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# Measuring the E-learning Readiness Level in Rural Areas During the Covid-19 Pandemic

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***ABSTRAK***

*Teknologi memainkan peran penting dalam kehidupan. Teknologi Informasi dan Komunikasi (TIK) telah memperluas pilihan pendidikan dengan memungkinkan guru dan siswa menggunakan teknologi untuk menata kembali sistem pendidikan dan pelatihan yang ada. Sejumlah penelitian yang memadai telah mengidentifikasi berbagai manfaat dari penerapan e-learning. Namun, tidak semua institusi yang menerapkan pembelajaran online mendapatkan hasil seperti yang diharapkan. Selain itu, guru di sekolah bukanlah guru yang homogen. Penelitian ini bertujuan untuk menganalisis tingkat kesiapan e-learning di pedesaan pada masa pandemi Covid-19. Jenis penelitian ini yaitu deskriptif kuantitatif. Subjek penelitian ini adalah sepuluh orang guru, tiga orang staf IT, dua orang pengurus yayasan, dan 87 siswa dari SD dan SMP. Pengumpulan data dilakukan dengan menggunakan kuesioner dan wawancara. Data dianalisis menggunakan E-Learning Readiness Score Aydin dan Tasci, yang menggambarkan hasil belajar. Hasil penelitian ini menunjukkan bahwa secara keseluruhan e-learning siap untuk diimplementasikan, karena komitmen pimpinan berupa dana dan dukungan kebijakan untuk implementasi e-learning. Faktor yang perlu mendapat perhatian serius adalah infrastruktur teknologi, sumber daya manusia, dan konten.*

**ABSTRACT**

Technology plays an important role in life. Information and Communication Technology (ICT) has expanded educational options by enabling teachers and students to use technology to reorganize existing education and training systems. An adequate number of studies have identified the various benefits of implementing e-learning. However, not all institutions that implement online learning get the expected results. In addition, teachers in schools are not homogeneous. This study analyzes e-learning readiness in rural areas during the Covid-19 pandemic. This type of research is descriptive and quantitative. The subjects of this study were ten teachers, three IT staff, two foundation administrators, and 87 students from elementary and junior high schools. Data was collected using questionnaires and interviews. Data were analyzed using Aydin and Tasci's E-Learning Readiness Score, which describes learning outcomes. The results of this study indicate that overall, e-learning is ready to be implemented due to the leadership's commitment in the form of funds and policy support for the implementation of e-learning. Factors that need serious attention are technology infrastructure, human resources, and content.



## 1. INTRODUCTION

Technology plays a crucial part in every aspect of life (Raja & Nagasubramani, 2018; Zafar, 2019). In recent years, Information and Communication Technologies (ICTs) have opened new opportunities in education (Gilakjani, 2017; Timbi-Sisalima et al., 2022; Uerz et al., 2021), allowing teachers and students to implement technology and redesigning the existing education and training systems (Bandyopadhyay et al., 2021; Basak et al., 2018). Education around the world is undergoing fundamental changes in this era of globalization. Technology can be said to be a result of science's development in the education world (Fu & Hwang, 2018; Ying et al., 2021). Therefore, education itself must utilize technology that will assist in implementation. Digital technology has also been used for learning facilities and tools in educational institutions (Meinzen-Derr et al., 2017; Qureshi et al., 2021). This technology has a negative impact if not used wisely. It causes teachers and students to use technology wisely. Technological developments have also revolutionized the current way of learning, known as e-learning. (Hu & Zhang, 2020; Wu et al., 2021).

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E-learning means learning supported by a computer network (Alnassar et al., 2021; Ntshwarang et al., 2021; Poulova et al., 2022). E-learning is commonly referred to as the intentional use of networked information and communication technology in teaching and learning (Chitra & Raj, 2018; Timbi-Sisalima et al., 2022). Students interact with teachers and other pupils and are not physically present to participate (Mariono et al., 2021; Singh & Thurman, 2019). The majority of names, for example, online learning, web-based learning, and blended learning refer to the capacity to use a computer connected to a network enabling learners to conduct learning from anywhere at any time and by any means (Dhawan, 2020; Mariono et al., 2021). Elearning is a critical instrument for enhancing the quality of teaching and learning (A. S. Alqahtani, 2019; Ntshwarang et al., 2021; Supriyatno et al., 2020; Uerz et al., 2021). Furthermore, it can improve students' knowledge, skills, and performance (Elfaki et al., 2019; Gilakjani, 2017; Hu & Zhang, 2020; RMO et al., 2020). It gives students greater access to education than traditional methods (Elfaki et al., 2019; Hermanto & Srimulyani, 2021). In its implementation, e-learning requires the readiness of both infrastructures, human resources (teachers/instructors), and organizational culture (Scherer et al., 2021; Y Sonatha & M Azmi, 2018).

E-learning can also be regarded as a modern learning method that helps distance learning activities. Through E-learning, teachers can deliver learning content appropriately and quickly (Valverde-Berrocoso, Garrido-Arroyo, et al., 2020; Wulandari et al., 2020). In addition, e-learning can provide students with a learning experience using technology (Ali & Maksum, 2020; Hariyanto & Köhler, 2020). E-learning can deliver teaching materials and increase knowledge by using internet media. In implementing e-learning, all parties must master the technology so that learning can run smoothly. Adequate research has identified various benefits from implementing e-learning, yet it does not stand that all institutions that implement online learning get the results as expected (A. Y. Alqahtani & Rajkhan, 2020; Dewantara & Dibia, 2021; Wu et al., 2021). Some organizations are not ready to implement e-learning because they experience challenges in technology, organization, culture, lesson design, and challenges by teachers and students. (Andersson & Grönlund, 2009; Putra et al., 2021).

It is challenging to implement e-learning due to inadequate infrastructure, limited teachers' ICT capabilities, and different fiscal policies (Kibuku et al., 2020; Paling & Sitorus, 2021). Even in some cases, students have difficulty providing online learning tools (Dewantara & Dibia, 2021). Teachers in schools are not homogeneous, and different subgroups may require different support approaches (Ariesta, 2019; Iptian, 2019; Scherer et al., 2021). Measurement of teacher perceptions in rural areas also shows that most teachers are not ready for e-learning due to lack of planning and preparation (Kmurawak & Mandowen, 2021).

Amid various limitations, e-learning must still be carried out during the Covid-19 pandemic.(Valverde-Berrocoso, del Carmen Garrido-Arroyo, et al., 2020). Especially in rural areas with low internet penetration rates. Schools and students face challenges in conducting online learning, such as in Papua, with low internet penetration rates and human resource indexes. (APJII, 2019; Badan Pusat Statistik, 2019). The significance of this research lies in an in-depth study of how to assess the performance of e-learning in schools in rural areas with various limitations. The previous research discussed teacher perceptions of online learning during the pandemic and the study of the effectiveness of online learning with the following categories: availability of facilities, complete knowledge, ideal learning time, student responses, and teacher abilities (Kmurawak & Mandowen, 2021; Paling & Sitorus, 2021). This study will overview various obstacles, challenges, and learning strategies applied in schools from multiple stakeholder perspectives. This study aims to analyze school readiness in implementing e-learning. Measurement of readiness to carry out online learning, known as e-learning readiness, is expected to show the readiness organizational of schools to implement e-learning. Measurement of Elearning Readiness (ELR) implementation itself will determine the condition and suitability of the organization's strategy compared to standard conditions (Adiyarta et al., 2018; Napitupulu et al., 2019).

## 2. METHOD

This quantitative descriptive study analyzes the readiness to implement e-learning in schools in rural areas. This research was conducted in five stages. In the first stage, the writer determines the research questions. The research questions were prepared based on a literature review related to the implementation of e-learning in rural areas. The second stage is conducting a literature study. The literature study aims to find research gaps and the uniqueness of the research, which is supported by other studies. The third stage is developing a research framework. In this stage, the problem boundaries are arranged, the research methods used, data collection methods, data processing, and data analysis. The next stage is to distribute the questionnaire instrument. Instruments are distributed online and offline. Offline is done by distributing questionnaires in schools, while for those who do not have time, the process of distributing questionnaires is done online, using google forms, which are distributed through class Whatsapp groups. After the data is obtained in CSV form, the fifth stage is processing the data. The statements presented on a Likert scale will be weighed and processed. The results of the processed data are analyzed to finally be presented in a usual manner about the score proposed by Aydin and Tasci. The score of each factor determines school readiness in implementing e-learning which is described in

five main indicators. The subjects of this study were ten teachers, three IT staff, two foundation administrators, and 87 students from the Papua Kasih Elementary and Middle School located on the outskirts of Heram district, Jayapura City, Papua. The data was collected using questionnaires and interviews. The grid of interview instruments and questionnaires showed in Table 1. To find out or map the level of organizational readiness, we used the Aydin and Tasci scale, which divides readiness into four groups showed in Table 2.

**Table I.** Grid of Factors, Indicators, and Supporting Research

| Factors | Indicators | Total List of Questions |
|---|---|---|
| Policies (Mercado, 2008) | Organizational Policy | 1 |
| | Commitment | 2 |
| Technology Infrastructure (Mercado, 2008; Sharma et al., 2015) | Infrastructure | 2 |
| | Internet Access | 3 |
| Human Resources (Mercado, 2008) | Motivation | 5 |
| | Technical Competence | 1 |
| | Time Management | 3 |
| | Independence | 3 |
| | Confidence | 3 |
| Financial (Alnassar et al., 2021; Mercado, 2008) | Budget Readiness | 1 |
| | Budget allocation | 1 |
| Content (Sulistio, 2013) | Availability | 1 |
| | Content Creator Availability | 1 |

**Table 2.** Level Status of Elearning Readiness Aydin and Tasci Score

| Score | Status | Level |
|---|---|---|
| 1.00 - 2.60 | Not ready need much work | Level 1 |
| 2.61 - 3.40 | Not ready need some work | Level 2 |
| 3.41 – 4.20 | Ready, but needs a few improvements | Level 3 |
| 4.21 - 5.00 | Ready go-ahead | Level 4 |

## 3. RESULT AND DISCUSSION

**Result**

This study uses a questionnaire with five factors, 13 indicators, and 27 statements that measure the readiness for e-learning implementation. Based on a questionnaire in the form of a google form distributed to 102 respondents at the Papua Kasih school, it was concluded that the Papua Kasih School was ready to implement e-learning, with some minor improvements. Referring to Aydin and Tasci's Status of Elearning Readiness Level, the overall score is 3.41. In comparison, the distribution of each factor is depicted in Figure 1.

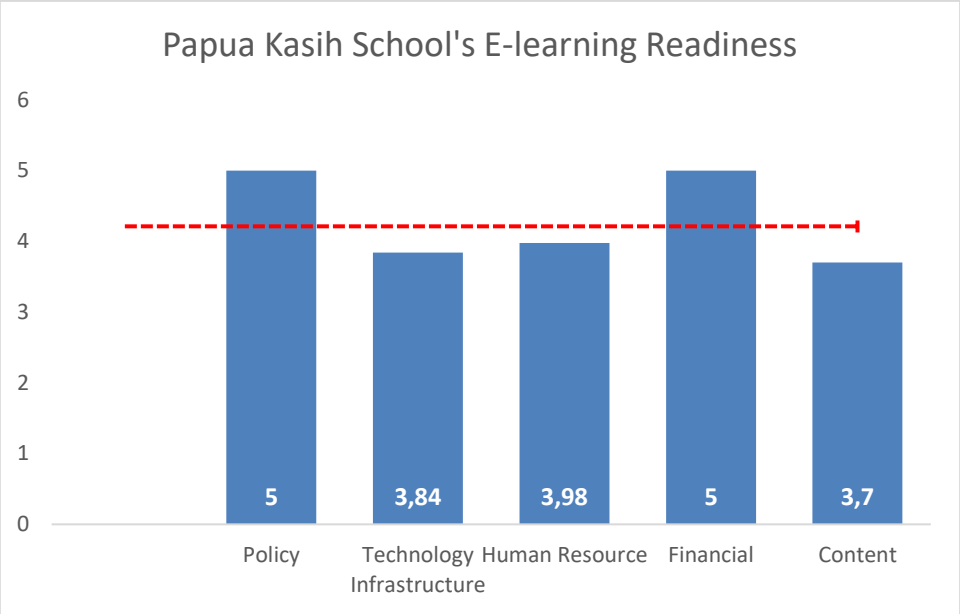


**Figure 1.** Factors of E-learning Readiness

When referring to Aydin and Tasci's E-learning Readiness scores, two factors have the highest: policy and financial. Meanwhile, human resources, technology infrastructure, and content are ready but need improvement. Based on this score, the lowest score is the content factor. The policy factor has a level of readiness at level 4 (ready, go ahead). The policy factor consists of two indicators, namely organizational policy and commitment. Where the score obtained from the two indicators is five. The figure shows that the e-learning implementation initiative is by the mission of the Papua Kasih School organization. In addition, the Management/Foundation has a solid organizational policy to implement e-learning into the learning system and a solid commitment to making it happen. The Technological infrastructure factor has a score of 3.84 which is at Level 3 (Ready but needs some improvement). This factor consists of two indicators, namely infrastructure (4.5) and Internet access (3.40). Based on the interviews with school principals, data obtained that schools' technological facilities and infrastructure are adequate for implementing e-learning—for example, many computers and supporting devices to conduct online learning. There is a computer laboratory in building 1 (TK and SD) and building 2 (SMP), with approximately 20 computers. Most students have internet access and learning media such as telephones, tablets, and laptops. Meanwhile, students who do not have the equipment can study at school while still carrying out health protocols.

One of the obstacles identified from interviews with the IT team was an unstable internet connection. Where the hotspot location is uneven, and the speed is not stable. The discussion also revealed one of the causes of unstable internet: only one Internet Service Provider (ISP) in Jayapura City. The lack of internet providers causes the quality of service to be not optimal. In addition, if the fiber optic cable has problems, the internet cannot be used. For example, an earthquake in mid-2021 damaged optical fiber and disrupted internet activities in Jayapura City. This factor needs serious attention to ensure teachers get a large bandwidth capacity during video conferencing sessions. The Human resource factor got an average score of 3.98 and was at readiness level 3 (ready but needs some improvement). This factor consists of five indicators, namely: Motivation (4.20), Technical competence (4.52), time management (3.67), independence (3.33), and self-confidence (3.67). The indicator with the highest score is technical competence, and the lowest score is independence. Based on these indicator scores, it can be concluded that the characteristics of teachers and students are as follows: (1) Teachers and students have sufficient motivation to use e-learning. However, students need a slight improvement to increase motivation in learning, especially elementary school students. (2) Teachers and students have basic technical skills, such as navigating web pages, downloading files, and saving or opening files. (3) Students have managed their study time well but still need to learn to be more punctual in attending video meetings. (4) Students are more independent in learning but still need to be directed when facing obstacles or challenges. (5) Students have the confidence to communicate or attend an online discussion with other people. However, it is not optimal, so they still need a little development of their self-confidence to be more actively involved. Most Papua Kasih school teachers understand the use of ICT in learning, especially the Learning Management System (LMS). There are no obstacles to using computers and or existing LMS applications.

This factor stands at level 4 of readiness (*ready, go ahead)*, implying that the school is financially prepared to develop the e-learning system. If inspected from the indicators attained, it can be concluded that the

company's financial side is as follows: (1) The institution has sufficient funds for the implementation of e-learning, but it is minimal. (2) The institution has made a special endowment for e-learning. It is supported by a statement (recorded in the interview) of the Chairman of the Papua Kasih Foundation (Mr. Bagus) that Papua Kasih has sufficient budget allocation for e-learning development, both for initial setup and maintenance and further development. The Content Factor reached readiness level 3 with a score of 3.7. This factor consists of two indicators: availability (3.6) and learning content tools (3.8). This factor means that the content of the existing material is ready to be used, although it needs to be more supportive of the learning content. Facilities for creating electronic content in various formats are already available, but they are not maximized, requiring more additions. Based on interviews, teachers have used several interactive platforms to improve the quality of teaching, such as Kahoot for interactive quizzes, youtube for presentation videos, and Canva to create more creative learning content. Still, sometimes it is hampered by limitations in understanding the application. Some forms of learning materials in electronic form are available but still need improvement.

**Discussion**

Along with technological advances, e-learning has become an unavoidable necessity. For three decades, e-learning has been used in various educational institutions. The Covid-19 pandemic has caused online learning to be carried out at all levels, including in Indonesia (Kim & Sihyun Park, 2021; Owusu-Fordjour et al., 2020; Selfi et al., 2021). The Papuan love school is one of the schools that must change learning methods during the pandemic. The pandemic has caused many schools in the Papua region to have to adapt to adopt online education. (Alnassar et al., 2021; UNICEF, 2021). E-learning can be applied, but some challenges need the right solution. Many factors influence e-learning readiness. This learning method will be an obstacle for educational institutions with limited facilities, infrastructure, and human resources. In this study, schools and foundations have a significant commitment to implementing e-learning. Schools provide funds and support facilities for implementing e-learning. The facilities provided are in the form of internet access, ICT tools, and also IT consultants. This factor is in line with previous research, which stated that the support from the manager was in the form of technical and ensured sufficient funding so that the implementation of e-learning could be carried out correctly (Almaiah et al., 2020; Timbi-Sisalima et al., 2022).

According to the findings of this study, one of the most critical variables in e-learning adoption is technology infrastructure. Papua love school's score is 3.84. The school has provided internet access and supporting facilities. The biggest obstacle comes from internet access that has not been evenly distributed at several points and bandwidth capacity that is still not maximized. Need support from schools to increase internet access capacity in schools. Because access to information resources, supporting applications, and ICT infrastructure directly related to the learning process is crucial (Almaiah et al., 2020; Hermanto & Srimulyani, 2021; Wu et al., 2021).

The lowest score in the e-learning readiness factor is content. (3.7). The obstacles faced are regarding the availability of content and how to make up-to-date learning content. Teachers have provided learning content and submitted it to the school system's learning management. However, the teacher considered that what was prepared was not optimal. How to present material with PowerPoint is still not optimal because the teacher's understanding is still limited in accessing information related to good content. Teachers have trouble finding pictures or finding a suitable template to describe a topic. These findings are also in line with research conducted in Jayapura City that teachers find it challenging to present learning content well and know how to use technology and understand the academic field. (Kmurawak & Mandowen, 2021; Scherer et al., 2021). One crucial factor that needs to be improved is supporting facilities for learning. There needs to be government and stakeholder intervention to ensure the improvement of the online learning infrastructure (Adiyarta et al., 2018; Ekalestari et al., 2021). Besides being able to provide standardized home-based learning/teaching tools to educators and students, as well as increasing teacher capacity through online teacher training (Dewantara & Dibia, 2021; UNICEF, 2021; Zafar, 2019).

## 4. CONCLUSION

Although Papua Kasih School is ready to implement e-learning, human resource factors, infrastructure technology, and content need improvement. In rural areas with different facilities owned by students, e-learning cannot be optimally implemented. However, teachers and school administrators have taken the initiative to prepare supporting tools to ensure that students with limited supporting devices can participate in the learning process. Furthermore, school policy on financial support is the crucial element that plays a vital role in implementing e-learning.

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