

# Teachers' Perception of Information and Communication Technology Integration in Teaching Primary Learners

Kristine Ann F. Villariaza<sup>1</sup>, Rodia B. Aleser<sup>2</sup>, Gengen G. Padillo<sup>3\*</sup>, Ramil P. Manguilimotan<sup>4</sup>,  
Reylan G. Capuno<sup>5</sup>

<sup>1</sup>*Cebu Technological University – Main Campus, College of Education, kristineann.fiscal@gmail.com,  
<https://orcid.org/0009-0006-7914-3566>*

<sup>2</sup>*Cebu Technological University – Main Campus, College of Education, kierkarlkyle2@gmail.com,  
<https://orcid.org/0009-0003-1007-9007>*

<sup>3\*</sup>*Cebu Technological University – Main Campus, College of Education, gengen.padillo@ctu.edu.ph,  
<https://orcid.org/0000-0002-3591-3059>*

<sup>4</sup>*Cebu Technological University – Main Campus, College of Education, ramil.manguilimotan@ctu.edu.ph,  
<https://orcid.org/0000-0002-5237-5555>*

<sup>5</sup>*Cebu Technological University – Main Campus, College of Education, reylan.capuno@ctu.edu.ph,  
<https://orcid.org/0000-0002-3426-1650>*

## Abstract

This researched assessed the early childhood education teachers' perception of the integration of ICT in teaching the learners at Mactan Elementary School and Soong Elementary School of Lapu-Lapu City Division. It employed a descriptive correlational research design utilizing an adapted instrument. A total of 100 teacher participants answered the survey questionnaire. Results showed that the respondents preferred personal Wi-Fi over mobile data and utilized laptops over desktops and smartphones. Moreover, the participants perceived the benefits of ICT in early childhood education as highly beneficial, and the extent of support in using ICT in the teaching process was very high. The test of a significant relationship between the extent of the respondents' utilization of ICT in the teaching process and the perceived benefits and support was found significant. It is concluded that the extent of integration of ICT in teaching learners was very beneficial in teaching early childhood education. The adoption of the action plans per school is hereby recommended.

**Keywords:** Early Childhood Education, ICT Integration Teaching Instruction, Technological Support, Descriptive Correlational Design, Lapu-Lapu City Division.

## I. Introduction

The role of computer technology in early childhood education from birth to eight years old is a crucial topic (Kim, 2020). Parents and teachers are concerned about potential benefits or harm to young learners, especially in this worldwide pandemic. Nowadays, computer technology allows today's generation to continue learning even when staying at home (McHaney, 2023; Szymkowiak et al.,

2021; Xie et al., 2020). Computer Technology plays a positive role in children's development and learning. Through the use of Zoom, google meet, and other applications, teachers have access to more innovative and improved teaching methods that allow them to promote learning and create an active learning environment for learners. (Pratama et al., 2020; Ramadani & Xhaferi, 2020; Simamora et al., 2020; Wiyono et al., 2021)

It is important that computer technology use be active (Dienlin & Johannes, 2020; Mirsharapovna et al., 2022); students should interact with the device regularly rather than observe passively (Fromm et al., 2021). It is also important for adults to guide learners toward learning and ensure that exposure to computer technologies is not excessive. In the Philippines, the Department of Education (DepEd) provides quality public and private primary education in the country. They as well aim to strengthen the foundation stage of education in which Kindergarten years plays a vital role (Tranquilan, 2020). The first step in enhancing the quality of Education is by closing the technological gaps in Information and Communication Technology (ICT) in the Philippines. (Abu Talib et al., 2021) The ethical and responsible use of desktop computers, laptops, projectors, tablets, cell phones, and other devices can greatly enhance the learning capability of learners, for it has been shown through studies that learners can better grasp and understand their lessons in a more relaxed environment (Gupta & Pathania, 2021), without the prying (and sometimes mocking) eyes of classmates or teachers. Emerging technologies can be powerful tools in education. As the budget of the Department of Education allows, provide schools with computers, fast Internet service, digital devices, and software for the use of learners.

COVID-19 pandemic has required the use of ICT at various levels of education, including early childhood education. Even though the use of ICT has many benefits to support the learning process (Paudel, 2021), for the level of education where most of the learning process has not used ICT much, it will certainly be a challenge, including in the early childhood education in some places here in Asia. Before the COVID-19 pandemic, the learning process in all early childhood institutions in the Philippines was carried out by face-to-face approach. However, the COVID-19 pandemic requires all early childhood institutions to implement online learning and other learning modality. Lapu-Lapu City Division is somehow using online classes during pandemic but not on a daily basis. This is certainly very

disturbing for early childhood teachers in Philippines who are not familiar with the use of ICT in the teaching process. Lapu-Lapu City Division is somehow using online classes during pandemic but not on a daily basis. Teachers integrate teaching instruction through interactive online educational games and essential instructional videos.

Therefore, this study aimed to investigate the perceptions of early childhood teachers, particularly in the Lapu-Lapu City Division regarding the use of ICT in the learning process and to provide an understanding of the ICT use to support the teaching and learning process in early childhood education, as well as an overview of how the online learning practice in early childhood education is during the COVID-19 pandemic.

### 1.1. Purpose of the study

This research assessed the early childhood education teachers' perception on the integration of ICT in teaching the learners at Mactan Elementary School and Soong Elementary School in Lapu-Lapu City Division, Cebu during the School Year 2022–2023. The findings of the study served as the basis for proposed action plans.

Specifically, it determined the profile of the respondents in terms of age and gender, highest educational attainment, length of service, internet connectivity, and gadgets used when integrating ICT in teaching; the extent of the respondents' utilization of ICT in the teaching process; the level of benefits of ICT for early childhood education; the extent of support received by the respondents in the utilization of ICT in the teaching process; the significant relationship between the extent of the respondents' utilization of ICT in the teaching process and the perceived benefits of ICT for early childhood education, and extent of support received by the respondents in the utilization of ICT in the teaching process.

## 2. Materials and Methods

This section presents the research design, respondents, instrument, data gathering procedure, and statistical treatment of the data.

### 2.1 Research design

This study used a descriptive correlational research design utilizing quantitative and qualitative research design. According to Badr et al.(2020), a correlation is a statistical test to determine the tendency or pattern for two (or more) variables or two sets of data to vary consistently. The purpose of correlational research is to determine the relationship among two or more variables in gathering the needed data on digital disruption in early childhood education among kindergarten learners during the COVID-19 pandemic in the two identified schools. In this regard, this study was conducted in identified public schools in Lapu-Lapu City Division. To get the necessary data, the respondents of this study are Kindergarten teachers.

### 2.2 Respondents

The respondents are the 50 Primary Grade Teachers in Mactan Elementary School and Soong Elementary School that comprise 100 total respondents. The respondents were suited for this study since they cater the needs of our primary grade learners to have teaching and learning instruction needed to be integrated with tools for information and communication technology as early as this stage learners should be equipped with this new trend of learning. These respondents were selected using a universal sampling technique.

### 2.3 Instrument

The instrument of the study was adapted from the study of Aditya et al. (2022) that will enable the researchers to investigate the Digital Disruption in Early Childhood Education curriculum. It was composed of three parts. The first part was about the demographic profile of the respondents'. The second part was about the perception of the respondents on digital utilization in the teaching process. The third part was about the challenges encountered in using digital utilization.

### 2.4 Data Gathering Procedure

Before the actual collection of the data and the testing procedure, the researchers sent out a request letter to the Schools Division Superintendent (SDS) of Lapu-Lapu City Division. The letter bear the information as to the importance of the study and its purpose. The letter would also include information that asks permission for the researchers to conduct the test with the help of the teacher adviser in order to collect the data on the effectiveness of the online and modular printed materials in the kindergarten learners in their language skills. After the approval by the SDS, a different letter was sent to the school administrator of the selected schools asking for permission to conduct the study in their school. The letter would further ask for assistance from the principal that the data were collected from the teachers. Both letters would include information as to the observation of established ethical standards in social science research which include the protection of the sources of data and that the information generated from the study would be exclusively used for educational purposes only.

In the Process section, the course of actions involved on the transmittal of the request letters to all concerned authorities, agencies, or offices; administration of the survey questionnaires to the respondents; collection and tabulation of data; statistical treatment and data analysis; as well as presentation of the scientific results. Nonetheless, for the Output section, an action plan was formulated and proposed for its appropriate implementations.

### 2.5 Statistical Treatment

To obtain valid and accurate results from the data that are gathered, appropriate statistical tools were employed by the researcher such as the Microsoft Excel and Statistical Product and Service Solutions (SPSS), Frequency and Simple Percentage, and Pearson's R.

### 3. Results

#### 3.1 Profile of the Respondents

Table 1 Age and Gender of the Teacher-Respondents

Age (in years)	Female		Male		Total	
	f	%	f	%	f	%
48 and above	3	3.00	1	1.00	4	4.00
40-47	16	16.00	2	2.00	18	18.00
32-39	39	39.00	4	4.00	43	43.00
24-31	31	31.00	4	4.00	35	35.00
<b>Total</b>	<b>89</b>	<b>89.00</b>	<b>11</b>	<b>11.00</b>	<b>100</b>	<b>100.00</b>

As presented in Table 1, a total of 100 teacher respondents whose teacher ages 32-39 has the highest percentage which comprises 43 percent of the total population of the respondents. Followed by teacher's ages 24-31 that has 35 percent of the population, 40-47 which is 18 percent and the lowest percentage is 4 percent of the total population. The respondents were 89 percent female and 11 percent for male. The result indicates that the respondents are already in the middle adulthood stage. Following Bandura's conceptualization of self-efficacy, teachers defined self-efficacy as their confidence in performing specific tasks that require the integration of ICT into the teaching practice.

Table 2 Teacher-Respondents' Highest Educational Attainment

Educational Attainment	f	%
With Doctorate Units	9	9.00
Master's Graduate With Master's Units	67	67.00
Bachelor's Degree	18	18.00
<b>Total</b>	<b>100</b>	<b>100.00</b>

Table 2 shows that 67 percent of the respondents are with masters units, 18 percent are with Bachelor's Degree, 9 percent of them are with Doctorate units and 6 percent of the respondents has Master's Degree. It gives us a notion that teachers are interested to pursue their post graduate studies for professional development. Overall, the result indicated that most of the respondents were Master's Units earner. This imply that the teachers has to spend time and effort in pursuing their

professional development and advancing in their career.

Table 3 Length of Service of Teacher-Respondents

Length of Service (in years)	f	%
16 and above	2	2.00
11-15	18	18.00
6-10	45	45.00
1-5	35	35.00
<b>Total</b>	<b>100</b>	<b>100.00</b>

Results shows that respondent's years of service who got the highest percentage is 6- 10 years which is 45 percent, 1-5 years which has 35 percent followed by 11-15 years of service that comprises 18 percent and 16 years of service and above got the lowest percentage which is 2 percent.

Table 4 Internet Connectivity of the Respondents

Internet Connectivity	f	Rank
Personal Wi-Fi	95	1
Mobile data	86	2

\*multiple response

Results shows that 95 of the respondents has their personal Wi-Fi and 86 of the respondents has their mobile data on their cellular phone. This gives an implication that teacher's finds way to cope up on this modern technology concept of delivery of learning.

Table 5 Gadgets Used by the Respondents

Gadgets Used	f	Rank
Laptop	100	1
Smartphone	97	2
Desktop	9	3

\*multiple response

Table 5 shows that all of the respondents have their own laptop and 97 of them has smartphones and 9 of them have desktop. Teachers use various gadgets for them to indulge ways to contribute and use all means to fit to the 21st century way of teachings.

### 3.2 Extent of the Respondents' Utilization of ICT in the Teaching Process

Table 6 Extent of the Respondents' Utilization of ICT in the Teaching Process

N	Indicators	WM	Verbal Description
1	Showing Videos	3.86	Highly Utilized
2	Sharing Teaching Resources	3.78	Highly Utilized
3	Classroom Video Call/Classes	3.71	Highly Utilized
4	Creating Educational videos	3.67	Highly Utilized
5	Accessible digital picture books	3.73	Highly Utilized
6	Drawing and coloring activities	3.71	Highly Utilized
<b>Aggregate Weighted Mean</b>		<b>3.74</b>	<b>Highly Utilized</b>

**Legend:** 3.25-4.00-Highly Utilized; 2.50- 3.24- Utilized ;1.75 – 2.49-Less Utilized ; 1.00 – 1.74- Not Utilized

Table 6 reflects the results of the responses of the extent of respondents of the ICT in the teaching process and all of the indicators has a perception of Highly Utilized; Showing videos, sharing teaching resources, classroom video

call or classes, Creating educational videos, accessible digital picture books and drawing and coloring activities.

### 3.3 Level of Benefits of ICT Early Childhood Education

Table 7 Level of Benefits of ICT for Early Childhood Education

S/N	Indicators	WM	Verbal Description
1	Easy way to share materials	3.92	Highly Beneficial
2	Help teachers to keep up with technology	3.89	Highly Beneficial
3	Effective to facilitate student's play	3.91	Highly Beneficial
4	Provide learning experience to the students	3.91	Highly Beneficial
5	Easy way to prepare materials	3.91	Highly Beneficial
6	Help students to acquire new technological skill	3.88	Highly Beneficial
7	Improve parent-teacher communication	3.89	Highly Beneficial
8	Promote teachers to creative teaching	3.89	Highly Beneficial
<b>Aggregate Weighted Mean</b>		<b>3.90</b>	<b>Highly Beneficial</b>

**Legend:** 3.25-4.00-Highly Beneficial; 2.50- 3.24- Beneficial ;1.75 – 2.49-Less Beneficial ;1.00 – 1.74- Not Beneficial

Table 7 shows the results of the level of benefits of ICT for Early Childhood Education for the two participating schools all of the indicators, Easy way to share materials, Help teachers to keep up with technology, Effective

to facilitate student's play, Provide learning experience to the students, Easy way to prepare materials, Help students to acquire new technological skill, Improve parent-teacher communication perceived as Highly beneficial.

It has a weighted mean of 3.90 which gives an implication that ICT integrated lesson for Early Childhood has a great impact and it is beneficial to the learning progress of the learner.

### 3.4 Extent of Support Received by the Respondents in the Utilization of ICT in the Teaching Process

Table 8 Extent of Support Received by the Respondents in the Utilization of ICT in the Teaching Process

S/N	Indicators	WM	Verbal Description
1	Providing Trainings	3.79	Very High
2	Providing gadgets and equipment	3.79	Very High
3	Providing strong internet connection	3.88	Very High
4	Accessible free/purchased software	3.80	Very High
<b>Aggregate Weighted Mean</b>		<b>3.82</b>	<b>Very High</b>

**Legend:** 3.25-4.00- Very High; 2.50– 3.24- High ;1.75 – 2.49-Low ; 1.00 – 1.74–Very Low

Table 8 shows the Extent of Support Received by the Respondents in the Utilization of ICT in the teaching process all of the indicators were

all perceived as Very High with an aggregated weighted mean of 3. 82

Table 9 Test of Relationship between the Extent of the Respondents' Utilization of ICT and the Benefits of ICT for Early Childhood Education

Variables	r-value	Strength of Correlation	p - value	Decision	Result
Utilization and Benefits of ICT	0.289*	Negligible Positive	0.004	Reject Ho	Significant

\*significant at  $p < 0.05$

Table 9 shows that the perception of the respondents in the utilization of ICT and the Benefits of ICT for early childhood education has a P value of 0.004 which means it has significant relationship between the extent of

the respondents' utilization of ICT in the teaching process and the perceived benefits of ICT for early childhood education.

### 3.5 Test of Significant Relationship

Table 10 Test of Relationship between the Extent of the Respondents' Utilization of ICT and the Support Received by the Respondents

Variables	r-value	Strength of Correlation	p - value	Decision	Result
Utilization and Support Received by the Respondents	0.187	Negligible Positive	0.062	Do not reject Ho	Not Significant

Table 10 shows the relationship between the Extent of the Respondents' Utilization of ICT

and the Support Received by the Respondents. It has a P value of 0.062 the results show that

there is no significant relationship between the extent of the respondents' utilization of ICT in the teaching process and the extent of support received by the respondents in the utilization of ICT in the teaching process.

#### 4. Discussion

The demographic profile of the respondents revealed that as to age and gender females aged 32-39 years old dominated in the distribution; 45 percent or majority of the teachers have been teaching for 6-10 years, and 67 percent of the teachers have units in their master's only. The study of Šabić et al. (2022) found that minor gender differences in self-efficacy for using ICT that are prominent among older teachers and practically non-existent among younger teachers. This imply that the teachers have to spend time and effort in pursuing their professional development and advancing in their career. Moreover, Padillo et al. (2021) perceived benefits of professional development activities were attributes to personal perceptions and contextual factors. The number of teaching experience is positively associated with student achievement gains through much of a teachers' career as teachers gain experience, their students are more likely to do better on measures of success beyond test scores (Podolsky et al., 2019).

Furthermore, result showed that most of the teachers has their personal wi-fi at home and also has their mobile data. One hundred percent of the respondent has their laptop to help them perform their work and activities that needs the help of these gadgets. According to the study of Sombatruang et al. (2019), mobile data is now a more secure means to connect to the internet and is becoming faster and more affordable, many users continue to use unsecured Wi-Fi. They found out that depleting mobile data significantly drove participants to use these networks, especially when their remaining allowance reached approximately 30%. Educational technology plays significant roles in the creation and dissemination of knowledge in several ways: through computers, mobile phones, etc. Mobile phones act as a catalyst for

fostering mobile learning. They are transforming traditional classroom –based teaching and learning into smart learning. In the study of Bala (2020), smartphone is one of the best educational technology tool teachers can use to produce and disseminate learning resources at their convenience and that students can use to access learning resources of any from, read and reread at any time, collaborate and share ideas with others; teachers and students elsewhere.

The data collected reflects the results of the responses of the extent of respondents of the ICT in the teaching process and all of the indicators has a perception of Highly Utilized; showing videos, sharing teaching resources, classroom video call or classes, creating educational videos, accessible digital picture books and drawing and coloring activities. This give notions that using ICT integrated tools in teaching place a vital role in in molding our young minds in today's generation.(Santos & Castro, 2021)

Gathered data also showed that the level of benefits of ICT for Early Childhood Education for the two participating schools all of the indicators namely help teachers to keep up with technology, effective to facilitate student's play, provide learning experience to the students, easy way to prepare materials, help students to acquire new technological skill, improve parent-teacher communication perceived as highly beneficial. The implementation of the K to 12 Basic Education Program is considered to be one of the most significant educational reforms in the country. It introduces programs and projects that aim to expand and improve the delivery of basic education in the country. It seeks to provide Filipino learners with the necessary skills and competence to prepare them to take on the challenges of the 21st Century. (Barrot, 2023)

On the other hand, the extent of support received by the respondents in the utilization of ICT in the teaching process all of the indicators were all perceived as Very High which gives an implication that the two participating schools has a very high support on facilities and other means to support the ICT related instructions. It

also shows that the perception of the respondents in the utilization of ICT and the benefits of ICT for early childhood education has significant relationship between the extent of the respondents' utilization of ICT in the teaching process and the perceived benefits of ICT for early childhood education. It rejects our null hypothesis which proves that the perception of the respondents of the two-participating school in utilization of ICT plays a great role and a great contributing factor to do with the benefits that the respondent can get in using ICT for Early Childhood education learners. A study in Indonesia on the implementation of digital literacy in ECE indicate that the application of ICT in ECE can be implemented in a limited way, and the implementation process must involve teachers and parents/guardians (Tatminingsih, 2022). In addition, a study of (Cahapay, 2022) found that many learners perform better in home education during isolation.

Conversely, the perception of the respondents in the utilization of ICT and the benefits of ICT for early childhood education has significant relationship to the extent of the respondents' utilization of ICT in the teaching process and the perceived benefits of ICT for early childhood education and it shows the relationship between the extent of the respondents' utilization of ICT and the support received by the participating schools has a very high support on facilities and other means to support the ICT related instructions.

## 5. Conclusion and Recommendation

Based on the findings of the study, it is concluded that the extent of integration of ICT in teaching learners was very beneficial in teaching early childhood education. Utilization of ICT plays a great role in making teaching and learning in early childhood education interesting and meaningful. It is recommended that the action plans prepared for each school be adopted to help teachers enhance their technical and pedagogical content knowledge in the use of emerging technological tools for teaching and learning.

**Funding:** There was no specific funding for this study.

**Competing Interests:** The authors declare no competition of this scholarly work.

**Acknowledgment:** All authors have equal contributed to the conception and design of the study

## Reference

- [1] Abu Talib, M., Bettayeb, A. M., & Omer, R. I. (2021). Analytical study on the impact of technology in higher education during the age of COVID-19: Systematic literature review. *Education and Information Technologies*, 26(6), 6719–6746. <https://doi.org/10.1007/s10639-021-10507-1>
- [2] Aditya, B. R., Ismiatun, A. N., Atika, A. R., & Permadi, A. (2022). Digital disruption in early childhood education: A qualitative research from teachers' perspective. *Procedia Computer Science*, 197, 521–528.
- [3] Badr, H. S., Du, H., Marshall, M., Dong, E., Squire, M. M., & Gardner, L. M. (2020). Association between mobility patterns and COVID-19 transmission in the USA: A mathematical modelling study. *The Lancet Infectious Diseases*, 20(11), 1247–1254.
- [4] Bala, B. P. (2020). Significant of Smartphone: An Educational Technology Tool for Teaching and Learning. 5(5).
- [5] Barrot, J. S. (2023). K to 12 curriculum reform in the Philippines: Towards making students future ready. *Asia Pacific Journal of Education*, 43(4), 1193–1207. <https://doi.org/10.1080/02188791.2021.1973959>
- [6] Cahapay, M. B. (2022). How Filipino parents home educate their children with autism during COVID-19 period. *International Journal of Developmental Disabilities*, 68(3), 395–398. <https://doi.org/10.1080/20473869.2020.1780554>
- [7] Dienlin, T., & Johannes, N. (2020). The impact of digital technology use on



- adolescent well-being. *Dialogues in Clinical Neuroscience*, 22(2), 135–142. <https://doi.org/10.31887/DCNS.2020.22.2/tdienlin>
- [8] Fromm, J., Radianti, J., Wehking, C., Stieglitz, S., Majchrzak, T. A., & vom Brocke, J. (2021). More than experience?—On the unique opportunities of virtual reality to afford a holistic experiential learning cycle. *The Internet and Higher Education*, 50, 100804.
- [9] Gupta, A., & Pathania, P. (2021). To study the impact of Google Classroom as a platform of learning and collaboration at the teacher education level. *Education and Information Technologies*, 26(1), 843–857. <https://doi.org/10.1007/s10639-020-10294-1>
- [10] Kim, J. (2020). Learning and Teaching Online During Covid-19: Experiences of Student Teachers in an Early Childhood Education Practicum. *International Journal of Early Childhood*, 52(2), 145–158. <https://doi.org/10.1007/s13158-020-00272-6>
- [11] McHaney, R. (2023). *The new digital shoreline: How Web 2.0 and millennials are revolutionizing higher education*. Taylor & Francis. [https://books.google.com/books?hl=tl&lr=&id=4g\\_JEAAAQBAJ&oi=fnd&pg=PA1969&dq=computer+technology+allows+to+day+%E2%80%98s+generation+to+continue+learning+even+when+staying+at+home&ots=I5t6PVLQet&sig=CRu8Tly---v5PaaoaRGmddj4Mb8](https://books.google.com/books?hl=tl&lr=&id=4g_JEAAAQBAJ&oi=fnd&pg=PA1969&dq=computer+technology+allows+to+day+%E2%80%98s+generation+to+continue+learning+even+when+staying+at+home&ots=I5t6PVLQet&sig=CRu8Tly---v5PaaoaRGmddj4Mb8)
- [12] Mirsharapovna, S. Z., Shadjalilovna, S. M., Kakhramonovich, A. A., & Malikovna, K. R. (2022). Pros and Cons of Computer Technologies in Education. *Texas Journal of Multidisciplinary Studies*, 14, 26–29.
- [13] Padillo, G. G., Manguilimotan, R. P., Capuno, R. G., & Espina, R. C. (2021). Professional Development Activities and Teacher Performance. *International Journal of Education and Practice*, 9(3), 497–506.
- [14] Paudel, P. (2021). Online education: Benefits, challenges and strategies during and after COVID-19 in higher education. *International Journal on Studies in Education (IJonSE)*, 3(2). <https://pdfs.semanticscholar.org/2d19/3d66504adc38255af97e7b78871a0105d09e.pdf>
- [15] Podolsky, A., Kini, T., & Darling-Hammond, L. (2019). Does teaching experience increase teacher effectiveness? A review of US research. *Journal of Professional Capital and Community*, 4(4), 286–308.
- [16] Pratama, H., Azman, M. N. A., Kassymova, G. K., & Duisenbayeva, S. S. (2020). The Trend in using online meeting applications for learning during the period of pandemic COVID-19: A literature review. *Journal of Innovation in Educational and Cultural Research*, 1(2), 58–68.
- [17] Ramadani, A., & Khaferi, B. (2020). Teachers' Experiences with Online Teaching Using the Zoom Platform with EFL Teachers in High Schools in Kumanova. *SEEU Review*, 15(1), 142–155. <https://doi.org/10.2478/seur-2020-0009>
- [18] Šabić, J., Baranović, B., & Rogošić, S. (2022). Teachers' self-efficacy for using information and communication technology: The interaction effect of gender and age. *Informatics in Education*, 21(2), 353–373.
- [19] Santos, J. M., & Castro, R. D. (2021). Technological Pedagogical content knowledge (TPACK) in action: Application of learning in the classroom by pre-service teachers (PST). *Social Sciences & Humanities Open*, 3(1), 100110.
- [20] Simamora, R. M., De Fretes, D., Purba, E. D., & Pasaribu, D. (2020). Practices, challenges, and prospects of online learning during Covid-19 pandemic in higher education: Lecturer perspectives. *Studies in Learning and Teaching*, 1(3), 185–208.
- [21] Sombatruang, N., Onwuzurike, L., Sasse, M. A., & Baddeley, M. (2019). Factors influencing users to use unsecured wi-fi networks: Evidence in the wild. *Proceedings of the 12th Conference on*

- Security and Privacy in Wireless and Mobile Networks, 203–213.  
<https://doi.org/10.1145/3317549.3323412>
- [22] Szymkowiak, A., Melović, B., Dabić, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, 65, 101565.
- [23] Tatminingsih, S. (2022). Implementation of Digital Literacy in Indonesia Early Childhood Education. *International Journal of Emerging Issues in Early Childhood Education*, 4(1), 12–22.
- [24] Tranquilan, T. (2020). The Implementation of Kindergarten Program in Multicultural Schools in Agusan Provinces, Philippines. *JPAIR Institutional Research*, 15(1), 20–38.
- [25] Wiyono, B. B., Indreswari, H., & Putra, A. P. (2021). The utilization of “Google Meet” and “Zoom Meetings” to support the lecturing process during the pandemic of COVID-19. 2021 International Conference on Computing, Electronics & Communications Engineering (iCCECE), 25–29.  
<https://ieeexplore.ieee.org/abstract/document/9534847/>
- [26] Xie, X., Siau, K., & Nah, F. F.-H. (2020). COVID-19 pandemic – online education in the new normal and the next normal. *Journal of Information Technology Case and Application Research*, 22(3), 175–187.  
<https://doi.org/10.1080/15228053.2020.1824884>