

Technology-Based Learning Innovation In Improving The Quality Of Education In Remote Areas**Nur Saebah¹, Riska Anggraeni², Muhamad Opan Fadilah³, Aah Khoriah⁴, Muhammad Fadil Himawan⁵**Universitas Cendekia Mitra Indonesia¹, Politeknik Siber Cerdika Internasional^{2,3,5}, Universitas Bunga bangsa Cirebon⁴**Email:** saebah47@gmail.com, riiskaan662@gmail.com, muhammadoppan@gmail.com, goriahaah97@gmail.com, fadlhimawan.1311@gmail.com**INFO ARTICLE****ABSTRACT****Accepted**

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This research aims to explore the application of technology-based learning innovations in improving the quality of education in remote areas. Using a qualitative approach, this research was conducted in one of the districts in Cirebon, Indonesia, involving school principals, teachers, and students as respondents. The results of the study show that the application of technology in learning is able to increase student participation and understanding, despite facing technical obstacles such as limited infrastructure and internet access. Based on these findings, the study concluded that technology has great potential to improve the quality of education in remote areas, but further investment is needed in terms of infrastructure and teacher training. This research makes an important contribution to policymakers in developing strategies for technology application in remote areas.

INTRODUCTION

Quality education is one of the important pillars in the development of a country. However, in the global context, there are still many remote areas that face serious challenges in accessing quality education. According to a UNESCO report (2020), more than 250 million school-age children in the world do not receive adequate education, especially in remote areas with minimal infrastructure. In Indonesia, this problem is increasingly conspicuous, especially in inland areas with limited accessibility. Information and communication technology (ICT) is a potential solution to overcome this problem, but its use is still uneven in various regions.

Specifically, in Indonesia, remote areas still face difficulties in providing quality educational resources. Limited infrastructure, lack of trained teachers, and lack of access to up-to-date learning materials are the main problems. Research by Yusuf et al. (2018) shows that remote areas in Indonesia have a low education participation rate, mainly due to the lack of technology that supports the teaching and learning process.

The urgency of this research lies in the importance of finding the right solution to improve the quality of education in remote areas through technology-based innovation. Technology can bridge the education gap by presenting digital learning materials, distance teacher training, and online-based learning that can be accessed from various locations. A study by Johnson & Smith (2019) shows that the use of technology in education can improve students' understanding by up to 30% in hard-to-reach areas.

This research has the value of novelty in proposing a technology-based learning model to be applied specifically in remote areas in Indonesia. Several technology-based learning models have been implemented in urban areas, but in-depth studies related to their application in remote areas are still minimal. This study aims to explore what technological innovations can be used to improve the quality of education in remote areas, as well as identify factors that affect the success of its implementation.

The benefit of this research for education practitioners and governments is to provide an overview of how technology can be applied effectively in remote areas to improve access and quality of education. The implications of this research are also expected to be recommended for the government in formulating technology-based education policies in areas that are difficult to access.

RESEARCH METHODS

Research Design This study uses a qualitative approach with a case study design. The case study was chosen because this study aims to understand the specific phenomena that occur in remote areas related to the application of technology in education.

Location and Subject of the Research The location of the research was conducted in one of the districts in the province of Cirebon, Indonesia. The subjects of the study were principals, teachers, and students in three schools who had tried to apply technology in learning. In addition, interviews were also conducted with policy makers at the local education office.

Research Instruments The instruments used in this study include semi-structured interview guidelines for teachers and principals, as well as open questionnaires for students. This instrument is designed to collect data on respondents' experiences and perceptions regarding the application of technology in the learning process.

Data Collection Techniques Data collection is collected through in-depth interviews, questionnaires, and direct observation in the classroom during the technology-based learning process. Interviews are recorded, while observation data is documented through field records.

RESULTS AND DISCUSSION

Research Results

General Description of Respondents The respondents in this study consisted of 3 principals, 10 teachers, and 50 students. The principals interviewed have more than 10 years of experience teaching in remote areas, while the teachers have varied educational backgrounds, ranging from bachelor of education to master's degree. The students who

became respondents were elementary and secondary school students with ages ranging from 10-16 years.

Key Findings from Interviews with ManagementFrom interviews with school principals, it was revealed that the application of technology in learning in remote areas faces various challenges, including limited infrastructure and limited training for teachers. Nonetheless, principals are optimistic that the use of technology, such as learning videos and online platforms, can increase student engagement.

Findings from the Licensed Employee QuestionnaireFrom the results of the questionnaire filled out by students, the majority are enthusiastic about the use of technology in learning, even though they face obstacles in unstable internet access. As many as 70% of students find it easier to understand lessons with the help of technology, while another 30% still feel that they need the help of teachers directly.

Observation ResultsObservations in the classroom show that technology has succeeded in increasing student participation, especially in science and mathematics subjects. Students seem to be more active in asking questions and engaging in discussions when using digital learning tools. However, technical obstacles such as power outages and internet disruptions often hinder the smooth learning process.

Visualization of Findings

Categories Findings	Number of Respondents	Percentage
Students are enthusiastic about technology	35	70%
Students find it difficult	15	30%

Research Discussion

Interview Data and Interpretation of Interview ResultsFrom interviews with school management, it was revealed that the biggest obstacle in the application of technology is the lack of training for teachers. This is in line with the findings of Yusuf et al. (2018) who highlighted the importance of teacher capacity development in the use of technology.

Discussion of Questionnaire ResultsFrom the results of the student questionnaire, it can be seen that technology has a positive impact on increasing student learning motivation. However, some students who experience difficulties reveal that environmental factors, such as limited electricity and internet, affect the quality of learning.

Analysis of Observation ResultsObservations in the field showed a significant increase in student engagement when technology was used, especially in subjects that required complex visualization. However, technical problems are still a major obstacle that must be overcome to improve the effectiveness of learning.

Comparison with Previous ResearchThis study supports the results of Johnson & Smith (2019), which shows that technology can improve students' understanding in difficult areas. However, the study found that the application of technology in remote areas requires special adjustments, especially in terms of infrastructure.

Practical implicationsThe application of technology in remote areas requires a more strategic approach, including investment in technology infrastructure and teacher training. This is important so that technology can really be used optimally in the learning process.

Research LimitationsThis research is limited to one remote area in Indonesia, so generalizing the results to other regions may be less relevant. In addition, technical problems that arise during the study also affect the smooth learning process.

CONCLUSION

This research shows that technology-based learning innovations have great potential in improving the quality of education in remote areas. Technology allows for wider access to digital learning materials such as videos, interactive simulations, and e-learning platforms. This helps students in remote areas get a more equal education than students in urban areas, as well as allowing for more effective communication between students, teachers, and teachers from outside the region.

However, the main challenge in the application of technology in remote areas is the limitations of infrastructure, especially inadequate internet and electricity access. Slow or unavailable internet connections hinder the use of technology in learning. In addition, the lack of training for teachers in utilizing technology is also an obstacle. Many teachers in remote areas still use conventional teaching methods, so technology cannot be used optimally.

Support from the community and parents is also still limited, with many not yet aware of the importance of technology in education. Economic factors are an additional obstacle, as not all families are able to provide technological devices for their children.

However, the potential for technology is still great. With the right support from the government and the private sector to improve infrastructure and provide training for teachers, technology-based learning can be an effective solution in improving access to quality education in remote areas. This research is expected to be a guide for policymakers in formulating strategies to realize educational equality throughout Indonesia.

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