secondary health facilities while 44 pregnant women were selected from the tertiary health facility giving a sample size of 144 respondents that were used for the study.

Instrument
The instrument used for data collection was Questionnaire on Pregnant Women's Perception and the Precautionary Measures they Adopt for Corona-Virus Pandemic (QPWPPMCP). The questionnaire consisted of three (3) sections. Section A consisted of items on demographic characteristics (age, educational level, employment status, health facility and parity). Section B consisted of items used to elicit information on pregnant women's perception of COVID-19 Pandemic (eg view and belief about existence of COVID-19, interaction with people with Covid-19, opinion about the outcome of the victim of Covid-19 disease and awareness of mode of transmission of Covid-19 disease). Section C of the instrument was made up of items used to elicit information from the respondents on the precautionary measures adopted by pregnant mothers for Covid-19 disease (eg compliance with wearing of face mask, maintenance of physical distancing, hygienic measures practiced in Covid-19 pandemic, etc).
Sections B and C of the instrument required "Yes" or "No" responses for the items. Response to either Yes or No option for each item = 1 point.
The questionnaire was subjected to reliability test using split-half method to measure the reliability and internal consistency from 20 pregnant women who were selected from a health facility in Edo state which was not used for the study. The Cronbach alpha yielded coefficient of 0.711.

Method of Data Collection.
Ethical approval was obtained for the study, and informed consent was obtained from the expectant mothers. Pregnant women who indicated not to participate were not used for the study. The researchers requested assistance of the midwife care providers in the health facilities during data collection. The pregnant women were approached at the time of their visits to the antenatal clinics. Interview method was adopted during the data collection; privacy and physical distancing were maintained during the period of data collection. Confidentiality was ensured by not including the names of the health facilities and the respondents in the data collection. 144 copies of the questionnaire were administered to the respondents.

Method of Data Analysis
Standard descriptive statistics was used to summarize the variables. Percentages were used to answer the research questions while Spearman Rank Order correlation test was adopted in testing the null hypotheses at <0.05 level of significance. Statistical Package for Social Sciences (SPSS) software version 20 was used in the data analysis.

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RESULTS

Table 1. Socio-demographic profiles of the respondents   n =144

Variable	Class	Frequency	Percentage(%)	
Educational Level	Tertiary	109	75.69	
	Secondary	27	18.75	
	Primary	4	2.78	
	No formal education	4	2.78	
Employment Status	Employed	79	54.9	
	Unemployed	65	45.1	
Health Facility	Primary	50	34.7	
	Secondary	50	34.7	
	Tertiary	44	30.6	
Parity	Primigravida	85	59.0	
	Multigravida	59	41.0	
Age	1 (Below 20 years)	1	0.69	Mean age=27.79$\pm$5.31 years
	2 (20-29 years)	99	68.75	
	3 (30-39 years)	37	25.7	
	4 (40-48 years)	7	4.86	Range = 17.0-48.0 years

Table 1 shows that 109 (75.69%) of the respondents had tertiary education, 27 (18.75%) had secondary education, 4(2.78%) had primary education, while 4 (2.78%) had no formal education. 79(54.9%) were employed while 65 (45.1%) were unemployed. For the Health facilities, primary and secondary levels constituted 50 (34.7%) each while tertiary level constituted 44 (30.6%). Among the respondents, 85 (59.0%) were primigravidae while 59 (41%) were multigravidae. 99(68.75%) were between 20-29years, 37 (25.7%) between 30-39 years, 7(4.86%) were between 40-48years while 1 (0.69%) was below 20 years. Mean age of the respondents was 27.79$\pm$5.31 with a range of 17.0 – 48.0 years

Table 2: Pregnant Women's Views, Beliefs, Wearing of face masks and Social/Physical Distancing for Covid-19 Pandemic.

Domain	Items	Responses (F/%)		Mean % Scores of the Domains
		Yes	**No**	
View	Covid-19 is real	126 (87.5)	18(12.5%)	86.80
	Covid-19 is existing	124(86.1%)	20(13.9%)	
Belief about Cause of Covid-19	Covid-19 is indication of abomination	16(11.1%)	128(88.9%)	75.53
	Covid-19 is caused by germ	92(63.9%)	52(36.1%)	
	Covid-19 is a curse/punishment from God	20(13.9%)	124(86.1%)	
	Covid-19 is a sign of end-time	53(36.8%)	91(63.2%)	
Compliance with wearing of face mask	I do not wear face mask	32(22.2%)	112(77.8%)	62.92
	I wear face mask always when out of home	98(68.1%)	46(31.9%)	
	I wear face masks sometimes when outside	110(76.4%)	34(23.6%)	
	It is not relevant to wear face mask	46(31.9%)	98(68.1%)	
	Wearing face mask makes me uncomfortable	109(75.7)	35(24.3%)	

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Maintaining physical/social distancing	I keep at least three steps away from people.	106(73.6%)	38(26.4%)	70.37
	I stay very close to people I come across	39(27.1%)	105(72.9%)	
	I minimize face-to-face discussion with people	102(70.8%)	42(29.2%)	
	I mostly use phoning/text message/email to discuss	100(69.4%)	44(30.6%)	
	I avoid crowded places	125(86.8%)	19(13.2%)	
	I suspend attendance to meetings	70(48.6%)	74(51.4%)	

KEY: Domain mean score of 50% and above = Positive score

View of Pregnant Women in South-South Nigeria about existence of corona virus Pandemic:-
Table 2 shows that majority of the respondents were of the view that Covid-19 is real (87.5%) and is existing (86.1%). Few of the respondents indicated that Covid-19 is not real (12.5%) and is not existing (13.5%). The mean domain score for view was 86.80%

Belief of pregnant women in South-South Nigeria about the cause of Covid-19.
In table 2, 92 (63.9%) of the respondents indicated that Covid-19 is caused by germ, 128 (88.9%) indicated that it is not an abomination, 124(86.1%) had the belief that Covid-19 is neither a curse nor punishment from God, and 91(63.2%) indicated that it is not a sign of end-time. The mean domain score for belief was 75.53%.

Compliance with wearing of face mask by pregnant women in South-South Nigeria:-
Table 2 shows that 98 (68.1%) of the respondents always wore face masks when out of home, 110 (76.4%) wore face mask sometimes outside their homes, 46 (31.9%) indicated that it is not relevant to wear face mask while 109 (75.7%) stated that wearing face mask made them uncomfortable. The mean domain score for wearing of face mask was 62.92%

Maintenance of physical/social distancing
Table 2 shows that 106 (73.6%) of the respondents kept at least three steps away from people, 105 (72.9%) did not stay very close to people they came across, 102 (70.8%) minimized face-to-face discussion with people, 100 (69.4%) mostly used phoning/text message/email for discussion with people and 125 (86.8%) avoided crowded places. The mean domain score for physical/social distancing was 70.37%.

HYPOTHESES TESTING

Table 3. Spearman Rank Order correlation showing the relationships between Views/Beliefs about COVID-19 and wearing of face mask.

Variable	Mean(%)	Rho	P-Value
View about Covid-19 Wearing of face mask	86.80 62.92	0.334	<0.001*
Belief about cause of Covid-19 Wearing of face mask	75.53 62.92	0.173	0.038*

* Significant at p<0.05

Hypothesis 1: View of pregnant women in south-south Nigeria about existence of Covid-19 pandemic is not significantly related to their compliance with wearing of face masks as protective measure.
Table 3 shows that:
alpha-level = <0.05
rho = 0.334
p-value = <0.001
The null hypothesis was rejected. Pregnant women's view about existence of COVID-19 in South-South Nigeria was significantly related to their compliance with wearing of face masks.

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Hypothesis 2: Belief of pregnant women in South-South Nigeria about the cause of COVID-19 is not significantly related to their compliance with wearing of face masks.

Table 3. Shows that at alpha level of <0.05, rho = 0.173, p-value = 0.038. Significant relationship existed between pregnant women's belief about the cause of COVID-19 and their compliance with wearing of face masks. Therefore the null hypothesis was rejected.

DISCUSSION

Views and belief of pregnant women about existence and cause of COVID-19.

Findings from the study showed that majority of the respondents indicated that COVID-19 is real (87.5%), is existing (86.1%) and is caused by germ (63.9%) (table 2). Studies have shown that corona-viruses are pathogens that can live in both animals and humans (Babymed, 2020; Omer et al, 2020). Some of the respondents' negative views and beliefs about the existence and cause of Covid-19 disease (table 2) could be due to their health belief system.

Compliance with wearing of face masks and maintenance of social distancing

Findings from the study showed that 68.1% and 73.6% of the respondents respectively always wore face masks when out of home and maintained physical/social distancing (table 2). Nwafor et al (2020) noted poor practice of preventive measures against Covid-19 among pregnant women attending prenatal clinic in Ebonyi State Nigeria. Researchers have observed that Covid-19 virus could potentially transfer to individuals within a distance of <2 metre (6 feet) of the infected person (Omer, Ali and Babar, 2020; Medline Plus, 2020).

Relationships between Pregnant Women's Views/Beliefs and their compliance with Wearing of face masks

Findings from the study revealed significant relationships between pregnant women views about existence of COVID-19 as well as their belief about the cause of the disease and wearing of face masks (table 3). Warnock-Parkes et al (2021), in their study in United Kingdom, observed that positive social cognitions were associated with increase in the number of people wearing face masks. Warnock-Parkes et al (2021) noted that as non-mask wearers see more people around them wear face masks, they became convinced about the reality and existence of Covid-19, and so develop positive social cognition (eg "I will look confident and competent wearing mask"), and thereby join others in wearing face masks, whereas those with negative social cognition (thoughts like "I will look foolish") were associated with less wearing of face masks. Warnock-Parkes et al (2021) also noted in their study that the strongest predictor of mask wearing by the populace was the belief that face mask helps to protect others from COVID-19.

CONCLUSIONS AND RECOMMENDATIONS

This study indicate positive views and beliefs about existence of COVID-19 among pregnant women in South-South Nigeria. The study also showed that majority of the pregnant women complied with wearing of face masks and maintenance of physical/social distancing; there was significant relationships between the views and beliefs pregnant women expressed and their compliance with wearing of face masks.

There is need to continue the campaign on the existence of corona virus disease by healthcare professionals in Maternal and Child Health Centres. Government and NGOs should supply face masks free-of-charge to pregnant women in antenatal clinics and in their communities to encourage more compliance with wearing of face masks especially among those that cannot afford the cost.

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Determination of the Location of the Limestone Processing Industry in Malang Districts

Lisa Astria Milasari

Faculty of engineering, University of 17 August 1945 samarinda Jalan Ir. H. Juanda 80 Samarinda City, East Kalimantan

ABSTRACT: Malang Regency has the potential for limestone mining and currently there is still not much use. This study was conducted with observations and criteria determining the industrial location for limestone processing. the research variables are raw materials, production, labor, markets and road pavement conditions, with weighting and suspension methods. From the results of the study, the location was chosen as the location of the limestone processing industry, namely Argotirto Village, which is a location close to raw materials and processing processes and is supported by adequate road pavement conditions.

KEYWORDS-location, limestone, potensial

INTRODUCTION

For its use, limestone is used as the main raw material in the processing process of the cement industry, plasterboard industry, lime industry, one of the materials in building construction and other industries that use limestone as the main raw material. Based on the Indonesian Industrial Standard, the cement industry requires limestone with a $CaCO_3$ content of ± 85%. This shows that limestone plays an important role as the main raw material. Malang Regency is one of the areas that has abundant limestone potential, this is because most of the limestone presence is spread in each area of Malang Regency. Based on research from the Mineral Resources Energy Service in 2008, Malang Regency has a limestone content of 1,951,820,050 m3 spread across Kalipare District, Gedangan District, Donomulto District, Sumbermanjing Wetan District, Pagak District, and Bantur District. From the data on the potential of C excavated material in Malang Regency in 2018, the limestone resources that have been measured, for Sumbermanjing Wetan District have the largest limestone content of 871,454,500 m3, compared to 5 other districts, with a mining area in Sumbermanjing Wetan District, which is ± 5,400 Ha. By paying attention to the distance of the location of the transfer of raw materials (raw materials) which will take quite a lot of time, it is feared that it will affect the level of production, where the production is used as industrial raw materials, which in turn will reduce the income level of people who make a living as miners. Thus, it is necessary to have an industrial location as a center of activity that has a number of units of industrial activity using the same means, produces similar products and has prospects as a center for the development of these activities. The study is aimed at determining the appropriate location for the limestone processing industry.

RESEARCH METHODOLOGY

For analysis methods by conducting several approaches using qualitative and quantitative descriptive methods. The research stage is the analysis of limestone potential sourced from the results of interviews with entrepreneurs / mine owners, survey results and related agencies. For the calculation of the analysis of the availability of raw materials, it is used to determine the availability of limestone in the long term as raw material for the limestone processing industry. Then analyze the determination of the location of the industry based on the level of importance and adjusted to the conditions in the field. The steps taken are to analyze scoring using variables of raw materials, production, accessibility, market, and labor. In the process of weighting and scoring, the summation of the weighting will then output the output of the selected location results.

RESULTS AND DISCUSSION

This limestone processing industry produces limestone that has been inventoried / cooked which then sells it to consumers either through orders or directly. The limestone processing process in the study area has a different way, namely processing that is

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carried out traditionally and modernly because the processing process is influenced by consumer demand using limestone. The limestone processing process carried out in the traditional way is in every village, but for Sumberagung Village, it produces more raw materials than processing. The traditional process and the modern process are almost the same in producing the final product but which becomes different in the combustion / heating process, in the traditional process using sawdust this is because the limestone maturation process is more really cooked because its use is used for limestone and bleaching materials. As for the modern process, the heating is carried out using wood, this is due to the increasing consumer demand. The amount of production carried out is inside the village, outside the village and outside the district.

The three villages have different production processes, where for Druju village and Argotirto village use the production process using machines with materials for burning in the form of wood so that the amount of production produced from industry in Argotirto village is 30 tons / day and Druju village is 35 tons / day, while Sumberagung village uses a manual (traditional) burning process with sawdust and produces a total limestone production of 15 tons / day. Themajority of the work for the limestone processing industry resides around the industry. The workforce comes from Argotirto Village with a total industrial workforce of 25 people and the lowest from Sitiarjo Village with a total of 3 industrial workers. Marketing data on limestone processing obtained from 3 limestone industry business owners in Druju, Sumberagung and Argotirto villages, which have recapitulated sales / orders to consumers both outside and within the Sumbermanjing Wetan district in the last 5 years.

Analysis of limestone potential consists of the process of forming limestone in Malang Regency which previously experienced a sedimentation process, where this sedimentation process occurs due to the presence of marine plants (colonies of foraminifera animals, algae and other species) that have died and been deposited on the seabed with calm sea conditions. Limestone that occurs due to chemical sedimentation occurs due to chemical processes that take place continuously in the vast ocean with solutions contained in it, which chemically contain calcium carbonate (limestone content based on data from the ESDM Office, Malang Regency, Limestone content CaO, SiO2, AI2O3, H20, Fe203, Fe 2 0 3, Na20, MgO). Based on the results of observations, the color of limestone in the study area is brown white (dirty white), hard and has small cavities. For indicators of raw material availability, namely for forecasting reserves for the future, it is still 45 years (Druju Village 24 years, Argotirto Village 6 years, Sumberagung Village 15 years). For mining techniques Based on the results in the field, the mining conditions carried out still use blasting, which is used to dismantle the excavated rock / material from the parent rock, after that, carry out dredging. This resulted in the blasting technique being a lack of supervision on the part of the government and resulting in a lack of work safety.

The analysis of determining the location of the limestone processing industry is the calculation of the classification of the selected location hierarchy based on the number of scores on each variable of the location of the limestone processing industry using weighting and scoring, so that the highest hiarchy value is the selected location. The closer the location of the raw materials, the smaller the transportation costs of both raw materials and finished goods, so the price of limestone products will be more affordable. Meanwhile, when compared to the location of raw materials, it will affect the decline in the level of limestone production. The score scores are arranged based on the class of a certain interval. Where for the selected location hierarchy classification score value uses the interval class range of 21 for each addition of the score value, while for the number of values the selected location hierarchy.

Table 1. Determination of selected locations

No.	Village	raw materials			Production			Workforce			Road Conditions			Market			Total value	Location Hierarchy
		A	B	C	A	B	C	A	B	C	A	B	C	A	B	C		
1	Sb.Manjing Wtn	5		50	2		16	3		18	7		28	2		4	116	III
2	Harjokuncaran	3		30	2		16	3		18	6		24	2		4	92	IV
3	Argotirto	4		40	8		64	4		24	5		20	3		6	154	I
4	Ringinsari	2	10	20	2	8	16	2	6	12	6	4	24	4	2	8	80	IV
5	Sitiarjo	3		30	2		16	1		6	7		28	4		8	88	IV
6	Sources	8		80	2		16	2		12	4		16	4		8	132	II
7	Ringinkembar	2		20	2		16	2		12	5		20	3		6	74	IV
8	Druju	4		40	6		48	2		12	5		20	7		14	134	II
	Sum	33	10	343	30	8	240	20	6	120	45	4	180	29	2	58	908	-

description : A = Score

B = Weight

C = Value

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In the table above, the value of the selected location is obtained from the final result score on each variable multiplied by the selected weight, where the selected weight is obtained based on the level of importance. Theraw material variable obtained the highest score value of 80 in Sumberagung Village and the lowest score value of 20 in Ringinsari Village and Ringinkembar Village. For the production variable, the highest score was obtained at 64 in Argotirto Village, and the lowest score value was 16 in Sumberagung Village, Sumbermanjing Wetan Village, Harjokuncaran Village, Sitiarjo Village, Ringinsari Village, Ringinkembar Village, and Druju Village.

Meanwhile, for other variables, namely the variable number of workers, the highest score of 24 was obtained in Argotito Village, and the lowest score value of 6 in Sitiarjo Village. For the road condition variable, the highest score was obtained at 28 in Sitiarjo Village and Sumbermanjing Wetan Village, while the lowest score value was 16 in Sumberagung Village. As for the market variable, the highest score value was obtained at 14 in Druju Village, and the lowest score value at 4 in Sumbermanjing Wetan Village and Harjokuncaran Village.

Based on the results of the total value of the selected location hierarchy, it is obtained from each number of scores on each variable, so that a total value is obtained. Then the total values are grouped according to the hierarchical classification of selected locations (in table 3.18). So the highest total score was obtained, which was 154 in Argotirto Village as the I-th location hierarchy. From the analysis above, the village that has the highest value and is the priority of being selected is Argotirto Village.
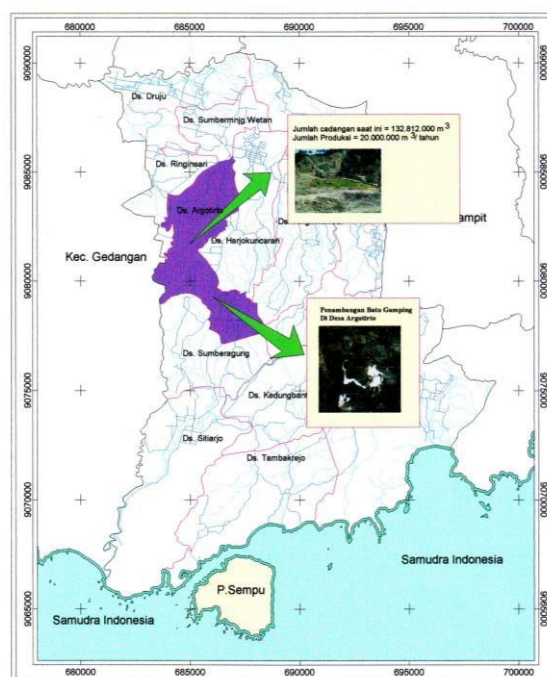
selected location on Argotirto Village

CONCLUSIONS

Based on the results of the analysis of the availability of raw materials, for limestone it is estimated that up to 24 years this is sourced from data from related agencies, but when viewed from conditions in the study area, there are still limestones whose reserves are still unknown. And the analysis of determining the location in Sumbermanjing Wetan District for the scope of the Village using the scoring and weighting method, the selected location is Argotirto Village with the highest number of score scores of 154. So that Argotirto Village is suitable for the location of the limestone processing industry, by having the potential for raw materials and production processes that can streamline limestone production results, having the highest number of limestone orders and the number of workers, and supported by adequate road pavement conditions.

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Optimizing Psychological Wellbeing, by Lowering Parental Stress in Parents of Intellectually Disabled Children.

Dr. G.Suganya[1], Dr.N.Balakrishnan[2]

[1]Ph.D Scholar, Department of Psychology, Annamalai University, ORCID ID: 0000-0002-8852-9878
[2]Associate professor, Department of Psychology, Annamalai University.

ABSTRACT: Intellectual disability is one of the most prevalent developmental disabilities of the children globally. As per the reports of the Disability Statistics in India 2017, which was updated from the census data of 2011, there are 1.5 million people with intellectual disability (Kumar, 2017). Though this number is alarming, there are less statistical data's available to describe about the family members, who is suffering because of intellectually disabled children. Family is the main source of support for those disabled children in any society. Parents experience enormous physical and mental stress while dealing with the intellectually disabled children (Islam, Shanaz, & Farjana, 2013). It could be an unfavourable and challenging occurrence that could follow the possibility of frustration, feeling of sadness, and hopelessness. Various evidences indicate that the parents of the intellectually disabled children face emotional, social and economic problems that are often limiting, destructive and conclusive in nature, (Boromand, Narimani, & Mosazadeh, 2014), since intellectual disability is a permanent condition unlike many other diseases (ThiyamKiran Singh, Indla, & Indla, 2008).

Perceiving stress in these parents is hence unavoidable in families with Intellectually Disabled children. When the parental stress is more, less psychological wellbeing will be existing for the parents. Hence, in this study, the researcher correlates perceived stress related to certain demographic variables like age, occupation & income with psychological wellbeing by a valid scale. The study was done with sixty parents, in Cuddalore district of Tamilnadu.

KEYWORDS: Intellectually Disabled, Psychological wellbeing, Parental stress, perceived stress.

INTRODUCTION

Mental health is now understood to involve both the absence of mental illness and the presence of psychological well-being. In the field of psychology, Psychological well-being is a complex construct that concerns optimal psychological functioning and experience. It may be defined as including hedonic (enjoyment, pleasure) and eudaimonic (meaning, fulfilment) happiness as well as resilience coping, emotion regulation, healthy problem solving; Gross and Munoz, 1995; Ryff, 1995; Ryan and Deci, 2001; Community Translational Science Team, 2016; NIH Report, 2018.

Carol Ryff, an American psychologist, studied the influence of certain life events, challenges, and transitions that we experience throughout our lives on Psychological health. She developed her Six-factor Model, which covers several axes associated with Psychological Well-being. Ryff describes in this model, that psychological well-being can be achieved when an individual can attain a state of balance between both challenging and rewarding life events. Evidence supports a causal relationship between Psychological well being & better overall health and improved disease specific outcomes. (Ong,2010 Diener and Chan,2011 Desteno et al 2013 Kok et al 2013Cohen et al,2016).

Parental stress is often related to the severity of the child's condition, the experience of stress is also dependent on how parents perceive the situation. It is also dependent on whether coping strategies are used to manage stress (Lopez, Clifford, Minnes, & Ouellette-Kuntz, 2008). Prominent theories of stress and coping, in recent times, focus on the importance of cognitive appraisals in parents of children with Intellectual Disabilities. Thus effective coping depends on how well the parents adopt in meeting the demands placed on them and how burdensome they feel about the whole situation. (Thakuri, 2014)

REVIEW OF LITERATURE

Extensive literature describes the possible causes and effects of parental stress & all the possible ways of coping.

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A study was done by Dabrowska & Pisula (2010) on parents of pre-school children who had children with Autism and Down syndrome. The study aimed at evaluating the association between parenting stress and coping styles. They brought to light some interesting facts. In this study, 162 parents were examined. They had to answer 'Holroyd's 66-item short form of Questionnaire of Resources and Stress for Families with Chronically Ill or Handicapped Members'. They were also given Endler and Parker's 'Coping Inventory for Stressful Situations'. Higher level of stress in parents of children with autism was shown in the result. Between child diagnostic group and parent's gender an interaction effect was revealed. With regard to gender of the parents, in comparison to fathers, mothers of children with autism scored higher in parental stress.

In Down syndrome and in typically developing children such differences were not found in the group of parents. In social diversion coping the parents of children with autism differed from parents of typically developing children. In the sample of parents, children with autism and Down syndrome, emotion-oriented coping was the predictor for parental stress. In the sample of parents of typically developing children task-oriented coping was the predictor of parental stress. By these results, earlier findings on parenting stress with autism were strongly supported. (Dabrowska & Pisula, 2010)

Gupta, Mehrotra & Mehrotra (2012) used the short form of the Parenting Stress Index and a few open ended questions in 2009 in the cities of New Delhi and Faridabad regions to a convenience sample of sixty-six patient families through six NGOs that serve children with disabling conditions. Among the variables, they found that the female gender children were associated with higher stress. It was related to the failure of the child to meet parent's expectations and also to satisfy the parents in their parenting role. Parents who were engaged in more lucrative and prestigious occupations had higher stress than parents engaged in less prestigious and lucrative occupations irrespective of their income. Many parents mentioned receiving little support from their extended families in taking care of their child.

In the study undertaken by Hidangmayum & Khadi (2012) to know the parenting stress of normal and intellectually disabled children studying in primary school and special school respectively in Hubli-Dharwad city of Karnataka during year 2009-2010, a differential research design was used to compare the parenting stress of intellectually disabled and normal children. The sample for intellectually disabled children and normal children constituted 30 parents of intellectually disabled children and 60 parents of normal children respectively. Parenting Stress Index - Short Form (PSI-SF) was administered to the mothers of the selected children. In their study they found that the parenting stress of intellectually disabled children was significantly higher than that of normal children. They also observed that parents of children with intellectual disability often experienced considerable stress resulting from worries and demand related to their children.

Farheen, Dixit, & Bansal (2013) did a research on the perceived stress by families with intellectually disabled children enrolled in special schools at Indore. For their study, a total of 100 families with intellectually disabled children were questioned. Pretest was done with "The Family Interview for Stress and Coping in Mental Retardation" (FISC-MR), developed at NIMHANS Bangalore. Stress scores were measured on Likert scale. Percentage of families on various score grades was calculated. Following were the areas in which stress was studied; daily care stress, emotional stress, social stress and financial stress. Of this, 81% families reported daily care stress, 65% reported emotional stress, 51.5% reported social stress, and 64% families reported financial stress. By this Farheen et al., 2013, concluded that severe or very high stress was reported by the families in sub areas of extra inputs for care and decreased leisure time. Moderate degree of stress was felt by maximum families in sub areas of personal distress and neglect of other family members.

Shyam, Kavitha, & Govil (2014) designed a study to assess the parenting stress and family burden in mothers of children with disabilities and mothers of children without disability, from the three districts of the state of Haryana, India. Parenting stress index and family burden scale was administered on 125 mothers of children with disabilities and without disability (25 mothers in each group). For this purpose, a multi group design was adopted which consisted of five groups of mothers. They were (1) mothers of children with mental disability, (2) mothers of children with both mental and physical disability, (3) mothers of children with physical disability, (4) mothers of deaf and dumb children and (5) mothers of children without disability. For statistical analysis, t-test, simple analysis of variance and Duncan's post hoc test were used. Results obtained by Shyam et al., (2014) revealed that mothers of children with both mental and physical disability and mothers of children with mental disability scored significantly higher level of parenting stress compared to others.

Need for the Study

Thus, as the studies describe, parents of intellectual disability children have to perform certain additional responsibilities as the presence of intellectual disability child can be a crisis for the parents. In such compensatory task, some parents lower their psychological wellbeing, day by day. Generally parents consult with health professionals, black magicians as well as their religious teachers to recover from this type of crisis situations. A study outlined that parents who have ongoing contact with health professionals are more likely to recover from the crisis and cope with the situation (Schmidt, Lay, Gope et. al, 2006). They strongly

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claimed that home based treatment programs for children with disabilities appear to be an effective, reliable and sustainable strategy.

Objectives

- To assess the perceived stress, of parents of intellectually disabled children, as related to certain demographic variables.
- To assess psychological wellbeing, of parents of intellectually disabled children, to know whether any of the subcomponents, As described by CAROL RYFF, carries a deficit.
- To statistically correlate, perceived stress of parents with the subcomponent in psychological wellbeing, for therapeutic Attention from health care professionals.

Psychological wellbeing according to Carol Ryff

She explains psychological wellbeing as composed of subcomponents, Autonomy, Environmental mastery, Personal growth, Positive relations, Purpose in life & Self-acceptance. The questionnaire devised by her is easily of self-administered type and summation of sub scores in all dimensions describes total score. Higher score indicates higher psychological wellbeing.

Findings of Psychological wellbeing in Parents of Intellectual Disability

Parents of intellectually Disabled children are evaluated by Psychological wellbeing scale of **Carol Ryff**(**Author**). It consisted of 42 statements, in which parents has to say how strongly they agree or disagree with the statements. Response is calculated by Likert scale, scoring for all six subcomponents will be noted.

As per the author description, High scores in AUTONOMY indicate, as applicable to this study, parents are independent and they can regulate their behaviour independent of social pressures. Low scoring parents were bothered by other's views. They were having the attitude of not attending any social activities, not taking their intellectually disabled child to a social gathering like marriage, not to expose their child to others.

As per the author description in ENVIRONMENTAL MASTERY, as applicable to this study higher scores indicate effective use of opportunities and mastery of managing everyday affairs, with creating situations to benefit personal needs will be present. Low scores, indicate parents are unaware of opportunities, they fail to manage daily activities.

As per the author description in PERSONAL GROWTH, as applicable to this study, higher scores indicate, parents can welcome new experiences, like learning a coping skill, they can recognize improvement in behaviour in short period of time, say 3 months, by that learning. Low scoring parents, may not show interest in such learning although it is applicable to them. Later in life feel bored & unsatisfied with life due to stress, may not reinforce positive behaviours of themselves, their children.

As per the author description in, POSITIVE RELATIONS with others, as applicable to this study, Higher scores indicate meaningful relationships with others that include reciprocal empathy, intimacy, and affection atleast with other such suffering parents from whom they can learn, share feelings, etc. Low scorers among the parents feel isolated, feel unwanted due to their intellectually disabled children with other relatives and fail to establish positive contact with other parents holding Intellectually Disabled children.

As per the author description in PURPOSE IN LIFE as applicable to this study, High scores can be taken for goal orientation and conviction that life holds meaning for parents. They should have individual goals as related to other normal siblings of intellectually disabled children. If the normal siblings can achieve success in their academics or in sports like extracurricular activities, then, parents should be able to motivate them irrespective of their situation and stress in life due to intellectually disabled child. Low scorers, doesnot fulfil these points when the researcher assessed them.

As per the author description in SELF ACCEPTANCE, as applicable to this study, higher scores were seen with positive attitude parents. They see everyday problems without any mood changes. They never reflected their bad situation due to intellectually disabled on normal siblings or on elders available in the family. Low scoring parents just exhibited mood changes, they were not happy throughout the day, expressed, why they are cursed to life in this world.

METHOD

Design and Sample

This qualitative, descriptive study examined the coping responses of siblings of children with disabilities. The design, method, and purpose were simply descriptive (Sandelowski, 2000). The work is part of a larger study of family adaptation to a child with a disability. For purposes of this study, *disability* was defined as any condition that qualified a child for federally mandated early intervention and special education programs offered by local school districts. The purposive sample was recruited from families with a child enrolled in such programs in special school in the Cuddalore district.

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Procedures

After approval for research with human participants from NGO involved, families were contacted by special meeting arranged with help of special school. An appointment was made for a home visit with those families who gave permission for participation in the study. Procedures were explained, informed consent obtained from parents, from all children involved in the study.

DATA ANALYSIS AND RESULT

Table 1. Influence of Age of the Respondents on Perceived Stress

Perceived Stress	Age based analysis of 60 parents			F-Value	p-Value
	26- 35 Years (10)	36-45 Years (14)	Above 45 Years (36)		
	Mean ± SD	Mean ± SD	Mean ± SD		
Stress in Daily Care Pre therapy	4.49±0.223	4.50±0.246	4.45±0.332	0.210	.811
Stress in Daily Care 3Months	3.24±0.151	3.66±0.122	3.76±0.173	41.118	.000
Stress in Daily Care 6Months	2.81±0.129	2.97±0.182	3.06±0.236	5.872	.005
Stress Family Emotional Pre therapy	4.93±0.048	4.30±0.184	4.20±0.332	28.010	.000
Stress Family Emotional 3Months	3.45±0.227	3.89±0.305	3.99±0.322	12.133	.000
Stress Family Emotional 6Months	2.87±0.330	3.21±0.570	3.65±0.368	15.918	.000
Stress Social Life Pre therapy	4.62±0.132	4.65±0.129	4.61±0.207	.233	.793
Stress Social Life 3Months	3.95±0.242	4.21±0.410	4.49±0.325	11.671	.000
Stress Social Life 6Months	3.63±0.368	3.74±1.077	4.35±0.296	9.350	.000
Stress Financial Implications Pre therapy	3.48±0.169	3.63±0.261	3.43±0.416	1.565	.218
Stress Financial Implications 3Months	3.57±0.116	3.50±0.232	3.44±0.402	.610	.547
Stress Financial Implications 6Months	3.62±0.148	3.30±0.499	3.42±0.408	1.850	.167

Table 1 shows the mean and standard deviation of the perceived stress with respect to the respondents' age group. ANOVA was performed to identify the existence of mean difference among the different age group of the respondents. Seven variables have significant outcome. The insignificant outcomes occurred for the Stress in Daily Care Pre-Therapy (F = 0.210; P = 0.811), Stress Social Life Pre-Therapy (F = 0.233; P = 0.793), Stress Financial Implications Pre-Therapy (F = 1.565; P = 0.218), Stress Financial Implications 3 month-Therapy (F = 0.610; P = 0.547), and Stress Financial Implications 6 month-Therapy (F = 1.850; P = 0.167). This shows that the respondents do not differ with respect to their age towards Stress in Daily Care.

While analyzing the existence of mean difference among the different age groups of the respondents towards stress in daily care 3-month therapy, ANOVA result shows a highly significant outcome (F = 41.118; p =0.000). Post-Hoc Tukey test result confirms that the respondents who are above 45 years (mean = 3.76; SD = 0.173) and 36-45 years (mean = 3.66; SD = 0.122) are having more perceived stress towards daily care 3-month therapy compared to the respondents who are in the age group of below 26-35 years (mean = 3.24; SD = 0.151).

Similarly, in the case of stress in daily care 6 month therapy also, respondents differ significantly with respect to their age (F = 5.872; p =0.005), and the Post-Hoc Tukey test result shows that the respondents who are above 45 years (mean = 3.06; SD = 0.236) and 36-45 years (mean = 2.97; SD = 0.182) are having more perceived stress towards daily care 6-month therapy compared to the respondents who are in the age group of below 26-35 years (mean = 2.81; SD = 0.129).

While analysing the existence of mean difference among the different age groups of the respondents towards stress family emotional pre-therapy, ANOVA result shows a highly significant outcome (F = 28.010; p =0.000). Post-Hoc Tukey test result confirms that the respondents who are 26-35 years (mean = 4.93; SD = 0.048) are having more perceived stress towards stress family emotional pre-therapy compared to the respondents who are in the age group of 36-45 years (mean = 4.30; SD = 0.184) and above 45 years (mean = 4.20; SD = 0.332).

Similarly, in the case of stress family emotional 3 month-therapy also, respondents differ highly significantly with respect to their age (F = 12.133; p = 0.000), and the Post-Hoc Tukey test result shows that the respondents who are above 45 years (mean

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= 3.99; SD = 0.322) and 36-45 years (mean = 3.89; SD = 0.305) are having more perceived stress towards stress family emotional 3 month-therapy compared to the respondents who are in the age group of below 26-35 years (mean = 3.45; SD = 0.227).

While analysing the existence of mean difference among the different age groups of the respondents towards stress family emotional 6 month-therapy, ANOVA result shows a highly significant outcome (F = 15.918; p =0.000). Post-Hoc Tukey test result confirms that the respondents who are 26-35 years (mean = 3.65; SD = 0.368) are having more perceived stress towards stress family emotional 6 month-therapy compared to the respondents who are in the age group of 36-45 years (mean = 3.21; SD = 0.570) and above 45 years (mean = 2.87; SD = 0.330).

Similarly, in the case of stress social life 3 month-therapy also, respondents differ highly significantly with respect to their age (F = 11.671; p = 0.000), and the Post-Hoc Tukey test result shows that the respondents who are above 45 years (mean = 4.49; SD = 0.325) and 36-45 years (mean = 4.21 SD = 0.410) are having more perceived stress towards stress in social life 3 month-therapy compared to the respondents who are in the age group of below 26-35 years (mean = 3.95; SD = 0.242).

While analysing the existence of mean difference among the different age groups of the respondents towards stress in social life 6 month-therapy, ANOVA result shows a highly significant outcome (F = 9.350; p =0.000). Post-Hoc Tukey test result confirms that the respondents who are 26-35 years (mean = 4.35; SD = 0.296) are having more perceived stress towards stress in social life 6 month-therapy compared to the respondents who are in the age group of 36-45 years (mean = 3.74; SD = 1.077) and above 45 years (mean = 3.63; SD = 0.368).

Table 2. Influence of Occupation of the Respondents on Perceived Stress

Perceived Stress	Occupation based analysis of 60 parents					F-Value	p-Value
	Government Sector (6)	Private Sector (15)	Agriculture Work (3)	Self-Employment (19)	Home Maker (17)		
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD		
Stress Daily Care pre therapy	4.65±0.356	4.31±0.228	4.6±0.000	4.52±0.297	4.48±0.307	2.114	.091
Stress in Daily Care 3Mon	3.68±0.214	3.59±0.264	3.93±0.153	3.72±0.123	3.56±0.302	2.509	.052
Stress in Daily Care 6Mon	2.95±0.207	2.95±0.141	3.27±0.153	3.12±0.190	2.88±0.256	4.901	.002
Stress Family Emotional Pre therapy	4.3±0.310	4.22±0.587	4.4±0.000	4.31±0.135	4.5±0.372	1.215	.315
Stress Family Emotional 3Mon	3.78±0.194	3.83±0.437	4.1±0.100	4±0.311	3.77±0.372	1.448	.231
Stress Family Emotional 6Mon	3.35±0.394	3.37±0.392	3.8±0.000	3.54±0.620	3.28±0.534	1.053	.389
Stress Social Life Pre therapy	4.58±0.147	4.45±0.185	4.7±0.000	4.69±0.152	4.69±0.125	6.901	.000
Stress Social Life 3Mon	4.15±0.333	4.25±0.372	4.5±0.000	4.51±0.416	4.26±0.387	1.781	.146
Stress Social Life 6Mon	3.93±0.952	4.15±0.329	4.27±0.058	4.14±0.903	4.01±0.534	.245	.911
Stress Financial Implications Prether	3.27±0.367	3.28±0.404	3.5±0.000	3.62±0.402	3.59±0.134	3.229	.019
Stress Financial Implications 3Mon	3.1±0.335	3.38±0.341	3.4±0.000	3.54±0.370	3.64±0.169	4.086	.006
Stress Financial Implications 6Mon	2.98±0.371	3.4±0.351	3.2±0.000	3.43±0.512	3.64±0.203	3.680	.010

Table 2 shows the mean and standard deviation of the perceived stress with respect to the respondents' occupation. ANOVA was performed to identify the existence of mean difference among the different occupation of the respondents. Among the towel variables, six variables have significant outcome. The insignificant outcomes occurred for the Stress in Daily Care Pre-Therapy (F = 2.114; P = 0.091), Stress Family Emotional Pre-Therapy (F = 1.215; P = 0.315), Stress Family Emotional 3 Month-Therapy (F = 1.448; P = 0.231), Stress Family Emotional 6 Month-Therapy (F = 1.053; P = 0.389), Stress Social Life 3 Month-Therapy

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(F = 1.781; P = 0.146), and Stress Social Life 6 Month-Therapy (F = 0.245; P = 0.911). This shows that the respondents do not differ with respect to their occupation towards Stress in Daily Care.

While analyzing the existence of mean difference among the different occupation of the respondents towards stress in daily care 3-month therapy, ANOVA result shows a significant outcome (F = 2.509; p =0.052). Post-Hoc Tukey test result confirms that the respondents who are in Agriculture Work (mean = 3.93; SD = 0.153) and Self-Employment (mean = 3.72; SD = 0.123) are having more perceived stress towards daily care 3-month therapy compared to the respondents who are in the occupation of Government Sector (mean = 3.68; SD = 0.214), Private Sector (mean = 3.56; SD = 0.302) and Home Maker (mean = 3.56; SD = 0.302)

Similarly, in the case of stress in daily care 6 month therapy also, respondents differ significantly with respect to their occupation (F = 4.901; p =0.002), and the Post-Hoc Tukey test result shows that the respondents who are in Agriculture Work (mean = 3.27; SD = 0.153) and Self-Employment (mean = 3.12; SD = 0.190) are having more perceived stress towards daily care 6-month therapy compared to the respondents who are in the occupation of Government Sector (mean = 2.95; SD = 0.207), Private Sector (mean = 2.95; SD = 0.141) and Home Maker (mean = 2.88; SD = 0.256)

Table 3. Influence of Income of the Respondents on Perceived Stress

Perceived Stress	Income based analysis of 60 parents				F-Value	p-Value
	Below Rs. 10,000 (21)	Rs.10,000-Rs. 25,000 (16)	Rs. 25,001 - Rs. 40,000 (15)	Rs. 40,000 and above (8)		
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD		
Stress in Daily Care Pre therapy	4.39±0.231	4.58±0.283	4.44±0.401	4.48±0.203	1.263	.296
Stress in Daily Care 3Mon	3.63±0.242	3.66±0.245	3.73±0.216	3.50±0.273	1.686	.181
Stress in Daily Care 6Mon	2.99±0.208	3.01±0.226	3.05±0.270	2.93±0.205	.586	.626
Stress Family Emotional Pre therapy	4.40±0.371	4.36±0.242	4.13±0.442	4.56±0.389	2.803	.048
Stress Family Emotional 3Mon	3.95±0.375	3.99±0.238	3.75±0.331	3.68±0.453	2.584	.062
Stress Family Emotional 6Mon	3.47±0.499	3.57±0.432	3.33±0.512	3.14±0.646	1.494	.226
Stress Social Life Pre therapy	4.58±0.144	4.69±0.175	4.58±0.240	4.68±0.089	1.651	.188
Stress Social Life 3Mon	4.41±0.368	4.49±0.287	4.19±0.389	4.11±0.500	2.940	.041
Stress Social Life 6Mon	4.16±0.614	4.36±0.332	3.87±0.791	3.75±0.835	2.393	.078
Stress Financial Implications Pre therapy	3.53±0.441	3.54±0.222	3.32±0.391	3.56±0.200	1.461	.235
Stress Financial Implications 3Mon	3.54±0.398	3.57±0.189	3.23±0.317	3.60±0.185	4.443	.007
Stress Financial Implications 6Mon	3.53±0.462	3.56±0.182	3.07±0.349	3.53±0.365	6.189	.001

Table 3 shows the mean and standard deviation of the perceived stress with respect to the respondents' income level. ANOVA was performed to identify the existence of mean difference among the different income level of the respondents. Among the towel variables, four variables have significant outcome, the insignificant outcomes occurred for the Stress in Daily Care Pre-Therapy (F = 1.263; P = 0.296), Stress in Daily Care 3 month-Therapy (F = 1.686; P = 0.181), Stress in Daily Care 6 month-Therapy (F = 0.586; P = 0.626), Stress Family Emotional 3 month-Therapy (F = 2.584; P = 0.062), Stress Family Emotional 6 Month-Therapy (F = 1.494; P = 0.226), Stress in Social Life Pre-Therapy (F = 1.651; P = 0.188), Stress Social Life 6 Month-Therapy (F = 2.393; P = 0.078), Stress in Financial Implication Pre-Therapy (F = 1.461; P = 0.235). This shows that the respondents do not differ with respect to their income level towards Stress in Daily Care Pre-Therapy, Stress in Daily Care 3 month-Therapy, Stress in Daily Care 6 month-Therapy, Stress Family Emotional 3 month-Therapy, Stress Family Emotional 6 Month-Therapy, Stress in Social Life Pre-Therapy, Stress Social Life 6 Month-Therapy, Stress in Financial Implication Pre-Therapy.

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While analyzing the existence of mean difference among the different income level of the respondents towards stress in family emotional pre-month therapy, ANOVA result shows a significant outcome (F = 2.803; p =0.048). Post-Hoc Tukey test result confirms that the respondents who are earn Rs. 40,000 and above (mean = 4.56; SD = 0.389), Below 10,000 (mean = 4.40; SD = 0.371) and Rs.10,000 - Rs. 25,000 (mean = 4.36; SD = 0.242) are having more perceived stress towards Family Emotional Pre-month therapy compared to the respondents who are in the income level of Rs. 25,001 - Rs. 40,000 (mean = 4.13; SD = 0.442).

Similarly, in the case of stress in Social Life 3-month therapy also, respondents differ significantly with respect to their income level (F = 2.943; p =0.041), and the Post-Hoc Tukey test result shows that the respondents who earn below 10,000 (mean = 4.41; SD = 0.368) and Rs. 10,000 – Rs, 25,000 (mean = 4.49; SD = 0.287) are having more perceived stress towards Stress in Social Life 3-month therapy compared to the respondents who are in the income level of Rs. 25,001 - Rs. 40,000 (mean = 4.19; SD = 0.389) and Rs.40,000 and above (mean = 4.11; SD = 0.500).

While analyzing the existence of mean difference among the different income level of the respondents towards stress in financial implication 3-month therapy, ANOVA result shows a significant outcome (F = 4.443; p =0.007). Post-Hoc Tukey test result confirms that the respondents who are earn Rs.40,000 and above (mean = 3.60; SD = 0.185), Rs. 10,000 – Rs, 25,000 (mean = 3.57; SD = 0.189) and Below 10,000 (mean = 3.54; SD = 0.398) are having more perceived stress towards stress in financial implication 3-month therapy compared to the respondents who are in the income level of Rs. 25,001 - Rs. 40,000 (mean = 3.23; SD = 0.317).

Similarly, in the case of stress in financial implication 6-month therapy also, respondents differ significantly with respect to their income level (F = 6.189; p =0.001), and the Post-Hoc Tukey test result shows that the respondents who are earn Rs.40,000 and above (mean = 3.53; SD = 0.365), Rs. 10,000 – Rs, 25,000 (mean = 3.56; SD = 0.182) and Below 10,000 (mean = 3.53; SD = 0.462) are having more perceived stress towards stress in financial implication 6-month therapy compared to the respondents who are in the income level of Rs. 25,001 - Rs. 40,000 (mean = 3.07; SD = 0.349).

RESULT

According to the age wise distribution of parents, the respondents who are above 45 years and 36-45 years are having more perceived stress towards daily care of intellectually disabled child. Parental stress as relating to occupation, shows, the respondents who are in Agriculture Work and Self-Employment are having more perceived stress compared to the respondents who are in the occupation of Government Sector, Private Sector and Home Maker. Ryff's philosophy is that psychological well-being isn't just based on positive emotions—it's a balanced overview of multiple aspects of life. Hence ,While analysing through Ryff's psychological wellbeing scale, researcher found that, mother's perceived stress affected the subcomponents 1.positive relations, 2.purpose in life, 3.self-acceptance. They were more in number, in low scorers than fathers, in these three subcomponents.

CONCLUSION

It is not an easy task to do parenting for an intellectually disabled child. In this study, the Perceived stress of the parents of intellectually disabled children is classified according to different demographic variables & tabulated. Even though both parents go through the stress, often it is the mothers who need more help and support in handling intellectually disabled children. This was true when analysing the psychological wellbeing of them. Many mothers (females) were low scorers, thus having depression. In mothers, depression compromises the ability to provide warm and sensitive care and is associated with the use of more negative discipline methods and with negative attribution biases regarding their children (Zahn-Waxler et al., 2002).

From this study, it is evident that, perceived stress & psychological wellbeing needs to be focused more on mothers compared to fathers of intellectually disabled children. Early administration of coping skills may reduce their stress. Any rehabilitation program may work effectively for the differently abled if professionals focus on reducing this parental stress. Moreover coping skill training is essential for better survey of other family members like siblings of the differently abled. Health professionals like Occupational Therapist need to integrate the multidimensional nature of psychological wellbeing into effective primary and secondary prevention programs to help normally functioning Parents, optimize their lives and to minimize the negative effects of stress.

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The Use of Flipbook Learning Media with a Scientific Approach to Improve Prodecure Text Writing Skills

Martina Sunaryo[1], Sarwiji Suwandi[2], Retno Winarni[3]

[1]Student, Master in Indonesian Language Education, Sebelas Maret University, Surakarta-Indonesia

[2,3]Lecturer, Master in Indonesian Language Education, Sebelas Maret University, Surakarta- Indonesia

ABSTRACT: This study aims to (1) describe and explain the quality of the learning process in procedural text writing skills (2) describe and explain the improvement of procedural text writing skills using flipbook learning media with a scientific approach. This study uses the classroom action research method (classroom action research) with 2 cycles, each cycle consisting of 2 meetings. Each cycle consists of planning, implementation, action, observation and reflection. This research was conducted for eight months, from August to March 2022 and was carried out at SMPN 22 Jambi City. The research subjects were Indonesian language teachers and students of class VII G SMP Negeri 22 Jambi City, totaling 28 students consisting of 12 female and 16 male. Data collection techniques consist of test and non-test techniques (observation, interviews, and documentation). The validity of the data in this study used triangulation of data sources. The data analysis technique uses descriptive analysis to describe the increase in student success in each cycle and calculates the average to see the value of student learning completeness. The results showed that 1) The quality of learning to write procedural texts in terms of teacher and student activities has increased. The increase in teacher activity from the learning aspect has increased to reach 100%. The activity of students in the active aspect of listening and receiving teacher explanations increased from 51.79% in the Cycle I to 73.21% in the Cycle II. In the aspect of answering and asking questions, it increased from an average of 44.64% in the Cycle I to 65, 18% in cycle II. In the aspect of ability in discussion increased from an average of 44.64% in the Cycle I to 66.96% in the Cycle II. In the aspect of activeness in carrying out tasks, it increased from 57.14% in the Cycle I to 83.93% in the Cycle II. In the aspect of following the reflection, it increased from 58.93% in the Cycle I to 100% in the Cycle II. 2) The results of students' procedural text writing skills increased as indicated by an increase in grades. In the pre-action, the percentage of completeness was 17.86% in the less category with an average value of 63.25. In the Cycle I, the completeness increased to 67.86% although it was still in the less category with an average value of 71.75. In the Cycle II, the percentage of completeness reached 100% in the very good category, with the average grade achieved was 90.75. This means that flipbook learning media with a scientific approach can improve the quality of learning and writing procedure text skills.

KEYWORDS: learning media, flipbook, procedure text writing skills.

I. INTRODUCTION

Writing is the most difficult language skill compared to others. Writing skill is the last skill that is learned and mastered by students and writing is a complex activity. As stated by Nurgiyantoro (2015: 422), that among the other three language skills (listening, reading, and speaking), writing skills can be said to be more difficult to master. In writing, not only imagination, ideas or ideas are needed but also consideration is needed in composing a good and correct sentence so that the reader can understand what we are writing. Therefore, writing is not only an easy activity and does not need to be learned but must be mastered (Slamet, 2009: 97). In the revised 2013 curriculum for class VII, there are basic competencies in presenting data on a series of activities in the form of procedural texts by paying attention to structure, linguistic elements, and content orally and in writing. The basic competence of writing procedural texts is important to be taught in order to achieve learning objectives.

The ability to write procedural text is a type of text that belongs to the factual genre of the procedural subgenre. In the procedure text, apart from the initial stage in conducting experiments, it can also be in the form of a series of experiments (Mahsun, 2014:30). Procedure text can usually be found in writing that contains how to, tips or tutorials on doing something. Learning to write an effective procedure text must be a learning methodappropriate learning media, interesting learning media,

conducive classroom conditions, and regular practice. So that students can write procedural texts with the right arrangement, according to the structure, linguistic rules and etc.

After conducting interviews with Indonesian language teachers at SMP Negeri 22 Jambi City, information was obtained that students had difficulties in procedural text material. This is evidenced by the average student score for the material for writing procedural texts of 63.25, there are 23 students whose scores are still below the Minimum Completeness Criteria (KKM) and 5 students whose scores are above the Minimum Completeness Criteria (KKM). This is due to the lack of interest and focus of students during the learning process. This can be influenced by a sense of laziness and insecurity. The limitations of the methods and media used are also one of the factors for the lack of students' ability to write procedural texts. Therefore, it is necessary to develop material for writing procedural texts in a learning media, this is based on the difficulties experienced by teachers and students when the learning process takes place.

In this modern era, IT development is very advanced and rapid. This is used by the world of education, one of which is applying it as a creative and innovative learning medium. The development of technology does not rule out the possibility of a student knowing things that are not known by the teacher. The use of technology in learning media is very helpful for students in learning about material that is wider in scope than the material presented by the teacher. Using learning media can improve learning outcomes (Yaumi, 2018:7).

Based on the results of the researcher's observations, there are several teachers who have not used learning media in the learning process at school. This is also based on the lack of learning media tools needed by teachers and students. Learning media is very useful in helping teachers explain the theories to be studied and able to provide a more real explanation of material that cannot be seen, heard, tasted, smelled, or experienced directly. In addition, Hamalik (in Arsyad, 2011:15) said that the media can increase student interest, develop learning motivation and provide good psychological influences on students.

Media utilization and the right method is expected to overcome the difficulties faced by students, the difficulty in getting ideas and creativity in writing procedural texts. According to Arsyad (2011: 2) a teacher must be able to apply a learning media even with makeshift tools. Teachers should be able to use their skills to develop a varied and innovative learning media so that learning in the classroom will be more fun.

The right solution to overcome the problems above can be done by applying the latest and interactive software learning tools or media. One of the learning media that can be used is flipbook media. Flipbook is software that can be flipped (back and forth) like a book which can actually be added with videos, images, audio and so on so that it can make the learning process more interesting. Making flipbook media in this study with a professional flip pdf application. Flip PDF Professional is software for creating an electronic book in the form of a flipbook. Flip PDF Professional has the advantage of being able to import videos into PDF files so you don't need to open them elsewhere or in a separate place, but insert them directly into the PDF file. This application can make the appearance of electronic books more attractive with the addition of animation, images, audio, and video. According to Hamiyati Fitri, Maison, and Dwi Agus Kurniawan (2017) flipbook learning media is computer software that is able to create interactive, creative, and innovative learning media and is able to provide moving animation displays.

The use of this learning media is also accompanied by the use of a scientific approach. The scientific approach was chosen because it has several advantages, including: (1) leading students to think critically, systematically, and creatively. (2) develop students' ability to argue and communicate.

This research is important to do because the existence of the Flip PDF Professional learning media with an approach is expected to be able to help students understand the procedural text material and assist students in improving their procedural text writing skills. Based on the literature study, the scientific approach flipbook learning media is able to increase students' interest in learning. Flipbook presents images with interesting compositions so that students' interest is higher in learning something. (Andini, Budiyono, and Fitriana, 2018: 227-238)

Based on the background and literature review above, the problem can be formulated as follows, how to improve writing procedural text skills using flipbook teaching materials with a scientific approach to class VII students of SMP Negeri 22 Jambi City. The purpose of writing this research is to describe and explain the improvement of students' procedural text writing skills using flipbook learning media with a scientific approach.

II. METHOD

The research was carried out at SMP Negeri 22 Jambi City class VII G for the 2021/2022 academic year. The type of research used is classroom action research. This type of research was chosen because it was motivated by the fact that problems in learning procedure text did not develop as expected, therefore efforts were made to overcome them. The model used in this study is the spiral model proposed by Kemmis and Mc. Taggart, with the following steps: (1) preparation, (2) implementation, (3) observation, (4) reflection. The subjects of this research are teachers and students who are involved in the implementation of learning

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(Suwandi, 2011: 60). There are 28 students, 12 girls and 16 boys along with one Indonesian teacher. The time of the research was carried out in August 2021 to March 2022. The research location was SMP Negeri 22 Jambi City, this place was chosen as the research location because it had never been used for similar research so that the possibility of repeated research could be avoided and also the Indonesian language teacher who was the subject of the study was very cooperative making it easier for the author to conduct research. The data sources in this study were Indonesian language teachers and students of SMP Negeri 22 Jambi City. The data collection techniques used are test and non-test techniques (observation, interviews, and documentation). The procedure of this research consists of 4 stages, namely planning, action, observation and reflection.

III. RESULTS

This classroom action research is divided into three stages, pre-action, cycle I and cycle II. Each cycle takes place in 2 sessions, each with a time allocation of 2 x 30 minutes. The subject of this research is the seventh grade Indonesian teacher, and the researcher is only an observer.

ACTION

This research begins with pre-action activities. In the pre-action activity, the researcher conducted interviews with Indonesian language teachers regarding the obstacles that occurred during the writing learning process at SMP Negeri 22 Jambi City. In accordance with the results of the interview, the obstacles to students' writing learning, especially in learning to write procedural texts, were the lack of interest and focus of students during the learning process and also students did not really pay attention to the material that had been explained by the teacher.

In addition to the low participation of students, the obstacles in learning to write procedural texts can also be seen from the results of the students' writing ability tests which are still below the Minimum Completeness Criteria (KKM) with an average of 63.25. Many students do not pay attention to linguistic rules when writing the steps of the procedure text and mostly just copy the existing procedure text.

Based on observations, interviews and pre-action tests, it can be concluded that there are problems in the quality of the learning process and students' writing procedural text skills, because more than 75% of students still score below the Minimum Completeness Criteria (KKM) 70.

The learning carried out by the teacher in the pre-action still uses conventional media, the teacher explains in front while the students listen. There is nothing interesting during the learning process so that students do not really learn about the procedure text. The learning patterns carried out by the teacher in the core activities include explaining, working on, and correcting the results of student work. The following is the value of students' procedural text writing skills in the pre-action.

Table 1. Score of Pre-action Procedure Text Writing Skills

No	Score	f	Percentage	Note:
1	<70	23	82.14%	Not complete
2	70	5	17.86%	Complete
Average Value = 63.25				
Classical Completeness = 17.86%				

Based on table 1, there are 5 students who get a score of more than 70 and there are 23 students who get a score of less than 70. The average score of students' procedural text writing skills in the pre-action is 63.25 with a classical completeness of 17.86%.

CYCLE I

Furthermore, researchers and teachers took action in the Cycle I by using flipbook learning media with a scientific approach. In the Cycle I, there was an increase in procedural text writing skills compared to pre-action. The implementation of the actions in the Cycle I was carried out in 2 meetings, the first meeting on January 19, 2022 and the second meeting on January 26, 2022 with an allocation of 2 x 30 minutes which includes initial activities, core activities and closing activities (end).

In the preliminary activity the teacher conducts classroom conditioning, apperception, conveys learning objectives, and gives motivation to students. Furthermore, in the core activity, the teacher conveys material on the structure of the procedure text using flipbook learning media with a scientific approach and students observe carefully to then carry out question and answer activities. In the closing activity, the teacher concludes the learning together with the students. At the second meeting, students were given a test to make a procedure text individually according to the structure that had been taught. The learning steps are carried out in accordance with the Lesson Plan (RPP) that has been made by the teacher, although the learning process has not been in accordance with the existing order of the RPP but the teacher has tried his best.

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Based on the results of observations of student activities in the learning of procedural texts in the Cycle I, it was found that the percentage was 51.43% with a fairly active category. In the Cycle I, some students were already actively learning to write procedural text skills using flipbook learning media with a scientific approach, although there were still many students who were not active. In general, students are quite active in carrying out learning. The results of student activities can be seen in the following table.

Table 2. Observation of Student Activity Cycle I

No	Aspect	Very active		Active		Active Enough		Less Active		Classical Per Aspect
		f	%	f	%	f	%	f	%	
1	Aspect A	1	3.57%	6	21.43%	15	53.57%	6	21.43%	51.79%
2	Aspect B	1	3.57%	5	17.86%	9	32.14%	13	46.43%	44.64%
3	Aspect C	1	3.57%	3	10.71%	13	46.43%	11	39.29%	44.64%
4	Aspect D	1	3.57%	8	28.57%	17	60.71%	2	7.14%	57.14%
5	Aspect E	0	0.00%	10	35.71%	18	64.29%	0	0.00%	58.93%
Average		0.8	2.86%	6	22.86%	14	51.43%	6	22.86%	51.43%
Classic		51.43%								
Qualification		Active Enough								

Information :

Aspect A   : Active listening and receiving teacher explanations
Aspect B   : Activity student in answering the teacher's questions and asking question
Aspect C   : Students' ability in discussion
Aspect D   : The activity of students carrying out the tasks given by the teacher
Aspect E   : The activeness of students following the reflection of learning outcomes

Based on table 2 above, 6 students are less active and 15 students are quite active in listening and receiving teacher explanations. In aspect B there are 13 students who are less active, most students are afraid to answer or ask questions. As many as 13 students were less active in discussing they chose to chat and play alone when other friends tried to discuss. In carrying out the tasks given by the teacher the students are quite active. Then as many as 16 students were quite active in participating in the reflection on the results of their learning with the teacher.

Based on the results of observations, it can be seen that the quality of the student learning process using flipbook learning media with a scientific approach in the Cycle I has not been maximized and will be improved in the Cycle II.

Table 3. The Value of Procedure Text Writing Skills Cycle I

No	Score	f	Percentage	Note:
1	<70	9	32.14%	Not complete
2	70	19	67.86%	Complete
Average Value = 71.75				
Classical Completeness = 67.86%				

Based on table 3, there are 9 students who get a score of <70 and 19 students get a score of 70. The average value of students in the Cycle I is 71.75 with a classical mastery score of 67.86%.

The results of students' writing skills in the Cycle I have not met the criteria for success indicators where learning is considered complete if 75% of the total students get a score more than or equal to the minimum completeness criteria (Minimum Completeness Criteria (KKM). The weakness in the Cycle I is that most students have not used the objectives and conclusions in the written procedure text, and also do not pay attention to the sentences used. In the future, it is hoped that the linguistic element material will be emphasized more so that students better understand the sentences that must be used. Therefore, the researcher continued the research up to cycle II.

CYCLE II
In the Cycle II, the learning carried out is still the same as the learning in the Cycle I, using flipbook learning media with a scientific approach but more emphasis on the linguistic element of procedure text and displays more examples of procedure text. The action

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in cycle II was carried out in 2 meetings, the first meeting on February 3 and the second meeting on February 10, 2022 with an allocation of 2 x 30 minutes. Learning activities include initial activities, core activities, and final activities.

Learning activities in the early stages begin with the teacher organizing classes, doing apperception, conveying learning objectives, and motivating students. The teacher starts the lesson with greetings and attendance. The learning objectives were conveyed by the teacher not having implemented apperception. Motivation is done to encourage students to pay attention and concentrate when learning is taking place. The learning steps are carried out in accordance with the Lesson Plan (RPP) that has been made by the teacher.

In cycle II, the learning activities were divided into several small groups, each group consisting of 7 students. This is expected to make it easier for students to discuss making a procedure text according to the structure and linguistic elements.
Based on the results of observing student activities in learning procedure text in cycle II, meeting II, the percentage was 77.68% with the active category. students have started to be active in procedural text learning activities using flipbook media. The results of student activities in cycle II can be seen in the following table.

Table 4. Student Activity Skill Results Cycle II

No	Aspect	Very active		Active		Active Enough		Less Active		Classical Per Aspect
		f	%	f	%	f	%	f	%	
1	Aspect A	6	21.43%	14	50.00%	8	28.57%	0	0.00%	73.21%
2	Aspect B	0	0.00%	17	60.71%	11	39.29%	0	0.00%	65.18%
3	Aspect C	3	10.71%	13	46.43%	12	42.86%	0	0.00%	66.96%
4	D Aspect	10	35.71%	18	64.29%	0	0.00%	0	0.00%	83.93%
5	Aspect E	28	100.00%	0	0.00%	0	0.00%	0	0.00%	100.00%
Average		9	33.57%	12	44.29%	6	22.14%	0	0.00%	77.86%
Classic		77.86%								
Qualification		Active								

Information:

Aspect A   : Active listening and receiving teacher explanations
Aspect B   : The activeness of students in answering the teacher's questions and asking question
Aspect C   : Students' ability in discussion
Aspect D   : The activity of students carrying out the tasks given by the teacher
Aspect E   : The activeness of students following the reflection of the learning outcomes

Based on table 4 above, as many as 6 students were very active in listening to and accepting the teacher's explanation. 17 students were active in answering the teacher's questions and 13 students were quite active in discussion activities. A total of 9 students are very active and 12 students are active in carrying out the tasks given by the teacher, and all students have actively participated in the reflection of learning outcomes together with the teacher.
The results of students' procedural text writing skills in cycle II can be seen in the following table.

Table 5. Score of Procedure Text Writing Skills Cycle II

No	Score	f	Percentage	Note:
1	<70	0	0%	Not finished yet
2	70	28	75%	Complete
Average Value = 90.75				
Classical Completeness = 100%				

Based on table 5 students who got a score of 70 as many as 28 students, which means that all students have scored above the Minimum Completeness Criteria (KKM) with an average of 90.75 and 100% classical completeness. The results of student scores in cycle II have met the criteria for success indicators where all students get scores above 70 or have exceeded the specified Minimum Completeness Criteria (KKM).

The results of students' ability to write procedural texts in terms of the learning process and results have increased. Overall improvement of students' procedural text writing skills from cycle I to cycle II can be seen in the image below.

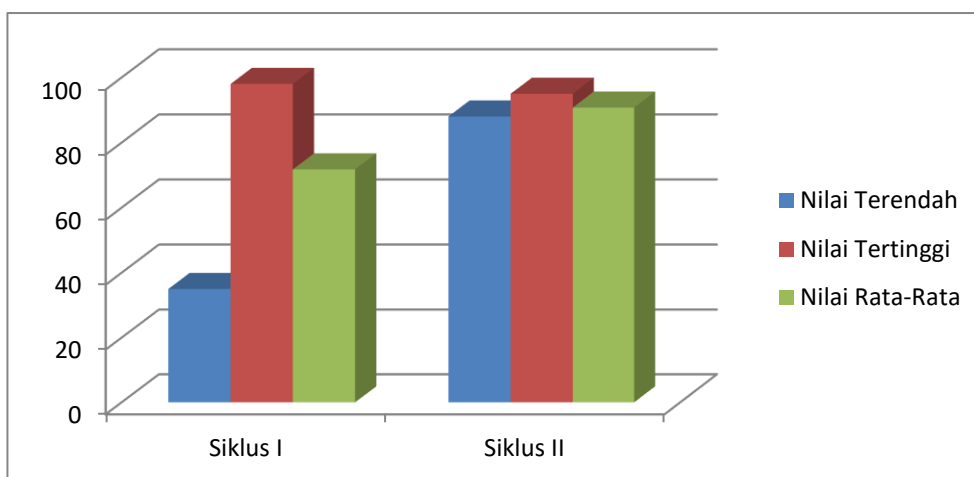# The Use of Flipbook Learning Media with a Scientific Approach to Improve Prodecure Text Writing Skills

Figure 1. Improving Procedures Text Writing Skills Cycle I and Cycle II

DISCUSSION

Application of learning mediaand creative and innovative methods are proven to be able to improve students' procedural text writing skills. This is in line with research conducted by research conducted by Shinta Hapsari, Gunarhadi and Roemintoro (2019: 80-89) that using the right learning media in learning can make the learning process effective and efficient and also easier for teachers and students. to achieve the existing learning objectives. Supported by research conducted by Aji (2020, 200-205) which concluded that image media can be applied in learning to write procedural texts. When the learning process takes place using image learning media is able to make students more active and creative in writing procedural texts. Furthermore, Irawati, N and Elfersia (2019: 26-33) in his research concluded that the use of flipbook maker media in chemistry learning, especially in hydrocarbon subjects, was effective in improving student learning outcomes.

From the initial survey inget the lowest score of procedural text writing skill of 40 and the highest score of 89 with an average of 63.25 in pre-action. The Cycle I action resulted in the lowest score of 35 and the highest score of 98 with a class average of 71.75. The Cycle II action got the lowest score of 88 and the highest score of 95 with an average of 90.75. The achievement of Minimum Completeness Criteria (KKM) in the pre-action was 17.86% in the poor category, increased to 67.86% in the poor category in the Cycle I and increased again to 100% in the very good category in the Cycle II.

In the Cycle I there were 9 students who got a complete score and 19 students did not complete. Factors that cause these students to be incomplete include: a) students do not focus on listening to teacher explanations, b) teachers focus on conventional learning, c) students find it difficult to understand the structure and linguistic rules of procedural texts, d) students are less active in asking questions. Based on these factors, several actions were taken by the teacher to overcome these problems, including: a) using more effective learning media, b) more often providing motivation and reinforcement to students, c) explaining again about the structure and linguistic rules of procedural texts, d) reminding the lessons that have been previously studied, e) appointing students to answer questions.

In the Cycle II as many as 28 students have achieved completeness scores. The highest score of students is 95 and the lowest score is 88. This is because students are more focused and enthusiastic when working on procedure texts in groups so they can discuss together.

Thus, there is an increase in procedural text writing skills. The quality of the process in terms of student activities and teacher skills has increased from each cycle, offset by an increase in the results of procedural text writing skills.

IV. CONCLUSIONS

Increased student activities in learning include: a) active listening and receiving teacher explanations by 51.79% in the Cycle I, increasing to 73.21% in the Cycle II; b) the activeness of students in answering the teacher's questions and asking questions was 44.64% in the Cycle I, increasing to 65.18% in the Cycle II; c) students' ability in discussion was 44.64% in the Cycle I, increasing to 66.96% in the Cycle II; d) the activeness of students in carrying out the tasks given by the teacher was 57.14% in the Cycle I, increasing to 83.93% in the Cycle II; e) the activeness of students participating in the reflection of learning outcomes with the teacher was 58.93% in the Cycle I, increasing to 100% in the Cycle II.

The application of flipbook learning media with a scientific approach can improve procedural text writing skills. The learning outcomes of class VII G students on the material of writing procedure text before using flipbook learning media with a scientific approach in pre-action obtained a completeness percentage of 17.86% with a poor category with an average value of 63.25. Then

in the Cycle I, action was given to learning activities, by applying flipbook learning media with a scientific approach, the percentage of completeness increased to 67.86% even though it was still in the less category with an average value of 71.75. Furthermore, the Cycle II was held with the results obtained with the percentage of completeness reaching 100% in the very good category, with the average grade value achieved was 90.75.

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A New Benchmarks in Higher Education: Teacher's Engagement in Online Learning

Helen T. Asio[1], Ma. Cristina Lalaine M. Nerona[2]

[1,2] Isabela State University

ABSTRACT: This study aims to find out the preparedness of Higher Institution's teachers and administrations in the conduct of online teaching. It was conducted at the Isabela State University during the Second Semester S. Y 2020-2021. There were 117 faculty members who served as respondents. Using a self-made questionnaire, the data was gathered along: Respondent's Profile, Level of Frequency in the Utilization of Online Teaching Platforms, and Level of Frequency in the Encountered Problems as to Teaching –Related, and the Level of Utilization of Teaching Practices / Aids. A Descriptive Research using Quantitative and Qualitative approach was used in this study.

As to the findings, majority of the respondents received training on online teaching "once". Most of them utilized Messenger and Google Meet as online teaching platforms; the respondents' profile, Academic Rank" and the level of frequency as to the encountered difficulty in teaching-related activities using online teaching Platforms have a significant relationship. It was also found out that there is a significant relationship between the respondents' level of utilization of teaching aids/practices and their profile, particularly the received trainings. As to the respondents' level of utilization of teaching aids/practices and the utilization of electronic platforms, there is a significant relationship. This shows the importance of exposure of the respondents to online teaching platforms for the execution of teaching practices to deliver quality education to students.

KEYWORDS: online platforms, teaching practices/aids, online teaching.

INTRODUCTION

Education has a significant impact in molding the lives of students. Teachers are the greatest assets of any education system. They stand in the interface of the transmission of knowledge, skills and values. Teacher education plays a vital role in reforming and strengthening the education system of any country. Training of teachers has emerging global trends in education and the overall needs and aspirations of the people. The Quality of education depends on the quality teachers and teaching. The way teachers are trained is an important aspect to improve quality. In fact, teachers are one of the critical components of this process, as they are one of the primary instruments in delivering quality learning to students. They are critical in ensuring the continued delivery of high-quality education in the face of the pandemic (Castroverde & Acala, 2021).

Education has always been a powerful agency in any society and it is considered as an indispensable instrument for bringing positive change in the social, political, economic and cultural life of people. The whole process is shaped by many important agents, and the teacher is one of them. The teacher is claimed to play a central role in education. Preparing teachers for the teaching profession is conceived as being a higher priority in any country since this profession is considered as being challenging and critical, and may lead to nations' rising and progress in the different domains. As a huge agency, education has great importance in building strong and developed societies, and the teacher is one of the primary agents for achieving that. For such reasons, it is always an urgent educational need that teachers should receive adequate educational and professional training to possess adequate knowledge and teaching skills and to be able to dedicate themselves to the teaching profession. (Nasirra, 2016),

The whole educational system from elementary to tertiary level has been collapsed during the lockdown period of the novel coronavirus disease 2019 (COVID-19) not only in India but across the globe. The onset of the novel coronavirus made everything from world economies to social rituals devastated.(Schulten,2020)

The Philippines is one of the countries most afflicted by the virus on a global scale. According to the most recent data, the Philippines is currently ranked 19th among countries with the highest viral infection rates. Despite the government's

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lockdowns and tight health standards, the virus's infection rate continues to increase. As a result, Filipinos are projected to continue living under the "new normal" for an extended term. Businesses, transportation, public services, health, and education are the sectors most impacted by this new situation (Jamon et al., 2021).

To preserve educational continuity, institutions transitioned to emergency remote instruction where logistically feasible, typically with little time for preparation. Transitioning to and implementing the new teaching and learning format has created numerous problems, risks, and challenges for both teachers and students (Cachón-Zagalaz et al.; Bao, 2020; 2020; Hiraoka and Tomoda, 2020). To get control over COVID-19 pandemic is possible to a greater extent with people's unbridled determination of the stringent precautionary measures such as maintaining social distancing, following medically instructed quarantine process and embracing hygiene and sanitation (Khachfe et al., 2020).

The educational scenario of the post-COVID-19 outbreak would not be easy to manage teaching-learning situations without using online teaching platforms rigorously. Central and State governments were unanimously agreed upon implementing online education across the country, keeping in mind the need of the hour.
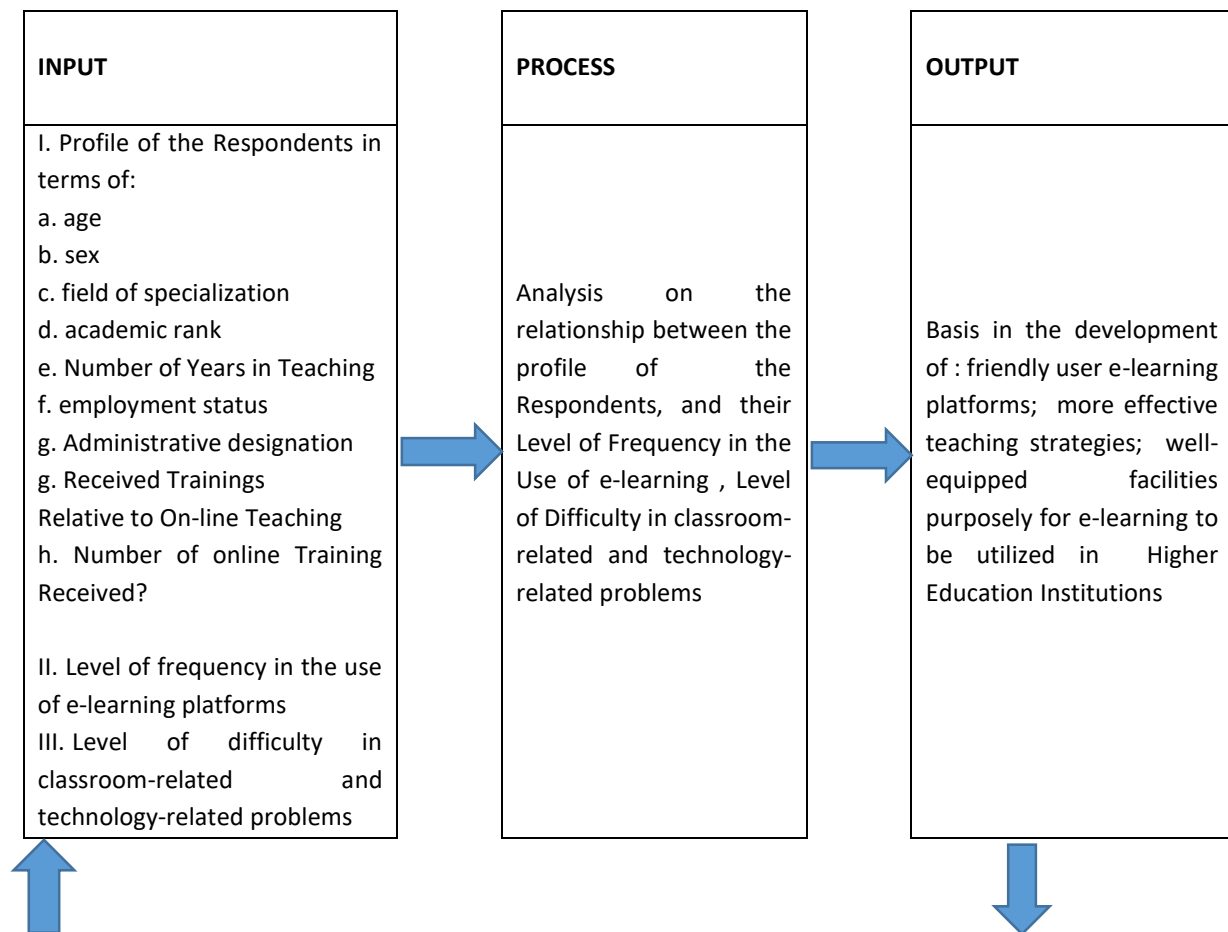
In a study conducted by Lapada et al. (2020), found that teachers were very aware of the COVID-19 pandemic's existence and its consequences. On the other hand, teachers also discuss their concerns via modular distance education. Indeed, the majority of teachers do not appear to have the necessary skills to teach online, either they have not been trained or have not previously taught online (Saraswati et al. 2020). Additionally, frontline teachers' health is jeopardized (Asbury & Kim, 2020), as they are responsible for physically distributing and retrieving modules from parents or guardians (Jamon et al. 2021). Additionally, instructors face dread, anxiety, and under appreciation in their profession. Similarly, teaching in the new normal has an effect on the mental health and well-being of instructors (Kima et al. 2020; Watermeyer et al. 2020; Schaffhauser, 2020; and Ramberg, 2019).

One of the significant roles of the teacher is as the first decision maker in his/her classroom. Absence of training, or poor training, will make him/her face the challenge of having poor subject-knowledge and poor professional and pedagogical skills to teach a given subject, deliver the lesson, assess learning, and provide the learner with the appropriate knowledge and learning experience. In addition, with the presence of the COVID 19 pandemic that disrupts the face-to-face mode of teaching, another challenge that the teachers are facing now is how to deliver the subject matter through online platforms, particularly those teachers teaching in the rural areas. On last year's first time engagements in online class, many negative feedback has come up in social media as to the problems encountered by both, the teachers and the learners. Indeed, with the change of mode of teaching from face-to-face to online, will bring various difficulties and effects to the teachers and learners, especially those who are not well-exposed to electronic learning platforms.

Thus the researchers has come up to this research work to identify the present status of the higher education teachers relative to their online teaching engagement and to solicit from them possible ways to improve their present status. Since the major areas to be assessed in this study are the types of online platforms they use, teaching aids, types of assessments, and problems encountered, the result could be used by the administration in the development of programs, and activities that could aid the faculty for the effective delivery of education to the learners.

Research Paradigm:

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INPUT	PROCESS	OUTPUT
I. Profile of the Respondents in terms of: a. age b. sex c. field of specialization d. academic rank e. Number of Years in Teaching f. employment status g. Administrative designation g. Received Trainings Relative to On-line Teaching h. Number of online Training Received? II. Level of frequency in the use of e-learning platforms III. Level of difficulty in classroom-related and technology-related problems	Analysis on the relationship between the profile of the Respondents, and their Level of Frequency in the Use of e-learning , Level of Difficulty in classroom-related and technology-related problems	Basis in the development of : friendly user e-learning platforms; more effective teaching strategies; well-equipped facilities purposely for e-learning to be utilized in Higher Education Institutions

Significance of the Study:

The result of this research work would benefit the following:

Faculty of Higher Education Institutions: Since the coverage of this study includes the profile, online teaching platforms, difficulties in handling online classes, and teaching practices/aids utilized by the respondents who are teachers from HEIs, surely the HEI Teachers will be given hints as to what among the variables under profile could affect their online teaching. Moreover, they will be guided as to what online platform that is more friendly to the user in handling online classes.

School Administrators. With the very limited time given to the teachers to prepare themselves to engage in online teaching, it is expected that many issues and problem that would encounter by teachers. Hence, this study would give a clear picture on the teacher's engagement on online teaching, particularly those who are teaching at Higher Education Institutions. This would be a strong basis of the school administrators in finding ways to support their teachers so that the learnings/ skills expected by the students from Tertiary Education will be given to them completely.

Future Researchers. The result of the present study could be used as a basis by future researchers who are interested to study on online Teaching and Learning. There are still possible important topics relative to online teaching and learning which have not discussed in the present study such as: the effects of online learning to the performance or learning motivations of students and Strengths and Weaknesses of online platforms in teaching.

Scope and Delimitation:

This research work titled, "A New Benchmarks in Higher Education: Teacher's Engagement in Online Learning" was conducted during the Second Semester, S.Y 2020-2021 with the Isabela State University Faculty members, particularly from Ilagan, San Mariano and Roxas campuses. The Study included the respondent's profile, Online Teaching Platforms and online Teaching Aids/ Practices utilized by the respondents, and the respondent's difficulty in terms of Teaching- Related Activities.

METHODOLOGY

In this research, the Descriptive Research Design using Quantitative- Qualitative Approach was employed. There were 117 faculty members who served as respondents. They were selected through simple random sampling. A self-made Likert form of

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questionnaire was purposely designed to achieve the objectives of the study. To analyze the gathered data, frequency and percentage distribution was used. To get the significant relationships of the following: 1) respondent's profile and their level of frequency in the utilization of online teaching platforms; level of frequency in the utilization of teaching practices/ aids and their profile Pearson's Chi-square was used; and as to the Respondents' Profile and Level of Frequency in the Utilization of Teaching Aids/ Practices, Pearson's r was employed.

RESULTS AND DISCUSSION

Table 1.1. Frequency and Percentage Distribution of the Respondents according to Age, Sex and Field of Specialization

Age	Frequency	Percent
21-25	19	16.2
26-30	**34**	**29.1**
31-35	17	14.5
36-40	13	11.1
41-45	16	13.7
46-50	8	6.8
51 Above	10	8.5
Total	**117**	**100.0**

Field of Specialization	Frequency	Percent
College of Allied and Science	17	14.5
College of Engineering, Architecture and Technology	25	21.4
College of Education	19	16.2
College of Arts and Sciences	35	29.9
College of Agriculture	12	10.3
Total	108	92.3
System Missing	**9**	**7.7**
Total	**117**	**100.0**

A Table 1.1 shows that among the 117 respondents, majority are under the age bracket of 26-30 with 34 or 29.1%; most of them are female with 61 or 52.1%; and majority are specializing subjects under the College of Arts and Sciences with 35 or 29.9%. The data confirms the general observation that "female" outnumbered "male" employees in most companies.

Table 1.2. **Frequency and Percentage Distribution of the Respondents according to Academic Rank, Employment Status, Number of years in Teaching**

Academic Rank	Frequency	Percent
Instructor	**86**	**73.5**
Assistant Professor	15	12.8
Associate Professor	15	12.8
Professor	1	.9
Total	**117**	**100.0**

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Employment Status	Frequency	Percent
COS	55	47.0
Permanent	62	53.0
Total	**117**	**100.0**

Number of years in Teaching	Frequency	Percent
1-5	**65**	**55.6**
6-10	18	15.4
11-15	9	7.7
16-20	9	7.7
21 Above	16	13.7
Total	**117**	**100.0**

Designation	Frequency	Percent
(None)	**43**	**36.8**
Coordinator	30	25.6
Chair	18	15.4
Dean	7	6.0
Director	19	16.2
Total	117	100.0

As shown from Table 1. 2, most of the respondents are under the academic rank of Instructor with 86 or 73.5%; majority are under "permanent" status with 62 or 53%; majority are within 1-5 years, with 65 or 55.6%; and majority do not have designations, with 43 or 36.8%.

This means that majority of the workforce of Isabela State University are new, or fresh in teaching profession. However, they are secured since they are holding permanent position. Since majority are instructor, generally, they are just given teaching load and they are not yet designated to any position.

Table 1.3. Respondents' Profile according to Received Trainings Relative to on-line Teaching

Received Trainings	Frequency	Percent
Yes	104	88.9
No	**13**	**11.1**
Total	117	100.0

Number of On line Training Received	Frequency	Percent
None	13	11.1
Once	**41**	**35.0**
Twice	29	24.8
Thrice	15	12.8
Many times	19	16.2
Total	117	100.0

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As to the table

R Rrelative to online teaching trainings received by the respondents, majority of the respondents, 104 or 88.9% have trainings but majority of them have received only one time training on online with 41 or 35%.

This only shows that prior to the implementation of online teaching, faculty are submitted to training on online teaching, but they are only sent "once" which means they are not really exposed to online teaching.

Table 2. Respondent's Level of Frequency in the Use of Online Learning Platforms

ON-LINE TEACHING PLATFORMS	5	4	3	2	1	Total	Mean	Description
Messenger	**97**	**8**	**6**	**6**	**0**	**117**	**4.68**	**Always**
Google Meet	54	33	17	12	1	117	4.09	Often
Google Classroom	32	9	28	21	27	117	2.98	Sometimes
Tele-Education	12	8	25	23	49	117	2.24	Rarely
Ed modo	39	9	22	20	27	117	3.11	Sometimes
Zoom	24	22	30	19	22	117	3.06	Sometimes
Mean							**3.36**	**Sometimes**

Table 2 shows that among the online teaching platforms, majority use Messenger with 4.68 mean with a description "always". The lowest, Tele-education with a mean of 2.24 and with a description "rarely". The over-all mean 3.36 has a descriptive rating of "sometimes".

Table 3. Significant Relationship between the Respondents' Level of Utilization   of   Electronic Platforms and Their Profile

Profile	Significance Pearson's Chi-square C	Analysis	Decision	Remarks
Campus	.185	C > .05	Accept H_o	Not Significant
Field of Specialization	.309	C > .05	Accept H_o	Not Significant
Academic Rank	.259	C > .05	Accept H_o	Not Significant
Age	.515	C > .05	Accept H_o	Not Significant
Employment Status	.657	C > .05	Accept H_o	Not Significant
Sex	.718	C > .05	Accept H_o	Not Significant
Number of Years in Teaching	.678	C > .05	Accept H_o	Not Significant
Designation	.407	C > .05	Accept H_o	Not Significant
Received Trainings	.419	C > .05	Accept H_o	Not Significant
Number of times of trainings	.350	C > .05	Accept H_o	Not Significant

   Table 3 shows the significant relationship between respondents' profile and the level of utilization of electronic platforms using Pearson's Chi-square C – test at 0.05 level of significance.

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As revealed in the table, the significance C values for all the profile were greater than 0.05. The null hypothesis was accepted. There is **no significant relationship** between respondents' level of utilization of electronic platforms and their profile campus, field of specialization, academic rank, age, employment status, sex, number of years in teaching, attendance to trainings and number of times of attendance to trainings.

This indicates that the level of utilization of electronic platforms of the respondents are independent with their profile campus, field of specialization, academic rank, age, employment status, sex, number of years in teaching, attendance to trainings and number of times of attendance to trainings.

All the profile variables of the respondents did not influence their utilization of electronic platforms.

Table 4. Respondent's Level of Frequency as to the encountered difficulty/problem in the use of online platforms in terms of classroom-related activities

A. MESSENGER

Teaching-Related Activities	5	4	3	2	1	Total	Mean	Description
1.Handling/managing/ collecting the students' output	32	31	28	23	3	117	3.56	often
2.Uploading of lecture materials	36	22	31	17	11	117	3.47	often
3.Giving quizzes/exams	24	24	44	18	7	117	3.34	sometimes
4.Conducting lecture with the students	25	21	39	22	10	117	3.25	sometimes
5. Preparation of Instructional Material/ module for the assigned subject/s due to time limitation	24	24	35	22	12	117	3.22	sometimes
6.Checking of students' attendance	34	33	25	19	6	117	3.60	often
7.Checking the reliability of student's output	25	30	38	12	12	117	3.38	sometimes
8.Conducting graded recitation	28	31	32	12	14	117	3.40	often
9.Setting asynchronous exam to the whole class	19	26	41	16	15	117	3.15	sometimes
10.Monitoring of set time during exam	23	23	43	14	14	117	3.23	sometimes
11.Soliciting student's response during lecture session	32	18	43	10	14	117	3.38	sometimes
12.Completing the coverage of course syllabus	30	23	33	18	13	117	3.33	sometimes
13.Conduct of demonstration lesson	32	20	34	20	11	117	3.36	sometimes
14. Checking students' output	26	20	40	16	15	117	3.22	sometimes
15.conducting group work activity during class	22	25	24	25	21	117	3.02	sometimes
Mean							3.33	sometimes

Table 4 indicates the data on the respondents' level of frequency on the encountered difficulty relative to teaching-related activities. Out of 15 items, there are four items identified by the respondents which are "**often**" difficult which are Handling/managing/ collecting the students' output, Uploading of lecture materials, Checking of students' attendance and Conducting graded recitation, and the rest, they are difficult "**sometimes**" which include Giving quizzes/exams, Conducting lecture with the students, Conducting lecture with the students, Preparation of Instructional Material/ module for the assigned subject/s due to time limitation, Checking the reliability of student's output, Setting asynchronous exam to the whole class, Monitoring of set time during exam, Soliciting student's response during lecture session, Soliciting student's response during lecture session, Completing the coverage of course syllabus, Conduct of demonstration lesson, Conduct of demonstration lesson Checking students' output, and conducting group work activity during class.

B. GOOGLE MEET

Teaching-related activities	5	4	3	2	1	Total	Mean	Description
1.Handling/managing/ collecting the students' output	35	21	32	19	10	117	3.44	Often
2.Uploading of lecture materials	35	25	26	17	14	117	3.43	Often

	5	4	3	2	1	Total	Mean	Description
3.Giving quizzes/exams	20	25	43	15	14	117	3.19	Sometimes
4.Conducting lecture with the students	38	20	26	26	7	117	3.48	Often
5. Preparation of Instructional Material/ module for the assigned subject/s due to time limitation	27	16	39	18	17	117	3.15	Sometimes
6.Checking of students' attendance	49	17	24	21	6	117	3.70	Often
7.Checking the reliability of student's output	31	20	33	20	13	117	3.31	Sometimes
8.Conducting graded recitation	35	35	26	14	7	117	3.66	Often
9.Setting asynchronous exam to the whole class	24	27	36	16	14	117	3.26	Sometimes
10.Monitoring of set time during exam	24	25	36	17	15	117	3.22	Sometimes
11.Soliciting student's response during lecture session	27	30	29	21	10	117	3.37	Sometimes
12.Completing the coverage of course syllabus	29	26	33	15	14	117	3.35	Sometimes
13.Conduct of demonstration lesson	31	22	25	24	15	117	3.26	Sometimes
14. Checking students' output	26	19	28	21	23	117	3.03	Sometimes
15.conducting group work activity during class	25	18	28	25	21	117	3.01	Sometimes
Mean							3.32	Sometimes

Through Google Meet, almost all of the items under teaching-related activities are encountered difficult "**sometimes**" by the respondents. Including here are: Giving quizzes/exams, Preparation of Instructional Material/ module for the assigned subject/s due to time limitation, Checking the reliability of student's output, Setting asynchronous exam to the whole class, Monitoring of set time during exam, Soliciting student's response during lecture session, Completing the coverage of course syllabus, Conduct of demonstration lesson, and conducting group work activity during class.

On the other hand, out of 15 items, there are four items "**often**" encountered difficult by the respondents in using Google Meet. They are Handling/managing/ collecting the students' output, Uploading of lecture materials, Conducting lecture with the students, Checking of students' attendance, and Conducting graded recitation.

C. GOOGLE CLASSROOM

Teaching-Related Activities	5	4	3	2	1	Total	Mean	Description
1.Handling/managing/ collecting the students' output	18	10	39	28	22	117	2.78	Sometimes
2.Uploading of lecture materials	24	16	35	25	17	117	3.04	Sometimes
3.Giving quizzes/exams	21	12	45	29	10	117	3.04	Sometimes
4.Conducting lecture with the students	16	15	43	35	8	117	2.97	Sometimes
5. Preparation of Instructional Material/ module for the assigned subject/s due to time limitation	25	13	43	22	14	117	3.11	Sometimes
6.Checking of students' attendance	21	14	47	26	9	117	3.10	Sometimes
7.Checking the reliability of student's output	18	22	41	24	12	117	3.09	Sometimes
8.Conducting graded recitation	15	24	41	22	15	117	3.02	Sometimes
9.Setting asynchronous exam to the whole class	18	26	38	17	18	117	3.08	Sometimes
10.Monitoring of set time during exam	19	22	36	20	20	117	3.00	Sometimes
11.Soliciting student's response during lecture session	15	20	40	18	24	117	2.86	Sometimes
12.Completing the coverage of course syllabus	18	23	35	23	18	117	3.00	Sometimes
13.Conduct of demonstration lesson	18	19	35	28	17	117	2.94	Sometimes
14. Checking students' output	12	12	39	29	25	117	2.63	Sometimes
15.conducting group work activity during class	16	10	32	22	37	117	2.54	Rarely
Mean							2.95	Sometimes

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In using Google Classroom, the respondents rated almost all items **"sometimes"** difficult which include: Handling/managing/ collecting the students' output , Uploading of lecture materials , Giving quizzes/exams except 1 item, Conducting lecture with the students, Preparation of Instructional Material/ module for the assigned subject/s due to time limitation, Checking of students' attendance, Checking the reliability of student's output, Conducting graded recitation, Setting asynchronous exam to the whole class, Monitoring of set time during exam, Soliciting student's response during lecture session, Completing the coverage of course syllabus, Conduct of demonstration lesson, and Conduct of demonstration lesson Checking students' output except item 15, Conducting group work activity during class, which is rated **"rarely"** difficult by the respondents.

D.   TELE-EDUCATION

Teaching-Related Activities	5	4	3	2	1	Total	Mean	Description
1.Handling/managing/ collecting the students' output	14	18	29	40	16	117	2.78	Sometimes
2.Uploading of lecture materials	19	20	27	29	22	117	2.87	Sometimes
3.Giving quizzes/exams	17	16	33	30	21	117	2.81	Sometimes
4.Conducting lecture with the students	16	17	38	30	16	117	2.89	Sometimes
5. Preparation of Instructional Material/ module for the assigned subject/s due to time limitation	16	24	37	27	13	117	3.03	Sometimes
6.Checking of students' attendance	18	22	40	21	16	117	3.04	Sometimes
7.Checking the reliability of student's output	11	31	35	19	21	117	2.93	Sometimes
8.Conducting graded recitation	9	31	34	24	19	117	2.89	Sometimes
9.Setting asynchronous exam to the whole class	18	29	35	21	14	117	3.14	Sometimes
10.Monitoring of set time during exam	14	29	33	21	20	117	2.97	Sometimes
11.Soliciting student's response during lecture session	15	28	32	22	20	117	2.97	Sometimes
12.Completing the coverage of course syllabus	17	27	34	20	19	117	3.03	Sometimes
13.Conduct of demonstration lesson	15	29	28	27	18	117	2.97	Sometimes
14. Checking students' output	11	22	30	34	20	117	2.74	Sometimes
15.conducting group work activity during class	16	16	25	26	34	117	2.61	Sometimes
Mean							2.91	Sometimes

Using Tele-education, all of the items are rated **"sometimes"** difficult by the respondents: Handling/managing/ collecting the students' output , Uploading of lecture materials , Giving quizzes/exams except 1 item, Conducting lecture with the students, Preparation of Instructional Material/ module for the assigned subject/s due to time limitation, Checking of students' attendance, Checking the reliability of student's output, Conducting graded recitation, Setting asynchronous exam to the whole class, Monitoring of set time during exam, Soliciting student's response during lecture session, Completing the coverage of course syllabus, Conduct of demonstration lesson, and Conduct of demonstration lesson Checking students' output and Conducting group work activity during class.

E.   EDMODO

Teaching-Related Activities	5	4	3	2	1	Total	Mean	Description
1.Handling/managing/ collecting the students' output	15	14	33	34	21	117	2.73	Sometimes
2.Uploading of lecture materials	23	16	22	38	18	117	2.90	Sometimes
3.Giving quizzes/exams	21	19	30	29	18	117	2.97	Sometimes
4.Conducting lecture with the students	12	20	32	32	21	117	2.74	Sometimes
5. Preparation of Instructional Material/ module for the assigned subject/s due to time limitation	12	22	37	31	15	117	2.87	Sometimes
6.Checking of students' attendance	14	13	33	36	21	117	2.68	Sometimes
7.Checking the reliability of student's output	18	19	28	28	24	117	2.82	Sometimes
8.Conducting graded recitation	11	17	37	38	14	117	2.77	Sometimes

	5	4	3	2	1	Total	Mean	Description
9.Setting asynchronous exam to the whole class	23	19	36	22	17	117	3.08	Sometimes
10.Monitoring of set time during exam	24	23	36	22	12	117	3.21	Sometimes
11.Soliciting student's response during lecture session	19	17	38	19	24	117	2.90	Sometimes
12.Completing the coverage of course syllabus	16	20	36	23	22	117	2.87	Sometimes
13.Conduct of demonstration lesson	14	18	41	26	18	117	2.86	Sometimes
14. Checking students' output	15	27	37	22	16	117	3.03	Sometimes
15.conducting group work activity during class	14	22	37	25	19	117	2.89	Sometimes
Mean							2.89	Sometimes

As to the utilization of Edmodo as online learning platform, all items under teaching-related activities are rated by the respondents "sometimes" difficult: Handling/managing/ collecting the students' output , Uploading of lecture materials , Giving quizzes/exams except 1 item, Conducting lecture with the students, Preparation of Instructional Material/ module for the assigned subject/s due to time limitation, Checking of students' attendance, Checking the reliability of student's output, Conducting graded recitation, Setting asynchronous exam to the whole class, Monitoring of set time during exam, Soliciting student's response during lecture session, Completing the coverage of course syllabus, Conduct of demonstration lesson, and Conduct of demonstration lesson Checking students' output and Conducting group work activity during class.

F. ZOOM

Teaching-Related Activities	5	4	3	2	1	Total	Mean	Description
1.Handling/managing/ collecting the students' output	21	15	28	38	15	117	2.91	Sometimes
2.Uploading of lecture materials	20	18	27	33	19	117	2.89	Sometimes
3.Giving quizzes/exams	21	17	36	27	16	117	3.00	Sometimes
4.Conducting lecture with the students	27	21	30	24	15	117	3.18	Sometimes
5.Preparation of Instructional Material/ module for the assigned subject/s due to time limitation	21	26	33	23	14	117	3.15	Sometimes
6.Checking of students' attendance	24	27	34	21	11	117	3.27	Sometimes
7.Checking the reliability of student's output	21	27	35	22	12	117	3.20	Sometimes
8.Conducting graded recitation	23	20	38	26	10	117	3.17	Sometimes
9.Setting asynchronous exam to the whole class	20	21	43	23	10	117	3.15	Sometimes
10.Monitoring of set time during exam	25	17	51	17	7	117	3.31	Sometimes
11.Soliciting student's response during lecture session	26	16	42	16	17	117	3.15	Sometimes
12.Completing the coverage of course syllabus	22	19	43	17	16	117	3.12	Sometimes
13.Conduct of demonstration lesson	26	16	38	18	19	117	3.10	Sometimes
14. Checking students' output	25	19	32	27	14	117	3.12	Sometimes
15.conducting group work activity during class	24	15	35	32	11	117	3.08	Sometimes
	15	18	35	31	18	117	2.84	Sometimes
Mean							3.12	Sometimes

Just like Google Classroom and Edmodo, Zoom is also rated **"sometimes"** difficult in all items under teaching-related activities: Handling/managing/ collecting the students' output , Uploading of lecture materials , Giving quizzes/exams except 1 item, Conducting lecture with the students, Preparation of Instructional Material/ module for the assigned subject/s due to time limitation, Checking of students' attendance, Checking the reliability of student's output, Conducting graded recitation, Setting asynchronous exam to the whole class, Monitoring of set time during exam, Soliciting student's response during lecture session, Completing the coverage of course syllabus, Conduct of demonstration lesson, and Conduct of demonstration lesson Checking students' output and Conducting group work activity during class.

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Table 5. Significant Relationship between the Respondents' Level of Frequency as to the Encountered Problem/Difficulty in the Use of Online platforms in Teaching Related Activities and Their Profile

Profile	Significance Pearson's Chi-square C	Analysis	Decision	Remarks
Campus	.364	C > .05	Accept H_o	Not Significant
Field of Specialization	.551	C > .05	Accept H_o	Not Significant
Academic Rank	**.019**	**C < .05**	**Reject H_o**	**Significant**
Age	.500	C > .05	Accept H_o	Not Significant
Employment Status	.113	C > .05	Accept H_o	Not Significant
Sex	.706	C > .05	Accept H_o	Not Significant
Number of Years in Teaching	.742	C > .05	Accept H_o	Not Significant
Designation	.683	C > .05	Accept H_o	Not Significant
Received Trainings	.345	C > .05	Accept H_o	Not Significant
Number of times of trainings	2.33	C > .05	Accept H_o	Not Significant

Table 5 shows the significant relationship between respondents' profile and the level of frequency as to the encountered difficulty/problem in the use of online platforms on Teaching Related Activities and their profile using Pearson's Chi-square C – test at 0.05 level of significance.

As revealed in the table, the significance C values for all the profile except for academic rank were greater than 0.05. The null hypothesis was accepted. There is **no significant relationship** between respondents' level of difficulty on Teaching Related Activities and electronic platforms and their profile campus, field of specialization, age, employment status, sex, number of years in teaching, attendance to trainings and number of times of attendance to trainings.

This indicates that the level of difficulty on Teaching Related Activities and electronic platforms of the respondents are independent with their profile campus, field of specialization, age, employment status, sex, number of years in teaching, attendance to trainings and number of times of attendance to trainings however it is dependent with their academic rank.

Thus, **academic ranks is significantly** among the profile variables that was affected by the difficulty on Teaching-Related Activities and electronic platforms specifically those who are Instructor in rank. The findings rationalize the status of instructors that they are just new in teaching world. Hence, they still lacks ample knowledge as to the use of electronic devices in teaching. Instructors are seldom sent in trainings or professional development programs since they are still new. This confirms the study of Garet et al (2001). In their study, it involved a representative sample of teachers who took part in the Eisenhower Professional Development Program in 1990. The results showed that teachers who participated in this professional development training program had a strong tendency towards changing their classroom instructional practices. They also gained greater subject knowledge and teaching skills when there was a direct connection and alignment between their daily experiences in teaching the curriculum and teaching standards and assessments. (From Importance of teacher's training)

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Table 6. Respondent's Level of Frequency as to the Utilization of Teaching-Learning Aids/ Practices

Teaching –learning Aids/Practices	5	4	3	2	1	Total	Mean	Description
a. Provide online video tutoring	37	43	24	11	2	117	3.87	Often
b. Provide students with timely feedback including email guidance after class	31	52	24	6	4	117	3.85	Often
c. adopt some measures to improve the degree of and depth of student's class participation	33	59	20	5	0	117	4.03	Often
d. adjust teaching speed/time to ensure the effective delivery	45	57	11	4	0	117	4.22	Always
e. match teaching content with the academic readiness	41	63	9	3	1	117	4.20	Always
f. provide reading/other learning materials	39	66	6	3	3	117	4.15	Sometimes
g. provide real life situation to further explain the content of the course	49	54	9	3	2	117	4.24	Always
Mean							4.08	Sometimes

Table 6 shows the respondent's level of frequency as to the utilization of teaching learning aid/practices. Out of seven identified teaching aids/practices used during online teaching, three of them are "**always**" used by the respondents: adjust teaching speed/time to ensure the effective delivery, match teaching content with the academic readiness, and provide real life situation to further explain the content of the course. There is one item, "**sometimes**" utilized implement by the respondent, provide reading/other learning materials.

Table 7. Significant Relationship between the Respondents' Level of Utilization of Teaching Aids/Practices and Their Profile

Profile	Significance Pearson's Chi-square C	Analysis	Decision	Remarks
Campus	.202	C > .05	Accept H_o	Not Significant
Field of Specialization	.511	C > .05	Accept H_o	Not Significant
Academic Rank	.906	C > .05	Accept H_o	Not Significant
Age	.215	C > .05	Accept H_o	Not Significant
Employment Status	.230	C > .05	Accept H_o	Not Significant
Sex	.075	C > .05	Accept H_o	Not Significant
Number of Years in Teaching	.670	C > .05	Accept H_o	Not Significant
Designation	.868	C > .05	Accept H_o	Not Significant
Received Trainings	**.034**	**C < .05**	**Reject H_o**	**Significant**
Number of times of trainings	.181	C > .05	Accept H_o	Not Significant

Table 7 shows the significant relationship between respondents' profile and the level of utilization of teaching aids/practices using Pearson's Chi-square C – test at 0.05 level of significance.

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As revealed in the table, the significance C values for almost all the profile excludes training received were greater than 0.05. The null hypothesis was accepted. There is **no significant relationship** between respondents' level of utilization of teaching aids/practices and their profile campus, field of specialization, academic rank, age, employment status, sex, number of years in teaching, and number of times of attendance to trainings.

This indicates that the level of utilization of teaching aids/practices of the respondents are independent with their profile campus, field of specialization, academic rank, age, employment status, sex, and number of times of attendance to trainings.

However, for their training received; the significance C value was less than 0.05. The null hypothesis was rejected. **There is a significant relationship** between **respondents' level of utilization of teaching aids/practices and their trainings received.**

Among all the profile variables mentioned on the above table, only attendance to training influence their utilization of teaching aids/practices. Hence, the more training they attend they are more equipped in utilizing teaching aids/practices on their instruction.

CONCLUSIONS

Based on the results of the study, the following conclusions are drawn:

1. As to the respondents' profile, majority of the respondents are on the desired age to teach, permanent status, but they are not yet designated to any position since they are still under instructor rank.

2. Though most of the respondents have received online teaching training, they are really exposed to it since most of them attended it only "once".

3. The respondents are more exposed to online teaching Platforms such as Messenger and Google Meet, but as to Tele-education, "rarely".

4. Regardless of respondent's profile such as age, sex, rank, status and number of trainings received, there is no effect or significant relationship with their level of utilization of online platforms.

5. As to the level of frequency in the encountered difficulty with the teaching-related activities, majority are rated "often" using messenger and Google Meet. It means that though the Messenger and Google meet are the usual online platforms used by the respondents, they still encounter difficulty in using them particularly in giving some teaching-related activities.

6. As to the significant relationship between respondents' profile and their level of frequency in the difficulty in teaching-related Activities using online teaching Platforms, "Academic Rank" is found to have a significant relationship. It is an indication that The academic rank, particularly those under "instructor" rank are the ones commonly encounter difficulty in the use of online Teaching platforms.

7. Among the seven teaching-learning practices/aids indicated, two of them are "**often**" utilized: "provide with timely feedback including email guidance after class "and "adopt some measures to measures to improve the degree of and depth of students' class participation". Two teaching practices are "**always**" utilized: "adjust teaching speed/time to ensure the effect delivery" and "match teaching content with the academic readiness" while "Providing Teaching materials" is "**sometimes**" utilized by the respondents.

8. It is found out that there is a significant relationship between the respondents' level of utilization of teaching aids/practices and their profile, particularly the received trainings. It shows the importance of exposure of the respondents to online teaching platforms for the execution of teaching practices to deliver quality education to students.

RECOMMENDATIONS

Based on the conclusion, the following are recommended:

1. The administration is encouraged to organize series of trainings for its faculty members, especially those under Instructor rank, in the use of different online teaching platforms for the faculty to be familiarized with e-learning platforms features and uses.

2. Hands-on Trainings on the various e-learning platforms among faculty members, particularly in the preparation of Instructional materials and assessment/evaluation tools, should be conducted in order for them to provide quality education for their students despite the absence of face to face teaching.

3. Although there is tremendous variety in the educational technologies available to online instructors, the field of distance learning technology is changing quickly, and it is therefore necessary for instructors and administrators to keep a close eye on emerging trends and associated best practices.

4. Based on the recommendations of the respondents, the administration should strategize the conduct of meetings involving faculty members to avoid disturbances of classes, limit suspension of classes due to local holidays, provision of internet allowances to all faculty regardless of status, limit paper works to provide ample time for instruction, and

Creation of Learning Resource Center for Online Learning and consideration of a modified face to face teaching for laboratory courses.

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Study Molecular Biology Clinically and Biologically Relevant in the Tumorigenesis and Progression of Cancer

Hayder Hatem Abdulwahhab

University of Çankırı Karatekin Department of Biology , Molecular biology

The paper aims to develop a new concept for stratifying cancer patients using their biomarker profiles. The study leading to HCC only assessed the diagnostic aspect of recurrent cancer. However, the next clinical evaluations will be geared towards predicting recurrence. Thus, the finalized platform should make it possible to determine marker profiles in a clinical context and to develop a set of rules for predicting the progression of the pathology, more particularly of recurrence. Such a predictive tool would be beneficial for the management of patients with bladder cancer. Indeed, the latter has a high rate of recurrence and improving the determination of the risk of recurrence would allow optimal and personalized care for each patient (Ahram M, 2008). Finally, this concept of personalized medicine thanks to the information obtained by the analysis of several parameters on our platform can be applied to other cancers or pathologies.Individual markers could play a role important diagnostic or predictive, and this clinical utility in the laboratories clinical automated manner. The arrays of CpG methylation islands have allowed the identification of new individual epigenetic profiles and candidates that are clinically and biologically relevant in the tumorigenesis and progression of cancer, with utility for the early detection of the disease (Burger M, 2013). The characterization of BDNF in tissue samples, urine and cell lines in an integrated way has allowed the identification of a new gene that is epigenetically silenced by methylation and that has clinical utility for the diagnosis and tumor stratification of patients with cancer. It is necessary to characterize other candidates identified both at the methylation and miRNA levels and to carry out complementary and independent validations to define markers that also allow early non-invasive detection (J.S. Ross, 2014).

The Polymerase Chain Reaction (PCR) has been the main diagnostic tool that has taken advantage of the benefits of molecular biology to the point of reaching great versatility as an analysis technique. The specificity, performance and fidelity of PCR are directly influenced due to the different components that make it up, such as the reaction mixture, cycling regimen and DNA polymerase; the technique allows the selective amplification of any DNA segment, knowing the flanking sequences, obtaining a specific DNA sequence without resorting to cloning in a host organism Its applications are variable and unlimited, an example of this is the possibility of carrying out genetic expression studies, direct sequencing of amplified sequences, detection of mutations, monitoring of the effectiveness of disease treatment, diagnosis of genetic and infectious diseases and in forensic science in the identification of remains biological, determination of paternity and forensic evidence in criminology (Edwards NJ, 2015).

The DNA sequence consists of determining the order of the bases A, C, G and T in a DNA fragment; This method was described by Sanger in 1977, and it makes it possible to obtain the sequence of a specific DNA fragment, a gene or part of it, and to be used today. This method has evolved over time and today implemented different types of sequences, highlighting the parallel, massive or new generation sequence (NGS), which allows the exploration of complete genomes of humans or other species; and the pyrosequence, with which it is possible to determine the sequence of a molecule of DNA, identifying individual bases, or short sequences of nucleic acids at specific positions. Hybridization is a method that is based on the union of two single strands of nucleic acids that produce double-stranded structures, which are DNA hybrids, RNA-RNA or DNA-RNA. The hybridization method is based on the development of two nucleic acid molecules: one homogeneous of sequence distinguished as a probe and the other heterogeneous of sequence known, which contains the target sequence to be analyzed. Single-stranded nucleic acids come from cloned DNA fragmented by restriction enzymes, or from synthetic oligonucleotides (Gogalic S, 2015).

This recently introduced methodology is a closed system combining the amplification of nucleic acids and the detection of the products in one step. This makes it faster, more efficient and reduces the risk of cross contamination with a mplicons as it eliminates post PCR manipulation. The detection system monitors the changes in fluorescence produced as it goes amplification taking place, thus allowing view product backlog in real time. It is a qualitative and quantitative test, since by quantifying the

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fluorescence emission, we can know the microbial load or the number of copies originally present in the sample. With this methodology it is also possible perform mutation analysis and genotyping studies (Cancer Genome Atlas, 2014).

The results are summarized in Table 1. No result was obtained for U.P.K.3.A because its complete analysis could not be carried out due to a technical difficulty (the 96-well plate was damaged by the pipetting machine during the analysis). Calibration curves in urine could be obtained for all other markers, with the exception of F.B.L.N3.

Table 1. Biomarker assays from the second study (Biomarkers Definitions, 2001)

Marker pen	Calibration range in the diluent	Calibration range in urine	Detection limits (urine) **	Detection of marker in patient samples
BIRC5	+	+	1000 pg/mL	+
EN2	+	+	1.25 ng/mL	+
FBLN3	+	-	25 ng/mL (diluant)	+
FGFR3	+	+	1000 pg/mL	+
IL8	+	+	125 pg/mL	+
MMP9	+	+	666.7 pg/mL	+
MYC	+	+	1.25 ng/mL	-
p53	+	+	10 ng/mL	-
PTGS2	-	+	5 ng/mL	+
TMOD1	+	+	2.5 ng/mL	+
UPK3A	-	-	N/A	N/A
VIM	+	+	112.5 ng/mL	-

Table 2. Individual performance of parameters

Clinical parameter	Pr(>|z|)	AUC	Marker	Pr(>|z|)	AUC
diagnostic sample	0.42	0.5	DCN$_{puce}$	0.67	0.57
sex	0.89	0.51	VEGF$_{puce}$*	0.05	0.67
age.diagnosis	0.7	0.48	IL8$_{puce}$*	0.08	0.69
sample age	0.45	0.57	CDH1$_{puce}$	0.66	0.53
grade.diagnosis (G2 / G3)	0.32 / 0.48	0.57	IL6$_{puce}$	0.65	0.48
stage.diagnosis	0.52	0.55	EN2$_{puce}$*	0.09	0.65
number of previous recurrences *	0.08	0.63	EGFR$_{puce}$	0.86	0.53
therapy.BCG *	0.1	0.65	ErbB2$_{puce}$*	0.06	0.73
therapy.mitomycin	0.49	0.54	MMP7$_{puce}$	0.9	0.5
nr.RTUV. previous *	0.33	0.58	MMP9$_{puce}$	0.72	0.58
			IL8$_{P A}$	0.74	0.47
			MMP9$_{P A}$	0.46	0.5
			FBLN3$_{P A}$	0.54	0.52

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Perception on Smart Phone Usage in Sustainable Learning among the Students of the Federal Polytechnic, Ado-Ekiti, Nigeria

TAIWO, David Olugbenga[1], OLOWOOKERE Clement Adebayo[2], ADEWALE Yemi Yekeen[3]

[1,2]Department of Urban & Regional Planning, The Federal Polytechnic, Ado-Ekiti.
[3]Department of Urban & Regional Planning, The Federal Polytechnic, Offa, Kwara State

ABSTRACT: In tertiary institutions, the usage of smartphones has become one of the most intriguing learning tools for improved teaching, research, and learning. The usage of this tool has enhanced the capacity of lecturers to be more flexible in the delivery of lectures. It also provides students with access to online learning resources, course platforms, and the ability to engage in digital interactions. The purpose of this study is to determine the most common usage of mobile phones among students of the Federal Polytechnic, Ado Ekiti, as well as the effects of mobile phones on students' learning abilities. For the study, a survey research design and questionnaires were used, with a total of 37 respondents. The study's goals include learning about students' perceptions of how easy it is to utilize smartphones in learning. The study's objectives are to assess students' perceptions of smartphone ease of use in learning activities, to determine the perceived utility of smartphones in students' academic achievement, and to investigate the effect of smartphone use in students' learning activities. Students find it easier to use a smartphone in their learning activities, according to the study. It was also discovered that smartphones played a significant part in the academic activities of students at the Federal Polytechnic, Ado-Ekiti. It also observed some negative effects on students' academic performance, as well as some barriers to smartphone use, such as distractions during critical learning times, unreliable internet connectivity, and invading calls during class hours.

KEYWORDS: Learning, Mobile technology, Perception, Smart phone, Students learning.

1.0 INTRODUCTION

Smartphones and tablets are internet-connected mobile devices, and seems to have become the preferred platform for the millennial population involved in numerous internet activities (Alzougool and Almansour, 2017). The global mobile market as well as ownership and penetration rates have tremendously increased, (GSMA Intelligence Report, 2016). By 2025, it is expected that there will be 5.8 billion internet subscribers and a 71 percent penetration rate of internet providers. It appears that advancement in technology, information and communication technologies (ICTs) have resulted in a wider usage of mobile technology in the education sector notably among tertiary institutions.

Smartphones have become a common place electronic device among the general populace hence, it has make it easier than ever to access a vast volume of information on the internet (Payne, Wharrad, & Watts, 2012). Students can use their smartphones and computers to learn and discuss issues even while they are physically apart. It also promotes cooperative learning as an alternative to reading books, using computers, or attending physical lectures on campus (Taleb & Sohrabi, 2012).Teachers may easily upload instructional materials to their students using mobile devices, and students can communicate with their teachers quickly using text, voice, or image (Kim, Rueckert, Kim, & Seo, 2013).Several research on student attitudes towards the use of smartphone and its impact on learning have been conducted in industrialized countries. Most of these studies demonstrated the benefits of cellphones and its contributions to the learning process of students. According to Wang and Smith (2013), Japanese students saw mobile phone-assisted learning as an excellent way to improve reading and grammar ability.

Focusing on Nigeria, mobile phone usage is rapidly increasing in response to the introduction of new digital technologies such as smart phones, 4G phones, and tablets. Furthermore, students at higher institutions may represent one of the most effective segments of Nigerian society, since they are frequently involved in the use of advanced mobile phone technologies, which has become an integral part of their everyday lives. Students at the Federal Polytechnic, Ado Ekiti, seem to be a good

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example of this, as evidenced by their diverse cell phone usage. Over the last two decades, integrated electronics has completely transformed our lives. These integrated circuits have become an indispensable resource in today's knowledge-based society.

Mobile phones have become one of the most ubiquitous modern telecommunication devices, particularly among students of higher education. In terms of academic concerns, some student seems to believe that their phones help them improve their learning quality outside of the classroom. Wireless communication devices, such as cellphones, have now become a commonplace tool for most individuals all over the world. Mobile phones were first brought to the world for business purposes, but they have since evolved into a number of settings, including internet access through mobile phone, multimedia communications, and voice communication applications (Alfawareh and Jusoh, 2014).

1.1 Objectives
The objectives of this study are to:
i.   Investigate the main uses of mobile phones among students of the Federal Polytechnic, Ado Ekiti.
ii   Identify the effects of mobile phones on the Federal Polytechnic, Ado Ekiti students learning abilities.

1.2 Research Questions
The following were the research questions the study seeks to answer:
i.   What is the most common usage of mobile phones among the students of the Federal Polytechnic, Ado Ekiti, based on motivation and behavioral characteristic concepts?
ii   How far is the usage of mobile phone is affecting the learning capabilities of the Federal Polytechnic, Ado Ekiti students?

2.0 LITERATURE REVIEW
2.1 The concept of the smartphone in mobile learning
Smartphones today are capable of running a wide range of applications. Many innovative applications have been created to make it easier to utilize cellphones as sensors, detect, and monitor variety of objects. Smartphones, for example, can be used to track traffic, detect urban space, monitor meteorological conditions, and assist in the identification of locations, among other things. A smartphone is a mobile phone with more advanced processing capability and connectivity than a feature phone with limited functionality, (Fawareh and Jusoh, 2017). In the year 2000, smartphones were introduced, Ericsson was the first to produce it, and the model was designated R380 (Alfawareh & Jusoh, 2014). Smartphones may be used to learn both offline and online activities. Offline access allows smartphone users to save any type of learning material, including pdf, PowerPoint, Word, Excel, photos, animations, and symbols, regardless of their location. Learners, such as students and teachers, require internet connection in order to view websites meet their information demands. Students' learning activities have changed as a result of their discoveries of smartphone.

2.2 Students' Perceived Usefulness of Smartphones in Academic Achievement
In a study conducted by Jung (2014), at North-West University (NWU) in South Africa on determinants impacting learners' satisfaction and performance with smartphones, it was discovered that one of the benefits of smartphones is the ability to study anywhere and at any time, making learning more appealing. Ifeanyi and Chukwuere (2018), used a quantitative methodology with a sample size of 375 undergraduate students in South Africa to explore the impact of smartphone use on academic achievements. Data were obtained via questionnaire administration. The use of smartphones, according to the study, assists students in communicating with their classmates as well as their course masters/tutors.

Students also utilize their iPhones to demonstrate facts, images, and concepts. Smartphones promote students' learning activities in a variety of ways, according to the same study, including downloading study materials, recording live lectures, accessing lecture slides at a convenient time, assisting with research work, and completing assignments. In a similar vein, Almansour and Alzougool (2017), conducted a study on the usage of smartphone for learning activities by university students in Kuwait, findings revealed that smartphone use plays a significant part in students' learning activities. Students, for example, use cellphones to register for classes, check lecture timetables and test schedules, check grades, have group discussions, read notices, and pay school fees, among other things.

2.3 The Impact of the Use of Smartphone on Students' Learning Activities
According to Ifeanyi and Chukwuere (2018), depending on how a smartphone is utilized, it has both harmful and beneficial effects on students. The author underlines the negative side; he noted that smartphone has become a major study distraction and if not rigorously managed students who are attached to their smartphones have a high proclivity to check updates or notifications virtually every minute. Kibona and Mgaya (2015), opined that despite the remarkable advantage of smartphones in learning, they

are a double-edged sword because most of the programmes, including WhatsApp, Facebook, and games, negatively affect Tanzanian students on all levels due to their addictive nature. Lin et al.(2014) findings reveals that, excessive smartphone use causes issues such as vascular permeability, neck pain and musculoskeletal disorders.

Despite the fact that smartphone has countless benefits; there are some impediments that prevent students from adopting the smartphone for their learning activities. Gikas and Grant (2013) focused on students' experiences with mobile computing in higher education. The study found that students were hesitant to utilize a smartphone as a learning tool because of its small screen size compared to a laptop, which has a larger screen. In addition to this, Sarfoah (2017), found out that inconsistent or unpredictable internet access as major problem that prevents students from using smartphones as a learning aid.

There are numerous obstacles to making efficient use of cellphones for educational purposes. Some of these issues were also noted in a 2015 survey conducted among medical students and employees at Niger Delta University, Wilberforce, Bayelsa State, Nigeria (Ebiye, 2015). According to the findings, smartphones were found to have a positive impact on their medical education, particularly in terms of their ease and speed of internet access, high-speed browsing, the time and money saved by not having to go to an internet café or college library, and easy access to available online medical e-learning materials. However, the research found that certain conditions can counteract the good effects of smartphone use and induce frustration among students.

3.0 METHODOLOGY

The disparities in student's attitude and behaviours towards mobile phone usage at the Federal Polytechnic, Ado Ekiti, have called for the conduct of this research. This study aims to investigate the main uses of mobile phones using motivation and behavioural characteristics concepts, as well to determine the effects on the students in terms of learning process. A quantitative technique was employed to collect data from students during working hours at the Federal Polytechnic Ado Ekiti main campus, using a set of standardized questionnaires.

3.1 Participants

In November 2021, a quantitative study was done at the Federal Polytechnic, Ado Ekiti Main Campus. A total of 40 students were chosen at random from the various academic departments. Furthermore, the reason for the small number of participants is due to a time limitation and a large number of students.

3.2 Materials

A survey questionnaire was adapted and redesigned based on the results of a study conducted by Braguglia (2008) on cell phone usage among college business students. There are ten questions in all, divided into two sections: Part A for demographic information and Part B for research data. In order to meet the study's aims, the questions focus on the motivational and behavioural elements of mobile phone usage, as well as its consequences on learning.

3.3 Procedures

In the afternoon, all participants received a hardcopy of the questionnaire at the Main Campus Bus Stop. The anonymity of the respondents' responses to the research survey questions was first explained to them. Due to incomplete responses, a small percentage of the questionnaires were discarded. As a result, the respondents completed a total of 37 questionnaires, which were then processed and utilized in the form of percentages and other graphical representations using SPSS.

4.0 DATA ANALYSIS AND FINDINGS

A total of 40 questionnaires were distributed to students at the Federal Polytechnic, Ado Ekiti, with 37 of them (92.5%) being retrieved and evaluated for the purpose of data presentation. Tables, pie charts, and histograms were used to show descriptive analysis of demographic profile, length of time since respondents have been using phones, benefits of phone usage, and much more.

4.1 Respondents' Gender

The results obtained from the Field Survey revealed that, males accounted for 37.8 percent of the respondents, while females accounted for 62.2 percent.

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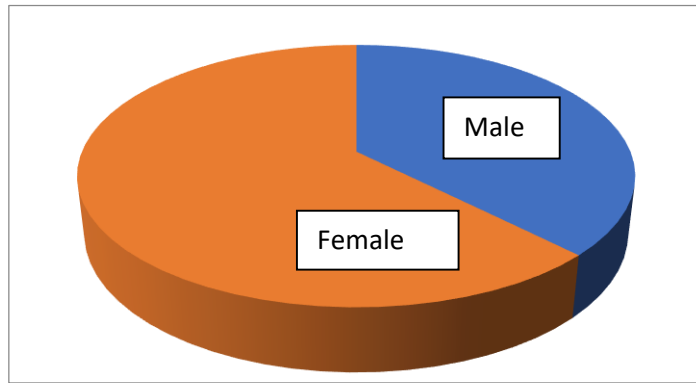

Figure 1. Sex of Respondents
Source: Authors' Field Survey, 2021

4.2 Age of Respondents

Here, a good number of the respondents are from the age groups 22-25 years representing 56.8 percent of the respondents followed by the age brackets 19-21 years representing 21.6 percent, respondents of ages 26-30 accounted for 13. 5 percent came next, while respondents within the group 31-35 representing 8.1 percent was at the rear as shown in Table 1.0

Table 1.0. Age of Respondents

Age of Respondents	Frequency	Percent
19-21	8	21.6
22-25	21	56.8
26-30	5	13.5
31-35	3	8.1
Total	37	100.0

Source: Authors Field Survey, 2021

4.3 Tribes of Respondents: The survey conducted revealed that the Yoruba speaking students recorded the highest number of respondents with 16 respondents representing 43.24 percent, while the Ebiras recorded 9 respondents representing 24.32 percent. Igbo came next with 5 respondents accounted for 13.51 percent, while Edo followed with 6 respondents and Hausa 1 respondent which amounted to 16.22 and 2.71 percent respectively. The large number of Yorubas in the study might be due to the location factor of the institution.
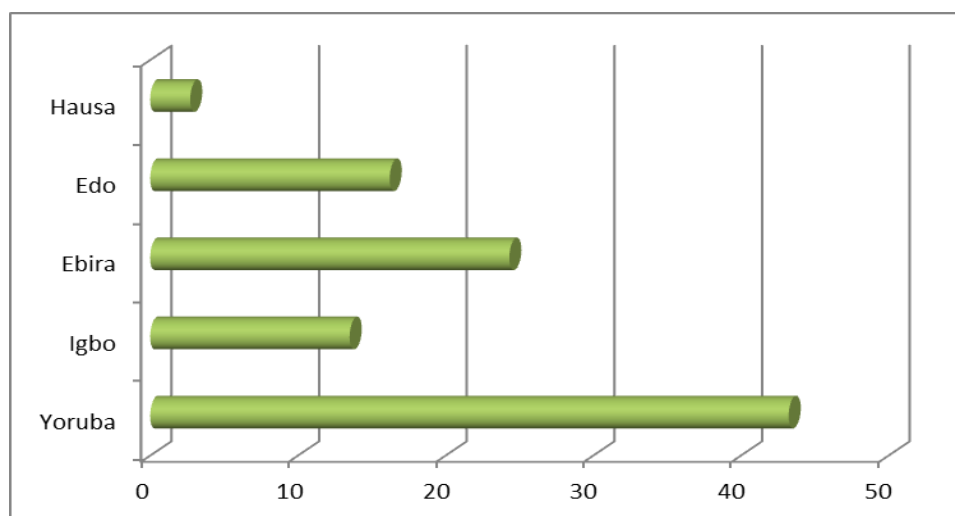
Figure 2. Tribes of Respondents
Source: Authors Field Survey, 2021

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4.4 Departmental Spread

Majority of the respondents are from Science Technology with 9 respondents representing 24.3 percent, followed by Architectural Technology with 6 respondents representing 16.2 percent. Both Food Technology and Computer Science were with 5 respondents representing 13.5 percent respectively. Office Technology & Management accounted for 10.8 percent of the respondents. Others from Civil Engineering and Surveying & Geo-informatics were with 2 respondents each representing 5.4 percent. Glass & Ceramics, Urban & Regional Planning, Mechanical Engineering and Elect/Elect each recorded 1 respondent representing 2.7 percent.

Table 2.0. Departmental Spread of Respondents

Departments	Frequency	Percent
Architecture	6	16.2
Civil Engineering	2	5.4
Surveying & Geo	2	5.4
Glass & Ceramic	1	2.7
Food Technology	5	13.5
Office Tech & Management	4	10.8
Urban & Reg. Planning	1	2.7
Science Technology	9	24.3
Mechanical Engineering	1	2.7
Computer Science	5	13.6
Elect/Elect Engineering	1	2.7
Total	**37**	**100.0**

Source: Authors Field Survey, 2021

4.5 Duration of Using Phone: From the survey carried out 54.1 percent were said to have been using smart phone for over 5 years, respondents using phone between 2-3 years accounted for 32.4 percent. Those who have used phone between 1-2 years constituted 2.7 percent. A total of 4 respondents representing 10.8 percent did not indicate the duration they have been using phone as shown in Table 3

Table 3.0. Period of Using Phone

Period of Using Phone	Frequency	Percent
1-2 years	1	2.7
3-4 years	12	32.4
5 years and above	20	54.1
No response	4	10.8
Total	37	100.0

Source: Authors Field Survey, 2021

4.6 Most Frequent use of Cell Phone: As shown in Figure 3.0, a total of 19 respondents use their cell phone for internet browsing which accounted for 51.4 percent, while text messages are next with 11 respondents representing 29.7 percent. 7 of the respondents accounted for 18.9 percent use the cell phone for only voice calls only.

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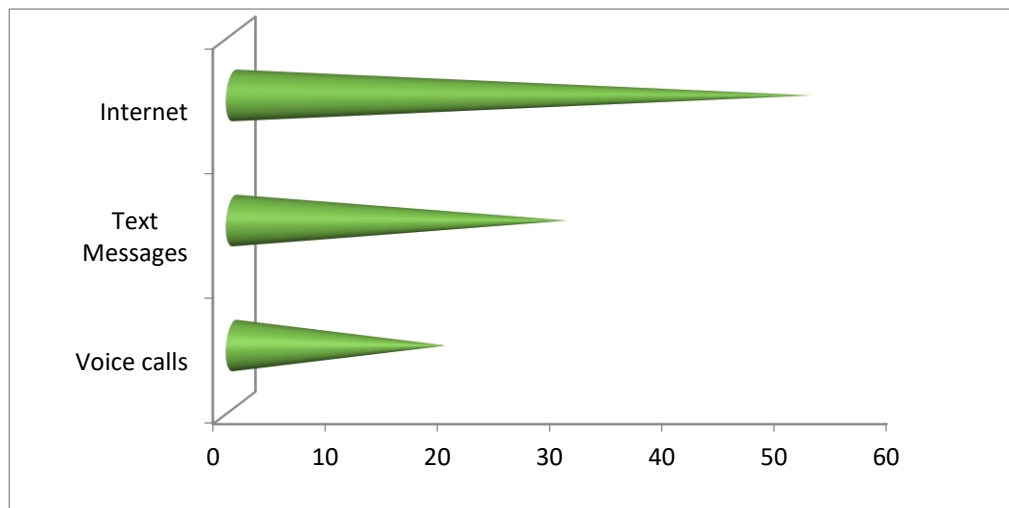
Figure 3. Most Frequent Use of Cell Phone
Source: Authors' Field Survey, 2021

4.7 Hours of Using Smart Phone: The results of the field survey conducted showed those who use their phone between 1-3 hours daily and this represent 48.6 percent, followed by respondents using phone for between 4-9 hours daily with 10 respondents representing 27.0 percent. 8 respondents use phone for 10 or more hours daily which accounted for 21.6 percent came next while respondents that use phone for less than 1 hour only recorded 2.7 percent

4.8 Frequency of text messages: As revealed from the survey carried out, respondents using their cell phone to send text messages 1-5 times a week were made up of 45.9 percent while 14 respondents using it for multiple times a day accounted for 37.8 percent. 5 respondents representing 13.5 percent chose rarely or once every few week only, only one respondent out of the all the respondents chose not to have used the phone for message sending.

4.9 Reason for Acquiring Cell Phone: The survey conducted and as depicted in Table 4.0 revealed that 14 respondents representing 37.8 percent acquired the cell phone for the sake of using it for emergency. 8 of the respondents acquired cell phone to keep in touch with their friends. Other social contact was represented by 21.6 percent. Those who said they acquired cell phone because everyone they know had one, has 7 respondents accounting for 18.9 percent. For good value of privacy management has 5 respondents representing 13.5 percent. Only 1 respondent use cell phone for accessing information representing 2.7 percent

Table 4.0. Reasons for acquiring cell phone

Reasons for Acquiring cell phone	Frequency	Percent
To use in case of Emergency	14	37.8
Everyone I know had one	7	18.9
To keep in touch with friends/other social contacts	8	21.6
Keep in touch with parents	2	5.4
For information access	1	2.7
Good value of Privacy Management	5	13.5
Total	37	100.0

Source: Authors' Field Survey, 2021

4.10 Educational Level: Results here showed that majority of the respondents are Higher National Diploma students with 22 representing 59.5 percent followed by the Ordinary National Diploma students having 13 respondents representing 35.1 percent. Two of the respondents representing 5.4 percent declined to reveal their educational levels.

4.11 Privacy of Phone Usage: The field survey carried out by the investigators reveals that, 11 of the respondents said they use cell phone to stay in touch with family representing 29.7 percent, followed by 10 respondents who use it to stay in touch with friends. Also, 3 respondents use their cell phone to direct some people to call their number which accounted for 8.1 percent, about 35 percent of the respondents kept quiet because of privacy management.

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4.12 Using cellphone During Class time: The survey shown in Table 5.0 revealed that 18 respondents representing 48.6 percent use cell phone during class time, and 51.4 percent of the respondents do not use the cell phone during class time.

Table 5.0. Using cellphone During Class time

Using Phone During Lectures	Frequency	Percent
Yes	18	48.6
No	19	51.4
Total	37	100.0

Source: Authors' Field Survey, 2021

4.13 Cell phone as Learning Tool: The field survey carried out revealed that 94.6 percent of the respondents admitted that they use their cell phone as learning tool while 2 respondents accounted for 5.4 percent.

4.14 Cell Phone Improving Students Performance: From the Field Survey carried out, it was shown that cell phone improves students' performance. The field work revealed that 25 respondents representing 67.6 percent use cell phone in search of information via internet and 13.5 percent use it in recording or taking lectures. 2.7 percent kept their notes in the phone. 6 of the respondents could were not categorical on how cell phone has helped them to improve on their performance.

4.15 Cell Phone interference with Learning: A total of 13 respondents representing 35.1 percent claimed that sometimes cell phones do interfere with their learning. Next to that are the respondents that claimed often cell phone do interfere with their learning this accounted for 32.4 percent. Seldom interference of cell phone with learning formed 18.9 percent of the respondents while 3 of the interviewed representing 8.1 percent said that, cell phone has never interfered with their learning. The remaining 5.4 percent of the respondents were indifferent to cell phone interference on their learning.

4.16 Phone Assisting in Learning: From the survey conducted, it was discovered that 40.5 percent of the respondents opined that phone usage often and sometimes assisted them in learning; while 3 of the respondents representing 8.1 percent said the use of cellphone seldom assist them in learning. Only one of the respondents said that phone usage does not assist in learning, 8.1 percent of the people interviewed declined to answer the way cell phone could assist in learning.

4.17 Phone Assist outside class study: 48. 6 percent of the respondents revealed that the use of cell phone found cell phone to be of assistance outside class study while 11 of the respondents representing 29.7 percent said that phone cell phone often assist in study outside classroom. The respondents with the opinion that cellphone seldom assist in learning outside classroom formed 10.8 percent. 2 of the respondents found phone usage to be of immense assistance in learning outside class study, while 5.4 percent of the respondents did not give their opinion as regard the use of phone outside their classroom studies.

4.18 Phone Distract outside Class study: From the responses gathered 14 respondents representing 37.9 percent opined that cell phone often distracts their attention outside class study while 12 of the respondents accounted for 32.4 percent of the survey revealed that sometimes cellphone sometimes distract outside class study. 6 of the respondents representing 16.2 percent said it seldom distract outside class study. 5.4 percent of the respondents could not ascertained whether cellphone usage distract outside class room study.

4.19 Upsetting News from Cell phone: 18 respondents representing 48.6 percent chose that sometimes that upsetting news received from the cell phone could cause distraction and eventual lost concentration. 24.3 percent believed that seldom upsetting news received on cell phone was a distraction and 13.5 percent said upsetting news often distract concentration from the use of cell phone. 2 members of the respondents did not volunteer their opinion on how they feel when received upsetting news from their cell phone.

4.20 Evaluation of Students Performance: A total of 22 respondents representing 59.5 percent of the students were medium performers, while 35.1 percent of the respondents said their academic performance were excellent. 5.4 percent of the respondents declined to reveal their academic performances.

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5.0 CONCLUSION

Students who used cellphones in their learning activities had a more favorable attitude about their studies. According to the research, these students took their studies seriously and were more likely to achieve good results in various courses. These students were able to access a large volume of information about their courses via the internet; they were able to learn anywhere due to the flexibility of carrying smartphones with them; they developed confidence; they were able to participate in class discussions because they had information; and they were also able to complete and submit their assignments quickly to their teachers. These elements help them develop independence in their studies and avoid relying too heavily on their lecturers. They are able to investigate knowledge outside of the classroom and create their own experiences, which become much more relevant during classroom learning, thanks to the use of cellphones. The ultimate result is an internal edge that motivates individuals to adopt a more positive approach toward learning. Though this study concluded that students' use of smartphones can help them establish a good attitude toward learning, it also discovered that some conditions can limit its effectiveness. These include using social media communication apps like WhatsApp in class while the lecture is still going on, as well as the small size of the smartphone screen.In comparison to PCs, the small size of smartphone screens makes it difficult to read and display a sufficient volume of information at one time. Smartphone users may become frustrated, and study time may be wasted as a result.

6.0 RECOMMENDATIONS

If the following strategies are implemented, the implications for mobile technology usage activities can result in significant savings and value without compromising educational achievements and will also enhance sustainable learning.

- Assist teachers in learning new teaching techniques that promote student involvement and assessment.
- Teachers should take on more of a facilitator role and keep track of "facilitator-student" parameters.
- Institutions must have methods in place to track and assess learning outcomes over time.

New ways are being developed to engage Millennia's in business (e.g. CSR) and in education (e.g. artificial intelligence and other technology) in the future of higher education (Ahmad, 2019c; 2020 ;). Finally, with the idea that in the future, "classrooms" will consist of students from many disciplines working together to solve problems utilizing their interdisciplinary and entrepreneurial skills.

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Delay of Issuing Laboratory Test Reports of a State Sector Clinical Laboratory in Sri Lanka: A Case Study

Sandamali, J. D [1], Rathnayake, S[2], Bandara, T.W.M.A.J[3]

[1,3]Ministry of Health, Colombo

[2]Post graduate,Institute for Management, University of Jayawardenapura, colombo

ABSTRACT: Medical treatment decisions are basically made based on the laboratory test reports. Therefore, rapid and accurate laboratory test report issuing is considered as one of the most noticeable signs of a clinical laboratory. Reducing the delay of issuing laboratory test reports will increase patients' and clinicians' satisfaction, reduce the hospital stays and indirect costs associated. Ultimately it increases the better image towards the institution. This study was a cumulative case study conducted at a state sector biochemical laboratory in Sri Lanka. Study tools were focus group discussions and review of secondary data sources. Turnaround time for a selected test was recorded as 3 days where the private sector laboratory benchmark is 24 hours. Three associated problems related to delay of issuing laboratory test reports were identified including non-value added laboratory procedure, increased number of laboratory occurrences and increasing staff focus on overtime. Found issues were brainstormed among few officials under three category labels including process management, quality management and people management to find out the root causes. Process Cycle Efficiency was recorded as 10.4%. Laboratory processes are not standardized and all the sample data management and report generation procedures are done manually. The number of incidences of sample missing and transcription errors was recorded as 12.6% and 9.6% respectively. Staff awareness on occurrence management seemed to be poor and self-audits were not being conducted which caused an increase in the number of occurrences. Annual overtime payment has exceeded the allocated amount by 29.9%. Laboratory staff trainings are not conducted and therefore they are not competent enough on new technology, staff supervision provided is limited and job descriptions are not available which ultimately has driven for high over time payment. Implementing solutions for the found issues will rectify the issue of delaying medical test reports.

KEYWORDS: Clinical Laboratory, Test Reports, Delay, Process Management, Quality Management Systems, People Management.

I. INTRODUCTION

Demand for the medical diagnostic service is continuously increasing, constantly innovating. Sri Lanka as a developing country, majority of people in the country are seeking government healthcare facilities for disease diagnoses. Health care sector in the world grows day by day. Therefore, many growing opportunities are available for the service suppliers. Furthermore, its huge demand facilitates stable prices and is quite resistant to ups and downs of the business cycle. It includes, diversified service portfolio including healthcare equipment and supplies, health care service, laboratory service, health care technology and pharmaceuticals. Among these portfolios medical laboratory testing plays a significant role as it provides the base for the disease diagnosis. Based on a market survey, it has found that the global market for clinical laboratory services is estimated at US$96.8 billion in the year 2020 and is projected to reach a revised size of US$135.5 Billion by 2027 with the growth rate of 4.9% [1]. The United States represents the largest market for clinical laboratory testing, which comprises well-developed healthcare infrastructure, advancements in diagnostic services and committed pursuit of excellence in diagnostic services.

In Sri Lanka, it has increased the demand for the medical diagnosis tests and this demand has been created by the aging population, on-going trend towards preventive healthcare, prevalence of non-communicable diseases, pandemic situations and rise of new strains of infectious diseases. Many diseases surveillance and screening programmes are carried out by the government, demanded massive increases in laboratory testing. Furthermore, people's awareness on the importance of prior disease diagnosis has increased in the recent past and changes of lifestyles, food habits have increased the tendency of prevailing noncommunicable diseases among the population which creates additional demand for medical testing.

Delay of Issuing Laboratory Test Reports of a State Sector Clinical Laboratory in Sri Lanka: A Case Study

Issuing laboratory test reports is considered as very critical and essential. Laboratory test report is a document given by a clinical laboratory mentioning what was diagnosed during the investigation and 80% - 90% of medical treatment decisions are made based on the reports produced by a clinical laboratory [2]. Rapid and accurate laboratory test report issuing is one of the most noticeable signs of a laboratory service and is considered as a key performance indicator of laboratory performance. Timeliness of laboratory service has been defined as issuing of the medical report to the clinician prior to a predefined due date [3]. Although the clinical laboratories do not focus on the timeliness of report issuing, there is an increasing pressure from the clinicians to obtain the laboratory reports rapidly [4].

Almost all the laboratory professionals considered it as an important attribute. It has mentioned timeliness is a fundamental dimension of a clinical laboratory. Reducing Turnaround Time (TAT) has been identified as a complex process and it is associated with long term planning, education, adequate resource allocation and adhering to the correct procedures [5]. Simple investment on improving TAT will significantly reduce the overall cost by reducing the hospital stays of patients, increase clinician efficiency, and ultimately increase both patients' and clinicians' satisfaction [4]. Enhancing timeliness of results reporting is fundamental to laboratory quality improvement. Studies have proved that there is a significant relationship between TAT and the lengthening hospital stay which involves additional cost to the health sector [6]. Improving efficiency in a laboratory should be a priority and it will ensure quality results, better output, and sustainable funding. This can be achieved through the right process, systems adequate resources and right people management [7].

Many laboratories in developing countries lack in their capacities including Sri Lanka. This is mainly due to the lack of technical training, equipment provision and weak assessment and monitoring methods practiced in developing countries [8]. Based on this information it is very clear that issuing laboratory tests reports plays a major role in patient care and laboratory service should be focused on achieving the quality indicators and performance specifications associated with the safety of the patient other than competing with the economic gains. Therefore it is significant in finding innovative ways to timely issue the laboratory test reports at state sector clinical laboratories.

II. METHODOLOGY

Both qualitative and quantitative data was used in this project. Quantitative data were gathered through secondary data sources including institution statistics, logbooks, databases and other related documents. Main problem was clearly identified in a quantified manner. Then the associated factors were identified and required data was collected. Based on these data, a problem description was developed. Informal group discussions and one to one discussion were made with Medical Officer (MO) quality, MO planning and Superintend Medical Laboratory Technologist (Supt. MLT) in order to understand the quantitative data.

Brainstorming session was conducted to identify the root causes with the participation of 10 officials including Consultant, Administrative Officer, Accountant, Chief Clark, Chief Financial Clark, MO quality, MO Planning, Supt MLT, and Counter in charge and Senior MLT of the selected study setting. The root causes were identified through a fishbone analysis under three category labels. Literature review for similar studies was done to understand the concepts and get the insight of possible solutions developed by the authors.

Administrative approval was taken from the relevant authority to conduct the case study.

III. RESULTS AND DISCUSSION

A. Root Cause Analysis

Author identified three project components stemming from the identified causes to conduct the project interventions as follows: people management, process management and quality management system. Few likely and probable causes were identified from the fish-bone diagram shown in Figure 1, which were further drilled down to analyze root causes.

Delay of Issuing Laboratory Test Reports of a State Sector Clinical Laboratory in Sri Lanka: A Case Study
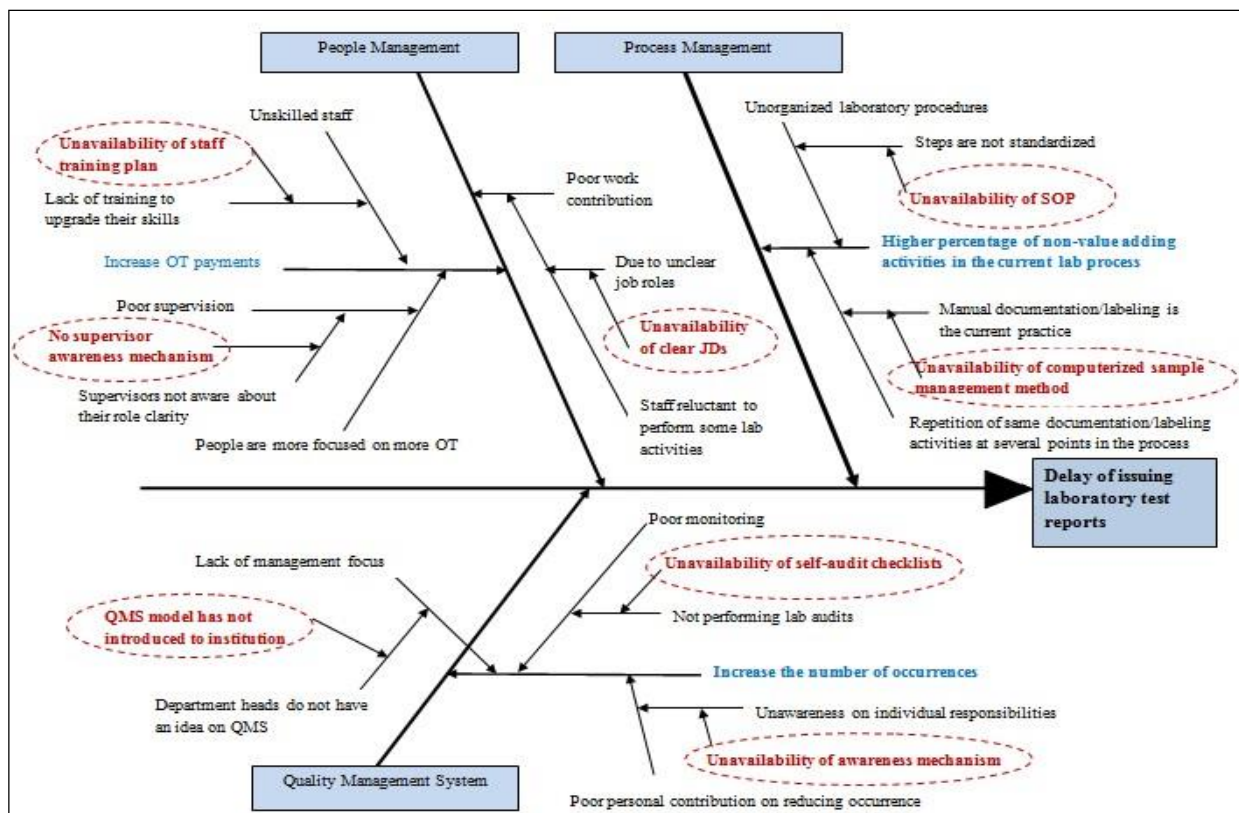

Figure 1. *Fish bone Diagram*

Neonatal Hypothyroidism Screening Test (NHST) is considered as essential, and the positive babies need to be treated within 3-5 days after their birth. Confirmation tests need to be followed based on the test results obtained from the screening test. Then the treatments will be started. Therefore, time is crucial for issuing tests as early as possible.

Report issuing time taken per 1 batch of above test (*n*=768) was calculated based on the available records as indicated in Table 2. In each year it has increased the time taken to issue a laboratory report. In 2022 it shows 8% increase than the previous year. The highest delay shown in the year shows in 2019 and as a percentage it was about 39.5% increase. The highest number of tests done has been reported in 2019 in the selected years.

Table 1. Time Taken to Issue a Neonatal Hypothyroidism Screening Test (NHST) Report

Year	Number of tests performed	Average time taken to 1 batch of report (hours)
2021	152675	67
2020	152568	62
2019	159792	59
2018	154841	43
2017	155203	40

Number of samples received for NHST has not increased significantly but the time taken has increased over the past few years. According to Senior MLT, almost all the tests took only 2-4 hours for the analysis. Therefore, it is clear that there is a substantial and consistent gap between expected and actual time taken for the analysis.

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B. Process Management

Process management refers to aligning and redesigning the existing process to achieve the organizational objectives and goals. Properly established processes will reduce waits and delays, errors, improve efficiency and the effectiveness of the laboratory operations and sustainable attainment of quality objectives while meeting the customer expectations [9]. Laboratory processes are extremely complex by its nature. Management of the laboratory process is a broad area and following procedures need to be critically managed by the laboratory administrators including laboratory information management process, sample handling, diagnosis, waste management, report management etc. [10].

Sample handling procedure was studied extensively and mapped as shown in Figure 1. Laboratory procedure was not standardized. Many steps are performed by the laboratory staff and the same activity was repeated in several places in the process flow. As per the focus group discussions documentation is repeated in several places in the process. Sample labelling, sample data management and report management activities are done manually which is time consuming and error prone.
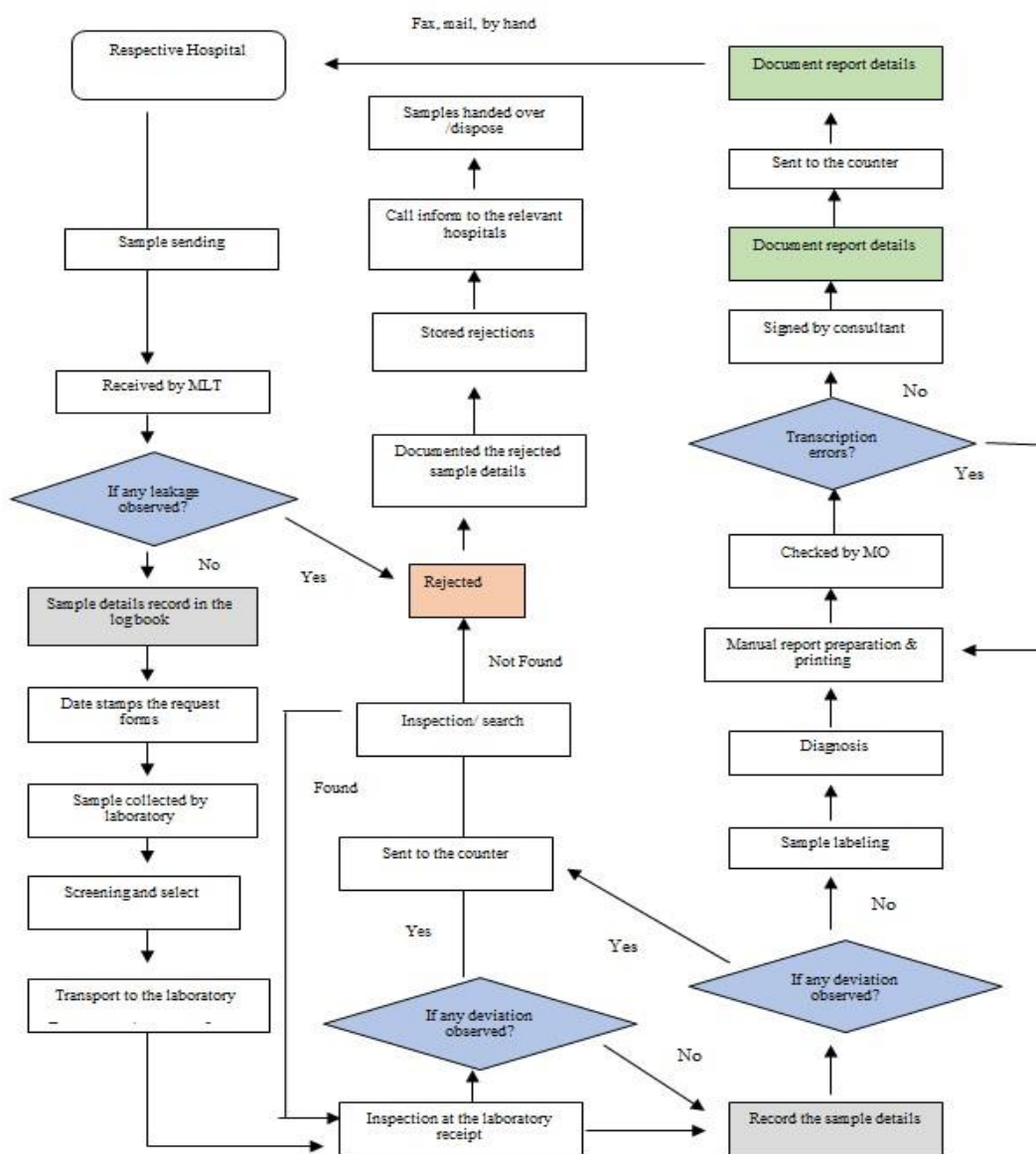
Figure 2. *Overall Laboratory Procedure*

Value stream mapping (see Figure 3) was done to identify the waits and delays associated in the current laboratory process for Neonatal Hypothyroidism Screening Test (NHST) and out of the total time spent, 76.9% were non-value adding activities (Table 2).

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Table 2. Percentage of Non-value Adding Activities

	Category	Min	Percentage %
1.	Lead time	3705	
2.	Non value added	2850	76.9
3.	Required non value added	470	12.7
4.	Value added	385	10.4
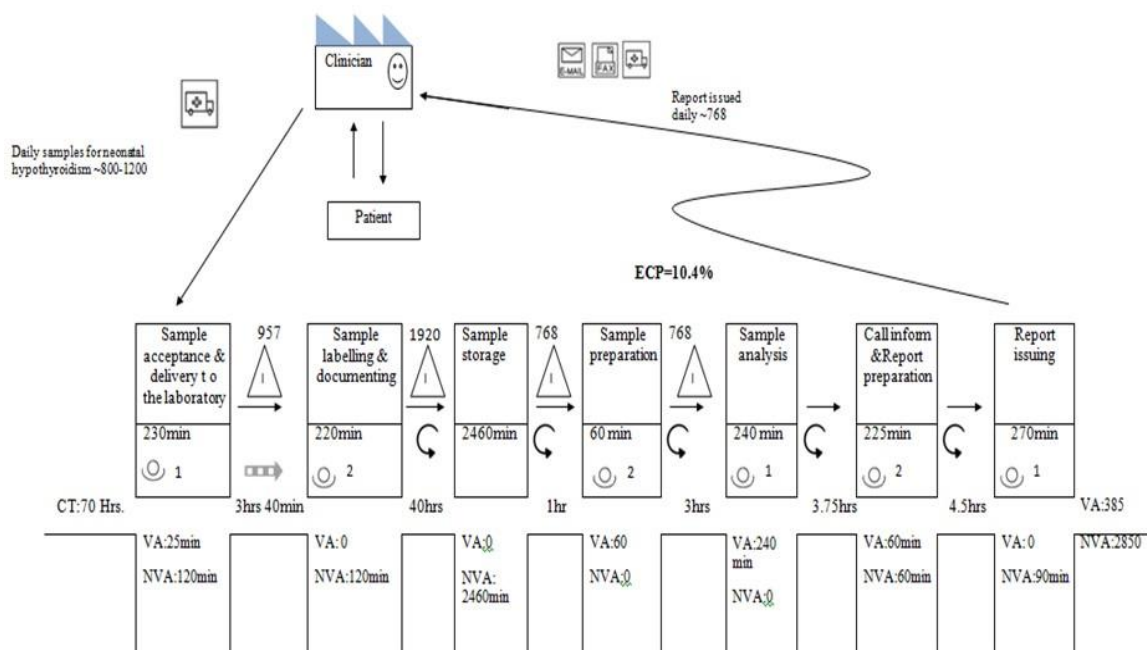
Figure 3. *Value Stream Map*

Most clinical laboratories in developed countries have shown higher process cycle efficiencies (PCE) which are higher than the 60% and go up to 86%. Non value added percentage of the process is below than 30%. There is scholarly evidence of reducing wastes by 30% by the first-time application of lean management techniques.

Laboratory procedure can be mainly divided into three phases including pre analytical, analytical, and post analytical. Preanalytical phase consisted of the activities of obtaining samples from patients and preparing those for testing. Analytical phase is about performing the tests and post analytical phase involves the activities of report generation and delivery to the patient. Accreditation of laboratories has become a major concern with the emergence of international standards [11].With these factors it is evident that laboratory process management is considered as a critical component in maintaining the timeliness of issuing laboratory reports. Laboratory managers in world class laboratories use different techniques in order to maintain the efficiency and effectiveness of the laboratory operations to the maximum level.

Application of lean concepts, computerized or automated processes for sample management and process standardization are commonly used techniques that can be applied in state sector laboratories in Sri Lanka. Standardization of processes ensures the consistency of a particular procedure. Furthermore, modern laboratories have become purveyors of information in the form of laboratory results with the advancement of Information Technology (IT) [12]. Current computerized systems installed in clinical laboratories are able to perform the functions of recording all test requests, ability of real time linking of automated equipment, increased traceability of samples, automated validation of test results, result storage, electronic delivery of results and decision support [13].

C. Quality Management

Assuring the quality of a clinical laboratory is critical. Quality Management System (QMS) of a clinical laboratory has been defined as a systematic and integrated set of activities which control the laboratory processes in order to maintain the consistent quality

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laboratory result [14]. The laboratory system has many steps, activities, processes and procedures. Errors that take place at any point will negatively affect the quality laboratory results. There are 12 elements that have been identified related to the quality management system in clinical laboratories. These factors include organization, personnel, equipment, information management, process control, purchasing and inventory, documents and records, occurrence management, assessment, facility and safety, customer service and process improvement. Each of these elements has separate interactive activities, set of rules and mechanisms to be performed called as systems [10].QMS facilitates the accuracy, reliability, and timeliness of a laboratory report. Hence it should attend to all the laboratory operations including organization structure, process, and procedures. Reduction or the elimination of errors through QMS allows for a great potential for the accreditation assessments. QMS models have been introduced by CLSI and currently practiced in the world class medical laboratories. It has stated that implementation of QMS does not guarantee an occurrence- free laboratory; however it allows for pre-detection of errors and prevents recurring [15]. As per the above factors, it is evident that QMS plays a critical role in timely issuing of laboratory test reports and among these 12 elements occurrence management is considered as critical.

Most common errors identified in the studied laboratory were missing incidences, transcription errors and lab accidents. Lab accidents are minimal. It has increased the number of occurrences in the past few years as indicated in Table 2.

Table 3. Occurrences% Per Batch

Occurrence %	2017	2018	2019	2020	2021
Temporarily missing of samples, request forms	2.6	4	3.4	5.8	5.7
Transcription errors	2.3	3.5	3.7	3.9	5.9

As revealed by lab orderly, all occurrences are not recorded by the MLTs, and actual incidents are much higher than the recorded values. According to the experiments of the lab orderly they spent a considerable amount of time for the sample screening at the counter. This is mainly due to their previous experiences on missing samples and the request forms. All incidents are needed to be recorded by MLT and should submit to Supt. MLT daily.

Occurrence management is the central part of the quality management system. Occurrence is an activity that should not happen throughout the laboratory process. According to the WHO guidelines even 1% of error is not acceptable. It is advisable to take immediate necessary arrangements to mitigate the error incidences [16]. Well managed laboratories frequently review their systems in order to identify the root causes of the occurrences. Delaying patient treatment, unnecessary treatments, treatment complications, waste of laboratory resources and inappropriate public health action are the negative consequences of the failure of proper occurrence management [10]. Pre-analytical phase is considered as an important phase in the laboratory process and most of those practices are done at the sample receiving counter. Pre-analytical errors are estimated to account for 70% of all mistakes made in laboratory diagnostics [17].

Authors have explained the significance of staff awareness as a tool to prevent the occurrences as the most occurrences are taken place due to careless working procedures followed by the workers. Most studies have revealed that staff do not consider the degree of the occurrences. Other than that it has mentioned usage of audit tools for frequent monitoring of the laboratories where it can identify the mistakes at the earlier stages and necessary precautions can be taken [18]. Different accredited bodies use such audit tools and compared with the ISO Audit checklist allows laboratory managers to get to know whether all procedures are meeting the expected requirements and if there is any deviation it can be detected early and apply the preventive measurements. Better QMS model facilitates resource optimization, safeguarding both staff and patients and guaranteeing the quality and reproducibility of laboratory results [19]. These practices are not currently practiced at the study setting where the improvements are needed in these areas.

D. People Management

Sound people management is considered as an essential function of any organization. People Management refers to the strategic approach of managing human resources in an effective and efficient manner in order to achieve the competitive advantage over the market [20] Laboratory staff is considered as the most important resource in the laboratory setting. Accuracy of the laboratory results will be dependent on the technical competency and the behaviour of the working staff. It has mentioned that staff members need to be provided with continuous education to keep them updated as the medical sector changes continuously. Most

of them must deal with different types of equipment which require higher technical knowledge of operating these machines. Upgraded knowledge will increase working efficiency ensuring safety of both personal and equipment. Laboratory administrators must create a better environment providing full support for all laboratory personnel [21].

During the past few years it has increased the number of staff allocated for the laboratory from 15 to 22 since 2017 to up to now. However, according to the information available, it has increased the number of Over Time (OT) hours during the past few years. According to SMLT, staff members in many categories work up to late evening to cater the required demand. However, only limited hours will be approved by the Ministry of Health.

Table 4. Extra OT Payments 2015-2021

Year			2017		2019		2021
			Number of staff & Average OT payment per month (LKR)				
Staff category	MO	2	110,220.00	2	154,140.00	2	201,312.00
	MLT	6	72,368.60	7	112,566.20	10	190,252.00
	Lab orderly	4	27,070.80	4	36,816.27	5	82,042.40
	HSA	3	19,750.00	4	32,245.00	5	73,750.80
Total		15	229,409.40	17	335,767.47	22	547,357.20

Provision of training to the lab staff is extremely poor. None of the technical people have been given training and no priority has been given. Supervision seems to be extremely low and get limited support from the supervisors. Most of the staff members are focused on OT payment rather than completing the duty as early as possible. This mainly due to the lack of supervision and supervisors are not aware about this since that is not properly delegated in their job descriptions.

Better management of lab staff at appropriate level is highly concerned in order to process the laboratory activities in an efficient and effective manner [22]. Higher output can be achieved with highly competent and motivated working staff. However, the Sri Lankan public sector has taken several attempts towards better HR management in the past. In 1994 Human Resource Development Council came up with some initiatives regarding HR Development of health staff. Although the policies and plans are formulated none of the activities has been implemented so far. This is mainly due to the lack of national level policies and durable mechanisms [23]. It has found that human resource utilization in public sector health institutions is suboptimal due to insufficient investment on other capital [24].

Working extra hours allows employees to get an additional income other than their salary. Although it is beneficial for the employee there is some negative impact for the organization in the long run. Institutions have to incur higher expenditure for OT payments and at the same time it reduces the employee's productivity when working longer hours. It hinders the ability of a person to work and show his potential in each time frame [25]. Prolonged OT may create overtime dependent workforce, create safety and quality issues, absenteeism, and lower productivity. Therefore, attention needs to be paid to managing cost efficiency while improving the labour productivity.

Developed countries are always seeking to improve efficiency and productivity while providing better service through new initiatives. Automation is one of initiatives highly widespread all over the world. Automation guarantees the reduction of the TAT in clinical laboratories, reduces errors, increases workloads, and improves laboratory performance while maintaining a constant number of headcount [26]. Medical field is frequently changing, adapting to new technologies [10]. Therefore, provision of training is essential, and this helps staff to familiarize with new techniques and upgrade the knowledge on advanced practices and procedures. Further it improves the working competency and the self-confidence [27]. Researchers argue that effective supervision increases the personnel commitment, reduces job stress, reduces turnover intention, and increases extra role behaviour [28]. Properly formulated JD will be beneficial in several ways such as it increases employee morale, improves the communication between management and the staff, retention of stellar employees and assistance in planning for future [29]. Further to that it acts as a core stone of preparation of performance evaluation, and it eliminates the obstacles that faced by the employee while they are working. It observed that all these areas needed in the selected study setting need to be improved.

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IV. CONCLUSION

Issuing a laboratory report has a greater significance as 80%-90% treatment decisions over the patients are made based on the laboratory report. Test reports of most biochemical investigations are issued within 24 hours in private sector laboratories but in this state sector laboratory, it takes about 69 (nearly 3 days) hours to issue a report which is significantly higher than the benchmark. Three project components stemming from the identified causes to conduct the project interventions included people management, process management and quality management system. Current process is associated with many delays and waits. This may be due to unavailability of standardized procedure for sample management and manual documentation, labelling activities and work repetition. Occurrences are quite higher due that staff members do not have a proper idea about the occurrence management and poor management involvement on monitoring of critical points and lack of audits. No QMS has been introduced to improve the overall quality of the lab work. Further, it was observed that over time payment has increased in recent years. Three factors were identified behind this problem including lack of skills, employee focus more towards the OT payment due to poor supervision and poor work contribution of the working staff due to unclear job roles. With further analysis it was found that employees are not trained to improve their working skills. Due to the poor supervision staff does not efficiently engage in working and they spend more time on personal commitments. And staff members are reluctant to perform some activities as there are no clear job descriptions. Suitable interventions need to be applied in order to rectify the issue of delay of issuing laboratory test reports.

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Profitability, Liquidity, Firm Size, Dividend Payout Ratio and Moderating Effect of Leverage

Fransisca Listyaningsih Utami

Universitas Mercu Buana

ABSTRACT: The dividend payout ratio determines the investment decisions made by investors and determines the company's financial condition. Generally, investors prefer companies with high and relatively stable profit sharing as a signal for the prospect of the company's performance in the future. Dividend distribution is based on the company's dividend policy. Not all companies distribute dividends because dividend distribution by the company will reduce the amount of retained earnings thereby reducing the number of the company's internal sources of funds even though the company earns high profits. Several studies on the factors that affect the dividend payout ratio give different results. This study aims to measure the effect of profitability, liquidity, firm size, and leverage on the dividend payout ratio. This research was conducted on primary consumer goods sector companies listed on the Indonesia Stock Exchange for the period 2016- 2020. The sampling method was purposive sampling.

KEYWORDS: Profitability, Liquidity, Firm Size, Leverage, Dividend Payout Ratio

INTRODUCTION

The company has alternative funding, both inside and outside the company. External funding from the issuance of debt securities or equity participation. Funding for equity participation by selling the company's shares to the public through the capital market and the company going public (Sudarmanto et al., 2021).

Generally, investors prefer companies with high and relatively stable profit sharing (Permana & Hendra, 2018). Investors use dividends as a signal for the prospect of the company's performance in the future (Rizal & Ana, 2016). Dividend distribution is based on the company's dividend policy. A Dividend policy is a policy of the amount of retained earnings and the amount of profit paid to investors in the form of dividends (Ginting, 2018). A Dividend policy is calculated by the dividend payout ratio (Husna & Satria, 2019).

The dividend payout ratio is the ratio of dividends distributed to investors to the company's net income. The dividend payout ratio determines investment decisions by investors and the company's financial condition. If the company distributes dividends, the amount of retained earnings will decrease, thereby reducing the amount of the company's internal sources of funds. On the other hand, if the company does not distribute dividends, the company's internal sources of funds will not decrease because it does not reduce the amount of retained earnings (Puspitaningtyas et al., 2019).

Previous research has shown that profitability has a positive and significant effect on the dividend payout ratio (FITRI et al., 2016; Situmorang, 2017, Arsyad, 2021). The higher the profitability, the higher the dividend payout ratio that can be distributed by the company. Companies that can pay their short-term debt obligations promptly reflect the availability of more funds which can then be distributed to their shareholders in the form of dividends (Yani & Dana, 2017). The higher the liquidity, the higher the dividend payout ratio distributed by the company. Liquidity positively affects the dividend payout ratio (Arseto & Jufrizen, 2018; Yani & Dana, 2017, Feizal et al., 2021). Leverage negatively affects the dividend payout ratio. The higher the leverage, the lower the level of dividend payout ratio distributed by the company (Kharisma, 2020; Zulkifli et al., 2017, Fitriati, 2019).

Leverage also has a relationship with profitability and liquidity (Devi et al., 2017). According to the Pecking Order Theory, there is a relationship between profitability and leverage in the company, namely if the level of profitability in the company is high, then the company's debt level is low (Juliantika & Dewi, 2016; Devi et al., 2017; Prastika & Candradewi, 2019). Companies with high profitability tend to have low levels of debt so as to allow increased profits to be distributed to investors (Fitriati,

2019). The higher the level of liquidity of a company, the lower its leverage will allow the company to pay higher dividends. (Deviani & Sudjarni, 2018; Dewi et al., 2018).

In addition to the financial ratio factor, the distribution of dividends is also influenced by the size of the company. Firm size has a positive and significant effect on the dividend payout ratio. Large companies tend to distribute high dividends (Fitriati et al., 2018). Leverage also has a relationship with company size. Firm size has a significant negative effect on leverage (Acaravci, 2015; Jahanzeb and Bajuri, 2014). Companies tend to use equity compared to debt in financing their operations. Gharaibeh (2015) and Tariq (2015) state that firm size has a positive and significant relationship with leverage.

Different results were stated by Kurniawan et al. (2016) and Jalung et al. (2017), and profitability has no effect on the dividend payout ratio. Wahyuni & Hafiz (2018) and Bahri (2017) state that the size of liquidity has no effect on dividend payments. The company's high level of liquidity does not guarantee a high level of cash either but is caused by other instruments such as inventories and receivables (Bahri, 2017). Feizal et al. (2021) and Ginting (2018) state that there is no effect of leverage on the dividend payout ratio. The high level of debt ratio does not prevent the company from distributing dividends.

Wulandari (2013) and Zulkarnain (2020) state that liquidity has no effect on leverage. Lasut et al. (2018) and Sari (2019) state that profitability has no effect on leverage.

The consumer goods industry sector company is one of the industries that have a considerable influence on the dynamics of trade in the capital market (Arlita et al., 2019). In addition, consumer goods industrial sector companies are the most defensive sector among other sectors, meaning that this sector is able to survive during recessions and crises (Situmorang, 2017). The products produced by this sector company are products that are needed by the community and are consumptive in nature so they have the potential to develop quite high (Setyaningsih et al., 2020). This is one of the reasons people prefer investing in the consumer goods industrial sector.

This study was conducted to prove the effect of profitability, liquidity, leverage, and firm size on the dividend payout ratio in consumer goods sector companies listed on the Indonesia Stock Exchange for the 2016-2020 period.

LITERATURE REVIEW
Pecking Order Theory

The Pecking Order Theory was put forward by Gordon Donaldson (1961), namely companies tend to prioritize internal sources of funds in paying dividends and funding their investments, if these funds are not sufficient, they make external funds in addition (Pebrianti, 2017).

The pecking order theory states that companies choose funding sources according to the order of risk, in this case, the company prefers to use internal funds first. If internal funds are insufficient, the company uses external funds (debt) to finance the company's operations. Internal capital comes from retained earnings, while external capital is in the form of funds originating from creditors (Harjito, 2011).

According to Febriana & Yulianto (2017), the pecking order theory states that the company's preferred funding is internal funding because it has low costs, issues debt, and the last option is to issue shares. Thus, the preferred funding is internal funding in the form of retained earnings. However, the presence of retained earnings will reduce the dividends distributed.

Dividend Payout Ratio

The dividend payout ratio is the amount of the percentage of net profit paid by the company to shareholders in the form of dividends, the greater this ratio means the less profit the company can hold (Sudana, 2015: 167).

According to Murhadi (2013: 65), the dividend payout ratio is a ratio that describes the proportion of dividends paid to the company's net income. The dividend Payout Ratio describes the percentage of profit paid by the company to common stockholders in the form of cash dividends (Puspitaningtyas, 2017). If the company decides to hold a large amount of retained earnings for its operational needs, the profits paid to shareholders will be smaller.

A high level of dividend payout ratio will benefit investors. However, this has an impact on reducing the company's internal funds. Conversely, if the level of dividend payout ratio distributed is getting smaller, it will be less profitable for investors, but the company's internal funding sources will be stronger (Zulkifli et al., 2017).

Profitability

Profitability is the ratio used to measure the company's ability to generate profits with the resources it has (Angelia & Toni, 2020). According to (Ginting, 2018) profitability is the company's ability to earn profits that can affect dividend distribution decisions. Profitability is closely related to profit, where profit is used as the basis for dividend distribution (Lestari et al., 2017). The greater the profit earned by the company, the greater the company's ability to pay dividends (Thunggalia et al., 2018).

Profitability, Liquidity, Firm Size, Dividend Payout Ratio and Moderating Effect of Leverage

In this study, profitability is proxied by return on assets. According to Wahyuni & Hafiz (2018), return on assets is the rate of return on investment on the company's investment in assets used for operations. The greater the return on assets, the better the company's financial performance, because of the greater rate of return on investment.

Liquidity

Liquidity is the company's ability to meet its short-term obligations on time (Fahmi, 2020: 87). This ratio can be used to determine the company's ability to finance operations and fulfill its financial obligations as they fall due (Yasin, 2019). Liquidity can be defined as the company's ability to pay dividends to shareholders (Yani & Dana, 2017). Companies with high liquidity can make dividend payments (Arseto & Jufrizen, 2018).

In this study, liquidity is proxied by the current ratio. This ratio is used to measure the company's ability to pay short-term obligations by using its current assets (Arista & Praptoyo, 2017). The greater the current ratio indicates the higher the company's ability to meet its short-term obligations (including the obligation to pay dividends payable), the high the current ratio can increase investor confidence in the company's ability to pay dividends (Wahyuni & Hafiz, 2018).

Firm Size

Firm size can be determined based on total sales, total assets, and average sales level (Novianty et. al., 2018). From this definition, it can be concluded that the size of the company can be seen from the number of assets owned by the company.

Mehta, 2012; Hejazi and Moshtaghin, 2014 and Al Najjar, 2016 state that firm size has a significant positive effect on the dividend payout ratio. A large company size allows the company to pay larger dividends.

The firm size indicator is measured using the natural logarithm (Ln) of total assets.

Leverage

Leverage is the ability of management to increase the company's operational activities by increasing debt (Hand Prastya & Jalil, 2020). This ratio can be used to measure how much the company is financed by debt (Fahmi, 2020: 62). Companies with high debt levels tend to distribute small dividends to their shareholders, this is because the profits earned are used to pay their obligations, causing small dividends to be distributed (Ginting, 2018).

Leverage in this study is measured by the debt-to-equity ratio. The debt-to-equity ratio is a comparison between total debt and equity which reflects the company's ability to meet its obligations using existing capital. The greater a company's debt will affect the level of income available to shareholders, meaning that the higher the company's obligations will reduce the company's ability to pay dividends (Wahyuni & Hafiz, 2018).

Hypothesis Development
Effect of profitability on the dividend payout ratio

High profitability has an effect on shareholder dividends. Companies with high levels of profitability can pay dividends using profits obtained from company operations (Ginting, 2018). The higher the company's profit, the higher the dividend to shareholders (Bahri, 2017). Profitability is measured by return on assets. According to Wahyuni & Hafiz (2018) return on assets is the company's rate of return on investment on assets used for operations. A high return on assets indicates a good company's financial performance, due to a high rate of return on investment. The higher the rate of return, the higher the dividends received by investors.

Research (FITRI et al., 2016) shows that return on assets has a positive and significant effect on the dividend payout ratio. In line with research (Situmorang, 2017) and (Arsyad, 2021) the results show that there is a positive and significant effect of return on assets on the dividend payout ratio. The higher the company's profits in managing assets, the higher the company's ability to pay dividends to investors (Situmorang, 2017).

H1: Profitability affects the dividend payout ratio.

Effect of liquidity on the dividend payout ratio

Liquidity is an important factor that needs to be considered before making a decision to determine the number of dividends. Therefore, the stronger the liquidity position of a company, the greater its ability to pay dividends (Ginting, 2018). Companies with high liquidity have a higher probability of paying dividends (Hand Prastya & Jalil, 2020). Liquidity is measured using the current ratio. The current ratio is a ratio to measure the company's ability to meet its short-term obligations which are due immediately when they are billed as a whole (Kasmir, 2015: 134). A high current ratio indicates the company's cash ability to meet its short-term obligations that are due soon. Companies that are able to pay their short-term debt obligations in a timely manner reflect the availability of more funds which can then be distributed to their shareholders in the form of dividends (Yani & Dana, 2017).

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Research (Arseto & Jufrizen, 2018) shows that the current ratio has a positive effect on the dividend payout ratio. In line with the results of research (Yani & Dana, 2017) and (Feizal et al., 2021) there is a positive and significant effect of the current ratio on the dividend payout ratio. Companies that are able to maintain their financial liquidity have a greater opportunity to distribute dividends because the company is not burdened by their short-term obligations (Yani & Dana, 2017).

H2: Liquidity affects the dividend payout ratio.

Effect of Firm Size on the dividend payout ratio

Hejazi and Moshtaghin (2014) state that large companies tend to pay higher dividends. Companies with large assets are easier to enter the capital market so they tend to pay high dividends. On the other hand, companies with smaller assets are more difficult to enter the capital market so they tend to distribute low dividends because the profits earned will be allocated to retained earnings to increase the company's assets. Myron Gordon and J. Litnner (1956) in Bird in the Hand Theory suggest that investors prefer if earnings are distributed in the form of dividends rather than retained earnings because dividend payments have a higher certainty value than capital gains. The results of research by Al-Najjar (2016) and Mehta (2012) support this statement. Both stated that the size of the company has a positive and significant effect on the dividend payout ratio. The bigger the company, the bigger the dividend ratio that will be distributed.

H3: Firm size affects the dividend payout ratio.

Effects of profitability on the dividend payout ratio moderated by leverage

The high level of corporate debt will increase the debt burden, including interest expense. This can reduce the company's ability to pay shareholder dividends (Fitriati, 2019). Companies use profits to pay obligations first before distributing dividends so that the level of dividends distributed by the company is getting lower (Ginting, 2018).

Debt to equity ratio is able to reduce the effect of return on assets on the dividend payout ratio (Simanjuntak, 2015). Based on these results it is stated that a high level of company debt ratio can reduce profits which has an impact on the lack of dividend distribution ratio. Companies with high profits cannot immediately pay dividends because they have to consider the debt that will be paid using profits. In line with the results of research (Deviani & Sudjarni, 2018) that if the company's profitability increases, the company's debt level will decrease. The decrease in the level of debt causes the company's ability to pay dividends to increase. This statement is supported by research (Zulkifli et al., 2017), that the debt-to-equity ratio has a significant negative effect on the dividend payout ratio. Companies that have a high debt-to-equity ratio will use profits to pay their obligations so that it has an impact on the lower of dividends distributed to shareholders.

H4: Profitability effects on dividend payout ratio moderated by leverage.

Effects of liquidity on dividend payout ratio moderated by leverage

The high level of liquidity can be used by the company to pay its obligations, thereby reducing the debt-to-equity ratio. Reducing the proportion of debt, reducing the burden of debt or interest so that the company's ability to pay dividends increases and has the potential to increase the dividend payout ratio (Fitriati, 2019). Companies with high liquidity cannot pay dividends directly, because they must consider the available funds to pay their obligations (Ginting, 2018).

Research by (Fitriati et al., 2018) and (Tariq, 2015) shows the debt-to-equity ratio as an intervening variable is able to mediate the effect of the current ratio on the dividend payout ratio. A high current ratio can reduce the debt-to-equity ratio, thereby increasing the dividend payout ratio. In line with the results of the study (Fitriati, 2019), the debt-to-equity ratio acts as a mediator of the effect of the current ratio on the dividend payout ratio. In his research, it is stated that the lower portion of debt can reduce the company's interest expense and increase the company's ability to pay cash dividends to shareholders

H5: Liquidity effects on dividend payout ratio moderated by leverage.

Effects of firm size on dividend payout ratio moderated by leverage

Large companies need a lot of company external funds. In contrast, small companies need a lot of company external funds in the form of debt. In other words, firm size has a negative effect on the debt-to-equity ratio. Investors tend to dislike corporate debt. A high debt ratio makes the company have a high cost of capital obligation, thereby reducing the profits distributed in the form of dividends (Jensen et al., 2002).

Research by Al-Najjar (2016) states that the debt-to-equity ratio has a negative effect on the dividend payout ratio. Large companies tend to have a low debt-to-equity ratio. The lower the debt-to-equity ratio will increase the dividend payout ratio. In other words, firm size has a significant positive effect on the dividend payout ratio. The same statement was also made by Mehta (2012), namely that large companies tend to pay higher dividends, while smaller companies tend to pay fewer dividends. The size of the company has a positive effect on the dividend payout ratio because large companies have a high capital capacity for their activities (Hejazi and Moshtaghin, 2014).

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H6: Firm size effects on dividend payout ratio moderated by leverage

RESEARCH METHOD

The dependent variable in this study is the dividend payout ratio. The independent variables in this study are profitability, liquidity, firm size, and leverage as moderating variables.

Profitability is proxied by return on assets. According to Kasmir (2015: 202), return on assets is a ratio that can show the results of the total assets used by the company. The return on assets ratio is the ratio between net income and total assets.

Liquidity is proxied by the current ratio. According to Kasmir (2015: 134), the current ratio is a ratio that can measure the ability of a company to pay short-term obligations or debts that are due soon. The Current ratio is the ratio between current assets and current liabilities.

In this study, firm size is measured using the natural logarithm (Ln) of total assets. The natural logarithm (Ln) is used to reduce the significant difference between the size of the company that is too large and the size of the company that is too small with the aim of data on the number of assets being normally distributed (Mita Tegar Pribadi, 2018).

Leverage is a moderating variable proxied by the debt-to-equity ratio. The debt-to-equity ratio is the ratio of total debt to total equity which is used to measure the extent to which the company is financed with debt (Brigham and Houston, 2014).

Sampling

The population in this study is the primary consumer goods sector companies listed on the Indonesia Stock Exchange (IDX) for the 2016-2020 period as many as 93 companies. Sampling companies in this study used the purposive sampling method.

The sample is determined on the basis of the suitability of certain characteristics and criteria, namely primary consumer goods sector companies listed on the Indonesia Stock Exchange (IDX) during the 2016-2020 period, making dividend payments consistently during the 2016-2020 period, displaying data and information used to analyze the factors that affect the dividend payout ratio for the period 2016 – 2020 and the company did not experience delisting from the IDX during the study period. The sample used in this study was 26 companies, so the total data for the 2016-2020 period was 130 companies.

Data Analysis Method

In this study, descriptive statistical analysis was conducted to provide a statistical description of the research variables. Hypothesis testing in this study was conducted using the Moderated Regression Analysis (MRA) analysis method or interaction test because there is a moderating variable in this study, namely leverage. The hypothesis testing equation model is:

DPR = a + b1 X1 + b2 X2 + b3 X3 + b4 X1*Z + b5 X2*Z + b6 X3*Z + e

RESULTS AND DISCUSSION

Descriptive analysis

Table 1. Descriptive analysis

	Mean	Median	Min	Max	Standard Deviation
X1	0.108	0.076	0.002	0.527	0.103
X2	2.347	1.693	0.029	8.638	1.788
X3	29.554	29.613	26.539	32.726	1.385
Z	1.204	0.891	0.164	4.286	1.064
Y	0.471	0.389	0.024	3.504	0.395

Table 1 shows that the mean value of the profitability variable is 0.108 indicating that the level of asset productivity in generating profits is only 10.8%, which is low, below the standard value of a good return on assets, which is 30%.

The mean value of the liquidity variable is of 2.347 or 234.7% indicating a good level of liquidity, because above the standard value of 200%, the company is able to pay its current debt.

The mean value of the firm size variable is 29,554 or 2,955.4% indicating the total assets owned by the company and is a large company.

The mean value of leverage variable is 1.204 or 120.44% indicating 120.44% of the company's capital is financed by debt and high risk.

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The mean value of dividend payout ratio variable is 0.471 or 47.1% indicating the company's ability to pay dividends is 47.1% of the company's profits.

Model Test

The model test in this study is the Chow test and the Hausmann test. The purpose of this test is to determine the panel data regression model to be used.

Table 2. Chow Test

Effects Test	Statistic	d.f	Prob.
Cross-section F	6.662495	(25,100)	0.0000
Cross-section Chi-square	127.456951	25	0.0000

Sumber: Data processed, 2022

Table 3. Hausman Test

Test Summary	Chi-Sq.Statistic	Chi-Sq. d.f	Prob.
Cross-section random	123.868636	4	0.0000

Sumber: Data processed, 2022

Chow and Hausman test results in tables 2 and 3 show the value of Prob. Cross-section Chi Square <0.05, the regression model used is the Fixed Effect Model.

Hypothesis Testing Results

The hypothesis test of this research uses t test (partial test), the independent variable partially has a significant effect on the dependent variable. This study uses a significance level of 0.05 or 5%. If the significance probability value is < 0.05, the independent variable individually has a significant effect on the dependent variable. If the significance value is > 0.05, the independent variable individually has no significant effect on the dependent variable.

Table 4. Results of the Hypothesis testing

Variables	Coefficients	t-Statistics	Adjusted R-squared	Probability
PROFITA	0.952670	-7.688742	0.581325	0.0000
LIQUIDI	0.436417	0.351716	0.341817	0.7258
FIRMSIZE	-2.208119	0.870692	0.345842	0.3859
PROFITA_LEV	1.014613	-3.441483	0.644351	0.0008
LIQUIDI_LEV	0.663181	-0.034024	0.338519	0.9729
FIRMSIZE_LEV	0.452810	0.898979	0.351572	0.3708

Sumber: Data processed, 2022

The profitability significance level of 0.0000 indicates a significant probability value of 0.0000 <0.05, it can be concluded that the profitability variable has a significant negative effect on the Dividend Payout Ratio. The liquidity significance level of 0.7258 shows a significant liquidity value of 0.7258 > 0.05, it can be concluded that the liquidity variable has no effect on the Dividend Payout Ratio. The significance level of firm size is 0.3859, indicating the firm size value is significant 0.3859 > 0.05, it can be concluded that the firm size variable has no effect on the Dividend Payout Ratio.

The profitability and leverage have a significant probability level 0.0008 <0.05 and adjusted R-Square value is 0.581325 to 0.644351. It can be concluded that profitability and leverage have a significant effect on dividend payout ratio. The liquidity and leverage have a significant probability level of 0.9729 > 0.05 and adjusted R-Square value is 0.341817 to 0.338519, it can be concluded that liquidity and leverage have no significant effect on the Dividend Payout Ratio. The firm size and leverage have a significant probability level 0.3708 > 0.05, it can be concluded that firm size and leverage have no significant effect on the Dividend Payout Ratio.

DISCUSSION

The Effect of Profitability on Dividend Payout Ratio

Profitability has a significant negative effect on the dividend payout ratio. The profit earned by the company is prioritized to pay the company's debts rather than the distribution of dividends. This study is not in accordance with the signaling theory

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which states that high company profitability is a good signal for investors, because profitability is the main indicator of a company's ability to distribute profits in the form of dividends (Basri, 2019). Profitability is the basis for dividend distribution (Lestari et al., 2017), but in this study profitability has not been used as a positive signal that the company will increase the dividends distributed (Asikin, 2021).

Company profits are prioritized to pay debts owned by the company rather than distributing dividends (Simanjuntak, 2015). In addition to paying off the company's debts, profits are used for company expansion so that dividend distribution does not increase when the company's profit increases (Arseto & Jufrizen, 2018). Company expansion is a strategy to increase the company's value in the future and maintain the company's sustainability (Asikin, 2021).

In line with research conducted by (Arsyad et al., 2021), (Ginting, 2018), and (Yani & Dana, 2017) showing a negative effect of return on assets on the dividend payout ratio.

The results are different from research by (Sejati et al., 2020) and (Kurniawan et al., 2016) the results show that there is no effect of return on assets on the dividend payout ratio.

The Effect of Liquidity on Dividend Payout Ratio

Liquidity has no effect on dividend payout ratio. This test is not in accordance with signaling theory which states that a company's liquidity is a good signal for investors in distributing dividends, when liquidity is high, investors will get high dividends. High company liquidity does not guarantee the company's high cash availability, but by other instruments such as inventories and receivables (Bahri, 2017).

This study is in line with research by (Ginting, 2018), (Arista & Praptoyo, 2017) and (Arsyad et al., 2021) the results show that the current ratio has no effect on the dividend payout ratio. These results are different from research by (Arseto & Jufrizen, 2018) and (Feizal et al., 2021) the results show that there is a positive effect of the current ratio on the dividend payout ratio.

The Effect of Firm Size on Dividend Payout Ratio

Firm size has no effect on dividend payout ratio. The results of this test indicate that the size of the company as a proxy for total assets has no effect on the dividend payout ratio.

The results of this test are in accordance with the pecking order theory which states that companies tend to prioritize internal sources of funds in paying dividends and funding their investments. Large companies with large asset values are considered to have debt values greater than the value of their assets and the acquisition of investment funds from the capital market is used to pay debts rather than distribute dividends (Nerviana, 2015).

The results of this study are in line with research by (Nerviana, 2015) and (Situmorang, 2017) which state that company size has no effect on the dividend payout ratio. These results are different from research by (Jaara, Bassam & Alashhab, Hikmat & Jaara, Osama, 2018) and (Fitriati, 2019) which show that there is a positive effect of firm size on the dividend payout ratio.

The Effect of Profitability on Dividend Payout Ratio is Moderated by Leverage

The test results in this study indicate that leverage increases the effect of profitability on the dividend payout ratio.

The results of this study are in line with research by (Simanjuntak, 2015) which shows that companies with high profits do not pay dividends directly, because they consider using profits to pay off their debts.

In line with research by (Deviani & Sudjarni, 2018) it is stated that the company's profitability increases, the company's debt level will decrease. The low level of debt, the company's ability to pay dividends is increasing.

Research (Zulkifli et al., 2017) also states that a high debt to equity ratio of a company will pay its obligations using the company's profits so that it has an impact on the less dividends that will be distributed to shareholders.

The Effect of Liquidity on Dividend Payout Ratio is Moderated by Leverage

The results of this test indicate that leverage is not able to increase the effect of liquidity on the dividend payout ratio.

These results are in line with research by (Thunggalia et al., 2018) which shows that leverage cannot increase the effect of liquidity on the dividend payout ratio. This means that the company's debt ratio cannot reduce the level of dividend payout ratio when the level of liquidity is high, otherwise the debt ratio cannot increase the dividend payout ratio that will be distributed when the level of liquidity is low. The results of research by (Bahri, 2017) and (Ginting, 2018) also indicate that the liquidity ratio has no effect on the company's dividend payout ratio.

The results of this study are not in accordance with the pecking order theory which states that companies with high liquidity have low debt. The low debt of the company has an impact on the high dividends that will be obtained by investors. The company continues to distribute dividends even though the company's debt ratio is high. the company also pays attention to the interests of capital owners (Ginting, 2018).

The Effect of Firm Size on Dividend Payout Ratio is Moderated by Leverage

The results of this test indicate that leverage is not able to increase the effect of firm size on the dividend payout ratio.

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The results of this study are in line with research by (Setyaningsih, 2021) which states that large companies with high debt amounts will distribute low dividends because most of the profits earned will be used to fulfill their obligations.

The results of this study are in accordance with research (Nerviana, 2015) and (Situmorang, 2017) which state that large companies with large assets have a debt value that is greater than the value of their assets so that investment funds obtained from the capital market are prioritized to pay debts first rather than distribute dividends (Nerviana, 2015).

CONCLUSIONS AND SUGGESTIONS

Conclusion

Profitability has a significant negative effect on the dividend payout ratio. The company's profit is prioritized to pay the company's debts rather than distributing dividends so that the dividends distributed to shareholders are low even though the company's profits are high.

Liquidity has no effect on the dividend payout ratio. High liquidity does not guarantee the company's high cash availability, but by other instruments such as inventories and receivables so that it does not affect the dividends distributed to shareholders.

Firm size has no effect on the dividend payout ratio. Large companies with large asset values have debt values that are greater than their asset values so that the acquisition of investment funds from the capital market is used to prioritize paying off obligations rather than distributing dividends.

Leverage is able to increase the influence of profitability on the dividend payout ratio. Companies with high liquidity use company profits to pay off their obligations so that the company's debt is low. The decreasing level of corporate debt makes the company's ability to make dividend payments increase.

Leverage is not able to increase the effect of liquidity on the dividend payout ratio. The company's debt ratio cannot reduce the level of dividend payout ratio when liquidity is high, and vice versa the debt ratio cannot increase the dividend payout ratio that will be distributed by the company when liquidity is low.

Leverage is not able to increase the effect of firm size on the dividend payout ratio. Companies with high use of debt will pay small dividends because most of the profits obtained will be used to meet their debts first compared to paying dividends.

Suggestions

Return on Assets has an effect on the dividend payout ratio, so that the company can continue to improve its performance through increasing profits from the use of assets. A high and stable dividend payout ratio can attract investors to invest in the company.

For further research, it is possible to add variables that can affect the dividend payout ratio, such as firm size, institutional ownership, or other variables and replace the leverage variable as a moderating variable with other variables that can moderate the effect of the independent variable on the dependent variable.

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Factors Affecting Student's Satisfaction with the Financial Management System of Public Universities in Vietnam

Tran Huong Xuan

Hanoi University of Home Affairs, 36 Xuan La, Tay Ho, Hanoi, Vietnam

ABSTRACT: In the context of state budget cuts and increasingly fierce competition, the increase in student satisfaction with the financial management system is one of the revenue growth goals of the Vietnamese public university. This study aims to examine the factors affecting student satisfaction with the financial management system. The multiple regression model was applied to test the proposed hypotheses. Participating in the study were 200 students from universities in Hanoi. The study period is May 2022. The research results show that financial information equipment and process factors affect students' satisfaction with the financial management system with the highest regression coefficient ($\beta = 0.366$, sig =0.000); next is the accessibility to financial support services factor (β =0.220, sig =0.000) and the lowest is financial services support staff factor (β =0.161, sig =0.006). This result implies that public universities in Vietnam need to focus on developing financial staff to meet the increasingly demanding expectations of students.

KEYWORDS: financial support services, accessibility , process, satisfied, public university, student, Vietnam

INTRODUCTION

Since the Vietnamese government accepted the development of the private university system in 1988 until now, the number and scale of private universities have been growing. Vietnam currently has 237 universities, including 172 public, 60 private, and five universities with 100% foreign capital. The competition for high-quality human resources between public and private universities is fierce in response to the current need to improve the quality of higher education in Vietnam (Hung & Dung, 2020). In response to the requirements of existence and development, public universities are applying many strategic policies to attract highly qualified lecturers with extensive experience in research and teaching, creating motivation to work for students. Moreover, they let them dedicate themselves to the development of the universities (Tan & Hoa, 2018).

Student Financial Services describes how colleges provide students and families with financial-related services, such as applying for financial aid, paying tuition bills, and related business processes needed to pay for higher education. Financial services vary by country. In Vietnam, several indicators measuring financial management innovation at public universities include financial autonomy; the proportion of financial sources outside the state budget; the proportion of spending on investment and purchase of assets; the ratio of the expenditure on additional income for employees, and the balance of spending on science and technology activities (Government of Vietnam, 2011).

The financial management system, if it makes students feel pressured, causing anger and frustration, will hinder the university's training activities and reduce enrollment. Therefore, improving the financial management system to serve students better and increase student satisfaction is of great interest to universities in Vietnam (Dinh The Hung, Nguyen Thi Hong Thuy, Han Thi Lan Thu, 2013). Public universities in Vietnam are innovating the financial management system, adding new financial instruments, increasing student satisfaction, and increasing the potential profits the system offers (Phan Ngoc Nha, 2020). The objective of reforming the financial management system of public universities in Vietnam is to balance financial innovation, financial performance, and financial stability and improve financial supervision concepts and rules. In addition, it enhances supervision's effectiveness. It provides a better environment for financial innovation by strengthening the construction of financial supervision systems to ensure that financial innovation develops in a more efficient, orderly, and healthy direction (Dinh The Hung, Nguyen Thi Hong Thuy, Han Thi Lan Thu, 2013).

Studying the financial management system in higher education, researchers mainly focus on the effective and efficient operation of the internal control system and the elements of the system that need to operate effectively and synchronized (Dinh

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The Hung, Nguyen Thi Hong Thuy, & Han Thi Lan Thu, 2013). The internal control system is an effective and efficient management tool for the entity's resources, limiting risks and increasing the reliability of the entity's financial statements (Phan Ngoc Nha, 2020). The internal control system in a public university must first be clean and professional, aiming to improve the efficiency of university autonomy (Dao Thuyet Lan & Phan Thi Yen Phuong, 2020). Many studies also show that the financial management innovation for universities to be autonomous is reflected in the economic mechanism making employees more aware of empowerment; the relationship between the increase in revenue leads to a rise in wages; higher productivity; finance contributes to the development of a positive, achievement-based culture and gives employees better opportunities to stay with the organization (Bhandari, 2010).

Many studies also show that the pressure to innovate the financial management system at public universities is increasing because the state budget allocation to public institutions has decreased. As a result, tuition prices are rising faster than inflation, and sources of financial aid are shifting from grants to loan-based support (Rizzo, 2007; Chabotar, 1989). From the perspective of practical financial management innovation, universities should be managed similarly to for-profit corporations in that the management in both institutions wants to have profits to continue operating in the future. Long-term, ultimately, stakeholders realized nonprofits, including universities, have many of the same operational goals as for-profit corporations (Chotobar, 1989). In higher education, debt is often required for new facilities or expansion of services. As a result, leverage ratios provide insight into management's ability to make sound strategic decisions (Chabotar, 1989). At public universities, financial contracts are clear, but the role of financial management system innovation as an agent in increasing university enrollment and revenue is unclear (Fama & Jensen, 1983). There are many causes, among them are passive financial leadership and exist in a poorly managed environment of public universities (Bhandari, 2010; (Gomez-Mejia & Balkin, 1992; Kivisto, 2005; Olsen, 2000; Smith, Zsidisin, & Adams, 2005).

In examining why not all universities are equally successful in diversifying their income, some studies are interested in how external factors affect income diversification as institutional autonomy (De Dominicis, Pérez, & Fernández- Zubieta, 2011). Many studies are interested in the critical factors to diversifying income sources, such as autonomy and self-responsibility (Li-Chuan Chiang, 2004), financial stability (Besana & Esposito, 2015; Webb, 2015; Stachowiak-Kudła & Kudła, 2017), less vulnerable of financial resources (Namalefe, 2014), stable source of public funding (Estermann & Pruvot, 2014; Teixeira et al., 2014), popularization policies (Teixeira & Koryakina, 2013; Jacob & Gokbel, 2018; Taylor,2013; Besana & Esposito, 2015; Koryakina, 2018).

Many solutions to help public universities increase financial resources have been recommended by researchers, such as strengthening the internal control system in the process of planning, implementing plans, accounting and reporting to development, and ensuring the successful implementation of the university's internal financial control system, contributing to financial stability and growth (Vasicek, Dragija, Martina, & Hladika, 2010). Investing in people is a strategic investment, requiring substantial financial resources and a financial mechanism to promote human resources (Rizzo, 2007). Meanwhile, studies approaching from the perspective of learners' impact on financial resources are rarely found in previous studies. However, the reality in Vietnam shows that learners' satisfaction with the financial system will positively impact enrollment decisions and increase university sales. Therefore, this study aims to fill the theoretical gap on the relationship between student satisfaction with the university's financial management system and test hypotheses about the factors affecting students' satisfaction with the university's financial management system.

LITERATURE REVIEWS

University financial management system

The university's financial management system is a system for managing income, expenses, liabilities, assets, and related transactions. The university's autonomy manifests itself in rationality characterized by reliability, accountability, and transparency, as well as a level of technical and organizational capacity that ensures financial and economic sustainability-standardized service. Therefore, the financial management system is increasingly important and is constantly being renewed (Benkovic, Joksimović, Nevenka, & Barjaktarovic Rakocevic, 2018). Reforming the university's financial management system is part of a series of innovations aimed at improving the efficiency of higher education, which requires highly adaptable institutions, including staff members, in strategic decision-making and financial decisions (Cowan, 1985)

The core element of the financial management system in the university is cash flow and liquidity. Therefore, in studying university financial management systems, researchers often focus on solvency and its implications for performance (Modigliani & Miller, 1963). In view of this approach, many studies have also demonstrated that profitability ratios are essential to understanding the organization's long-term viability. Repeated deficits are unsustainable and reflect poor financial management decisions (Chabotar, 1989). Since public universities typically have no non-state owners, virtually any profits are retained within

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the institution to advance the shared mission (Chabotar, 1989). The effectiveness of financial management in universities depends on how the financial management is delivered by the leadership and the organization responsible for managing the operation in a particular manner Kivisto (2005). However, studies all confirm that innovation in financial management in public universities makes finance a cost-effective means of evaluating faculty research and teaching Gomez-Mejia & Balkin, 1992).

Student financial service system management

The university's financial management system plays a massive role in helping students manage their finances well. In addition, students are learning to transition from being dependent on society to living a leisurely life (Xiao, Shim, Barber, & Lyons, 2007). Students are young people who develop a consumerist lifestyle and emphasize material ownership, preferring to consume rather than save and seeing money as an essential factor for their success (Watson, 2003). Students' orientation toward this materialism leads to increasing their unhappiness (Goldberg, Gorn, Peracchio, & Bamossy, 2003). Students use a value-driven financial services system and attempt to represent their status in life or social relationships (Christopher, Kuo, Abraham, Noel & Linz, 2003; Pantzar, Raijas, & Eeiskanen, 2005). A sound financial management system helps students avoid credit abuse and poor financial management (Erasmus & Mat-hunjwa, 2011).

The development of new products and technologies and a well-developed distribution system put pressure on market segmentation and target marketing, supported by competition in the service systems sector student finance (Desta, 2011; Kailash, 2012). Students are the biggest users of financial services and student market products (Dickler, 2008). The student financial services system's approach to students has been very passive in the past. However, with the introduction of a two-tier student financial services system, the industry has become increasingly competitive and driven by demand with the emergence of new services in the market and changing student behavior (Kubenka & Ptackova, 2011). The competitive environment forces student financial services systems to create different student customer segments (Kubenka & Ptackova, 2011), competitive crux (Dubey, 2011), requires much more creativity in product and service development (Kubenka & Ptackova, 2011). The student, financial services system changed from a two-tier financial services system; marketing influence became more apparent (Kubenka & Ptackova, 2011). Student financial services systems focus on young people as a critical market for personal financial services with the goal of long-term profitability (Kubenka & Ptackova, 2011). The academic model of students at universities is very favorable for student financial services systems because students depend on grants, loans, or financial support from their parents (Muellbauer, 2008). Students are expected to have a high income after graduation and thus become a lovely student customer group for student financial services systems. So, student financial services systems try to attract students with special promotions and offers, which vary between financial services and products but do not change much (Muellbauer, 2008).

Increasing competition, socioeconomic changes, and technological advancements continue to drive student demand for convenience. As a result, University financial services systems are working to provide comfort as an effective means of managing student clients. Comfort, mainly studied in product purchases, began to suggest comfort in the service sector through research on retail stores (Yu, 2017; Kim, 2018). The convenience provided by the financial services system in the university service is provided through information delivery. It is provided for both indirect and intangible benefits and student clients through physical and human services.

Student satisfaction with the university's financial system

Student satisfaction is critical to an institution's financial success (Muntean & Stremtan, 2011). Institutions should investigate and measure the factors that promote student satisfaction (Kaura, 2013; Muntean & Stremtan, 2011). Satisfaction is a student's feeling towards a product or service after using it (Waqar & Bakhtiar, 2012) a comparison between the rewards and costs associated with using or purchasing a product or service relative to the expected consequences of using (Foscht et al., 2010). Improved experiences with positively responsive service create a higher sense of satisfaction (Suman & Rohit, 2012). Repeated use of the financial services system and positive word of mouth will lead to higher acceptance rates on the student client side and higher levels of satisfaction and pride in their work on the student side (Koraus, 2011). Negative word of mouth can seriously harm a business (Yavas, Benkenstein & Stuhldreier, 2004). Improving student satisfaction also plays a vital role in financial strategy (Koraus, 2011).

Numerous studies have found that these special student financial services system incentives increase student satisfaction both in breadth and depth for their product mixes, such as New loan products, discount brokerage services, and a wide range of commercial accounts (Muellbauer, 2008). Not only can promotions help student financial services systems gain market share and stimulate demand for their services (Yavas, Bilgin, & Shemwell, 1997). Thanks to streamlined channel planning models, student financial services systems can identify profitable student customer segments (Jeyabalan, 2013).

Students are increasingly demanding financial services (Bingham & Lewis, 1991). The system also generates student satisfaction besides objective parameters (such as low-cost overdraft, free student financial services system with low or zero interest accounts, ..). Subjectively perceived methods (such as a more attentive approach from student financial services system

staff, queuing, slow service, service communication, approaching student needs, ..) play a vital role in their satisfaction level (Belas, 2008). The convenience of the financial management system significantly impacts student satisfaction (Gao, 2019, Sekhar & Sarma, 2018). The factors affecting students' satisfaction with the student financial management system have been identified by many studies, including, First, the convenience of providing accurate information. This process requires students' time and effort to purchase a service or make a purchase decision. Second, the convenience of access helps student customers save time and effort in meeting student customers and using services. Third, comfort is when the service is provided (Kim & Lee, 2012). Transaction convenience involves reducing the cost of time and effort received after using the service. Convenience to compensate for unexpected service failures or defects after using the service. The provision of additional services is associated with the satisfaction of service recovery efforts (Chang & Kim, 2017, Ahn, 2016). Increased student satisfaction with the financial management system means increasing university sales. Existing student financial services customers are taking control and must reassess student trends by region to prioritize products, improve service, and ultimately give student customers what they want (Belas, 2010; Kailash, 2012). Thanks to the rapid technological change leading to high service quality expectations, student financial services systems must pay attention to service quality and student satisfaction (Belas, 2010; Kailash, 2012).

We propose the following research model and research hypotheses from this research literature review:
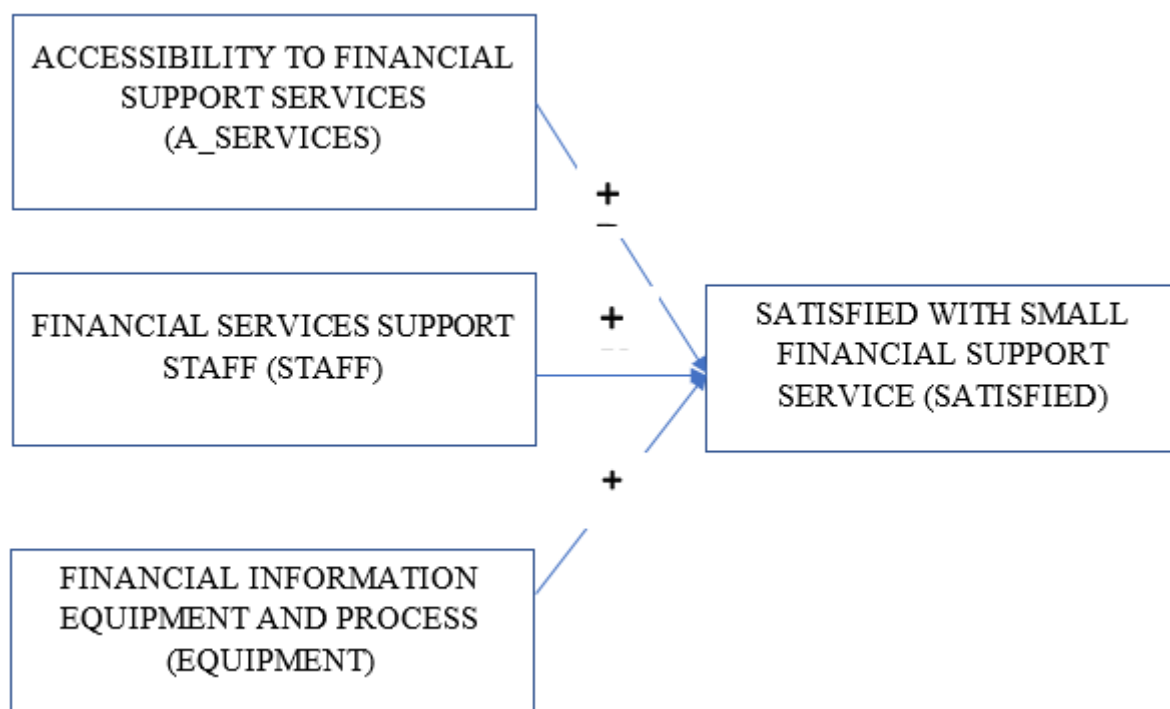
Figure 1. Reseaching model

H1. Accessibility to financial support services has a positive and significant relationship with satisfied with financial support service

H2. Financial services support staff has a positive and significant relationship with satisfied with financial support service

H3. Financial information equipment and process has a positive and significant relationship with satisfied with financial support service

RESEARCH METHOD

The study was conducted at public universities in Hanoi in May 2022. Participating in the survey were 200 full-time students. To carry out this study, the authors conducted a survey, collecting opinions of the study participants in two steps: preliminary investigation and formal investigation. In the initial examination, the research team conducted in-depth interviews with researchers in education, economics, and psychology to build a research scale and improve the questionnaire to suit the characteristics of the survey area. The questionnaire was constructed based on the results of the literature reviews and experts' comments, including two parts. Part 1 is used to collect demographic information of study participants. Part 2 is used to collect data on factors affecting student satisfaction with the financial management system at the university. A 5-point Likert scale is applied (1= Strongly disagree; 2= Disagree; 3= Neither agree nor disagree; 4= Agree' 5 = Strongly agree). This final version was

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pre-tested on 40 participants selected to be demographically representative of age, sex, education, and occupation. During the assessment, participants were asked to complete this final version, followed by minor edits to improve the question structure for better understanding. The same completed version adopted the official survey (Table 1).

Table 1. **Items in the questionnaire**

Factors	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
ACCESSIBILITY TO FINANCIAL SUPPORT SERVICES					
Always have direct contact with support staff when necessary for guidance and advice	☐	☐	☐	☐	☐
Easy access to regulation-based support	☐	☐	☐	☐	☐
Easy access to information through websites, social networks, academic advisors	☐	☐	☐	☐	☐
Convenient student reception time of support services	☐	☐	☐	☐	☐
FINANCIAL SERVICES SUPPORT STAFF					
Friendly, enthusiastic advice	☐	☐	☐	☐	☐
Timely support	☐	☐	☐	☐	☐
Clear support and advice	☐	☐	☐	☐	☐
FINANCIAL SUPPORT PROCESS					
Receive science, timely	☐	☐	☐	☐	☐
Correct information processing	☐	☐	☐	☐	☐
Respond quickly and objectively	☐	☐	☐	☐	☐
FINANCIAL INFORMATION EQUIPMENT					
Transparency	☐	☐	☐	☐	☐
Timely, often	☐	☐	☐	☐	☐
Short, complete, easy to understand	☐	☐	☐	☐	☐
SATISFIED WITH FINANCIAL SUPPORT SERVICE					
Satisfied with access to information	☐	☐	☐	☐	☐
Satisfied with the staff	☐	☐	☐	☐	☐
Satisfied with the facilities	☐	☐	☐	☐	☐
Satisfied with the processing	☐	☐	☐	☐	☐

The official survey. The questionnaire was sent directly to the respondents by the purposeful sampling method. The result was 200 valid votes (100%)—demographic information of study participants (Table 2).

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Table 2. Demographic characteristics of survey participant.

		Majors										
		Business administration		Construction		English language		Information technology		Law		Tourism	
		N	Row N %	N	Row N %	N	Row N %	N	Row N %	N	Row N %	N	Row N %
Gender	female	19	20.2%	15	16.0%	11	11.7%	15	16.0%	18	19.1%	16	17.0%
	male	16	15.1%	15	14.2%	28	26.4%	16	15.1%	18	17.0%	13	12.3%
Age	18 years old	6	16.2%	8	21.6%	5	13.5%	6	16.2%	7	18.9%	5	13.5%
	19 years old	11	28.9%	5	13.2%	5	13.2%	8	21.1%	7	18.4%	2	5.3%
	20 years old	9	14.8%	6	9.8%	15	24.6%	9	14.8%	10	16.4%	12	19.7%
	21 years old	4	13.3%	4	13.3%	6	20.0%	5	16.7%	4	13.3%	7	23.3%
	Over 21 years old	5	14.7%	7	20.6%	8	23.5%	3	8.8%	8	23.5%	3	8.8%
Level	bachelor	29	20.4%	21	14.8%	29	20.4%	15	10.6%	27	19.0%	21	14.8%
	Postgraduate	6	10.3%	9	15.5%	10	17.2%	16	27.6%	9	15.5%	8	13.8%

Analyzing the Reliability of the Scales:

We have tested the scales through Cronbach's Alpha reliability coefficient to identify and remove impulsive variables to avoid creating bias factors when performing exploratory factor analysis. The verification criterion is that Cronbach's Alpha coefficient must be greater than 0.6, and the The correlation coefficient of the smallest total variable in each scale must be greater than 0.3 (Hair, Black, Babin, & Anderson, 2010). Table 3 shows that the scales of the factors are all standard. Therefore, all the rankings of the factor are reliable and used for exploratory factor analysis (EFA).

Table 3. Summary of Reliability and Relative Minimum Variables of Scales

Scales	Number of variables observed	Reliability coefficients (Cronbach Alpha)	The correlation coefficient of the smallest total variable
A_SERVICES	4	0.799	0.578
STAFF	3	0.700	0.497
PROCEDURE	3	0.754	0.516
EQUIPMENT	3	0.756	0.555
SATISFIED	5	0.803	0.561

After testing Cronbach's Alpha, the author uses EFA to preliminary evaluate the scales' unidirectional, convergent, and discriminant values. EFA was used by extracting the Principal Components Analysis Factor and Varimax rotation to group the factors. With a sample size of 200, the factor loading of the observed variables must be greater than 0.5; variables converge on the same factor and are distinguished from other factors. In addition, the Kaiser-Meyer-Olkin coefficient (KMO) is the index used to consider the suitability of factor analysis must be in the range $0.5 \leq KMO \leq 1$ (Cerny & Kaiser, 1977; Kaiser,1974).

The analysis results in Table 3 show that all factor loading coefficients of the observed variables are greater than 0.5; Bartlett test with Sig meaning. = 0.000 with KMO coefficient = 0.917. All 18 items when using EFA are extracted into four factors with Eigenvalues > 1 and cumulative variance percent = 58.570%. Thus, the research model consisting of 3 independent and one dependent variable is used for linear regression analysis and subsequent hypothesis testing.

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Table 4. **Exploratory factor analysis**

Rotated Component Matrixa				
	Component			
	1	2	3	4
EQUIPMENT1	.710			
PROCEDURE1	.709			
EQUIPMENT3	.646			
PROCEDURE3	.630			
EQUIPMENT2	.597			
PROCEDURE2	.527			
SATISFIED2		.745		
SATISFIED1		.692		
SATISFIED4		.677		
SATISFIED5		.648		
SATISFIED3		.616		
A_SERVICES4			.753	
A_SERVICES3			.747	
A_SERVICES1			.681	
A_SERVICES2			.614	
STAFF3				.730
STAFF1				.692
STAFF2				.627
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.				
a. Rotation converged in 7 iterations.				

Pearson correlation analysis

The author used Pearson correlation analysis to analyze the correlation between quantitative variables. Table 5 shows that, at the 5% significance level, the correlation coefficient indicates that the relationship between the dependent and independent variables is statistically significant (Sig. < 0.05). The magnitude of the correlation coefficients ensures that multicollinearity does not occur. Therefore, other statistics can be used to verify the relationship between variables.

Table 5. Pearson correlation analysis results

Correlations					
		A_SERVICES	STAFF	EQUIPMENT	SATISFIED
A_SERVICES	Pearson Correlation	1	.523**	.569**	.550**
	Sig. (2-tailed)		.000	.000	.000
	N	200	200	200	200
STAFF	Pearson Correlation	.523**	1	.530**	.505**
	Sig. (2-tailed)	.000		.000	.000
	N	200	200	200	200
EQUIPMENT	Pearson Correlation	.569**	.530**	1	.602**
	Sig. (2-tailed)	.000	.000		.000
	N	200	200	200	200
SATISFIED	Pearson Correlation	.550**	.505**	.602**	1
	Sig. (2-tailed)	.000	.000	.000	
	N	200	200	200	200
**. Correlation is significant at the 0.01 level (2-tailed).					

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Linear regression analysis

Multivariate linear regression analysis on the relationship between 3 independent variables A_SERVICES, STAFF, EQUIPMENT and 1 dependent variable SATISFIED . Table 6 shows that all the proposed hypotheses are accepted, which means that both the independent variables have a statistically significant impact on the dependent variable. With R^2 = 0.585, the multivariable linear regression model is built by the data set (research data explains 0.558 % of the variance). The VIF coefficient of all three independent variables to less than 1.7 is valid; the model has no multicollinearity (Alin, 2010). The ANOVA test has statistical significance (p.value = 0.000), proving that the relationship between the independent and dependent variables in the regression model is linear. On the other hand, the test of variance changes with a significance level (p.vale > 0.005) shows that the model does not have a variance change phenomenon (Koenker, 1981).

Table 6. The results of regression analysis

Coefficientsa										
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	.808	.180		4.480	.000	.452	1.164		
	A_SERVICES	.220	.061	.247	3.634	.000	.101	.339	.608	1.644
	STAFF	.161	.058	.182	2.762	.006	.046	.276	.646	1.548
	EQUIPMENT	.366	.069	.364	5.327	.000	.230	.501	.602	1.661
a. Dependent Variable: SATISFIED										

DISCUSSION AND CONCLUSIONS

The first. Research results (Table 6) show that access to financial support services has a positive and significant relationship with satisfaction with financial support services with regression coefficient β = 0.220, sig = 0.000. With this result, hypothesis H1 was accepted. This finding adds to the evidence of previous studies. Student satisfaction will increase when access to financial management systems in universities is easy (Modigliani & Miller, 1963; Chabotar, 1989; Kivisto; 2005). Thus, it can again be asserted that the financial management system in the university is a tool to increase student satisfaction as it adapts to the increasingly demanding needs of students (Gomez-Mejia & Balkin, 1992).

Second. Research results (Table 6) show that the factor of financial services support staff has a positive and significant relationship with satisfaction with financial support services with a regression coefficient β = 0.161, sig =0.006. With this result, hypothesis H2 was accepted. This result further complements the evidence that has been found in previous studies. Despite modern technology, human resources are an essential element of the financial system. In addition, the staff's enthusiasm for serving students increases their satisfaction ((Kubenka & Ptackova, 2011; Kubenka & Ptackova, 2011). Human resource innovation is the key to increasing competition (Dubey, 2011; Kubenka & Ptackova, 2011). Compared with other factors such as accessibility to financial support services and financial information equipment and process, the impact of financial services support staff factor on satisfaction with financial support service is at the lowest level. This result is different from the results of previous studies (Kubenka & Ptackova, 2011; Kubenka & Ptackova, 2011).

Third. Research results (Table 6) show that financial information equipment and the process have a positive and significant relationship with satisfaction with financial support service with regression coefficient β =0.366, sig = 0.069. With this result, hypothesis H3 was accepted. The results of this study are similar to the effects of previous studies in that in the technology development environment, the degree of application of modern technology to the financial management system in universities has increased student satisfaction at the highest level (Bingham & Lewis, 1991; Belas, 2008; Gao, 2019, Sekhar & Sarma, 2018).

Fourth. This result implies that Vietnam's public universities must focus on reforming the financial management system to increase student satisfaction. Specifically, it is necessary to innovate so that the financial management system can facilitate decisions in providing accurate information and to innovate the process of solving procedures to help students have

convenience when accessing help and save time and effort (Kim & Lee, 2012). In assisting students in financial matters, universities need to focus on transaction convenience regarding the reduction of costs, time and effort of students, and the results they get after using the service (Chang & Kim, 2017, Ahn, 2016). Increasing student satisfaction with the financial management system means increasing university sales, so the university needs to re-evaluate student financial services systems and improve service quality. service and ultimately give students what they want (Belas, 2010; Kailash, 2012; Belas, 2010; Kailash, 2012).

Limitations

As with other empirical studies, there are limitations to this study that should be considered when discussing the results. First, our survey method reflects the subjective perception of the respondents toward the questions being investigated. Subjective data has some inherent disadvantages that are hard to avoid in surveys (Pakpour, Gellert, Asefzadeh, Updegraff, Molloy, & Sniehotta, 2016). Our data is collected over a single period, so certain limitations exist in the analysis and evaluation of the results (Xin & Zhanyou, 2019). Future research should combine cross-sectional analysis and long-term research.

The purposeful sampling method has limitations and does not fully reflect population characteristics (Lin et al., 2016; Strong et al., 2018). Our survey was conducted in a Vietnamese cultural context. Therefore more general statements are needed than could be made by applying the development research model and research conclusions to other countries (Sun et al., 2012). This study did not examine demographic variables. Therefore, further studies should consider demographic factors such as age, gender, and occupation to understand better students' satisfaction with the financial management system in Vietnamese public universities.

Acknowledgments

Conflict of interest

The author declares that there is no conflict of interest.

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Quality of Life Parameters - An Urban Design Perspective

Asha N[1], Dr. K. S. Anantha Krishna[2], Dr. Salila Vanka[3]

[1]Associate professor, School of Architecture, Siddaganga Institute of Technology, Tumakuru, Karnataka, India.
[2]Professor Emeritus NITTE School of Architecture, Planning & Design, Bengaluru, Karnataka, India
[3]Associate professor, RV College of Architecture, Bengaluru, Karnataka, India

ABSTRACT: Quality of life (QoL) is an important goal that needs to be achieved by an urban society in general and a neighborhood in particular. The physical space and the QoL of a community are related to a very significant extent. Physical space provides a setting for community living among the residents. There is a sense of place attachment through the way people interact and engage with the physical space. This sense of space becomes even more important in the present context, because of the rapid process of urbanization, which has negatively impacted the QoL in Urban areas.

This paper attempts to identify the connection between urban design parameters and Quality of life (QoL) through a literature survey. The attempt is to review various definitions and dimensions of QoL as discussed in the contemporary urban design theories and approaches, both objective and subjective. Furthermore, this paper discusses methods put forward by various researchers to quantify the qualitative aspects of QoL. Finally, a matrix is proposed to establish a set of parameters that includes physical, social, environmental, and psychological concerns of Quality of life in urban neighborhoods. These parameters may act as a guide for the analysis of the urban neighborhoods from the perspective of Quality of Life (QoL)

KEYWORDS: Urbanism, Urban Design, Quality of Life, Public space, Community

I. INTRODUCTION

Urbanism is not a new term with respect to cities. The term is associated with skillful and planned interventions of the growth and development of cities. During the 1980s, technological advances, especially in the IT sector and globalization brought in diversified economic processes and triggered accelerated urbanization. Many global cities developed worldwide, as a result. In the last five decades, several researchers have attempted to study the relationship between social processes and city form. They include the work of Jacobs and Hall in the 1960s, and more recently, those of Gehl, Dovey, and Habraken in recent times. They emphasize that a conceptual framework for socio-spatial urban design, which is sensitive to the production of urban space with a sense of place, safety, and control, is highly important. Urban design has to create a congenial environment for enhancing QoL. This paper uses the descriptive analytical approach to literature review to identify the general concepts of Quality of life and sustainable development. It analyses the recent urban planning theories and practices, that have been applied to many case studies across the world, for enhancing the Quality of life. Through this analysis, principles of urban design which promote Quality of Life (QoL) in urban neighborhoods, have been deduced.

II. QUALITY OF LIFE (QOL)

The term quality of life in urban areas describes the relationship between physical features of the built environment and the sense of wellbeing in that environment. Many theorists from various disciplines have attempted to identify elements that constitute Quality of life. Quality of life is ''the satisfaction in your life that comes from having good health, comfort, good relationship, etc., rather than from money''. "The personal satisfaction (or dissatisfaction) with the cultural or intellectual conditions under which he lives" [1]. Within a context of a given time, place, and society, some elements of Quality of life are held in common by members of that society. Otherwise, community quality of life is often used to explore community factors, resources, and services that community members observe as factors influencing their life quality or assisting them in coping with each other. Myers (1987:

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108-109) writes that "a community quality of life is constructed of the shared characteristics residents experience in places (for example, air and water quality, traffic or recreational opportunities), and the subjective evaluations residents make of these conditions."[2]

Social interactions are potentially crucial for a positive impact on QoL. Several aspects of the design of the neighborhood affect the QoL of the residents. There are several Concepts that are often used as synonyms for QoL. These include a) liveability, b) living environment quality, c) Quality of place, d) residential perception and satisfaction, e) the evaluation of the residential and living environment, and f) sustainability. The crucial feature of the built environment which has a bearing on the QoL is the spatial condition of the public spaces, which provides opportunities for interaction for the people. Functional diversity, in other words, varieties of functions/ activities, has been found to be a significant factor, in facilitating user interactions and Quality of life. Links with the spatial and social environment and a sense of acceptance by the neighborhood community are essential determinants for social belonging. Since many essential aspects of people's lives, such as the quality of the urban environment, feelings of security or social solidarity, sentimental attachment, and the quality of neighborhood relationships, are challenging to measure only through objective indicators, subjective perception of the QOL requires assessment [3]

The most popular way to gauge or evaluate urban QOL is via indicator-based evaluation tools. [4] Core aspects of QoL Viz social, environmental, and economic are typically used to categorize the numerous QoL domains and subdomains. The majority of these evaluation methods make use of a set of QoL criteria (indicators, domains, and subdomains) that quantify the many aspects of urban QoL. [5] The body of research review demonstrates how complicated and multifaceted the concept of quality of life is. [6] Therefore, a comprehensive and multidimensional instrument is required to capture its numerous dimensions. The body of research has highlighted the need for theory-based, multidimensional QoL assessment methods. [7]

URBAN THEORIES ON QUALITY OF LIFE (QOL)

Urban theories propound that Quality of life (QoL) could be measured by evaluating the built and social environment using quality-of-life indicators. Kevin Lynch (1960) considers four criteria for the visual Quality of the environment which include a)
Legibility, b) Building the Image, c) Structure and Identity, and d) Imageability. [8]

Jane Jacobs (1961), an American-Canadian journalist, author, and activist, pronounced the four necessary physical conditions for dynamic Quality of urban life. They are a) multifunction neighborhoods or districts, b) promotion of social life and safety of urban inhabitants, c) essentially short blocks, and d) buildings that differ in age and conditions [9] Jacobs and Appleyard (1987) suggested that "The urban environment should be an environment that encourages people to express themselves, to become involved, to decide what they want and act on it" [10]. These urban designers and theorists suggest five physical characteristics must be present for positive urban life which include the following a) streets and neighborhoods which promote the health and safety of the residents; b) a minimum density of development and intense land-use patterns; c) Multiple land use/integration of many activities; d) encouraging pedestrian needs e) many separate, distinct buildings with complex arrangements and relationships rather than a few buildings or superblocks

Jan Gehl (1987), a Danish architect and urban design consultant, created 12 quality criteria for the structure of open spaces, under three primary headings Viz: protection, comfort, and enjoyment.[11] Under the heading of protection, the subheadings were related to required preconditions for people to stay in the open space. These included criteria of assurance against a) traffic and mishaps, b) crime and violence, and c) disagreeable sensory experiences. The heading of comfort, dealt with requirements for people to spend more time in the open space. These included criteria of possibilities for a) walking, b) standing and staying, c) sitting, d) seeing, hearing, and talking, e) play, and f) unfolding activities. The third heading of enjoyment encompassed criteria of potential outcomes for enjoying positive aspects of a) climate, b) aesthetic Quality, and c) positive sensory experience. Carr et al. (1992), an architect/ environmental designer, have recognized people's needs in public spaces to encourage Quality of life, which include a) comfort, b) relaxation, c) passive engagement, d) active engagement, e) discovery, and f) encounter with a place.[12] The six main categories of community needs and quality criteria in public spaces developed by Tara Smith and Maurice Nelischer (1997), an American philosopher and landscape architect, include a) livability, b) character, c) connection, d) mobility) personal freedom and f) diversity. [13] Project for Public Spaces (2000), an NGO based in New York dedicated to helping people create sustainable public spaces that build stronger communities, suggests four essential qualities/criteria for high-quality environments in public areas, which include a) access and linkage, b) uses and activities, c) comfort and image, and d) Sociability.[14]

Quality criteria developed by Matthew Carmona (2010), an architect, planner, and researcher, relate to public spaces and deal with social, economic, and environmental characteristics [15]. The criteria include a) inclusiveness, b) cleanliness, c) tidiness, d) accessibility, e) vitality, f) attractiveness, g) comfort, h) viability, I) function j) distinctiveness, k) safety and security, l) robustness m) greenness, n) unpollutedness, and 0) capability for fulfillment. Ewing & Clemente (2013), from the field of urban studies, have

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explored qualities of urban design that are applicable to streets as public spaces. They mention five intangible qualities of spaces viz a) Imageability, b) visual enclosure, c) human scale, d) transparency, and e) complexity. [16]

Vikas Mehta (2013), professor of urbanism, university of Cincinnati, has worked on the role of planning and design in creating a more responsive, equitable, supportive, and communicative setting and recognizes the five dimensions for evaluating the Quality of public spaces which includes a) inclusiveness, b) meaningfulness, c) safety, d) comfort, and e) Pleasureability.[17] Seema Praliya, and Pushplata Garg (2019), researchers from the Indian Institute of Technology Roorkee have devised eight quality criteria for evaluating the Quality of public space. They are a) attractiveness, b) accessible and linked, c) maintenance, d) appeal, e) comfort, f) inclusiveness, g) activity and user, h) purposefulness, and i) safety, and security.[18] Kostas Mouratidis (2021), professor at the Norwegian University of Life Sciences, Department of Urban and Regional Planning, researched potential strategies for improving Subjective well-being through urban planning, thus enhancing the Quality of life, and identified the following measures.[19] a) Integration of various forms of urban nature; b) providing accessible and inclusive public spaces as well as communal spaces; c) maintaining upkeep and order in vegetation, d) urban space, and transport systems; e) implementing noise reduction strategies; f) developing aesthetically pleasing buildings and public spaces; g) reducing socio-spatial inequalities and h) having good urban planning processes

III. DISCUSSIONS

Table 1. Provides the parameters for QoL, developed by urban design theorists, and reviewed in this paper.

Urban design theorists	Parameters						
	Legibility	Safety and security	Opportunity for varied activities	comfort	inclusiveness	cleanliness	Others
Kevin Lynch	✓						Building the Image, Structure, and Identity
Jane Jacobs		✓	✓				Blocks must be short, and Buildings that vary in age condition.
A. Jacobs and D. Appleyard		✓	✓				Density, Distinct Buildings with complex arrangements and relationships
Carr et al.			✓	✓			Relaxation, Discovery, Encounter with a place.
Bramley and power		✓	✓				Community Stability, pride/sense of place
John Gehl		✓	✓	✓			
Project for Public Spaces	✓		✓				Character, Diversity, Continuity and enclosure, Ease of Movement, Adaptability
Matthew Carmona		✓	✓	✓	✓	✓	Accessibility, Attractiveness, Vitality and viability, Distinctiveness, Robustness,

						greenness, Unpollutedness, Capacity for fulfillment
Vikas Mehta		✓	✓	✓	✓		Pleasureability
Seema Praliya, Pushplata Garg		✓	✓	✓	✓	✓	Accessible and linked, Attractiveness and appeal, Purposefulness
Kostas Mouratidis			✓		✓	✓	Aesthetically pleasing, integration of good transport network, noise reduction strategies, good planning processes.

The table reveals that one parameter that is commonly mentioned by all the theorists is opportunities for varied activities (pronounced with various nomenclature).

This parameter promotes better Quality of life in any urban setting. Most researchers have considered safety and comfort for enhancement of the Quality of life in an urban built environment. Some researchers have considered inclusiveness, legibility, and cleanliness as significant features for improving and assessing the Quality of life. The other qualities proposed by researchers were related to the particular kind of public space they were studying. We may therefore conclude that there are vital qualities that hold good for all types of public spaces, irrespective of the scale and size of the public space, whereas others are of significance in specific types of spaces.

IV. QUANTIFYING TECHNIQUES

It is pertinent to note that several researchers have attempted to quantify the measures related to Quality of life (QoL) in urban settings. In his research related to the evaluation of the cityscape by the public, Jack L. Nasar (1990), an Academy Professor of City & Regional Planning, The Ohio State University, developed evaluative maps through face-to-face interviews and phone interviews and arrived at five desirable features for cities.[20] Dr. Derya Oktay et al. (2009), in their research on the Quality of urban life, adopted a systematic sampling procedure and conducted face-to-face interviews [21]. They have used the Five points Likert scale to measure the general neighborhood satisfaction

Vikas Mehta (2014), from the University of Cincinnati, used structured and semi-structured observations to understand the characteristics of the public space.[17]. He also observed the importance of various characteristics, which aided the public in assigning weightages to the variables. More than forty variables were developed to capture the use and perception of public space, among which thirty-two variables were observable and hence rated by the researchers. Thirteen were perceptual, and thus rating was obtained by users. The research used a rating scale ranging from 0-3. Handan Turkoglu (2015), from the Department of Urban and Regional Planning, Istanbul Technical University, in her research, has conducted a physical survey using Arc GIS to map the physical environmental indicators for assessment of the quality of community life. Face-to-face interviews were conducted as a part of the social survey technique. [22]

Craig A. Talmage et al. (2018) used the questionnaire Survey method of seven Point Likert Scale to assess the Neighbourhood quality of life using Place-based indicators.[23] The indicators used, focus on individual and community participation in their environments and their feelings. The data thus obtained is analyzed using t-test and chi-square tests, and linear regression analysis. Seema Praliya and Pushplata Garg (2019), researchers from IIT Roorkee, have used the Observation method and photo documentation for evaluating the quality of public space, apart from obtaining user responses on a five-point Likert scale.[18]

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Analysis was done based on the Pubic space Quality Index, which the researchers developed by averaging the feedback received, assigning weightages, and calculating the overall performance score of different public spaces under study.

The data collection techniques, adopted by various theorists are a) Observation and photo documentation - what, How & where—activities and behavior, b) structured and semi-structured observations at activity nodes and movement spines, c) survey Interviews & questionnaires –why and how---- to get people's perspective, random sample, use of interval, ordinal scale, or Likert scale are preferred to for accurate response for data analyses and presentations, IMB SPSS software is mainly used. Evaluative maps are developed and used for graphical representation by some researchers. The data obtained by the survey is mapped based on the preferences expressed by the user for both objective parameters and subjective parameters, and conclusions are drawn.

V. CONCLUSIONS

In the last five decades, several research works have indicated the connection between the design of urban spaces and the Quality of Life (QoL)of the people who use them. The feeling of sense of place, safety, and control are important for enhancing the QoL. Social interactions are extremely important for QoL and the design of public spaces has to facilitate them. The design has to enhance functional diversity which will provide richer interactions and promote QoL. The feeling of protection, comfort, and enjoyment are of primary importance to QoL and urban spaces need to be designed to augment them. Visual aspects of urban spaces like human scale, sense of enclosure, and a certain level of complexity are also of relevance. All theorists have mentioned the requirement of 'opportunities for varied activities being a promoter of QoL. Several attempts have been made to quantify the measures related to QoL so that rigorous statistical analysis and inferences are possible. There is a need to draw on these experiences of researchers and test the validity of principles in the Indian context, which is the current ongoing work of the author.

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Effects of Sociocultural Practices Contributing to Inhibiting Female Students from Completing Primary Education: A Case of Mkalama District – Singida – Tanzania

Mwibilicha Sefania Mallole[1], Shadrack Ernest Mwakalinga[2]

[1,2]Department of Education, Faculty of Arts and Social sciences, Jordan University College (JUCo), P. O. Box 1878, Morogoro – Tanzania.

ABSTRACT: The study aimed at finding out the effects of sociocultural practices contributing to inhibiting female students from completing primary education. Descriptive survey research design and mixed method approach were employed. The sample comprised of 15 female primary school students, 8 head teachers 3 Ward Executive Officers (WEOs), 3 community traditional leaders and 1 District Educational Officer (DEO) (primary). Data were collected through questionnaires and interviews. The study came out with the following findings, some sociocultural practices leads to: hopeless and isolated female students at school, prepares girls for marital responsibilities than education, some girls fail to deliver their academic abilities. The study recommended that, parents and guardians need to be the centers of changes and valuing education to females as they value males, nevertheless strict laws which are protecting educational rights to all children should be observed so that no barrier to education is caused by the social cultural practices.

KEY WORDS: Social-cultural practices, and Primary education

INTRODUCTION

Sociocultural practices are those customs and values that community practice for their rituals, traditions and identity. Ngaiza (2002) in the study about perception of parents on girls' education in United States observed that, scholars who have focused on gender issues often treat all aspects of education as working to the disadvantage of women. Gender imbalance between men and women is still noted although not as much as in other countries such as Eastern Asia and Africa.

Kainuwa & Njeemah (2013) asserted that, women are left behind in terms of access, support and educational opportunities due to cultural bias in developing countries. This has motivated us to carry out this study since Tanzania is among the developing countries and studies shows that there are such cultural practices in the country. Our study tries to indicate the effects of such gender imbalances to female students from completing their primary education.

OBJECTIVE OF THE STUDY

The study identifies the effects of social cultural practices which inhibit female pupils from completing primary education in Mkalama district in Singida regionTanzania. It is expected that the findings of the study may have multiple benefit to various stakeholders, parents and educational planners in handling educational matters to female learners. Nonetheless, the study assumes that the awareness created by it may contribute to the panacea of problems that female pupils face toward their way in realizing primary education.

METHODS

The study used questionnaires and the interviews as the main tools of the data collection whereby questionnaires were presented via paper and pencils and interviews were conducted through face to face. Pilot study was done to test for validity and reliability of the instruments. The sample size of the study was 30 people. This comprised of 15 female primary school students, 8 head teachers 1 from each primary school of the sampled schools, 3 Ward Executive Officers (WEOs), 3 community traditional leaders

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and 1 District Educational Officer (DEO) (primary). We used simple random sampling to make selection of 3 WEOs then stratified sampling was employed to get 15 female students under study.

RESULTS AND DISCUSSIONS

Table 1. Effects of Socio-Cultural Practices Contributing to Inhibiting Female Students from Completing Primary Education (n = 30)

Item	Af(%)	Uf(%)	Df(%)	Tf(%)
Some students who are culturally isolated tend to feel shy and lose morale to go to school	62.5	25	12.5	100
Initiated girls became physically and mentally ready for marital status	75	00	25	100
Initiation ceremonies force girls to stay away from school for some time while others fail to come back to school after ceremony	75	12.5	12.5	100
Girls fail to deliver their academic abilities because of the teaching they get from the traditional dances	62.5	12.5	25	100
Education to girls seem to be regarded as luxurious by the members of the community	50	12.5	37.5	100
Traditional stereotyping makes a girl to be much attached to domestic duties than school	75	00	25	100
FGM produces helpless and isolated girls at schools	62.5	12.5	25	100
Some traditional dances end up late in the midnight, this increases school truancy among girls	75	00	25	100
Early pregnancy is sometimes enhanced by some traditional norms such as, initiation ceremony	50	25	25	100

Note: Af = Agree frequency, Uf = Undecided frequency, Df = Disagree frequency, and Tf =Total frequency.

Having a glance on the table above it can be realized that initiation rites has effects on girls realization of their goals to education, because girl becomes physically and mentally ready for marital status than education (75%). This study asserts that, girls who are initiated seem to be much prepared for motherhood responsibilities than going on with educational opportunities. This is contributed by initiations since elders teach girls the way to satisfy a husband and other matrimonial responsibilities. In one of the interviews the respondent said:

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Respondent ₚ: 'In initiation rites girls are more taught on handling their husbands and family as future mothers than going for further education'

Thus, the central theme of initiation teachings is preparing a girl child for motherhood tasks leading to lowering down her concentration towards schooling. HakiElimu (2010) contented that, most of the girls are forced to be married after passing through traditional rites. This contributes to affect psychologically a girl, and hence develops negative perceptions upon school as a result many of them drop studies. Initiation ceremonies within the communities are normally conducted in countryside areas where there are widespread traditions and customs. Ayoub (2010) in support of this finding explained that, once a girl is initiated is likely being arranged for matrimonial accountability to experience what she was taught during initiation period. Nevertheless, girls who went through initiation ceremonies reflects themselves as grownups, and some of them see school as an institution for teenagers. It can therefore be revealed that, initiation rites create a room for a girl get married to materialize the ideas lent from initiations, thus she fails to complete her education.

Moreover, initiation ceremonies contribute to the forcing of girls to stay away from school for some time while others fail to come back to school after ceremony (75%), portrayed the negative influence of initiation rite practice towards female students' education efforts. Initiations arrangements in the communities is done in a selected area far from normal shelters where girls are required to stay there for a certain duration. This finding was in agreement with Kainuwa & Najeemah (2013) which argued that initiation rites oblige girls to stay out of schools for a certain period of time while studies are going on. The study found that, under some circumstances the schoolgirls fail to come back to school after the ceremonies. Initiation practice leads girls to learn motherhood roles of which they become interested to rehearse, therefore, the chance of failing to complete their education becomes rampant.

The directives and knowledge girls receive during initiation are beyond their actual age. Initiation rites in the communities reflect practice and belief about suitable roles for adult life. Omari (2006) in support of this finding explains that, mother and aunts discourage their daughters from studying instead, they convince girls to marry, cook for their husbands, deliver and rear children. On the other hand, this practice is related with supplying primary knowledge on reproduction, marriage, puberty and sexuality to female children. It can as a result be claimed that, most parents do not take attention about education of their daughters because they do not value the benefit of it. The perception of dis valuing girls' education drives parents to opt to allocate their daughters to matrimonial answer abilities such those learn from initiation rites. Thus, this hinders girls' right to complete their primary education.

Notwithstanding, traditional stereotyping makes a girl to be much attached to domestic duties than school (75%). In the sub-item on traditional stereotyping makes a girl to be much attached to domestic duties than school, the responses portrayed the effects of traditional stereotyping to many girls. A related finding was made by UNESCO (2005) which reports that, girls are forced to participate more in household activities than school activities. Traditional stereotyping increases chances for female students fail to recall most of the things they formerly learn at school than male students do. This was also noted in the interview session when respondents said:

Respondent ₓ: "You know most of the girls when they come back from schools have to make sure they work together with their mothers in household activities like cooking, collecting firewood, and making sure the family is in place"

Respondent ᵧ: "In most of our culture girls needs just to know reading and writing then get married, it is worthless to educate girls because they will be married to other clans then no benefit to your clan, but they if they know taking care of families then it will be a great appraisal to the clan where she is married"

Taylor (2006) is in consensus with this view that, female students lack enough time to do revision of the matters they learn after school hours, because they spend much of their time on domestic chores. It was uncovered from the study that, traditional stereotyping concedes the opportunity for male students to do well in classes and complete primary school successful comparing to girl students. Domestic chores too, which are being performed by girls and women in the community, are considered not helpful for yielding profitable economic status comparing to which are done by males. Parsons & Bales (2014) comes in accord that, women undertake more non-economical deeds while men occupy in learning more profitable economic tasks. The research revealed that, the reflection of traditional stereotyping upon girls in the community, is much influenced by their cultural beliefs about the role of women in the society, that is, the role of motherhood. These gender disparities in the family and in education position girls into the narrowed apprehended characters of wives and mothers (Kimego, 2007; Mtinda, 2015). Women are traditionally groomed to be the bearers and makers of traditions identity. This makes parents inspire their daughters to attend traditional arrangements for their proper identity in the society. It can hence be safely concluded that, girls are overwhelmed with household chores in many families. Girls spend more time in household duties before going and after coming from school. This slows down their education morale and accelerates their failure to complete education.

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Nonetheless, in the sub-item on some traditional dances end up late in the midnight, this increases school truancy among girls 75%, the finding shows that, such practice has impact towards girl's education. It was disclosed from this study that, there is the famous traditional dance known as 'Nkininda' which is normally held during harvest season. During such dance people of all ages and sex are allowed to participate, and it sometimes ends up late in the night. A similar report was done by UNESCO (2002) that, factors such as social-cultural practice leads to, early marriage, and pregnancy. 'Nkininda' dance exposes girls to various activities such as getting entangled with a male person, early pregnancy and marriage. These speeds up the chance for female student not to complete their education.

In addition, Female Genital Mutilation (FGM) produces helpless and isolated girls at school 62.5%, yielded high score to show evidence that, such cultural practice has an uninvited influence upon girls' education. FGM signifies all conducts which comprise either partial or total elimination of the external female genital organs for non-medical motives (UNICEF, 2013). The finding from the current study shows that, FGM is normally conducted by traditional practitioners mostly in rural areas who are called 'ngaribas'.

> Respondent $_z$: 'Girls are mutilated so that they become less stimulated by sexual hormones and that once they are married, they cannot easy cheat their husbands'

From the interview response above, female genital mutilation is used as a controlling mechanism of unfaithfulness behavior especially when they get married. This finding is in agreement with Pesambili & Mkumbo (2018) earlier cited which reports that, traditionally, the central idea behind FGM is to control fleshly stimulation of girls so that they become satisfied with their husbands.

Girls who are mutilated in the traditional community face several consequences such as early marriages, psychological upset, and parents' negative attitudes towards their education, lose interest of going on with school. UNICEF (2014) corresponds with this view that, after a girl has undergone mutilation she suffers from severe pain, bleeding, shock, urine retention, bacterial infection, open wounds in the genital region, frequent bladder and urinary tract infections, infertility and child delivery-related contradictions. It appears that, girls who succeed to escape FGM suffer from isolation and shame from their peers who have been mutilated. This makes some girls run away from their homes because they feel being disrespected, ultimately they fail to complete their education. FGM practice needs girls to stay out of school either temporarily or permanently, and those who disagree to undertake FGM become dis-valued in the community (Msuya, 2017). The study also disclosed that, girls who are not mutilated are prohibited to cook for in-laws, cannot get married and sometimes can be divorced if it is revealed, she got married without being mutilated. It can as a consequence be appealed that, some women are being mutilated after they get married, especially when they encounter difficulties related to take in children and repeated miscarriage. This is because the in-laws find guilty that, the wife is considered responsible for that unfriend outcome. Thus, the current research study was set to find out if such practice has any impact to female student on completing their primary education.

Apart from the above arguments, students who are culturally isolated tend to feel shy and lose morale to go to school 62.5, the respondents displayed that, some cultural practices such as FGM are discriminatory against female students. This influences girls to shyness and many of them turn to see no value to continue with education. Girls who reject to abide with their community cultural conducts are normally isolated and sanctioned from various deeds. Pesambili & Mkumbo (2018) were in agreement with this view that, FGM acts as a barrier to many girls towards their efforts of continuing with education because, the effects resulting from that practice like isolation, consequently, leads to psychological suffering. Psychological misery finally leads girls to be unable to complete education especially at primary level.

It emerged from the current study that, biased cultural practices in the community serve as the interfering agents to female students' education and that, girls unapproachability to education makes them be in danger of failing to complete education career. Some parents decide to withdraw their daughters from school when they see education as a conflicting factor with cultural norms such as FGM and marriage (UNFPA, 2010). Teenage girls are being taken out of school to prepare them for the traditional marriage occasion. It can consequently be safely said that some girls who are culturally alienated normally escape from their families to live with the family of their relatives, such as aunts and uncles until they reach mature ages. This makes girls engage in undesired behaviors which at the end of the day leads them fail to complete their education.

The sub-item on girls fail to deliver their academic abilities because of the teaching they get from traditional norms (62.5%), discloses the view that, girls are gifted different talents and abilities, but they become unable to practice them because of the presence of uninvited cultural conducts in the community. Most traditional teachings girls get diminish their capabilities on the basis of their femaleness. It appears that, girls are mostly coached towards motherhood answerabilities. Such knowledge cannot enable girls to uncover their academic capacities because they consider themselves as subordinates before men. This finding fits well with that of Eitzen (2000) which argued that it was measured a social shortcoming for a female student to be talented because

of negative cultural perception from the community. The findings of this study show that, parents in the community mentor their daughters about how they should act, be respectful and how they should often speak out in different situations, simply because they are girls. Such teachings are being provided through various traditional experiences a girl is borne to, such as initiation rites. During the interviews, a respondent pointed out that:

> Respondent $_p$: 'It is not normal and is a shock in some of the families and our communities when a female student performs well academically than a male student'

The view of the respondent $_p$: seems to be in line with the study by Amadi (2013) which pointed that, teachers were able to recognize smart boys, but were often amazed to learn that, girls could also be considered academically intelligent. It can thus be claimed that certain communities have no trust in the concept of girls' education, capabilities and women empowerment.

The sub-item on initiated girl is likely to be prepared for motherhood responsibilities to show experience she got during initiation period (62.5%), the respondents' responses showed that, initiations ceremonies have a negative role to play to the arrangements of a girl towards matrimonial accountability. It emerged from this study that, teachings girls get during initiation period largely influence them to be good wives and mothers when they get married. The moment a girl passes initiation rites psychologically develops her physical stimulation that creates a room for a girl to indulge into disloyalty affairs with men in order to go through the teachings she got (Ayoub, 2010). It can be explained that traditional lessons' openness enlarges the want for the initiated girl to rehearse what she was trained during initiation rite session. This becomes an obstacle to her school continuity because after doing the rehearsal they automatically develop negative interest to wards education.

Although, education for girls seems to be luxurious activity by the community members (50%), yet displays the presence of low concentration upon educating girls. Girls who are reared in the communities and groomed for matrimonial responsibilities than education. The current research study revealed that, parents on the basis of traditional view have the mandate to opt to send their daughters to school or not and no cultural bound to be accountable for. Community members do not see and value the benefit of educating girls. Many parents consider girl's education as loss of investment. HakiElimu (2011) is in agreement with this finding that, in some parts of Tanzania, education for girls is seen as a luxury thing, and when a female student gets back home from school, she is obliged to fulfill domestic title roles instead of doing school assignments and exercises. The tendency of not valuing girl's education makes many parents to opt educating boys, with a belief that, boys can get admission to civil service work compared to informal and cheap work of their sisters (UNGEI, 2014). This maybe contributed by the masculine nature of the communities that put the boys as the first receiver of social cake including education to the detriment of girls. It can at this point be concluded that, even if a certain parent knows the importance of sending a girl to school, so long traditions have no bounds to adjust for conflicting effects, they can remain vague to back up their daughter towards education.

All above, early pregnancy is sometimes enhanced by some traditional norms such as, initiation ceremony (50%), traditional customs among other factors donates a lot to early pregnancies among many school ongoing female students. Traditional conducts such as FGM, initiation rites and traditional dances expose girl to infidel behaviors than education. Mollel & Chong (2017) are in consensus with this study that, several cultural practices attract some parents to pull girls out of school immediately when they reach puberty stage. This is to prepare them to be responsible mothers of the family when they get into marriage. Such situation increases girl's vulnerability to the risk of discontinuing with education.

Girls in the communities are exposed to unethical actions because of attending traditional dances and initiations. Such practices disclose them to male aggressiveness which many times result into early pregnancies, early marriage and finally failure to complete their primary education. HakiElimu (2010) opined that, in some areas of our country there still happening initiation ceremonies which subsidize girls to early physical relationship with men which finally springs school withdrawal. The current research study observed that, in most cases the cultural practices through which girls pass at early maturity, have the theme to introduce girls to social and spouse related tasks as women. This tendency has negative end product on girls' education. It seems that, many girls who become wide-open to unpleasant traditional practices fail to complete school. It can consequently be contended that, traditional practices such as initiation rites leads girls to lack access to productive incomes deeds which can enable them to opt for better choices. This situation softens and sub standardize them to gender based violence occurrences which at the end hamper their education continuity.

CONCLUSION

This study was done in one district in Singida, it cannot be representative enough for the effects of sociocultural practices contributing to inhibiting female students from completing primary education for the whole country. Nevertheless, it may save as the reference point for the wider studies to be conducted in other areas. Since Tanzania has many tribes with different cultural practices which might not be the same all over the country. Withal, education for girls is very important as they can participate in

developmental issues as boys. This can be realized in different political, economic and social affairs, due to the reason that their participation is valuable as boys.

Conflict of interest

The authors declare they have no conflict of interest.

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Perception of Teacher Educators towards 2-Year B.Ed. Programme in Odisha

Priyadarshini Swain[1], Pradipta Kumar Mishra, Ph.D[2]

[1]Research Scholar, Fakir Mohan University, Vyasa Vihar, Balasore, Odisha

[2]Professor-cum- Principal, Y.S.Palpara Mahavidyalaya, Palpara, (NAAC Accredited – B), Purba Medinipur – 721458, West Bengal

ABSTRACT: The nation's development is based on its education. The Teacher Educators train the student teachers to ensure quality in school education by raising the learning levels of the students. The 2-Year Bachelor of Education (B. Ed) is essential to fulfill the said purpose. In the present study it has been found that this Programme is providing sufficient time to acquire proper content knowledge for the development of student teachers. It has been reported that the Teacher Educators of Science stream perceived the programme better in comparison to their Arts counterparts. Like this, the Teacher Educators of higher qualification have perceived the programme better in comparison to their counterparts having inferior qualification. In totto, it has been observed in the present study that the teacher educators are in favour of the 2-Year B. Ed Programme

KEYWORDS: Perception, Teacher Educators & 2- Year B. Ed Programme.

INTRODUCTION

We have comfortable and respectable lives thanks to education. It is in charge of the overall development of the person and of society. Education entails bringing forth a child's hidden abilities. It is an activity that aids pupils in gaining the knowledge, skills, attitudes, and perception they require (Mirunalini and Anandan, 2012). The nation's development based on its education. The teacher educators train competent educators who raise student learning levels and the quality of education in schools. Through the Bachelor of Education (B.Ed.) degree, teacher educators are prepared. This indicates that the quality of teacher educators depends on the B.Ed. degree. Even in the worst system, a good teacher may undoubtedly produce the best results (Parvez, 2010).

Singh and Tayeng (2019) made a study to access the attitude of teacher educators and student teachers of B.Ed. College, Rajiv Gandhi University of Arunachal Pradesh, towards 2-year B.Ed. programme. They reported that the teacher educators' attitude towards 2-year B.Ed. programme is more favourable than the attitude of student teachers. In Karnataka the B.Ed. programme has been going on as per the NCTE guidelines and in this context, Vijaylaxmi and Menon (2017) made a study to know the teacher educators teaching competencies for 2-Year B.Ed. Programme. They reported that the teacher educators' competencies were very high, while their perspective towards 2-year B.Ed. programme is moderate. The teacher educators of Tamilnadu have positive attitude towards 2-year B.Ed. Programme (Sudha, 2017), while the teacher educators of Faridabad district of Haryana have moderate attitude towards NCTE Regulations 2014 (Khanna and Pandey, 2014).

The 2-Year B.Ed. Programme is also going on in the State of Odisha. No such research has not yet been conducted to know the perception of teacher educators towards ongoing B.Ed. Programme in Odisha. Therefore, in the present study, the researchers have attempted to conduct research to know the perception of teacher educators towards the ongoing 2-Year B.Ed. Programme in Odisha.

Objective of the Study

To learn about Teacher Educators perception on the 2-Year B.Ed. Programme.

Hypotheses

H01- There is no significant difference in the perception of Teacher Educators having Science and Arts background.

H02: There is no significant difference in the perception of Teacher Educators having varied educational qualification.

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METHODOLOGY

Design of the study

For carrying out the study, Descriptive Survey Method was adopted by the researchers in which both Quantitative and Qualitative Approach was used by the researchers.

Sample

Basing on the revenue districts of the State, Odisha, the researchers selected ten (10) districts i.e, Puri and Jagatsinghpur, Khordha, Balasore and Bhadrak from Central Division, Balangir, Dhenkanal and Angul from Northern Division, Ganjam and Koraput from Southern Division for the present study. There are 37 institutes offering 2-year B.Ed. programme in Odisha having 201 number of Teacher Educators. In the present study, the researchers have selected 11 institutions (30% of the total Population) by using Stratified Random Sampling Method for collecting the data. Hence, 52 Teacher Educators were constituted the sample by using Stratified Random sampling Technique for the present study.

Tool: Questionnaire on Perception of Teacher Educators

The tool was divided into four sections along with their general information. First part of the tool was based upon the "General Information" of Teacher Educators like their Name, Institute Name, Gender, Educational Qualification, Teaching Experience. In the inner part **Section –A** was based upon "Teacher educators' perception towards 2-year B.Ed. programme";where 17 items were therewith having 5-Point Scale such as SA-Strongly Agree, A- Agree, UD-UnDecided, DA-Disagree, SD-Strongly Disagree.These 17 Items were comprised with the duration of the B.Ed. Programme, change of basic unit, introducing of common entrance test, eligibility of candidates, time, number of working days, attendance, duration of internship programme, cooperation of headmasters, learning engagement, and continuation of 2-year B.Ed. programme etc.

Section-B deals with the perception of Teacher Educators towards the objectives of 2- Year B.Ed. programme; it contained six items having five different options. **Section-C** comprised with the teacher educators perception towards the major Papers of Present B.Ed. Curriculum; with 5- Point Rating Scale i.e., Strongly Agree, Agree, Neutral, DisAgree, Strongly Disagree and **Section-D** was based on the Teacher Educators view on addition, deletion and corrections in the content of major papers. In this section, there are four questions. In the first question, there are ten items and asked to give their suggestions on the curriculum by adding, deleting, and correcting the content of major papers of the curriculum which had been asked in each paper basis. In this section, Teacher Educators' preferable subjects also asked and whether they want to add any in that paper, also asked. What other papers are to include in the curriculum also asked to them. Teacher Educators' perception regarding teaching practices is also asked by the researchers through this questionnaire.

RESULTS

Demographic characteristics of Teacher Educators

In the present study, the teacher educators of eleven teacher education institutes participated. The developed questionnaire had been shared among the teacher educators through their WhatsApp numbers and in some cases, a hard copy was also shared. 52 teacher educators responded to the questionnaire. After getting all the responses, it transferred into excel sheet for further analysis.

Table 1. Demographic characteristics of Teacher Educators

Sl. No.	Variables		Number (%)
1	Gender	Male	14 (22.9%)
		Female	38 (73.1%)
2	Average Age with standard deviation		35.6 $\pm$ 7.8
3	Qualification	M.A. M.Ed.	8 (15.4%)
		M.Sc., M.Ed.	8 (15.4%)
		M.A./M.Sc, M.Phil	16 (30.8%)
		M.A./M.Sc., Ph.D.	6 (11.5%)
		M.A./M.Sc., B.Ed.	14 (26.9%)

The average age of the teacher educators is 35.6 $\pm$ 7.8. In the present study, though the researchers aim to collect the responses from an equal number of teacher educators in terms of gender, it is not possible. Most of the respondents who

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responded to the questionnaire are female teacher educators (73.1%), while only 22.9% of male teacher educators responded to the same. According to the qualification of the teacher educators, the majority of the teacher educators possess MA/MSc with M.Phil. Degrees (30.8%) followed by MA/MSc., B.Ed. (26.9%), both MA, M.Ed, and MSc, MEd (15.4%) and MA/M.Sc, Ph.D. (11.5%). More than 60% of teacher educators are married, while others are unmarried (38.5%). According to the experiences of the teacher educators, the majority of teacher educators are within a period of less or equal to 5 years (78.8%), followed by 6 to 10 years (11.5%) and 11 to 15 years (7.7%), and so on.

Interpretation of Teacher Educators' response

A questionnaire having 35 statements was shared among the teacher educators of different institutions. The questionnaire contains different items based on different aspects of the 2-Year B.Ed. curriculum.

Table 2. Perception of Teacher Educators towards 2-year B.Ed. course

Sl. No.	Statements on B.Ed. Programme	SA	A	U	DA	SD
1	The Prescribed duration of B.Ed. Programme is good enough to complete the Curriculum.	18 (34.6%)	29 (55.7%)	---	2 (3.9%)	3 (5.8%)
2	Change in the basic unit of students from 100 to 50 with a maximum of two units is satisfactory.	9 (17.3%)	37 (71.2%)	3 (5.8%)	3 (5.8%)	
3	The change in the duration of B.Ed. Programme from 1 year to 2 year is justified.	27 (51.9%)	13 (25%)	---	10 (19.2%)	2 (3.9%)

The statement, "The prescribed duration of the B.Ed. programme is good enough to complete the curriculum" and more than 50% of teacher educators agreed with this statement, while 34.6% strongly favoured this statement. The majority of the teacher educators (71.2%) opined that running two units having 50 student-teachers is a good idea (Table 2). For better learning enhancement, the number of students in a classroom is also too much important. It helps the teachers to reach all the students in a small classroom setting, instead of a large group classroom setting. Better communication is also possible in case of a small classroom setting. Again, NCTE has changed the duration of B.Ed. program from 1 year to 2 years. In this regard, the researchers aim to know the teacher educators' perception and 51.9% of teacher educators strongly favoured this, while 25% favoured this statement (Table 2). The result clearly depicts that the teacher educators favoured the enhancement of the duration of the B.Ed. program from 1 year to 2 years and viewed that the NCTE decision in this regard is justified. By enhancing the time duration, both teacher educators and student teachers will get enough time to go into detail in the programme. It helps the student teachers in focusing their internship, community activities, and other activities and at the same time, the teacher educators will complete the course easily and can guide the student teachers in all aspects smoothly.

Table 3. Perception of Teacher Educators regarding selection process in to 2-year B.Ed. course

Sl. No.	Statements	SA	A	U	DA	SD
1	Introducing common entrance test for selecting candidates for taking admission into the B.Ed. course is appropriate.	35 (67.3%)	14 (26.9%)	3 (5.8%)	---	---
2	The eligibility of candidates having qualification with bachelor in Engineering /Technology with specialization in mathematics / science with 55% mark is justified.	9 (17.3%)	23 (44.2%)	11 (21.2%)	6 (11.5%)	3 (5.8%)
3	The Present Two-Year B.Ed. Programme is providing sufficient time to acquire sufficient content knowledge for student teachers.	21 (40.4%)	23 (44.2%)		2 (3.9%)	6 (3.9%)
4	Increase in the number of working days from 180 days to 200 days excluding examination and admission period is sufficient.	12 (23.1%)	31 (59.6%)	3 (5.8%)	3 (5.8%)	3 (5.8%)
5	80% attendance of student teachers for all coursework including practicum and 90% attendance for school internship made mandatory.	33 (63.5%)	19 (36.5%)	---	---	---

Teacher educators (44.2%) also opined that the present 2-Year B.Ed. program is providing sufficient time to acquire sufficient content knowledge for the student teachers. This is due to the time duration for the same purpose has been increased. The

enhancement of working days excluding examination days is sufficient. Most of the teacher educators (59.6%) also favoured about the enhancement of working days (Table 3).Regarding admission and eligibility, some criteria have been fixed by NCTE-2014. The researchers put two statements in front of the teacher educators and reported that 67.3% of teacher educators strongly revealed that introducing a common entrance examination for admission to 2-Year B.Ed. programmes is a good initiative (Table 3). It has been reported that more than 44% of teacher educators agreed that students from engineering/technology backgrounds having mathematics/science as a specialization with 55% is justified for taking admission into this course, while 21.2% of teacher educators remain silent and 11.5% of teacher educators disagree with this statement (Table 3). This clearly demonstrates that though some teacher educators favoured the admission of engineering/technology-based students having mathematics/science as their specialization subjects others are not supporting this idea suggested by NCTE. Almost all teacher educators revealed that attendance is mandatory for the student teachers in order to complete a professional course like B.Ed. the program, while 63.5% strongly supported this idea of NCTE, which is implemented in different TTIs in the State of Odisha. They are in favour of 80% attendance for all aspects of the course and 90% attendance for the internship phase.

Table 4. Perception of teacher educators on Internship programme

Sl. No.	Statements on Internship of B.Ed. Programme	SA	A	U	DA	SD
1	Increase in the duration of 6 months Internship Programme is justified.	12 (23.1%)	30 (57.7%)	2 (3.9%)	8 (15.4%)	---
2	Expansion in the duration of internship programme provides scope to student teachers in developing requisite skills and competencies to meet diverse needs of the learners in school.	23 (44.2%)	24 (46.2%)	3 (5.8%)	2 (3.9%)	---
3	School Internship facilitates the student teachers to multicultural contexts of the society by taking school as a miniature society.	26 (50%)	21 (40.4%)	---	3 (5.8%)	2 (3.9%)
4	School Internship enables the student teachers to play the role of a resource mobilizer and manager.	11 (21.2%)	32 (61.5%)	6 (11.5%)	3 (5.8%)	---
5	School Internship facilitates the student teachers to act as service provider for the Community and Parents.	11 (21.2%)	32 (61.5%)	6 (11.5%)		3 (5.8%)
6	Headmasters of schools are cooperative enough to organize internship in their respective schools.	26 (50%)	26 (50%)			

The internship is a very important part of the teacher education program. Many initiatives have been taken up by NCTE for its enhancement. The majority of the teacher educators (57%) reported that an increase in the duration of the internship programme is justified (Table 4). It helps in developing requisite skills and competencies among the student teachers (46.2%); scope for multicultural contexts of society (50% strongly favoured); to act as resource mobilizer (61.5%); also supports acting as a service provider for the community and parents (61.5%) (Table 4). All the teacher educators agreed that the headmaster of the concerned internship schools is very helpful. They provide all sorts of support to both student teachers and also to teacher educators.

Table 5. Perception of teacher educators on learning experiences of 2-year B.Ed. programme

Sl. No.	Statements on Learning experiences of B.Ed. Programme	SA	A	U	DA	SD
1	The 2-year B.Ed. Programme enables the student teachers to have learning experiences to adjust in diverse learning contexts.	21 (40.4%)	31 (59.6%)			
2	The 2-year B.Ed. Programme facilitates the student teachers to develop active inquiry, Collaboration and supportive interaction in the classroom.	22 (42.3%)	27 (51.92%)	3 (5.8%)		
3	The 2-year B.Ed. Programme provides various modes of learning engagement to the student teachers as a reflective practitioner in the teaching learning process.	18 (34.6%)	34 (65.4%)			

About 60% of teacher educators revealed that 2-year B.Ed. programme enables the student teachers to have learning experiences in multilevel situations. The said course is also very supportive (51.9%) to the student teachers to become future teachers and it

also provides all sorts of learning engagement (65.4%) to student teachers as reflective practitioners in the teaching-learning process.

Testing of Hypotheses: H_{01}- There is no significant difference in the perception of Teacher Educators having a Science and Arts background.

Table 6. t-test showing the response of Teacher Educators having Arts and Science background

Dimensions	95% confidence interval of the Difference		t	df	Sig. (2-tailed)
	Lower	Upper			
Attendance	-1.34104	-0.33896	-3.460	24	0.002
Learning experiences	-0.49188	-0.09188	-1.414	24	0.024
Active inquiry and collaboration	-0.46371	-0.22371	-0.721	24	0.004

The researchers have taken a t-test to test the level of significance through SPSS software. It has been reported that the perception of teacher educators of both Arts and Science categories are statistically significant having the t-value is, -3.46 (p= 0.002) towards attendance of student teachers. The 2-year B.Ed. the program enables student teachers to have learning experiences (p=0.024), facilitates the student teachers to develop active inquiry, and collaboration (p=0.004are statistically significant.

H_{02}: There is no significant difference in the perception of teacher educators having varied educational qualification

Table 7. Pearson Chi-Square value on different variables of Teacher Educators having varied educational qualification

Dimensions	Value	df	Asymp. Sig. (2-sided)
Number of working days	21.629	16	0.156
2-year B.Ed. programme continuity	16.937	12	0.017

A hypothesis such as there is no significant difference in the perception of teacher educators having varied educational qualifications, the researchers took Chi-square and the data has been run through SPSS software and is presented in Table-7. Teacher educators having varied educational qualifications are statistically significant with the number of working days as per NCTE-2014 guideline at a 0.01 level of significance (p = 0.156). NCTE needs to continue with the 2-year duration of B.Ed. programme and it is statistically significant having varied educational qualifications at a 0.05 level of significance (p = 0.017).

DISCUSSION

In the present study, it has been found that the teacher educators are in favour of the implementation of 2-year B.Ed. programme in Odisha. The study conducted by Adhikary (2017) reported that teacher candidates had conflicting opinions about the 2-YearB.Ed. Programme in Assam. According to Sushma (2016), there are many different perspectives among teacher educators regarding the Two-Year B.Ed. degree. Again, it was also reported that the teacher educators need more professional training for their development from time to time. For developing quality teachers for our future, teacher educators are to be strengthened in many aspects such as research, ICT, etc. Additionally, it was stated that all institutions must abide by the 2014 NCTE Regulations in order to prepare qualified and responsible teachers for the foreseeable future (Mondal, 2020).

EDUCATIONAL IMPLICATIONS

The present study has many implications for student teachers, teacher educators, Principals of teacher education institutes and as well as Experts in teacher education, and other stakeholders like SCERT.

i.   According to the study, teacher educators' professional development is facilitated by the principal's oversight of their work. Therefore, all principals of institutes for teacher education must supervise, monitor, and direct the activities of the faculty.

ii. The teacher educators have to go through different research activities and the head of the institution needs to be encouraged and supported in all situations.

iii. The results of this study may be helpful in establishing the types of activities that curriculum developers should include to assist teacher educators' professional development.

iv. The study found that teacher educators' work and thinking can be improved through professional development. The findings of this research will be helpful in understanding how interactions between teachers and other teachers, principals and teachers, and instructors and student teachers assist teacher educators' professional development.

v. The teacher educators can put the new skills they have learned through various programmes to use at different universities and other institutions for teacher education. The development of instructional methods, reflection procedures, and suggestions for important problems and difficulties that will advance their professional growth will be useful for teacher educators.

CONCLUSION

Overall speaking, the attitudes of teacher educators towards the 2-Year B.Ed. programme, regardless of gender, location, or experience, point to the urgent need to ensure that all B.Ed. institutions must adhere to the norms and standards outlined in the NCTE Regulations, 2014 for preparing professional and accountable teachers in the future. In the present study, it has been found that the teacher educators are in favour of the implementation of 2-year B.Ed. programme in Odisha.

The result clearly depicts that the teacher educators favoured the enhancement of the duration of the B.Ed. programme from 1 year to 2 years and suggests that the NCTE decision in this regard is justified. The major reason is, the present 2-Year B.Ed. programme is providing sufficient time to acquire sufficient content knowledge for the student teachers. Besides, the enhancement of working days excluding examination days is sufficient.

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A Sociolinguistic Survey of How Covid 19 Terminologies are Translated to Tonga Language of Zambia
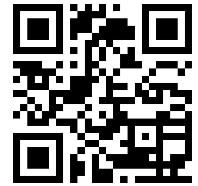
Elliot Machinyise[1], Francis Kasebula[2], Martin Chabu[3]

[1,2,3]David Livingstone College of Education Livingstone, Zambia

ABSTRACT: In Zambia, COVID- 19 and other health lifesaving information is not adequately disseminated in the indigenous languages understood by the majority citizens. In cases where this information is written in local languages, the terminologies are inexact due to wrong methods and approaches to translation. This study sought to establish the appropriate methods and approaches to translation and it has also attempted to come up with the most appropriate and correct Tonga terminologies for COVID-19. The study also recommended that African languages should be taught in medical tertiary institutions so as to equip health practitioners with African linguistic knowledge.

KEYWORDS: Communicative translation approach, Coronavirus, COVID-19, Linguistic perspective, Philological perspective, Tonga.

1. BACKGROUND

Coronavirus disease 2019 (COVID-19) is an infectious disease with symptoms that include fever, cough, fatigue, shortness of breath, and loss of smell and taste. The disease was first identified in December 2019 in Wuhan, Hubei, China, and has resulted in an ongoing life threatening pandemic. Measures recommended by WHO and other government health agencies to prevent further infection include frequent hand washing, maintaining physical distance from others (especially from those with symptoms), quarantine (especially for those with symptoms) covering coughs, and avoiding handshakes..

However, lack of modern terminology in the indigenous Zambian languages for use in domains such as health, science and technology has to some extent affected the fight against the spread of Covid-19. As the spread of the disease has spiked up altering the lives of billions of people worldwide, it has correspondingly necessitated the need to create a new vocabulary and terminologies to the general populace accommodating specialist terms from the fields of medicine, especially terminologies directly related to Covid-19. As cases of Covid19 spread to developing countries, affecting poor indigenous peoples, it is crucial to join efforts and cooperate closely to ensure the sharing of vital life-saving information and resources about COVID-19 in minority and indigenous languages. According to Madzimbamuto (2012), patients always prefer receiving vital information in their own language, but in Africa the development of such technical language has been neglected. In Zambia, technical terminologies are not formally translated and used uniformly by various institutions and stakeholders. In most cases scientific words especially medical terminologies are simply used as borrowed or loaned words as public health specialists addressing speakers of indigenous languages fail to find equivalent terminologies in indigenous languages. It is noted with concern that in the Zambian scenario, most health workers lack the terminology in their African languages for the information being delivered, mainly because such technical and medical knowledge is acquired and developed through formal education in English rather than their first languages.

Stressing the importance of teaching Africans science and technology in indigenous languages, Osborn (2010) points out that accommodating the language most familiar to people is a consideration of primary significance in an effort to use ICT and science for development. This view is very crucial as it is a known fact that education and communication are easily executed in the first language than in the second or foreign languagee.

As fears mount over the potential impact of the COVID-19 pandemic on developing countries, the African government through ministries of health and other health agencies have been scaling up efforts of communications to warn people of the dangers of COVID-19 and how to stay safe. Okonkwo (2016) points out that in emergency situation, there is need for translation and it is unreasonable to think that everyone speaks and understands English or an international language. This means that language comprehension is the centre of all communication and without it the world would remain static.

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A critical aspect of transmitting lifesaving health information in the languages that are understood by speakers of other minor languages is translation. But insisting on using jargon terms which are largely unknown outside the medical community is actually complicating and frustrating efforts of fighting the spread of COVID-19 worldwide. The challenges encountered in translation just reveals and emphasises the need for health information to be accessible to speakers of minority languages especially in developing countries. Looking at the technical terminologies used by health professionals, there is no doubt that people aren't getting enough reliable, accurate and timely information that they can understand and use to best protect themselves.

As COVID19 pandemic escalates to all parts of the world, it is crucial to join efforts and collaborate to ensure the sharing of correct life-saving information and resources about COVID-19 in minority and indigenous languages of the world. Since all the vital information about the COVID-19 pandemic is transmitted in the English language, the limited English proficient individuals are at risk of not understanding the steps they must take to protect themselves and others. In order to enhance this exercise of ensuring everyone is not left behind, there is need to translate this vital information to minority indigenous languages of the world.

Like other African countries, the issue of medium of communication in the public health sector is also a serious challenge. The current COVID- 19 pandemic, like other public health crises, introduces new terminologies to the health fraternity and the general public. As a result, this study sought to establish how some prominent COVID- 19 terminologies are translated to the Tonga language of Zambia. The study also attempted to investigate if the indigenous speakers of Tonga were availed with the correct information on COVID- 19 in Tonga language. This study, working with other Tonga language specialists has proposed expeditious translation of coronavirus-related terminologies so that important information can reach the people who need it.

2. CHITONGA LANGUAGE

Kashoki (1998) reports that Chitonga is one of the seven officially recognised languages in Zambia and represents a cluster of languages (Bantu Botatwe) spoken by about 25% of Zambians. Members of the Bantu Botatwe linguistic group Lenje, Ila, Kaonde-Ila and Sala are closely related to Chitonga though Chitonga is considered as a separate language. According to Simwinga (2006), Chitonga has the status of a regional official language spoken in Southern, Central and parts of Lusaka (rural) province. In these regions, Tonga is widely used in public discussion, on the radio and television and in various print literatures. In the domain of education it is used as language of instruction in the lower levels of primary education, and is taught as a subject up to tertiary level in few colleges of education in the country.

The challenge however with Tonga, like any other Zambian language, is that there hasn't been any effort made to develop science and ICT terminologies in this language to adapt to the fast changing lifestyles and technological trends. Example: Basic protective measures to limit the spread of COVID-19 include recommendations using new terminologies which are new to Zambian indigenous language vocabulary. It is not uncommon to hear health professionals failing to translate COVID-19 terms to Tonga as they explain health issues in Tonga during local language forum interviews. However, local journalists especially those from the national broadcaster, Tonga section of ZNBC are doing a good job to translate most of the key COVID-19 words to Tonga.

3. THEORETICAL Framework

This study falls under the umbrella of sociolinguistics and language use, translation to be specific. There are six main approaches within contemporary translation theory: the sociolinguistic approach, the communicative approach, the hermeneutic approach, the linguistic approach, the literary approach and the Philological perspective/ Sociolinguistic approach. For the purpose of this study, the Philological perspective/ Sociolinguistic approach, Communicative translation perspective and the Linguistic approach will be discussed as they underpin this study.

3.1. Philological perspective or Sociolinguistic Approach

The Philological or Sociolinguistic approach is based on the translation act which links language to social factors of society by analysing the weaknesses and strengths of the original text. Nida (1991) argues that the meaning of verbal symbols on any level depends on the culture of the language of the community. Language is a part of culture, and in fact it is the most complex set of habits that any culture exhibits.

According to the Sociolinguistic approach, a translator is naturally the product of his or her society. This means therefore that our own sociocultural background is present in everything we translate and the moral norms of society prevail over contents of the original text.

3.2. Communicative translation perspective

According to Ali, W, I (2018) Communicative translation perspective attempts to render the exact contextual meaning of the original text in such a way that both content and language are readily acceptable. Nida, E (2006) points out that the process of translation is not simply the replacement of one word or expression by another, but places the message before the language used.

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"Communicative translation attempts to produce on its readers an effect as close as possible to that obtained on the readers of the original. It is the process of conveying a message from one language into another while respecting the linguistic features of the target language (TL) at different levels, morphological, lexical and grammatical" (Newmark, 2006: 39). He claims that the message in communicative translation is the most significant factor. It stresses the power and influence of the message more than the content of the message. In communicative translation, the translator is available, somehow, when necessary, and has the right to remove obscurities or repetition and specify general terms.

3.3. Linguistic perspective

Linguistics plays an important role in the translation of a document from one language to another. Translating information includes more than just changing each word from the original language to another. Ulanska (2014) stresses the fact that since linguistics is essentially the study of human language, it takes a significant place in the process of translation. Linguistic perspective therefore breaks down the target language into several sub-categories: *Grammar:* the study of language structure and the system of rules it uses. It includes several fields as follows, *Morphology, Syntax, Phonology and Semantics*. According to Ulanska (2014) translation is a language act in which a text from one language is substituted with an equivalent text from another, by making that substitution in accordance with the regulations of both language systems. This, according to the Linguistic approach to translation, means that the translator should consider all the grammatical elements of the source language as he or she attempts to translate the text to the target language.

4.   COVID-19 SITUATION IN ZAMBIA

The recent spike in COVID- 19 cases and subsequent rise in COVID-19 related deaths in Zambia has been a reason enough to see the Ministry of Health scale-up its effort in mitigating the pandemic. Although sensitisation work in communities is growing, it is not clear whether members of the communities, especially those in rural areas are getting this lifesaving information in the language they understand.

This study revealed that lack of information in the language that is familiar to the vulnerable and underprivileged rural residents may soon be the culmination of the spike in community infection if no intervention is put in place. On the other hand, continuing attitude of 'business as usual' in many high density areas of the cities has seen many people going about their normal business without following health preventive measures. People still market in crowded places; travel in congested minibuses without wearing face masks either through negligence or lack of knowledge.

The challenge faced by health agencies in the disseminating of COVID-19 information to the majority of Zambians is the ability to translate COVID-19 information into local languages. There is need of writing important health messages in the seven local official languages so that the majority of the people can access and understand the technical language used.

5.   TRANSLATING COVID-19 TERMINOLOGIES TO TONGA.

In Zambia there are a number of organisations and agencies that use Tonga language to disseminate COVID-19 information. These organisations include the Zambian National Broadcasting Cooperation (ZNBC), local community radio stations in Southern Province, district public health centres in Southern and Central provinces and some faith organisations.

The challenge faced by these organisations in disseminating COVID-19 information is lack of language experts in Tonga. This study revealed that there was no consistence and uniformity in coming up with the equivalent COVID- 19 words and terms in Tonga by these organisations. It was noted that each organisation had different terminologies for the same words.

6. 1 FORMATION OF TONGA WORDS FROM ENGLISH COVID-19 TERMS

This study in consultation with Tonga language experts from the Tonga section of ZNBC, Curriculum development Centre, Teacher education colleges and teachers of Tonga, developed the following Tonga terms used in COVID- 19.

Method of formation	Explanation	Example
Borrowing	A term is borrowed with its meaning and Zambianised	• **Coronavirus**- Koronavairasi • **COVID-19**- Kovidi 19
Loan translation	Form and meaning of the word in the source language is kept but the word is translated using words from the target language	• **New normal**- Buponi bwenzu • **Self quarantine**-Kulizandula omwini • **Lockdown**- Kujalilwa

| Contextual translation | What is translated is the meaning of the message in the source language rather than the words used | **Contact tracing**- Kulangaula bantu bakaswangana amulwazi mazuba masyonto ayinda **Mass screenining and testing**- Kufunyungulwa mubunji **Hand sanitisers**- Musamu wakunana mumanza ujaya tuzunda. **Face mask**- Kasabwe kakulivumba kumulomo akumpemo **Social distance**- Mwaako |

7. DISCUSSION

for Indigenous Language Computing, IDRC: Cape Town

Ulanska, T (2014) "The Role of Linguistic Factor In Translation" Procedia - Social and Behavioral Sciences 191 (2015) 2585 – 2587

Many terms used in the medical fraternity are not easy to translate to African language; consequently most of them are borrowed and transformed morphologically to suit the Zambian language orthography and phonology. As noted by Okonkwo (2016), technical terms should be translated in the language of the less educated individuals so that the message communicated is actualised. In the same vein, Madzimbamuto (2012) points out that this problem of failure to use local familiar languages to disseminate lifesaving information is complicated by the fact that most of the science and medical experts have no linguistic knowhow. "Terminology development in science and technology is more difficult because many African scientists may have no formal training in their mother tongue or another African language and language specialists usually have little background in sciences."

Apart from using the borrowing method in translation, public health workers use the loan method which is based on the linguistic perspective. This is the most common translation method where translators put much stress and concentration on the lexical and grammatical elements of the language used. This method is not reliable as some terms may be translated out of contextual meaning of their original source words. Osborn (2010) observes that it is of primary importance to accommodate a familiar language of the community so as to impart modern technology to the less privileged. This is the most fundamental reason why this study employed the Communicative translation approach to come up with the appropriate Tonga terms for COVID- 19. It cannot be gainsaid that Communicative translation perspective is the most appropriate method for translating as it is not easy to find equivalent terminologies in target Zambian language. Since translation is a mutual process of conveying meaning from one language to another, the most effective way is to translate the context of the original text rather than translating the elements of the source language.

CONCLUSION

Based on the findings, the study revealed that there is no much effort being put in place to ensure that important information about COVID-19 is disseminated in indigenous Zambian languages so as to reach out to the rural communities of the country. The researcher, working with Tonga language specialists, managed to translate the most pertinent COVID-19 terminologies from English to Tonga using the Communicative translation approach which is the most effective and appropriate approach to translation. It is seriously proposed that Zambian languages should be taught to health institution students to enable them communicate effectively to the majority of Zambians.

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Approaches to the Use of the Game in the Development of Mathematical Representations

Kochkarova Shakhnoza Satvaldievna

Lecturer Andijan State University, Department of Methods of Preschool Education (Uzbekistan)

ANNOTATION: Modern requirements for preschool education determine the need to use new organizational forms in which elements of cognitive, search, game and educational interaction would be integrated.

The purpose of this Law is to regulate relations in the field of preschool education and upbringing. The following basic concepts are applied in this Law: state preschool educational organization — an organization funded and managed by the state and providing preschool educational and educational services in accordance with the state standard of preschool education and upbringing.

It is necessary to interest children in mathematical material, to activate their logical mental activity, to entertain and captivate children, to deepen and expand their mathematical representations, to consolidate acquired knowledge and skills, to exercise children in the application of skills and knowledge in other activities.

KEYWORDS: Mathematics, representation, formation, play, development, preschool education and upbringing.

INTRODUCTION

Modern requirements for preschool education determine the need to use new organizational forms in which elements of cognitive, search, game and educational interaction would be integrated.

The purpose of this Law is to regulate relations in the field of preschool education and upbringing. Preschool age — the age of children from birth to seven years, until the moment of providing him with education in organizations of general secondary education;

preschool education and upbringing — a type of lifelong education aimed at educating and raising children, their intellectual, spiritual, moral, ethical, aesthetic and physical development, as well as preparing children for general secondary education;

the state standard of preschool education and upbringing — a set of mandatory requirements for the volume, content and quality of the educational process, the construction and equipment of a preschool educational organization, as well as the organization of healthy nutrition and safety of preschool children;

state educational program of preschool education and upbringing — a document that determines the volume and content of basic knowledge, skills and abilities to be acquired by the child, as well as characterizing the specifics of the content of education and upbringing, especially the organization of the educational process;

Preschool educational organization — a state and non-governmental organization that provides educational and educational services in the field of preschool education and upbringing;

METHODOLOGY

The creation of conditions that ensure the development of children, the realization of the potential of children is one of the priority social tasks of society and the state. A.S. Makarenko said that the child's play activity is the "zero cycle" of his future personality. He wrote: "Like a child at play, so in many ways he will be at work when he grows up. Therefore, the education of the future figure takes place, first of all, in the game. And the whole history of an individual as a figure and an employee can be represented in the development of the game and in its gradual transition into work ..." [20, p. 45]. A person's personality is formed in activity, the more diverse it is, the more versatile a person is. Play, learning, communication, work are the main requirements for knowledge, you should have a certain framework. The most important thing is to instill in the child an interest in knowledge. To this end, math

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classes should be held in a fun way.

The game is a child's way to know himself, his abilities, possibilities, his limits. Only in play activities does a child show so much determination, perseverance and tirelessness. Play activity strengthens the child's useful habits and skills. Mathematics has a unique, developing effect. A.A. Stolyar writes: "It forms the techniques of mental activity and the qualities of the mind. Its study contributes to the development of memory, speech, imagination, emotions; forms perseverance, patience, creative potential of the individual" [22, p. 112].

The peculiarity of the "mathematician" is that he plans his activities in the best way, is able to predict the situation, expresses his thoughts more accurately and consistently, and is able to justify his position. Increasing the mental load in classes on the formation of elementary mathematical representations makes teachers think about how to keep children interested in the material being mastered, to keep active throughout the whole lesson.

The maximum effect in the study of mathematics can be achieved by using didactic games, entertainment, entertaining exercises and tasks in the classroom. At the same time, the use of fascinating and interesting mathematical material is determined taking into account the age characteristics of children, the tasks of their upbringing and comprehensive development.

It is necessary to interest children in mathematical material, to activate their logical mental activity, to entertain and captivate children, to deepen and expand their mathematical representations, to consolidate acquired knowledge and skills, to exercise children in the application of skills and knowledge in other activities.

Playing, children acquire new knowledge, skills and abilities. Games develop perception, attention, memory, speech, thinking, develop creative abilities of children, they focus on the mental development of preschool children in general.

Organizing the management of the game, the life in the game of children, the teacher influences all aspects of the development of the child's personality: consciousness, feelings, behavior and will in general.

The game is important in the life of preschool children: it is work for them, play for children is learning, play is a serious form of their upbringing. With the help of the game, children learn about the world around them.

The use of didactic games and game exercises stimulates communication between children, between children and adults, because during the games these relationships begin to have a more emotional, more relaxed character.

An effective tool for the development of mathematical representations in children is the use of various types of didactic games. These games teach children to understand a number of complex mathematical concepts, form an idea of the ratio of numbers and numbers, numbers and numbers, develop orientation in the directions of space and time, teach them to draw conclusions.

For a child, interest in a didactic game is much more than an uninteresting task performed, the game attracts his interest, thereby becoming an impetus for the development of thinking, memory, attention, etc.

Games that promote the development of perception, memory, attention, thinking, and the development of creative abilities are generally aimed at the mental development of preschool children.

Let's consider the features of didactic games.

Didactic games are one of the varieties of games with rules that are aimed at solving certain tasks in teaching children [13].

RESULTS

They are widely used as a means of education, upbringing and development. The difference between a didactic game and an ordinary one is that all children necessarily participate in it. Its content, rules, and methodology are developed in such a way that for some preschool children who have absolutely no interest in mathematics, these games can become a starting point in the emergence of interest in the science of mathematics.

The creation of a game form of classes is carried out with the help of game situations and techniques that act for children as a means of stimulating and encouraging them to mathematical activity.

A didactic game is characterized by the presence of a certain structure that defines the game both as a game activity and as a form of learning. It can be argued that the game is a rather multifaceted concept. In practice, there are various types of games that can be used in educational activities.

According to the forms of the game, it can be divided into individual, group, pair. According to educational tasks – for games aimed at learning new material, obtaining new knowledge, games that form certain skills and abilities, and it is possible to distinguish a large group of games that have the character of knowledge control and generalizing repetition. By types, role-playing, cognitive, complex, business games can be distinguished.

The use of didactic play in educational activities is not an end in itself, it is a means of teaching and upbringing. A didactic game is not fun, and it is not worth considering it as an activity that gives pleasure for the sake of pleasure. The concept of "didactic

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game" emphasizes its pedagogical orientation, this concept reflects the diversity of its application. In accordance with this, it can be argued that the use of didactic games in teaching mathematics is an important tool that makes the educational activities of preschoolers more optimized, and didactic games themselves are a means of developing mathematical concepts. The most significant is the consideration of the following issues:

1. The importance of didactic games and game situations in the system of other types of activities in the classes of FEMP.

2. The expedient use of didactic games and exercises at different stages of the study of mathematical material of various nature.

3. Development of methodological recommendations on the use of didactic games in the classroom, taking into account the didactic goals of the lesson and the level of mathematical preparedness of children.

4. Requirements for the content of play activities in the classroom in the light of the ideas of developmental and personality-oriented learning [14].

The value of didactic games is that in the process of conducting these games, children largely acquire new knowledge on their own, while actively helping in this.

The use of didactic games requires tracking the interest of preschool children in the game throughout the lesson. If there is no interest or fades, then it is not recommended to force the game on children, because in this case the game will lose its developmental, didactic, meaning; and the most valuable thing will fall out of the game activity - its emotionality.

If there is a loss of interest in the game, then the teacher needs to take the necessary actions in a timely manner that will lead to a change in the situation. It can be emotional speech, support for laggards, friendly attitude to children. If there is an interest in the game, then children are engaged with great pleasure, which, of course, has a positive effect on the assimilation of the necessary mathematical knowledge by children.

Expressiveness in the game is also important.. If the teacher speaks to the children indifferently, dryly and monotonously, then the children will treat the lessons just as indifferently, they will start to get distracted during the lesson. In these cases, it can be quite difficult to maintain the interest of children, to keep their desire to watch, listen, participate in the game. When this fails at all, then the children will not benefit from the game, it will only cause them fatigue. At the same time, a negative attitude towards classes will also arise.

The teacher himself must be involved in the game to some extent, otherwise his leadership and influence will not be very natural. The ability to quickly get involved in the game is an indicator of pedagogical skill. A game that is interesting to children, which gives them pleasure and satisfaction, has a positive impact on the conduct of subsequent games. Ways and means that increase children's emotionality for the game are not an end in themselves, but as a path that leads to the solution of didactic tasks.

The mathematical component in the content of the game is always brought to the fore. Only in this case, the game will fulfill its role in its purpose, namely, to contribute to the mathematical development of children and the education of interest in mathematics.

When organizing didactic games with mathematical content , the teacher should consider the following issues of the methodology of the game:

1. The goal of the game. What knowledge, skills and abilities in the field of mathematical development will preschool children acquire during the game?.

What point in the game should you pay close attention to? What other educational goals does the process of conducting the game pursue?

2. The number of children playing. Each game requires a certain number of players or a maximum number of them. This should be taken into account when organizing the game.

3. What didactic manuals and materials will be required for the game?

4. How to introduce the rules of the game to children with the least amount of time?

5. For what period of time should the game be designed?.

Will the game be exciting, entertaining for children? Will the children want to return to the game again?

6. How to organize the participation of all children in the game?

7. How to organize monitoring of children to

determine whether everyone is included in the work?

8. What changes should be made to the game in order to

increase the activity and interest of children?

9. What conclusions should be communicated to children in conclusion, after

the game (the best moments in the game, shortcomings, the results of mastering mathematical knowledge, give an assessment to individual participants of the game, make comments about violations of discipline, etc.)? [16].

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The question of the expediency of using didactic games and game situations at various stages of the lesson is relevant. In particular, when conducting classes for the assimilation of new knowledge, the possibilities of didactic play are more inferior to traditional forms of learning. In accordance with this, it is recommended to use game forms of classes when checking learning outcomes, forming skills, developing skills, etc. Children should develop a positive attitude to education during the game.

Among the forms of conducting: games, it is possible to distinguish games-competitions for the best speed, quality, quantity; games-traveling through stations with alternating game situations, imitation of events; games - dramatizations, dramatizations aimed at finding solutions to problems; games - discoveries of research [10]. The main structural components of a didactic game include: rules, game design, game actions, cognitive content or didactic tasks, materials and equipment, game results.

Consider these structural components:

1) The game idea is expressed mainly in the name of the game. It is embedded in the didactic task that needs to be solved in the educational process. The game plan is often implemented in the form of a question, which, as it were, projects the course of the game, or can be presented in the form of a riddle. In any case, the game plan sets the cognitive character of the game, it imposes certain knowledge requirements on the participants of the game.

2) In each didactic game there are rules that determine the order of actions and behavior of children during the game, contribute to the creation of a certain working environment in the classroom. Therefore, the rules in didactic games should be developed taking into account the purpose of the lesson and the individual capabilities of the pupils who study in the game. By doing this, the teacher creates conditions for the manifestation of mental activity, perseverance, independence of children, for the possibility of a sense of success and satisfaction for each child. In addition, the rules make it possible to cultivate the ability to obey the requirements of the children's collective, to control the child's behavior. 3) Game actions are an important aspect of didactic games, they are regulated by the rules of the game, contribute to the emergence of cognitive activity of children, provide children with the opportunity to show their abilities, apply existing skills, knowledge, skills to achieve the goal of the game. Quite often, before playing actions, older preschool children are given an oral solution to a didactic task.

4) The basis of the didactic game is its cognitive content, which consists in mastering the knowledge and skills that are used in solving the educational problem that the game has set.

5) The equipment and materials of the didactic game largely includes the equipment of the entire lesson as a whole. This may be the availability of technical training tools. Also, this includes a variety of visual aids: models, tables, didactic material, flags that are awarded to children or winning teams.

6) A didactic game always has a certain result, which gives completeness to the game and is its finale. The result appears, first of all, in the form of solving the educational task set by the game and gives the pupils mental and moral satisfaction. For the teacher, the result of the game is an indicator of the level of achievement of the assimilation of knowledge by children or in their application [11].

Dzhumaev M.I identifies the following structural components in the didactic game:

1) didactic task;

2) game actions;

3) rules of the game;

4) result [12].

The didactic task is determined by the purpose of teaching and educational

influence. It is formed by the educator and reflects his teaching activity. For example, in some didactic games, counting skills are fixed or practiced in accordance with program tasks.

The game task is always implemented by children. A didactic task in a didactic game is carried out through a game task. It sets the game actions, becomes a task for the child himself.

Game actions form the basis of the game. The more diverse the game actions, the more interesting the game itself is for children and the more successfully the game and cognitive tasks are solved. With the help of didactic games, knowledge is provided not in a ready-made form, but through the process of self-discovery by a child.

The teacher is guided by the experience of creative activity, which is acquired by the child and gives him the right to his own choice of action. Different games differ in game actions both in their orientation and in relation to the players. These can be, for example, guessing riddles, role-playing actions, spatial transformations, etc. They are always connected with the game plan and proceed from it. Game actions are means of implementing a game plan, and may include actions that are aimed at performing a didactic task.

Rules of the game. The content and orientation of the rules are determined by general tasks aimed at the formation of the child's personality, cognitive content, game actions and game tasks.

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Summing up – the result is summed up as soon as the game ends. This can be counting as scoring points; identifying children who have completed a better game task; determining the winning team, etc. At the same time, it is necessary to note the achievements of each of the children, to emphasize the successes of children who are lagging behind.

Didactic games bring joy to children – the joy of participating in joint activities with peers, the joy of victory, and the pleasure they received from doing mental work, develop an interest in mathematical activity, develop a desire to do it, and this is the key to further successful education in elementary school. Success in games inspires children to new victories.

Thus, as V.A. Kozlova notes, didactic play is a multifaceted, complex pedagogical phenomenon. It manifests itself as a game method of teaching children, a form of learning, independent play activity, a means of comprehensive formation of a child's personality, and is also a means of forming cognitive activity of older preschool children and mathematical representations.

The use of didactic games makes the pedagogical process more effective, in addition, they contribute to the development of thinking and memory in children, influencing the mental development of the child. Teaching and developing children in the process of play, it is necessary to strive to ensure that the joy of games turns into the joy of learning.

CONCLUSION

Preschool age is characterized by the fact that it forms the foundations of knowledge that a child needs at school. Mathematics, being a rather complex science, causes significant difficulties for children during school education. Many children may not have a mathematical mindset, in this case, preparing them for school, it is necessary to introduce children to the basics of counting in preparation for it.

Teachers know that mathematics is a powerful factor in the mental development of a child, the formation of his creative and cognitive abilities. The most important thing in the period of preparing a child for school is to instill in him an interest in knowledge. To do this, the educational and daily activities of children in the preparatory group for school should take place in a playful and entertaining way. Thanks to the game activity, you can concentrate attention and attract interest even from unassembled children. At first, they are only interested in game actions, and then they begin to be interested in what the game teaches. Gradually, children become interested in the subject of study itself.

Based on the results of the study , the following conclusions can be drawn:

1. The mathematical development of children at preschool age is manifested in qualitative changes in the forms of cognitive activity that occur as a result of the formation of elementary mathematical representations and logical operations in them.

2. Teaching elementary mathematics to preschool children should be given a special place in the educational process. This is due to a number of quite good reasons: the beginning of some children's education at school from the age of six, with a large amount of information that the child receives, with increased attention to information and communication technologies in educational organizations, with the intensification of the learning process, with the desire of parents to teach the child to know numbers, solve examples and tasks as early as possible, perform account operations.

3. Analyzing educational programs for the formation of elementary mathematical concepts, it can be noted that older preschool children master ways to establish and determine various types of connections between mathematical objects, relationships. For example, the establishment of correspondence between the elements of sets (the application of overlay techniques, matching elements of sets in the form of "one to one", the use of application techniques in order to determine the relations of quantities). By the end of the senior preschool age, children understand that the most accurate way to determine quantitative relations is to measure the magnitude and count of objects. Skills, counting and measuring skills become more meaningful and durable in children.

4. For the development of elementary mathematical concepts in older preschool children, it is advisable to use a variety of didactic games. These games give the child the opportunity to understand a number of complex mathematical concepts, form their ideas about how numbers and numbers, numbers and numbers relate, develop spatial and temporal representations, formulate conclusions.

5. Didactic games use a wide range of visual materials (sticks, geometric shapes, puzzles, constructors of various types, etc. – all this contributes to the fact that educational activities in mathematics take place in an accessible, entertaining, fun form. The use of logic games, mathematical puzzle games (for example, the Tangram game) contribute to the development of cognitive interest in children, the ability to carry out creative search, desire and ability to learn. A game situation of a problematic type, which is characteristic of almost any task of an entertaining kind, arouses cognitive interest in children.

Entertaining tasks develop children's interest in logic and mathematics, the evidence of reasoning, focusing on the problem and finding the right solutions for it, the manifestation of mental stress.

6. The conducted experimental search work consisted of three stages: ascertaining, forming, control.

At the ascertaining stage of the study, methods were selected and primary diagnostics of the level of formation of

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mathematical representations was carried out. At the formative stage of the study, didactic games aimed at forming mathematical representations were developed and conducted

At the control stage of the study, repeated diagnostics of the level of formation of mathematical representations was carried out, the analysis of the results obtained was carried out.

Thus, the didactic game is a means of developing mathematical concepts in preschoolers in the cognitive and independent activities of children.

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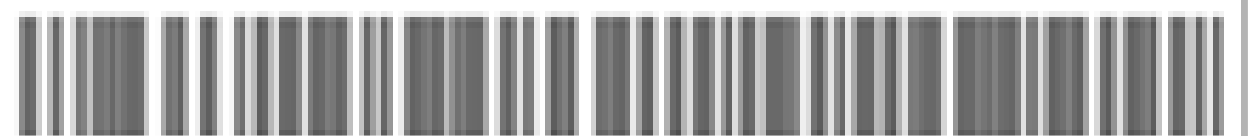1) WE PROVIDE FULL OPEN ACCESS.
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