

Computer-based Learning Model in Early Schools During the Covid-19 Pandemic in Rural Areas

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ABSTRACT

The COVID-19 pandemic has affected many aspects of life. In education, the conventional learning process has drastically changed to online. Schools with good resources and infrastructure, of course, can quickly adapt. However, schools with limited infrastructure, as well as low teacher skills, are a challenge. This research is to study the implementation of e-learning in online kindergarten classes from the existing conditions, challenges, and learning strategies that will be applied in PAUD schools in Jayapura City. The results of this study can be used as a reference in making decisions for implementing more effective online learning at the PAUD level. To gather data, a survey was conducted among 20 kindergarten and early childhood teaching staff in Jayapura City using a combination of methods, including contacting the schools, WhatsApp, and Google Forms. The findings reveal that the kindergarten-level teaching staff are predominantly women, aged between 24 and 54 years, with the majority falling within the age range of 35-53 years. The study also highlights the importance of e-learning in the current pandemic, as it enables teachers to document the educational process, remain organized, and provide more effective support to students amid distance restrictions and other challenges. The study results show that e-learning is essential to be prepared, especially during a pandemic. The willingness to engage in e-learning can help teachers document the educational process, be more organized, and be more helpful to students amid distance restrictions and other effects. However, teachers still need training to improve skills related to digital literacy. The training is more on multimedia to support learning and create exciting learning content with Multimedia.

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1. INTRODUCTION

The Covid-19 pandemic has affected all aspects of life, including education. [1][2]. No nation or race in the world is immune from the coronavirus pandemic, and the world seems overwhelmed by the speed of spread and the adverse impact of COVID-19. This pandemic has created new problems in the world of education. [3]. More than 1 billion and 575 million students in approximately 188 countries worldwide are reportedly affected by school and university closures due to preventative measures taken by governments against the spread of COVID-19 [2][3][4].

The closure of educational institutions impacts achieving the targets set by the government and their respective schools. This condition affects students' maturity in achieving learning goals, both academically and psychologically [5]. In addition, social distancing causes educators to work harder to prepare for online learning [5]. Educators designed learning media as innovation through the online press. Kindergarten schools must ensure that teaching and learning activities continue, even if students are at home [6][7].

Online learning processes can accommodate students' learning needs to develop talents and interests according to their level of education [8][9][10]. Requires teachers' curriculum, learning media, and adequate infrastructure to effectively communicate between students and educators [11][12]. The current conditions of online learning cannot be called ideal because various obstacles still need to be faced. These obstacles are also a challenge in implementing online learning to ensure that the educational process can continue to run amid the COVID-19 pandemic.[9][10][11][13].

Putria stated that students are bored with online learning. The enthusiasm shown by students is decreasing day by day. Many educators complain about the limitations of educational technology, operating capabilities, and limited internet networks in some regions. This condition differs from when students study in class with friends [14][15].

The significance of this study lies in an in-depth analysis of how to assess the implementation of online learning in kindergartens in rural areas, with much more limited supporting factors, which are focused on Jayapura City. The previous study discussed the perception of teachers on a broader scale towards online learning during the pandemic [11] and the study of the effectiveness of online education in schools with the following

categories: availability of facilities, completeness of knowledge, ideal learning time, student response, and teaching ability [16].

This study aims to study various obstacles, challenges, and learning strategies applied in kindergartens in the city from the perspectives of school teachers and stakeholders. The results of this study can be a reference in decision-making for implementing more effective online learning at the kindergarten level.

Online learning can assist students in education, especially groups in rural areas. Despite the advantages of online education, developing countries must face many challenges in implementing eLearning. Many important components, such as computers and electricity, are not owned, and skills are limited. In addition, the active and participative students required for interactive learning are also rare in developing countries [14][17].

In some ways, technologies are implemented by developed countries and have several limitations when implemented in developing countries or rural areas. In addition, many regions still need more ICT specialists in education and rely on only a few enthusiastic pioneer teachers who work hard to drive change in their schools [17].

Andersson and Grönlund analyzed several related papers on e-learning in various developing countries and created a conceptual framework for e-learning. They discuss the e-learning challenges in developing countries and summarize them in four categories: courses, individuals, technology, and context. They state, "The conclusions of these challenges are equally valid for both developed and developing countries; however, in developing countries, more articles focus on access to technology and context, whereas in developed countries, more papers concern individuals [18]. Because the challenges are interconnected, the conceptual framework of the problems arising from e-learning in developing countries resembles the problems of rural areas for their insights.[18]. This rural challenge is mapped using these parameters to determine the situation in Papua [15].

1.1. Elearning Readiness

Elearning Readiness can be defined as a "state of school preparation" for teaching online [19]. Teachers' perceptions of their readiness and institutions relate to their belief in their readiness. Perceptions of online readiness will include attitudes and experiences influenced by various individual characteristics and contextual and cultural factors [16].

Implementing e-learning requires the readiness of infrastructure and institutional culture [20]. This readiness is known as E-learning Readiness (ELR). ELR is an organization's mental or physical readiness for learning experiences. Measurement of ELR implementation is necessary to determine the conditions and suitability of institutional strategies compared to standard conditions [17] [21].

Industry, education, government, and society are essential components of e-learning readiness at the first level. At the second level, e-learning readiness is evaluated based on relationships, a country's capacity to deliver and use e-learning literacy levels, and training and lessons learned, including content and culture [18].

1.2. E-learning Readiness Assessment Models

An E-learning readiness assessment is very important for educational institutions that want to adopt E-learning and those with an E-learning system.

E-learning readiness evaluations offer significant information to build solutions that can satisfy the demands of each learning community. The availability of online content, institutional management support, competent human resources, and ICT infrastructure are essential in determining E-learning readiness. Therefore, numerous specialists have presented diverse grading models [19].

Chapnick claims several factors in the assessment of e-learning readiness. These factors are grouped into eight categories: psychological, sociological, environmental, human resources, financial readiness, technological skills, equipment, and content readiness [22]. Some organizations in many countries have used this model to evaluate E-learning readiness.

Aydain and Tasci established instruments for measuring ELR levels used in developing countries in four categories: people, innovation, self-development, and technology. The four factors are influenced by three other variables: resources, skills, and attitudes. They claim that since most businesses purchase E-learning solutions from outside suppliers, many E-learning providers and mentors can be seen as another indicator of whether E-learning can be implemented quickly [20].

Psycharis [19] recommends three categories, namely education, resources, and the environment, each with specific requirements. Environmental types include cultural readiness, entrepreneurial readiness, and leadership readiness. The resource category includes economic readiness, human resource readiness, and technology. The educational category includes material readiness and academic readiness [23].

Machado [24] proposed a key model with key factors in the form of (1) the ability of higher education stakeholders (PT), (2) facilities by learning stakeholders and key stakeholders, and (3) the capacity of learning stakeholders. In the research conducted by Lopez and his evaluation of ELR, he obtained the ELR model in educational institutions, which consists of six dimensions: business, technology, content, culture, human resources, and finance. Kaur and Abas also categorized e-learning readiness measuring factors into eight categories when conducting ELR research at an open university in Malaysia [25]. The categories are learner readiness, management, personnel, content, technical, environmental,

cultural, and financial. In a study conducted by Saekow and Samson at universities in Thailand, five categories were used to determine the readiness of e-learning implementation: policy, technology, finance, human resources, and infrastructure. [18][21][25].

Divjak and Begičević proposed an E-learning readiness evaluation model in the E-readiness report on E-learning work in Kosovo. They developed a model with five main categories: (1) economics, (2) community, (3) learning, (4) access, (5) and strategy and policy.

Table 1. Elearning Readiness Assessment1

Parameters	Individual	Culture	Technological	Content
Chapnick	v	v	v	
Aydain and Tasci	v	v	v	
Psycharis	v	v		
Machado	v	v	v	
Lopez	v	v	v	v
Kaur and Abas	v	v	v	v
Divjak and Begičević	v	v	v	

The research refers to the problems that often arise in rural areas, the eLearning readiness assessment model—the proposed model for assessing eLearning readiness Developed to aid this research. In addition, each factor has a set of sub-factors, which will be used during the assessment period.

1.3. Technological Readiness

E-learning is an electronic-based system that can be accessed from anywhere and anytime. In its implementation, e-learning requires adequate technological infrastructure. Saekow said that about 60% of faculty said the main obstacles were caused by students' inability to access the system off-campus due to limited technical infrastructure [18].

1.4. Culture Readiness

This factor refers to the habits and perceptions of educational institutions toward using e-learning. Therefore, if institutions want eLearning to be successful, they must be culturally and environmentally prepared. For this reason, this parameter will test lecturers' perceived usability and ease of use. Institutional management's support for adopting and using eLearning will also be assessed based on these parameters.

Content readiness

The material presented in the e-learning learning system must be in digital form. The material can be in the form of text, images, video, audio, or animation. According to

Chapnick, digital material content is a tool for instruction in e-learning learning. Therefore, this factor must have a good level of readiness so that learning can run smoothly.

1.5. Demographic Factors

This parameter will collect the demographic factors of the respondents, such as age, gender, and level of education. People factors are related to the institution's human resources characteristics, and individuals with higher education are more likely to adopt an innovation than others. The level of education can be used as one of the predictors of eLearning readiness. These parameters will help determine the influence of demographic factors on eLearning readiness [20].

2. RESEARCH METHOD

2.1. Data Collecting Method

The data collection methods used in the preparation of this study are as follows:

Interview In this method, the author interviews the Head of the Jayapura City Education Office to explain the purpose and objectives of the research. Then, the next stage is to implement the research results to support policies in the Jayapura City area. Several things are discussed in the interview, from how to analyze the situation.

Questionnaire This research uses a questionnaire to collect the data necessary for the study. It allows researchers to see many things simultaneously (age, education level, gender) occur simultaneously.

Literature Study Using this method, the author conducts a literature study in several repositories in Indonesia, including all relevant journals. The author uses the Publish and Perish application to record research related to report cards, which is sourced from Google Scholar.

Research methodologies are used to collect data on eLearning readiness. This includes discussing research design, surveys, research populations, data collection methods, data analysis, and presentation.

2.2. Data Analysis Method

Descriptive statistics are used to analyze the collected data, and the results are presented in tables and graphs. The SPSS program is used to analyze its data. Descriptive statistics are used to determine eLearning readiness. At the same time, the analysis will be conducted to determine the factors that affect eLearning readiness and test whether the

developed model can determine respondents' eLearning readiness. The assessment model from Aydin and Tasci [20] was used to determine the expected level of readiness of 3.4

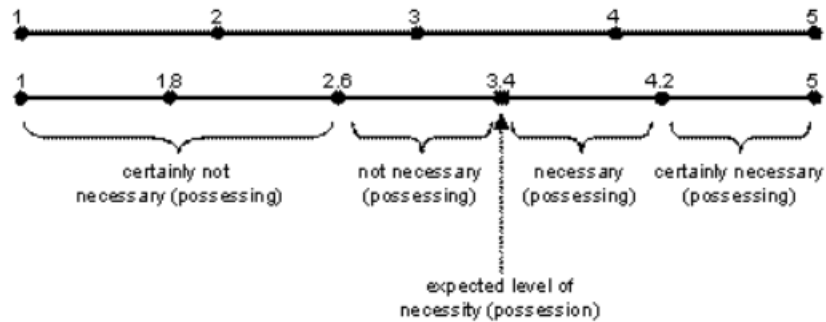


Figure 1. The assessment model adopted from Aydin and Tasci's (2005)

This research was conducted with a quantitative descriptive survey m, almost the same as the descriptive method. The difference is that the explanatory survey method emphasizes finding causal or causal relationships between the variables studied. The survey method is researching whose source of data and main information is the main source of data and information.

3. RESULTS AND DISCUSSION

The survey was conducted on 20 Jayapura City kindergarten and early childhood teaching staff. The survey was conducted by contacting the school, using WhatsApp, and using a Google form to complete the questionnaire. Based on this research, the teaching staff at the kindergarten level are women, with an age range ranging from 24 to 54 years. With the most frequency at the age of 35 and 53, as many as two people.

Based on the level of education, the largest percentage is from bachelor graduates, amounting to 35% (7 people), then by high school graduates, 30% (6 people), and 25% are D2 graduates (5 people). And the smallest percentage comes from 2 teachers who graduated with Master's. (10%).

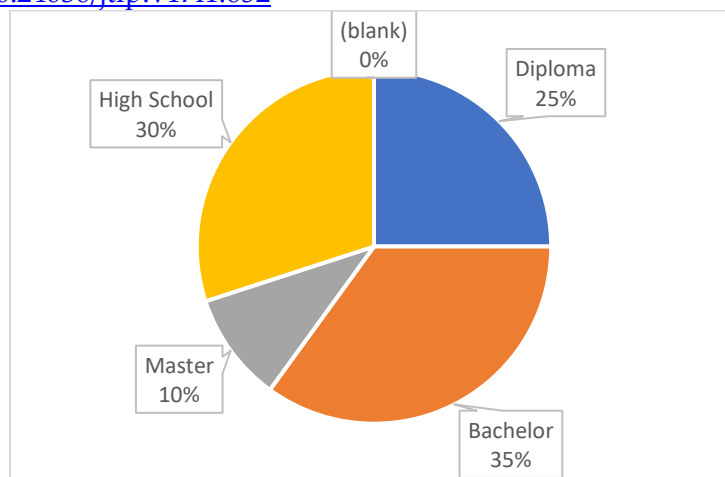


Figure 2. Teacher's level of Education in Kindergarten and Playgroup

The level of education that is mastered is for the kindergarten A, kindergarten B, and playgroup levels, with a percentage of kindergarten B at 55%, kindergarten at A at 35%, and playgroup at 10%.

The age range of working in schools also varies from 3 years to 26 years. This means that the teacher has long been a kindergarten teacher. This is with the average age of teachers who are 39 years old. For the type of application used in communicating, most (95%) use WhatsApp media. This means teachers and students have WhatsApp groups and build communication through the application. As for video conferencing, as many as 45% of teachers use the Zoom application, 30% use Google Meet, and 25% interact using Whatsapp as their connecting medium. The Learning Management System used is Google Classroom (55%), 10% use Moodle, and 10% make WA a Learning Management System. At the same time, the remaining 25% consists of Zoom, video, and face-to-face, including no online learning platform.

It is carried out in several ways to help students collect assignments during the pandemic. Namely, 65% of assignments are collected directly to school, and 30% through WhatsApp, while 5% is done through these two ways, WhatsApp, then gathered again to school. Based on this statement, it can be concluded that although the school already has a digital learning platform, it is not used as a medium for collecting assignments. Tasks are more directed to be collected directly to the school or via WhatsApp. For example, usually, tasks are in the form of handicrafts, photographed, and then collected directly via WhatsApp. The learning management system is made personally by several teachers using the Google Classroom platform. However, some schools in the Jayapura area use Google

Classroom and Moodle at the school level, meaning they have been supported institutionally. However, it has not been able to be optimized for the learning process.

3.1. Elearning

The following is an overview of teachers' perceptions of e-learning implementation in the learning process. The study results are in the form of questions in the form of a Lickert, which are then weighted based on the answers given to obtain the following results.

Table 2. Teachers Perceptions of e-learning implementation in the learning process

Description	Score
I have experience with technology-based training (e.g., Computer-based training, Multimedia-based learning, Videos, etc.)]	3,7
I am willing to collaborate and share information and knowledge through eLearning	3,9
eLearning content design is important to be engaging	3,9
Technology is the most important readiness factor in eLearning	3,9
I'm ready to follow the manual learning shift to an e-learning approach	3,8
Children and guardian parents support the implementation of e-learning	3,4
Educators support the implementation of e-learning	3,7
The central government supports the implementation of e-learning	3,8
Local governments support the implementation of e-learning	3,9

Teachers know that the implementation of eLearning is important, as are design and technological factors, and the government, as a policymaker, also supports the implementation of e-learning. The obstacle seen from the lowest score is that children and guardian parents need to support the implementation of e-learning, and some teachers also need help with digital literacy. This is likely because the teacher's digital literacy experience still needs to be improved.

3.2. Content

The highest assessment point for learning content is at the end of teachers' desire to participate in more training to improve learning implementation skills, especially in training on creating interesting learning content. At the same time, the other 3 question indicators have the same point, namely 3.4. Regarding basic ICT skills and insufficient teaching materials, the following training still needs to be improved.

Table 3. Teachers Perceptions about learning content

Description	Score
My teaching materials and learning tools are available in the eLearning system	3,4
I have attended training on eLearning	3,4
I have basic ICT skills that allow me to feel comfortable with eLearning	3,4
I need more eLearning content development training	3,5

Teachers were also asked about their greatest interest in the type of course they wanted to learn, and most replied that it requires learning in the areas of Audiovisual and Audio learning (88%), content management (5%), and attractive Assessment (5%)

3.3. Technology

The technology category is divided into several aspects, namely: (1) Access to Resources, (2) Technical Skills on the use of Computer and the Internet, and (3) Teacher Attitudes Regarding Elearning. Here are some explanations of each of these factors.

3.3.1. Technology: Access to Resources.

All teachers agree that internet access is at a fairly good level. For this statement, the answer is on a scale close to agreeing (4). All teachers already have good, satisfactory, and reliable internet access.

Table 4. Teachers Perceptions about technology (*Access to Resources.*)

Description	Score
I have access to a reliable computer/Laptop]	3,9
The school has a good IT infrastructure (internet network, computer, printer, scanner)	3,9
The speed of internet access in schools is satisfactory	3,8

3.3.2. Technical Skills in the use of Computers and the Internet

For the Technical Skill aspect in using computers and the internet, the highest point is in the indicator that teachers know how to access online information and other data sources (3.7), followed by other factors, with a value of 3.6, namely (1) the basic function of computer hardware components (2) the use of the internet in searching for information (3) and having an email address. The lowest point is the difficulty factor of using a web browser, with a value of 3.3. This question is of low value because there are respondents

who are completely unable to use the browser application, which impacts the overall value and weight of this question. It is already on the computer for office applications, but it still needs training, including how to use asynchronous applications in the learning process.

Table 5. Teachers Perceptions about technology (*Technical Skills in the use of Computers and the Internet*)

Description	Score
I know the basic functions of computer hardware components (CPU and monitor) and peripherals like printers, speakers, mice, etc.	3,6
I have a Microsoft Office suite (e.g., Ms. Word, Excel, PowerPoint) installed on my computer, and I use it easily	3,4
Do you use the internet as a source of information?	3,6
Can you have an email address and open/send emails with file attachments?	3,6
Can use a web browser (e.g., Internet Explorer, Google Chrome, Mozilla Firefox) easily	3,3
I know how to access online information and other data sources	3,7
I know how to use asynchronous tools (e.g., discussion boards, chat tools) effectively	3,4

3.4. Teacher Attitudes Regarding Elearning

The teacher's attitude regarding e-learning still needs to improve understanding and utilization (3.5 to 3.6), but the willingness to learn and motivation have the highest points. Teachers are willing to devote time to learning (3.8) and are motivated and enthusiastic about learning (3.8)

Table 6 Teacher Attitudes Regarding Elearning

Description	Score
I have information about what eLearning is	3,5
Is it currently utilizing eLearning?	3,5
Is the use of eLearning in teaching systems appropriate?	3,6
Do you feel ready to integrate eLearning into teaching?	3,6
Do you recommend eLearning as an alternative to traditional teaching and learning approaches in ECCE?	3,6
Are you willing to devote more time to eLearning?	3,8
Are you highly motivated and enthusiastic about eLearning?	3,8

The author gives an open question to teachers to be able to provide input based on information from the school related to learning support facilities that are still minimal, including data pulses. Besides that, learning is very much needed now, especially for educators who must understand more about ICT. However, all return to readiness, both from educators, infrastructure, and approval from parents, school administrators, and administrators. Teachers are also asked to train to improve knowledge to support digital literacy.

3.5. Culture

For cultural factors, the highest point is related to the motivation of teachers' learning (3.9) to learn better, while the ability to use eLearning is still quite limited (3.5). Leadership policies must be more adequate in implementing eLearning, including the need for e-learning in the school vision. However, school management still accepts learning as an alternative to learning.

Table 7. Teacher Perception about Culture

Description	Score
I find it easy to use eLearning tools	3,5
My interaction with eLearning tools is clear and understandable	3,6
I think eLearning systems are flexible to interact with	3,7
eLearning motivates me to learn	3,7
eLearning can improve the quality of my teaching	3,9
I believe that using eLearning can increase my productivity	3,7
I believe that eLearning is useful for my research	3,6
E-learning allows me to complete my teaching more effectively than the offline classroom-based approach	3,6
Organizational Policies have supported the adoption of eLearning	3,6
eLearning is aligned with the school's mission and vision	3,4
School management supports the use of eLearning.	3,6
School management accepts eLearning as a mode of teaching and learning	3,6
Lack of legal provisions for Intellectuals	3,4
The property has hindered my plans to use eLearning	3,2

4. CONCLUSION

The conclusions and suggestions of this study are:

- 1) Teachers agree that e-learning is important to prepare, especially during a pandemic. The willingness to learn can help teachers document the educational process, be more organized, and help students more amid distancing and other effects.
- 2) The Google Meet platform is the most widely used LMS. The tasks are collected via WhatsApp or directly to the school in its implementation. This shows that the LMS needs to be carried out optimally.
- 3) Teachers still need training to improve skills related to digital literacy (computers and the internet). The training is more geared towards multimedia to support learning and create interesting learning content with Multimedia.

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