ICT Skills, E-Supervision Scheme of School Heads, And Teacher Development in Distance Learning Among Selected Private Schools in Cainta

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ABSTRACT: The study aimed at examining the interplay the relationship among the ICT skills, e-supervision scheme of school heads, and teacher development in distance learning which longed to be a valuable undertaking in the time of pandemic where alternative delivery mode of education is implemented; skills of school heads in Information and Communication Technology (ICT) have been challenged and brought impact to their administrative and academic role. Descriptive-correlational design was employed. The study revealed that school heads had very high ICT skills level in terms of utilization and competence, had very high e-supervision scheme level in terms of video conferencing, instant messaging, and office suite, and very high level of teacher development in distance learning. Correlation indicated that the higher the ICT skills level of school heads' in terms of competence and utilization, the better is their e-supervision scheme and teacher development in distance learning. In essence, these findings demonstrate importance to maintain the high-level ICT skills, e-supervision scheme of school heads, and teacher development in distance learning, Similarly, data served as basis for a training program to make the school heads' skills level higher on the indicators that ranked last.

KEYWORDS: ICT Skills, E-supervision, Teacher Development, Distance Learning, Descriptive-correlational study, Philippines.

INTRODUCTION

UNICEF 2019 Annual Report: Information and Communication Technology Division stated that over the past two decades, the advent of digital information and communication technologies (ICTs) has expanded and spread rapidly [1]. Notably, the integration of ICT into education has become a process whose implications go far beyond the technological tools nurturing the educational environment [2]. Specifically, ICT integration in basic education classrooms in the Philippines has been progressively embraced and has brought impacts on the technical core, administrative tasks, and innovative processes in schools. Without a doubt, ICT has become essential in teaching and learning in classrooms, in educational management, and in improving the functional effectiveness of school systems [3]. The application of ICT in school administration is indeed a necessity and worthwhile venture especially in this era of globalization.

From the above-mentioned premises, it depicts that ICT skills are an indispensable skill of a school head to facilitate an e-supervision scheme in the implementation of curriculum during distance learning. ICT offers unprecedented opportunities to the education systems with its capacity to integrate, enhance and interact with each other over a wide geographic distance in a meaningful way to achieve the learning objectives [4]. The studies made by Eremie and Agi [5], and Ibrahim, Adu-Gyamfi, and Kasim [6] identified the ICT skills needed by principals and application tools relevant to school administration which enhance efficient management of educational resources and gives direct effect on improving the effectiveness of administrative functions of an institution. Hence, leading through this uncertain time requires leadership that is flexible and can adapt to changing circumstances [7]. The transformation of the practice of supervision in schools should be implemented so as to produce a positive impact on teachers [8]. Meanwhile, in the study of Lapid [9], and Iroegbu and Eyo [10] explained the objective of supervision in an online environment which serves as a mechanism to evaluate and validate teachers' performance towards the achievement of school goals, aims and objectives. However, the principals experienced several obstacles in conducting online-based academic supervision due to the absence of standard

ICT Skills, E-Supervision Scheme of School Heads, And Teacher Development in Distance Learning Among Selected Private Schools in Cainta

applications provided by the government to facilitate the process of supervision [11]. Also, the extent of their application is very slow as school administrators are incompetent in handling ICT facilities for the effective administration of schools [12]. Further, the COVID-19 pandemic brought about an alternative delivery mode of education utilizing ICT, challenging school heads to a greater extent for their administrative and supervisory role.

Teacher development on the other hand creates readiness and effective delivery of distance learning. Wilichowski and Cobo explained the importance of developing teachers' pedagogical skills which is needed to critically assess and decide when and how to incorporate digital tools, and realistically define their impact to support or enhance learning [13]. Teachers need specific professional development opportunities in order to increase their ability to use ICT for formative learning assessments, individualized instruction, accessing online resources, and fostering student interaction and collaboration [14]. Remarkably, in the study of Kim and Lee [15], they explained that principals can have more impact on teacher development by formally arranging opportunities and resources for teachers' collaborative learning. Principals need to devise professional improvement programs to help teachers implement digital teaching practices [16]. It is therefore recommended to provide more training in the context of technology during distance education [17]. Consequently, in the study of Gustafson & Haque [18] stated that professional development could actually be easier in a virtual school however professional development on best practices in online teaching was actually very limited. Thus, the British Council [19] found out that teacher educators and teachers feel they need more training and support in how to teach online. This study aimed to determine the level and relationship of the ICT skill, e-supervision scheme of school heads, and teacher development in distance learning. The findings of the study may serve as guide in the enhancement of school heads' ICT skills, online supervision, and implementation of teacher development in distance learning.

METHODS

The study used descriptive-correlational research design since it determined the level of ICT skills, level of the e-supervision scheme of school heads, and level of teacher development in distance learning among selected private schools in Cainta of Academic Year 2021-2022. Likewise, it determined the relationship that exist among variables and their correlations. Data used in the investigation came from 174 teachers of five private schools in Cainta of Academic Year 2021-2022. Out of 174 teachers, Raosoft Calculator was used arriving at 120 sample respondents who were given research instruments through Google Form. All the respondents were able to accomplish and return the completed survey questionnaire, representing 100 percent retrieval rate.

The researcher used a survey questionnaire with three parts. Part 1 dealt with the level of ICT skill of the school head. Part 2 pertained to the level of the e-supervision scheme of the school head. Part 3 covered the level of teacher development in distance learning. All parts of the questionnaire were measured using the four-point Likert Type Scale: Strongly Agree (3.25-4.00), Agree (2.50-3.24), Disagree (1.75-2.49), Strongly Disagree (1.00-1.74). Notably, the researcher personally wrote a letter to the Schools Division Superintendent for her approval to conduct the study. Afterwards, the researcher sought permission to the school heads among selected private schools in Cainta for the distribution of research instrument through Google Form. After gaining permission, link to the survey questionnaire were distributed to respondents through their respective school head. To make sure that data gathered were precisely treated; weighted mean was used to describe the school heads' ICT skills in terms of competence and utilization, e-supervision scheme of school heads in terms of instant messaging, office suite and videoconferencing, and teacher development in distance learning. Pearson r Moment Correlation Coefficient was utilized to determine the significant relationship between the school heads' ICT skills and e-supervision scheme, ICT skills of school heads and teacher development, and e-supervision scheme of school heads and teacher development.

RESULTS AND DISCUSSION

Discussion of the ICT skills, e-supervision scheme of school heads, and teacher development in distance learning is presented in the succeeding tables and textual presentation.

It is depicted in Table 1 that school heads got a very high overall weighted mean of 3.46 as the respondents strongly agreed with the indicators of their ICT skills in terms of competence. It implies that they are competent in providing an ICT driven educational environment and learning communities. This finding is aligned with the statement of Leong, Chua, & Sathiamoorthy [20] that principals stay abreast of emerging trends regarding effective use of technology; model and promote effective communication and collaboration among school communities using ICT; and encourage evaluation of new technologies potential to improve student learning. It depicts

ICT Skills, E-Supervision Scheme of School Heads, And Teacher Development in Distance Learning Among Selected Private Schools in Cainta

that school heads competence as postulated by Griffin, McGraw, & Care (cited in Al-Khateeb) [21] involves (digital) skills which exceed searching for information online, and includes more demanding services and advanced expertise such as problem-solving, sharing, and collaborating with peers. However, it debunks Abraham et.al [22] observation that the principal's knowledge of ICT is basic with the goal that systems can be set up to make organizational procedures progressively effective, including the work of faculty to oversee and direct the ICT foundation.

Table 1. ICT Skills Level of School Heads in Terms of Competence

Indicators	Weighted Mean	Categorical Response	Verbal Interpretation
1. demonstrates the use of technological tools, online applications, or software	3.54	Strongly Agree	Very High
2. solves technological issues encountered by teachers	3.37	Strongly Agree	Very High
3. implements technology-infused organizational procedures	3.48	Strongly Agree	Very High
4. evaluates teacher competence in an online platform	3.47	Strongly Agree	Very High
5. provides technology learner-centered environment to meet the diverse need of learners	3.51	Strongly Agree	Very High
6. facilitates learning sessions to update teachers' digital skills	3.39	Strongly Agree	Very High
Overall Weighted Mean	**3.46**		**Very High**

From the data shown in Table 2, school heads got a very high overall weighted mean of 3.70 as the respondents strongly agreed with the indicators of their ICT skills in terms of utilization. This suggests that they utilize information and communication technologies in their administrative and supervisory functions. Likewise, it confirms that principals utilize information technology to acquire information to analyze existing situations, identify problems in school, facilitate communication between and among stakeholders, evaluate the desirability and feasibility of policy options, and access online schools' historical records to evaluate current performance [23]. It also conforms with the study of Abraham et.al [22] that principals had high proficiency in the usage of the following ICT materials; internet for accessing the information on the computer, email to communicate with colleagues, family, and friends, computer for performing assignments, computer for keeping records/data, computer for making a presentation, computer for teaching, browse on the internet using different websites, projector for doing presentations, Microsoft word, excel, and PowerPoint for document preparation. Moreover, the data supports the study of Barrido and Abadiano [24] that academic heads have very high utilization of ICT application tools because as academic heads, they encouraged the use of PowerPoint during instruction, applied PowerPoint presentation in giving instruction, and in the conduct of in-house training, applied ICT applications to prepare the school, teacher and staff meetings, announcements and reports, and being an academic head they have the basic skills of using ICT in school daily administrative and management job.

Table 2. ICT Skills Level of School Heads in Terms Utilization

Indicators	Weighted Mean	Categorical Response	Verbal Interpretation
1. communicates or sends feedback through several online communication tools such as e-mail, messenger, etc.	3.67	Strongly Agree	Very High
2. disseminates information through	3.72	Strongly Agree	Very High

several online communication tools such as e-mail, messenger, Viber, etc.			
3. collaborates to create academic plans using office suite or productivity applications like online spreadsheets, Google Docs, Slides, etc.	3.66	Strongly Agree	Very High
4. conducts meetings, orientations, and workshops via an online platform like Zoom, Google Meet, etc. with the use of advanced features of the communication tools used to enhance the presentation	3.74	Strongly Agree	Very High
5. supervises teaching-learning processes via online platforms such as Zoom, Google Meet, etc.	3.67	Strongly Agree	Very High
6. shares documents and/or teaching materials using cloud-based storage solutions like Google Drive	3.68	Strongly Agree	Very High
7. uses cloud-based storage solutions like Google Drive in collecting academic reports and learning materials i.e. class records, learners' profiles, learning plans, learning videos, etc.	3.74	Strongly Agree	Very High
Overall Weighted Mean	**3.70**		**Very High**

Table 3. Summary Table of School Heads' ICT Skills

Indicators	Weighted Mean	Categorical Response	Verbal Interpretation
1. Competence	3.46	Strongly Agree	Very High
2. Utilization	3.70	Strongly Agree	Very High
Overall Weighted Mean	**3.58**		**Very High**

The composite table presented in Table 3 reflects that the school heads have a very high level of ICT skills (mean = 3.58). It implies that school heads are abreast in the use of different ICT tools and applications. The finding is in conformity with Hernandez [2] statement that the integration of ICT into education has become a process whose implications go far beyond the technological tools nurturing the educational environment. It strengthened the idea postulated by Tyagi et. al [25] that technical competence mainly encompasses handling hardware and software, and application competence include the capability to handle and make use of ICT for specific purposes, personal and professional applications. The finding is also related to the study of Barrido & Abadiano [26] which stated that academic heads have very high utilization of ICT application tools during instruction, in giving instruction, and in the conduct of in-house training, applied ICT applications to prepare the school, teacher and staff meetings, announcements and reports.

Table 4. School Heads' E-Supervision Scheme

Indicators	Weighted Mean	Categorical Response	Verbal Interpretation
Instant Messaging 1. lesson plan review	3.30	Strongly Agree	Very High

2. assessment of online instructional materials	3.46	Strongly Agree	Very High
3. virtual classroom observation and monitoring	3.54	Strongly Agree	Very High
4. monitoring of learners' needs, progress, and achievements	3.53	Strongly Agree	Very High
5. feedbacking, coaching, and/or mentoring	3.42	Strongly Agree	Very High
Average	**3.44**		**Very High**
Office Suite 1. lesson plan review	3.34	Strongly Agree	Very High
2. assessment of online instructional materials	3.48	Strongly Agree	Very High
3. virtual classroom observation and monitoring	3.50	Strongly Agree	Very High
4. monitoring of learners' needs, progress, and achievements	3.45	Strongly Agree	Very High
5. feedbacking, coaching, and/or mentoring	3.38	Strongly Agree	Very High
Average	**3.43**		**Very High**
Video Conferencing 1. lesson plan review	3.38	Strongly Agree	Very High
2. assessment of online instructional materials	3.47	Strongly Agree	Very High
3. virtual classroom observation and monitoring	3.58	Strongly Agree	Very High
4. monitoring of learners' needs, progress, and achievements	3.53	Strongly Agree	Very High
5. feedbacking, coaching, and/or mentoring	3.51	Strongly Agree	Very High
Average	**3.50**		**Very High**
Overall Weighted Mean	**3.46**		**Very High**

It can be gleaned from table 4 that school heads got a very high overall weighted mean of 3.46 as the respondents strongly agreed with the indicators of the school heads e-supervision scheme. Specifically, it showed that the respondents strongly agreed that the school heads have e-supervision scheme in terms of instant messaging (mean = 3.44), office suite (mean = 3.43), and video conferencing (mean = 3.50). This means that school heads are capable of using different electronic modes of supervision for curriculum implementation. Specifically, this study agrees with Cha, Kim, Park, Yi, & Lee [27] findings that instant messaging is primarily used for relationship maintenance purposes, such as planning, coordinating, sharing, discussing, and reflecting on everyday activities. Also, it coincides with the suggestion of Mutter & Marescaux (as cited in Byrnes, Kiely, Dunne, McDermott, Coffey) [28] that video conferencing technology may be applied to a range of academic activities, including teaching sessions, large group webinars, examinations, research meetings, and academic conferences. They noted that supervisors would engage in conversations with the teachers in the videos, not just disseminate information. By engaging in instructional supervision conversations through the video channel, the teachers felt like they were not just being told information but having authentic conversations [29].

ICT Skills, E-Supervision Scheme of School Heads, And Teacher Development in Distance Learning Among Selected Private Schools in Cainta

Table 5. Teachers' Development in Distance Learning

Indicators	Weighted Mean	Categorical Response	Verbal Interpretation
1. teacher development is a school-based activity conducted by the school head or a resource speaker	3.52	Strongly Agree	Very High
2. teacher development are sourced from webinars	3.48	Strongly Agree	Very High
3. teacher development topics are directed by the school head	3.43	Strongly Agree	Very High
4. teacher development provided to improve teachers' technology teaching practices	3.55	Strongly Agree	Very High
5. teacher development given is on pedagogical approaches for distance learning	3.55	Strongly Agree	Very High
6. teacher development prepared are for designing learning activities for online instruction	3.58	Strongly Agree	Very High
7. teacher development provided focus on creating distance learning materials	3.56	Strongly Agree	Very High
8. teacher development given is for effective learning assessment during distance learning	3.55	Strongly Agree	Very High
9. workshops are conducted in an online platform like Google Meet during teacher development	3.42	Strongly Agree	Very High
10. teacher development is done through video conferencing	3.51	Strongly Agree	Very High
Overall Weighted Mean	**3.51**		**Very High**

It is depicted in Table 5 that the implementation of teachers' development in distance learning got a very high overall weighted mean of 3.51 as the respondents strongly agreed with the indicators. The finding further illustrates that professional development to develop teachers' necessary skills in carrying out their role are implemented during distance learning. The findings of the study are much related to Sadler et. al [30] observation from their facilitated teacher professional development project in the midst of the COVID-19 pandemic with the aim of collaboratively designing instructional activities to teach about COVID-19 using videoconferencing technologies worked well. The ability to form smaller design teams and flow between full group sessions and small group workspaces seemed to facilitate productivity. All of the teachers made substantive contributions to the development of novel curriculum materials. Many researches, like those of Hamzah, Nasir, & Wahab [16] reveal that in a time of distance learning due to pandemics principals need to devise professional improvement programs to help teachers implement digital teaching practices. Thus, the highest means of professional development is institution professional development, i.e. webinars and online workshops [31].

Table 6. Relationship Between the School Heads' ICT Skills and E-Supervision Scheme

Variables	ICT Skills	
	Competence	Utilization
	Instant Messaging r=.698 (high correlation)	Instant Messaging r=.724 (high correlation)

ICT Skills, E-Supervision Scheme of School Heads, And Teacher Development in Distance Learning Among Selected Private Schools in Cainta

E-supervision Scheme	p=.000 Decision: Null hypothesis rejected Interpretation: Significant	p=.000 Decision: Null hypothesis rejected Interpretation: Significant
	Office Suite r=.657 (high correlation) p=.000 Decision: Null hypothesis rejected Interpretation: Significant	Office Suite r=.733 (high correlation) p=.000 Decision: Null hypothesis rejected Interpretation: Significant
	Videoconferencing r=.711 (high correlation) p=.000 Decision: Null hypothesis rejected Interpretation: Significant	Videoconferencing r=.721 (high correlation) p=.000 Decision: Null hypothesis rejected Interpretation: Significant

Significant @ .01

As observed from the data in table 6, a high correlation was found between school heads' ICT skills and e-supervision scheme, specifically between competence and instant messaging (r=.698), office suite (r=.657) and videoconferencing (r=.711) and between utilization and instant messaging (r=.724), office suite (r=.733) and videoconferencing (r=.721). It is worth noting that all p-values of .000 were lower than the test of significance at .01 which revealed that there is significant relationship existed. The result showed that the higher are the ICT skills level of the school heads in terms of their competence and utilization, the better is their e-supervision scheme along with instant messaging, office suite and videoconferencing. This relationship can be explained with the premise that the ICT knowledge acquired by the school head actuate effective application of ICT on the supervisory function in curriculum implementation through the different technological platforms. This finding solidifies the idea revealed by Uğur & Koç [32] that principals, as instructional leaders, who do not understand how to use technology cannot properly evaluate the use of it by teachers for instruction and students for achievement. The ICT skills needed by principals include among others: knowledge of operating ICT devices, good knowledge of using ICT devices in teaching, ability to use ICT devices to store and retrieve information. They also posited that ICT skills enhance efficient management of educational resources through enhancing proper keeping of records, effective communication, and proper accountability of educational resources among others [5]. However, it contradicts the observation of Abraham et.al [22] that the principal's knowledge of ICT is basic with the goal that systems can be set up to make organizational procedures progressively effective, including the work of faculty to oversee and direct the ICT foundation.

Table 7. Relationship Between the School Heads' ICT Skills and Teacher Development

Variables	Statistical Treatment (Pearson r)	p-value	Decision	Interpretation
Competence and Teacher Development	.724 (high correlation)	.000	Null hypothesis rejected	Significant
Utilization and Teacher Development	.699 (high correlation)	.000	Null hypothesis rejected	Significant

Significant @ .01

As disclosed in table 7, a high correlation was found between the school heads' ICT skills and teacher development specifically between competence and teacher development (r=.724) and utilization and teacher development (r=.699). Both the p-values of .000 were lower than the test of significance at .01, leading to the rejection of the null hypothesis. This showed that the higher are the ICT skills

level of the school heads in terms of their competence and utilization, the better is the teacher development in distance learning. This relationship can be explained by the modality used in delivery of teachers training in distance learning. It connotes that school heads being abreast to different communication technologies positively ramifies the professional learning of teachers. As elucidated by N., Dzakpasu, and Amenyedze [33] that in this era of information, principals must incorporate ICT into their day-by-day practice and give steady and positive leadership to technology use in the instructing learning process. School leaders should ensure that processes are in place during professional development opportunities to support the diverse learning styles of teachers. By providing a variety of learning options, districts can guarantee their teachers will have support and access to training, ownership of their learning, and the ability to assess their technical skill levels [34]. Along this line, school heads ought to motivate a mutual vision for far-reaching reconciliation of technology and cultivate a domain and culture helpful for the acknowledgment of that vision. Principals ought to depict an enthusiastic responsibility for giving proper ICT proficient staff improvement for individual staff members [35]. Hence, Cadiente, Acob, & Bagon [39] concurred in their study that literacy skills of school principals as a contributory factor may lead to effective instruction and facilitate managerial functions in the school setting.

Contrary to the finding, it opposes the study of Apsorn, Sisan, & Tungkunanan [36] telling that even though school directors may be effective and fine examples of how to plan and implement ICT for use by teachers and supporting staff, they are not necessarily experts in using ICT, but need to give school teachers and staff knowledge and opportunities and establish a culture of ICT in order to shape learning communities.

Table 8. Relationship Between the School Heads' E-Supervision Scheme and Teacher Development

Variables	Statistical Treatment (Pearson r)	p-value	Decision	Interpretation
Instant Messaging and Teacher Development	.741 (high correlation)	.000	Null hypothesis rejected	Significant
Office Suite and Teacher Development	.708 (high correlation)	.000	Null hypothesis rejected	Significant
Videoconferencing and Teacher Development	.794 (high correlation)	.000	Null hypothesis rejected	Significant

Significant @ .01

Table 8 unveils a significant relationship between the respondents' e-supervision scheme and teacher development, specifically between instant messaging and teacher development (r=.741), office suite and teacher development (r=.708) and videoconferencing and teacher development (r=.794), as evidenced by their obtained probability values of .000 which were lower than the test of significance at .01. This showed that the better is the school heads' e-supervision scheme in terms of instant messaging, office suite and videoconferencing, the better is their teacher development. This relationship can be explained by the process of drawing authentic information through an e-supervision scheme to determine the overall need of teachers in curriculum implementation that might be included in the teacher development program. Kim & Lee [15] revealed that principals can have more impact on teacher development by formally arranging opportunities and resources for teachers' collaborative learning. Mentoring, peer observation, and coaching activities are regarded as effective forms of professional development in that they rely on interactions and co-development of expertise between teachers and focus on teachers' individual needs to improve instructional practices. This finding supported by what was stressed by Abdullaha, Sulongb, & Rahimc [37] that a high percentage of teacher trainees felt that using the Google Classroom application was a good and effective e-supervision system that supported traditional supervision methods. Also, as what Van Boxtel [38] had noted, a video-based remote supervision method in strategic implementation of an asynchronous video-based remote supervision model is feasible and equally effective or preferred over traditional face-to-face observations by teacher candidates and cooperating teachers for self-reflection, professional growth, and convenience.

ICT Skills, E-Supervision Scheme of School Heads, And Teacher Development in Distance Learning Among Selected Private Schools in Cainta

CONCLUSION AND RECOMMENDATION

The school heads are confident to claim that they manifest a very high level of ICT skills in terms of competence and utilization for it makes them abreast with the use of instant messaging, office suite, and video conferencing for e-supervision scheme. Meanwhile, teachers among selected private schools in Cainta had a very high level of teacher development in distance learning. Hence, it can be viewed that the higher the ICT skills level of school heads the better is their e-supervision scheme and teacher development in distance learning. The investigation, however, has some limitations particularly on the sample size which was used in the study since it was only limited to the teachers among 5 selected private schools in Cainta during Academic Year 2021-2022. To have a better generalization of the study, it is recommended to future researchers to conduct similar study considering a larger number of respondents including school heads. Training program implementation is highly recommended to make the school heads' skills level higher on the indicators that ranked last.

REFERENCES

1) UNICEF (2019). 2019 Annual Report: Information and Communication Technology Division. https://www.unicef.org/media/91061/file/ICTD-2019-HQAR.pdf

2) Hernandez, R.M.. (2017). Impact of ICT on Education: Challenges and Perspectives. *Propósitos y Representaciones, 5(1)*, 325-347. doi: http://dx.doi.org/10.20511/pyr2017. V5n1.149

3) Buenviaje J. T. (2019). Basic Education ICT for Governance, Finance, and School Improvement. In D. Ocampo & K. Lucasan (Eds.), *Key Issues in Governance, Finance, School Improvement, and ICT in Basic Education* (pp. 16-23). Quezon City: UP Center for Integrative and Development Studies. https://www.researchgate.net/ publication /333309653_Key_Issues_in_Governance_Finance_School_Improvement_and_ICT_in_Basic_Education

4) Ugwu N. P. and Nnaekwe K. (2019). *THE CONCEPT AND APPLICATION OF ICT TO TEACHING/LEARNING PROCESS.* International Research *Journal of Mathematics, Engineering and IT, 6(2)*. https://www.researchgate .net/publication /332843634_THE_CONCEPT_AND_APPLICATION_OF_ICT_TO_TEACHINGLEARNING_PROCESS

5) Eremie I., & Agi U. K. (2020). Information and Communication Technology (ICT) Skills and Efficient Management of Educational Resources in Secondary Public Schools. *Journal of the International Society for Teacher Education, 24 (1)*, 36-47. https://web.b.ebscohost.com/abstract?direct=true&profile

6) Ibrahim A., Adu-Gyamfi M., & Kassim B. A. (2018). Factors Affecting the Adoption of ICT by Administrators in the University for Development Studies Tamale: Empirical Evidence from the UTAUT Model. *International Journal of Sustainability Management and Information Technologies, 4(1)*, 1-9. doi: 10.11648/j.ijsmit.20180401.11

7) Australian Institute for Teaching and School Leadership (2021). The role of school leadership in challenging times. https://www.aitsl.edu.au/research/ spotlight/the-role-of-school-leadership-in-challenging-times.

8) Makin M., Abdullah Z., & Shafee S. (2018). The art of supervision: Role of supervisory skills in developing teacher capacity. *Malaysian Online Journal of Educational Management, 6 (4),* 37-55. DOI:10.22452/mojem.vol6no4.3

9) [Lapid J. R. (2021). Instructional Supervision Under the New Normal in Education: Tenets of Job-embedded Learning. *DepEd Bataan.com Publications*. http://www.depedbataan.com/resources/4/instructional_supervision_under_the_new_normal_in_education-_tenets_of_job-embedded_learning.pdf

10) Iroegbu E. E. & Eyo E. E. (2018). Teacher's Participation in Quality Assurance in Private and Public Secondary Schools in Uyo Local Education Committee, Akwa Ibom State, Nigeria: Administrators' Perspective. *International Journal of Managerial Studies and Research, 6(2)*, 1-9. https://www.arcjournals.org/pdfs/ijmsr/v6-i2/1.pdf

11) [11] Fendi H. et.al (2021). Online-Based Academic Supervision during the Covid-19 Pandemic. Journal of Physics: Conference Series. doi:10.1088/1742-6596/1779/1/012027

12) [12] Atunde M., Abdulraheem J., Tijani A., Ayoku O., and Adeseko S. (2020). Information and Communication Technology (ICT) and Administrative Performance of Principals': A Survey of Public Secondary Schools in Ilorin Metropolis, Nigeria. *Texila International Journal ofAcademic research*. DOI: 10.21522/TIJAR.2014.07.01

13) Wilichowski T. & Cobo B. (2020). From coping to improving and accelerating: Supporting teachers in the pandemic and beyond. https://blogs.worldbank.org/education/coping--improving- and-accelerating supporting-teachers-pandemic-and-beyond

14) Learning Portal (2021, July 13). Information and communication technology (ICT) in education. https://learningportal.iiep.unesco.org/en/issue-briefs/improve-learning/information-and-communication-technology-ict-in-education

15) Kim T. & Lee Y. (2020). Principal instructional leadership for teacher participation in professional development: evidence from Japan, Singapore, and South Korea. *Asia Pacific Education Review, 21*, 261-278. https://doi.org/10.1007/s12564-019-09616-x

16) Hamzah N. H., Nasir M. K., & Wahab J. A. (2021). The Effects of Principals' Digital Leadership on Teachers' Digital Teaching during the COVID-19 Pandemic in Malaysia. Journal of Education and e-Learning Research, 8(2), 216-221. DOI:10.20448/journal.509.2021.82.216.221

17) Kilic M. E. (2021). What are the Expectations of Primary School Teachers from Instructional Leaders during the Distance Education Period?. *Athens Journal of Education, 8,* 1-17. https://doi.org/10.30958/aje.X-Y-Z

18) Gustafson & Haque (2020). Uncovering the Challenges and Leadership Practices of Virtual School Principals. *Online Journal of Distance Learning Administration, XXIII(4).* https://www.westga.edu/~distance/ojdla/winter234/ Gustafson_haque234.html

19) [British Council (2020). A Survey of teacher and teacher educator needs during theCOVID-19 pandemic. https://www.teachingenglish.org.uk /sites/teacheng/files/covid19-teacher-teacher-educator-survey.pdf

20) Leong M. W., Chua Y. P. & Sathiamoorthy K. (2017). Relationship between principal technology leadership practices and teacher ICT competency. Malaysian Online Journal of Educational Management, 4(3), 13-36. http://mojem.um.edu.my/index.php/MOJEM/article/view/6062

21) Al Khateeb A. M. (2017). Measuring Digital Competence and ICT Literacy: An Exploratory Study of In-Service English Language Teachers in the Context of Saudi Arabia. *International Education Studies, 10 (12),* 38-51. doi:10.5539/ies.v10n12p38

22) Abraham L. N., Dzakpasu P. E., and Amenyedzi K. D. (2019). "Principals' ICT Proficiency Level and Tutors' Willingness to Adopt Modern Technological Devices in Teaching in the Volta and Greater Accra Regions, Ghana." *American Journal of Information Systems, 7* (1), 1-6. doi: 10.12691/ajis-7-1-1.

23) Gulpan J. O. & Baja R. M. (2020). Technological Leadership of 21st Century Principals of Private Secondary Schools. *International Journal of Advanced Research and Publications, 4 (4)*, 66-69. Retrieved from http://www.ijarp.org/published-research-papers/apr2020/Technological-Leadership-Of-21st-Century-Principals-Of-Private-Secondary-Schools.pdf

24) Barrido B. D. & Abadiano M. N. (2018). Leadership Style in the Utilization and Effectiveness of ICT Application Tools by Educational Management. *International Journal of Management and Commerce Innovations, 5 (2)*, 1290-1321. https://www.academia.edu/38458701/Leadership_Style_in_the_Utilization_5523_pdf?bulkDownload=thisPaper-topRelated-sameAuthor-citingThis-citedByThis-secondOrderCitation&from=cover_page

25) Tyagi R., Vishwakarma S., Alexandrovich Z.S., Mohammmed S. (2020) ICT Skills for Sustainable Development Goal 4. In: Leal Filho W., Azul A.M., Brandli L., Özuyar P.G., Wall T. (eds) Quality Education. Encyclopedia of the UN Sustainable Development Goals. Springer, Cham. https://doi.org/10.1007/978-3-319-95870-5_39

26) Cha Y., Kim J., Park S., Yi M. Y., & Lee U. (2018). Complex and Ambiguous: Understanding Sticker Misinterpretations in Instant Messaging. *In Proceedings of the ACM on Human-Computer Interaction, 2 (30)*, 1-22. ACM, New York, NY. https://doi.org/10.1145/ 3274299

27) Byrnes K.G., Kiely P.A., Dunn C.P., McDermott K.W., Coffey J.C. (2021). Communication, collaboration and contagion: "Virtualisation" of anatomy during COVID-19. *Clin Anat.*, *34*, 82– 89. https://doi.org/10.1002/ca.23649

28) Brock J. D., Beach D. M., Musselwhite M., & Holder I. (2021). Instructional supervision and the COVID-19 pandemic: Perspectives from principals. *Journal of Educational Research and Practice, 11*, 168–180. https://doi.org/10.5590/JERAP.2021.11.1.12

29) [Sadler, T.D., Friedrichsen, P., Zangori, L. & Ke, L. (2020). Technology-Supported Professional Development for Collaborative Design of COVID-19 Instructional Materials. *Journal of Technology and Teacher Education, 28(2)*, 171-177. Waynesville, NC USA: Society for Information Technology & Teacher Education. https://www.learntechlib.orgprimary/p/216087/.

30) Rahayu N. & Suprina R. (2021). EFL teacher professional development in the pandemic era of COVID-19. In K. A. Putra & N. A. Drajati (Eds), Post Pandemic L2 Pedagogy (pp). London: Taylor Francis Group. DOI 10.1201/9781003199267-7

31) Uğur, N.G. & Koç., T. (2019). Leading and Teaching with Technology: School Principals' Perspective. *International Journal of Educational Leadership and Management*, *7(1)*, 42-71. DOI: 10.17583/ijelm.2018.3758

32) N.A., Dzakpasu P., and Amenyedzi K. (2019). Principals' ICT Proficiency Level and Tutors' Willingness to Adopt Modern Technological Devices in Teaching in the Volta and to Greater Accra Regions, Ghana. *American Journal of Information Systems, 7* (1). doi: 10.12691/ajis-7-1-1

33) Belastock E. (2020). How to Improve Teacher Training for More Successful Remote Learning. https://edtechmagazine.com/k12/article/2020/08/how-improve-teacher-training-more-successful-remote-learning

34) Njathi, S. N., Ngaruiya, B., & Maithya, P. (2018). Principal's Computer Application Skills as a Determinant of Computer Use in Administration of Public Secondary Schools in Kiambu County, Kenya. Journal of Education and Practice, 2(1), 26-41. http://irlibrary.mmarau.ac.ke:8080/xmlui/bitstream/handle/123456789/7717/241-1169-1-PB.pdf?sequence=1&isAllowed=y

35) Cadiente , A. M., Acob, J. R., & Bagon, A. E. (2020). Assessment on the information communication technology literacy among education managers as an expression of caring education . *Basic and Applied Nursing Research Journal*, *1*(2), 36-45. https://doi.org/10.11594/banrj.01.02.03

36) Apsorn, A., Sisan, B., & Tungkunanan, P. (2019). Information and Communication Technology Leadership of School Administrators in Thailand. International Journal of Instruction, 12(2), 639-650. https://doi.org/10.29333/iji.2019.12240a

37) Abdullaha M. H., Sulongb M. A., & Rahimc M. A. (2020). Development and Validation of the Music Education Teaching Practice E-Supervision System Using the Google Classroom Application. *International Journal of Innovation, Creativity and Change, 11(10)*,102-116. https://www.researchgate.net/profile/Mohd-Abdullah-14/publication/340264563

38) Van Boxtel J.M. (2017). Seeing Is Believing: Innovating the Clinical Practice Experience for Education Specialist Teacher Candidates With Video-Based Remote Supervision. *Rural Special Education Quarterly*, 36(4),180-190. doi:10.1177/8756870517737313