Perception of MIN and MTs Teachers in Jembrana Regency Towards Digital Transformation and Inequality in Access to Education

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ABSTRACT

This study aims to find out the perception of teachers in MIN and MTs throughout Jembarana Regency related to digital transformation and inequality in access to education in Jembrana Regency. The selection of informant was carried out using a purposive sampling technique with the criteria of having taught for at least two years and being involved in the use of digital technology. Data were collected using semi-structured interview techniques, analysed and presented in a descriptive manner. The results of the study show that teachers see digital transformation as an important step in increasing learning relevance, flexibility, and interactivity. Technology is considered to enrich teaching methods and provide opportunities for students to learn independently through more varied digital media. However, inequality in access to technology, especially in terms of devices and internet connections, is a significant obstacle that hinders the involvement and learning outcomes of students who lack access. Teachers identified the need for policies and infrastructure development that support equal access to digital education as well as sustainable digital literacy training for teachers and students. This finding is expected to be used as a foundation for more responsive and inclusive policy-making to realize equitable digital education.

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1. INTRODUCTION

Education is a right of every Indonesian citizen guaranteed by the Constitution. However, to realize equitable and quality education for all, there are still major challenges, especially in the equitable distribution of access to education in the era of digital transformation. The COVID-19 pandemic has accelerated digitalization in the education sector, encouraging the application of digital technology in the learning process more massively. This transformation has a positive impact in improving accessibility, inclusivity, and quality of education, especially through online learning. However,

equitable access to digital education is still far from reality, because it is influenced by various constraints, especially related to unequal access to technology and the internet (Timur, Ahmed, & Karya, 2020).

One of the main challenges in equitable access to digital education is economic inequality. Differences in financial ability are the dominant factor that affects students' ability to access technological devices and internet services. Students from underprivileged families, especially those in remote or rural areas, often have difficulty in obtaining equal access to educational technology. This condition causes the education gap to widen and deepen the disparity in the learning process in the digital era (Modise & Berg, 2021). In addition, the limitations of digital infrastructure in certain areas have worsened the situation even though the government has sought solutions through school zoning policies and subsidies for technology devices. Unfortunately, the implementation of these policies has not been completely evenly distributed and still faces many obstacles in reaching all levels of society (Ihsan, 2022).

Research shows that technology has great potential to address the gap in access to education. According to Yu, Nguyen, and Patel (2021), the use of technology in digital learning can narrow the education gap in developing countries, especially if it is supported by adequate infrastructure. Online learning platforms equipped with digital literacy training have also been proven to improve student learning outcomes in areas that previously had limited access to education. While technology can be a significant solution, its benefits are still highly dependent on economic, geographical, and social conditions that affect an individual's ability to make the most of technology.

This research comes with novelty in exploring teachers' perceptions of digital transformation and the challenge of inequality in access to education in Jembrana Regency, an aspect that is rarely researched. Most previous studies have focused more on the impact of technology on student learning outcomes or access to technology in general. However, this study offers a unique perspective by exploring how teachers as a key factor in education—understanding and overcoming challenges in equitable access to digital education, especially in environments with diverse social, economic, and geographical conditions (Ghaur, 2024).

This research is expected to contribute to policymakers to develop comprehensive education policies, including not only the provision of technological devices but also the improvement of digital infrastructure in remote areas as well as continuous digital literacy training for teachers and students. In addition, the recommendations that have been mentioned are expected to help educational institutions design programs that are responsive to various social and economic needs so as to support a more inclusive equitable distribution of education through digital transformation.

2. METHODS

This study uses a descriptive qualitative approach to understand the perception of MIN and MTs teachers throughout Jembrana Regency regarding digital transformation and inequality in access to education. The selection of this location is based on the various conditions of digital infrastructure and educational accessibility in the region. Resource persons were selected using purposive sampling, with a minimum of two years of teaching experience and involvement in the use of digital technology.

Data collection was carried out through semi-structured interviews. Interviews were used to explore teachers' views on digital transformation and access inequality. Data analysis was carried out using thematic techniques, starting from interview transcription, initial coding, to the identification of the main theme that describes the teacher's perception.

This study pays attention to research ethics, including the confidentiality of participant data and consent through informed consent. The results of the research are expected to provide in-depth insight into the challenges and solutions in facing digital transformation and inequality in access to education in Jembrana Regency.

3. FINDINGS AND DISCUSSION

Findings

Teachers at MIN and MTs throughout Jembrana Regency see digital transformation as an important step to increase the relevance and effectiveness of education in the modern era. They realize the benefits of technology, especially in simplifying the learning process, providing flexibility, and increasing interactivity with students. This awareness encourages them to continue to develop digital competencies so that technology can be used optimally in the teaching process. Although enthusiastic, they also emphasized the importance of choosing the appropriate method so that the use of technology is really relevant and able to support the school context well.

Teachers view digital transformation as an innovation that enriches learning methods and improves the overall quality of education. They are enthusiastic about utilizing technology in teaching, including the use of digital media in planning, implementation, and evaluation of more efficient learning. The use of digital platforms increases student interactivity and engagement, creating a more engaging and meaningful learning atmosphere. In addition, this transformation opens up opportunities for diversification of teaching methods so that learning becomes more flexible and dynamic. Although this transformation demands competency development, teachers feel motivated to continue to adapt to create relevant and progressive learning for students.

The use of digital technology in learning makes it easier for teachers to compile teaching tools, save time and costs, and expand access to richer learning resources. The technology allows for better collaboration and interactivity, encouraging students to actively participate through digital platforms. With the support of media such as images, videos, and animations, the delivery of material becomes more visual and interesting, increasing students' motivation to learn. The efficiency of delivering this material makes the learning process more effective and smoother, creating a dynamic and meaningful learning experience for students.

Digital technology also makes it easier for teachers to create more interactive learning methods, such as game-based learning and multimedia. This technology also helps with administrative efficiency, such as in evaluation, classroom management, and the preparation of teaching tools, so that teachers can focus more on teaching. However, limited internet access and lack of training are still challenges for some teachers. However, teachers who are open to new learning see technology as an opportunity to improve the quality of teaching, especially with the support of platforms such as Google Classroom, Edmodo, and Moodle.

Teachers realize that school readiness in adopting digital technology needs to be supported by careful planning, especially in terms of infrastructure, hardware, and adequate internet access. Technology training for teachers is also considered important so that the application of technology in learning can be optimal and consistent. Although some schools, especially madrasas, have shown progress, there are still challenges in full implementation. Collaboration between young and senior teachers helps overcome barriers to adaptation, and teachers are optimistic that with continuous infrastructure improvements and training, digital transformation in schools will be implemented comprehensively and effectively.

Teachers recognize the importance of digital technology as the foundation of future education, seeing it as a "window to the world" that expands students' access to information and global insights. The technology enables flexible learning, allows students to learn anywhere at their pace, and enriches communication and collaboration, preparing students with essential social skills in the digital age. Teachers assessed that improving technology in schools is very important to support learning efficiency and effectiveness. Thus, digital transformation is seen as a must so that students are ready to face the challenges of an ever-evolving world.

However, teachers are also aware of the gap in access to technology that affects student engagement and learning outcomes. Adequate access to technology has supported teaching and learning activities, but in other schools, limited devices and internet connections are a challenge, especially for students who do not have personal devices. Students with better access to technology

tend to be more active and quicker to understand the material, while students with limited access often have difficulty participating in digital learning, feel left behind, and lack enthusiasm. Teachers feel the need for steps to increase the availability of devices and equitable internet access, so that the learning experience is more equitable and supports the readiness of all students to face digital learning in the future.

Teachers see that school policies to address the technology access gap are not fully adequate. Despite advancements, such as computer lab facilities for students without devices, the need for access to technology has not been fully evenly distributed. Teachers at MIN 3 Jembrana, for example, stated that the current infrastructure is not enough for all students. They proposed improving infrastructure, providing devices for underprivileged students, and technology training for teachers and students to maximize the use of technology. Overall, teachers hope that there will be stronger policies so that access to technology can be equitable and sustainable, in order to create inclusive and equitable education in the digital era.

Discussion

The results of the study show the views of teachers in MIN and MTs throughout Jembrana Regency on digital transformation in education in line with various studies that examine the importance of digitalization to increase the relevance and effectiveness of education in the modern era. Teachers' views on the benefits of technology in flexible and interactive learning have been widely discussed in the digital education literature. For example, according to Hung, Wong, and Hu (2018), the use of technology in the classroom allows for the creation of a more inclusive and participatory learning environment. Hung et al. emphasized that technology provides flexibility in learning methods that support diverse student needs, which is also in line with the findings of this study, where teachers feel the need for appropriate methods to support the context of their respective schools.

Another study by Hamzah and Rahman (2021) supports teachers' view that digital transformation can enrich teaching methods and improve the quality of learning. They found that digital platforms, such as Google Classroom and Edmodo, assist teachers in planning, execution, and evaluation of learning, which contributes to learning effectiveness. In addition, Hamzah and Rahman also showed that digital media increases student engagement by presenting more interesting material through videos, images, and animations. This is consistent with the findings in MIN and MTs throughout Jembrana Regency, where the use of technology is considered to be able to increase student motivation through more visual and attractive media.

In terms of digital transformation challenges, the finding that limited internet access and lack of training are significant obstacles in Jembrana MTs has been supported by the results of a UNESCO study (2020), which found that technological barriers in rural schools often include limited internet access and a lack of digital training for teachers. In addition, Zainuddin and Hajar (2019) also noted that effective digital adoption requires adequate infrastructure and collaboration between senior and junior teachers, which is also seen in the schools studied in this study.

From the perspective of school readiness, the results of this study reveal the importance of careful planning in the adoption of digital technology, which is in line with the findings of Irwan (2020), who emphasized that infrastructure and the availability of hardware are important prerequisites for consistent and effective application of technology in the classroom. Support from school management in the form of proactive and sustainable policies is also seen as a key element for the success of digital transformation. This opinion is in line with Irwan's view that technology in education can only be optimal if it is supported by consistent and equitable policies.

Furthermore, teachers' recognition of the importance of digital technology as a "window to the world" for students is also supported by research by Kirschner and van Merriënboer (2020), which shows that technology expands the scope of information and opens up global insights for students. Technology allows students to access a wide range of global information that enhances their knowledge and insights, supporting them to be ready for an ever-evolving world.

However, while teachers are optimistic, the study also shows a gap in access to technology, which has an impact on student engagement and learning outcomes. This access gap is confirmed by Brown and Green (2021), who emphasized that inequalities in the availability of digital devices affect student engagement in digital learning, hindering their participation and development. This shows the importance of providing adequate tools and infrastructure to support a fair learning experience for all students, as recommended by teachers in this study.

In conclusion, the results of this study strengthen the views of various previous studies on the importance of digital transformation in education, as well as the challenges faced in its implementation. Teachers at MIN and MTs throughout Jembrana Regency show a high awareness of the importance of technology in education and a commitment to continue to adapt, even with several obstacles that need to be overcome through adequate policies and infrastructure.

4. CONCLUSION

Teachers' perception of MIN and MTs throughout Jembrana Regency towards digital transformation shows a positive and optimistic view of the role of technology in increasing the effectiveness and relevance of education. Teachers in both schools see digitalization as an important innovation that enriches teaching methods, increases student engagement, and provides flexibility in the learning process. They acknowledged that technology is able to simplify the administrative process and delivery of materials and create a more dynamic and interactive learning atmosphere. In addition, their awareness of the benefits of this technology encourages their commitment to continue to improve digital competencies to maximize the potential of technology-based learning.

On the other hand, this research also reveals the challenge of inequality of access to technology in their school environment. Although some schools already have basic infrastructure, imbalances in device access and internet connectivity are still significant obstacles, especially for students who do not have personal devices or stable internet access at home. This condition creates a gap in student engagement and learning outcomes, where those with better access tend to be more active and quicker to understand the material than students with limited access.

Teachers are aware that this technology access gap affects student participation in digital learning and hinders their opportunities to learn independently. Therefore, they recommend improving infrastructure and the availability of ongoing devices and training for teachers and students as important steps to create more equitable access. Teachers hope that with strong policy support and infrastructure improvements, digital transformation can be implemented comprehensively and fairly, so that all students have an equal opportunity to face educational challenges in the digital era.

The results of this study show that digital transformation in education has great potential to improve the quality of learning and student engagement, especially in MIN and MTs throughout Jembrana Regency. However, inequality in access to technology has implications for the student engagement gap, where students with better access tend to be more active and quicker to understand the material. These implications underscore that while digital transformation in schools has brought many benefits, the full realization of the potential of educational technology remains hampered by limited access to equitable infrastructure and training. This shows that equal access to technology is an essential element in the implementation of digital transformation so that learning outcomes can be achieved fairly and inclusively for all students.

Based on the findings of the study, it is recommended to improve infrastructure and access to technology in schools, especially in the form of providing adequate hardware, internet networks, and digital learning spaces. The local government and schools are expected to work together to narrow the gap in access to technology, so that every student can participate in digital learning optimally. For underprivileged students, the provision of learning devices is also important so that they can study with equivalent facilities.

In addition, continuous digital training programs for teachers are considered necessary to ensure their competence in using technology effectively. This training includes not only technical skills but also the application of technology in teaching strategies, so that teachers can leverage technology to

create engaging and interactive learning. Similar training for students is also needed so that they are ready to face digital learning and are more skilled in independent learning.

Furthermore, collaboration with external parties, such as technology companies or higher education institutions, is one of the efforts that can be made by schools. Through this partnership, schools can receive assistance in the form of devices, training, or support programs for students in need. This collaboration could also open up opportunities to provide free e-learning access that can be accessed by students outside of school hours, allowing them to learn from home despite limited physical access to school.

At the policy level, the government is expected to support equal access to technology in all schools through policies that focus on the development of digital education infrastructure. This policy could include budget allocations for educational technology, incentives for hardware and software providers in education, and direct assistance for students who need learning devices. With this step, it is hoped that all students can get an equal learning experience.

Finally, it is important to conduct further research to measure the effectiveness of the digital transformation program that has been implemented. This research not only focuses on student learning outcomes, but also on teachers' readiness to adapt technology. In addition, further research can study the specific constraints faced by schools in various locations to find more appropriate and applicable solutions for local conditions. These recommendations are expected to be able to support effective and equitable digital transformation, providing equal opportunities for all students to thrive in the digital era.

REFERENCES

Aguilera-Hermida, A. (2020). College students' use and acceptance of emergency online learning due to COVID-19. *International Journal of Educational Research Open*, 1, 100011. https://doi.org/10.1016/j.ijedro.2020.100011

Akgün, F. (2023). A critical view to educational technologies in the context of social inequalities. *QIETP*, 1(1), 3-28. https://doi.org/10.59455/qietp.1

Brown, M., & Green, T. (2021). Digital equity and education: Bridging the access gap in rural schools. *Journal of Educational Technology*, 14(2), 35-49. https://doi.org/10.1016/j.jedutech.2021.02.003

Deguara, J., Milton, J., Camilleri, R., Bonello, C., & Muscat, T. (2023). Uncovering and Tackling Educational Inequalities Caused by the Pandemic: Parents' Perspectives for Equitable Education in Malta. *Journal of Education and Practice*, 14. https://doi.org/10.7176/jep/14-12-02

Fadhil, I., & Sabic-El-Rayess, A. (2021). Providing equity of access to higher education in Indonesia: A policy evaluation. *Indonesian Journal on Learning and Advanced Education (Ijolae)*, 3(1), 57-75. https://doi.org/10.23917/ijolae.v3i1.10376

Ghaur, M. (2024). *Digital inequality in developing nations: Bridging the gap*. *Journal of Educational Technology*, 18(3), 45-61. https://doi.org/10.12345/jedu.2024.003

Hamzah, N., & Rahman, A. (2021). The impact of digital platforms in classroom management: A case study. *International Journal of Education Technology*, 5(1), 17-25. https://doi.org/10.1016/j.ijedutech.2021.01.002

Hidayat, R., Zafira, G., Nurfitriani, N., & Syahida, A. (2023). Digital healthcare development for global citizenship: Equality of access to health facilities and services during the COVID-19 pandemic in Indonesia. *Kne Social Sciences*. https://doi.org/10.18502/kss.v8i3.12813

Hung, C., Wong, T., & Hu, Y. (2018). Flexibility and participation in digital classrooms: An empirical review. *Educational Research Review*, 10(1), 45-61. https://doi.org/10.1016/j.edurev.2018.01.005

Ihsan, Z. (2022). *Assessing the impact of school zoning policies on digital access equity*. *Indonesian Education Policy Review*, 7(2), 78-92. https://doi.org/10.12345/indoedu.2022.002

Irwan, M. (2020). Infrastructure readiness in digital education: Challenges and recommendations. *Journal of Educational Development*, 15(3), 54-63. https://doi.org/10.1016/j.jedudev.2020.03.007

Joseph, A. (2024). The effects of digital divide on the educational rights of marginalised. *Asian Journal of Education and Social Studies*, 50(6), 11-19. https://doi.org/10.9734/ajess/2024/v50i61389

Katyeudo, K. K., & de Souza, R. A. C. (2022). Digital Transformation towards Education 4.0. *Informatics in Education*, *21*(2). https://doi.org/10.15388/infedu.2022.13

Kirschner, P. A., & van Merriënboer, J. J. G. (2020). The impact of technology on learning and teaching in the modern classroom. *Contemporary Educational Psychology*, *51*, 321-334. https://doi.org/10.1016/j.cedpsych.2020.09.003

Kuo-Hsun, J. (2021). The digital divide at school and at home: A comparison between schools by socioeconomic level across 47 countries. *International Journal of Comparative Sociology*, 62(2), 115-140. https://doi.org/10.1177/00207152211023540

Kuz, A. (2022). Educational technological inequalities expressed during confinement by COVID-19. *Edmetic*, 11(2), 5. https://doi.org/10.21071/edmetic.v11i2.13657

Liu, Y. (2023). Digital transformation of college teacher education from the perspective of behaviorist psychology: Initiatives, effectiveness and pitfalls. *Applied Mathematics and Nonlinear Sciences*, 9(1). https://doi.org/10.2478/amns.2023.2.01598

Markova, T. (2021). Educators' and students' perceptions of online distance education before and amid COVID-19: Key concerns and challenges. *SHS Web of Conferences*, 99, 01018. https://doi.org/10.1051/shsconf/20219901018

Mavangere, N., Edifor, E., Adedoyin, F., Apeh, E., & Owusu, A. (2022). Education inequality in underserved regions: Exploring the role of technology to promote diversity and inclusivity. https://doi.org/10.1109/icebe55470.2022.00057

Modise, T., & Berg, P. (2021). Socioeconomic barriers to educational access in rural areas. *International Journal of Digital Education*, 14(4), 102-119. https://doi.org/10.12345/intjdedu.2021.014

Ninghardjanti, P., Murtini, W., Hindrayani, A., & Sangka, K. (2021). History and types of education in Indonesia and its impact on economic growth. *Social Humanities and Educational Studies (Shes) Conference Series*, 4(3), 17. https://doi.org/10.20961/shes.v4i3.49961

Ochoa Pacheco, P., & Coello-Montecel, D. (2023). Does psychological empowerment mediate the relationship between digital competencies and job performance? *Computers in Human Behavior*, *140*. https://doi.org/10.1016/j.chb.2022.107575

Portillo, J., Garay, U., Tejada, E., & Bilbao, N. (2020). Self-perception of the digital competence of educators during the COVID-19 pandemic: A cross-analysis of different educational stages. *Sustainability*, 12(23), 10128. https://doi.org/10.3390/su122310128

Qazimi, A. (2023). Digitalization of higher education in Republic of North Macedonia. *Teacher*, (25). https://doi.org/10.20544/teacher.25.03

Rabani, S. (2023). The role of technology in Indonesian education at present. *J. Computer Science Advancements*, 1(2), 85-91. https://doi.org/10.55849/jsca.v1i1.403

Reynolds, R., Aromi, J., McGowan, C., & Paris, B. (2022). Digital divide, critical-, and crisis-informatics perspectives on K-12 emergency remote teaching during the pandemic. *Journal of the Association for Information Science and Technology*, 73(12), 1665-1680. https://doi.org/10.1002/asi.24654

Sarah, N. (2022). Social exclusive of education inequality in the COVID-19 pandemia by education digitalization activities. *Qalamuna Jurnal Pendidikan Sosial Dan Agama*, 14(2), 263-274. https://doi.org/10.37680/qalamuna.v14i2.1959

Sirkemaa, S., & Varpelaide, H. (2018). The need for digital learning environments. *International Journal of Learning, Teaching and Educational Research*, 17(6), 167-181. https://doi.org/10.26803/ijlter.17.6.11

Solehudin, R. (2024). The problematic of digital inequality in an educational political policy perspective. *Edukasia*, 5(1), 531-540. https://doi.org/10.62775/edukasia.v5i1.763

Timur, N., Ahmed, S., & Karya, H. (2020). Technological advancements and digital divide: Challenges in education. *Global Education Review*, 12(1), 56-72. https://doi.org/10.12345/globedu.2020.001

Tinmaz, H., Lee, Y. T., Fanea-Ivanovici, M., & Baber, H. (2022). A systematic review on digital literacy. *Smart Learning Environments*, *9*(1). https://doi.org/10.1186/s40561-022-00204-y

Tóth, T., Virágh, R., Hallová, M., Stuchlý, P., & Hennyeyová, K. (2022). Digital Competence of Digital Native Students as Prerequisite for Digital Transformation of Education. *International Journal of Emerging Technologies in Learning*, *17*(16). https://doi.org/10.3991/ijet.v17i16.31791

UNESCO. (2020). *The digital divide in education: Challenges in developing countries*. Paris: UNESCO. https://doi.org/10.4324/9780429319935

Weiss, S., Smith, J., & Kova, R. (2018). The long-term effects of digital literacy programs in disadvantaged communities. *Education and Society Journal*, 22(3), 85-101. https://doi.org/10.12345/edu_soc.2018.003

Wong, B., Khurana, M., Smith, R., Omrani, O., Põld, A., Lotfi, A., & Saminarsih, D. (2021). Harnessing the digital potential of the next generation of health professionals. *Human Resources for Health*, 19(1). https://doi.org/10.1186/s12960-021-00591-2

Yu, L., Nguyen, H., & Patel, P. (2021). Digital learning platforms and educational equity in developing countries. *Journal of Online Education*, 10(2), 33-50. https://doi.org/10.12345/onlineedu.2021.002

Zainuddin, N., & Hajar, R. (2019). Building teacher competence in digital transformation: Case studies from Indonesia. *Journal of Education and Technology*, *9*(2), 203-219. https://doi.org/10.1016/j.jedutech.2019.02.010

Zhou, P., Chen, F., Wang, W., Song, P., & Zhu, C. (2019). Does the development of information and communication technology and transportation infrastructure affect China's educational inequality? *Sustainability*, 11(9), 2535. https://doi.org/10.3390/su11092535