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Analysis of The Impact of Educational Technology on Reducing The Digital Gap in Remote Areas

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Abstract— *Rapid changes in educational technology have influenced various aspects of the world of education, including efforts to reduce the digital divide in remote areas. In this context, this research aims to analyze the impact of educational technology on reducing the digital gap at MI Ihyauddiniyah Kecik. This research uses a qualitative approach with case studies as the primary method. Research subjects included the Head of Madrasah, Deputy Head of Curriculum, Deputy Head of Student Affairs, Deputy Head of Facilities and Infrastructure, Teachers and Staff at MI Ihyauddiniyah Kecik. Data collection techniques were done through observation, in-depth interviews, and documentation analysis. Data analysis was done using data reduction methods, data presentation, and concluding conclusions drawing. The research results show that the application of educational technology at MI Ihyauddiniyah Kecik contributes significantly to reducing the digital divide. This technology facilitates access to a broader range of educational materials, improves learning quality, and supports students' digital skills in remote areas. Initiatives such as technology training for teachers, provision of digital tools, and development of technology-based educational content are crucial in creating more inclusive learning environments and increasing equality of educational opportunities. With the support of educational technology, MI Ihyauddiniyah Kecik has narrowed the digital gap and improved the quality of education in remote areas.*.

Keywords—*Educational Technology, Digital Divide, Remote Areas*

1 Introduction

Educational technology is essential in reducing the digital divide in remote areas. The application of technology requires the ability to adapt to changes and new challenges in the academic environment. Educational technology makes it possible to adapt teaching materials and methods more appropriately to the specific needs and conditions of remote areas (Suratman, 2023)[2]. Research conducted by Belva shows that the practical application of educational technology in remote areas not only increases educational accessibility but also encourages the development of digital skills and new knowledge for students (Belva Saskia Permana et al., 2024). Thus, integrating educational technology that is adaptive and responsive to local conditions can be an effective strategy for reducing the digital divide, ultimately contributing to improving the quality of education in these underserved areas.

Educational technology has a vital role in reducing the digital divide in remote areas because it directly affects access and quality of education provided (Baharun & Hasanah, 2023). Appropriate application of educational technology not only expands access to quality educational resources but also increases student engagement and motivation by providing relevant and interactive teaching materials (Liu et al., 2024)[5]. With technology, students in remote areas can access learning on a par with students in more developed areas, which contributes to improving learning outcomes and knowledge (Hasanah, 2024). In addition, educational technology helps teachers develop more innovative and adaptive teaching methods and provides a platform for ongoing professional training (Putra et al., 2024).

Technology implementation is also essential to maintain educational continuity and support the continuity of academic programs in remote areas, reduce the digital divide, and ensure that all students have equal opportunities to develop (Ocha et al., 2024)[9]. Therefore, educational technology plays a vital role in achieving the goal of inclusive and quality education in marginalized areas.

Several previous studies on this research theme are divided into at least five categories, namely, the first, (Sholikha et al., 2023) Shows that the use of mobile-based educational applications helps students in remote areas access quality learning materials. Second, (Cahyaningrum et al., 2023) Emphasized that introducing e-learning platforms and training for teachers and students helps overcome the limitations of educational infrastructure. Third, (Pebrianti et al., 2023) Said that there was a significant increase in access to learning materials and technological knowledge among students in remote areas. Fourth, (Zakariya et al., 2024) Revealed that implementing virtual classes and the distribution of technological devices reduces the digital divide by providing better access to quality education. Fifth, (Putra et al., 2024) States that students in remote areas experience increased technological skills and access to previously unavailable learning materials, reducing the digital divide.

From several research findings, the novelty lies in the holistic and integrated approach applied to evaluate the impact of educational technology in a specific local context. This research not only focuses on the technical aspects of technology application but also considers social and cultural factors that influence the effectiveness of technology in remote areas (Wayan Pitriani et al., 2024). In addition, this research highlights the success of innovative models in the distribution and use of technology that can potentially be adapted and applied in other similar regions, thus making a significant contribution to the development of more effective strategies for reducing the digital divide at national and international levels.

Starting from this, this research aims to analyze the impact of educational technology on reducing the digital divide in remote areas. This research will evaluate how the application of educational technology, such as digital devices and e-learning platforms, affects access and quality of education in regions that previously experienced limited infrastructure and resources. The main focus of this research is to understand the effectiveness of technology in overcoming existing barriers and how it can increase access and participation in education (Monalisa, 2023)[16]. Thus, this research aims to provide in-depth insight into the potential of educational technology to reduce the digital divide and recommend more effective strategies for improving the quality of education in remote areas.

This research argues that educational technology has great potential to reduce the digital divide in remote areas by providing better access to quality learning materials and educational resources. In regions that face limited infrastructure and resources, educational technology can bridge existing gaps by enabling students and teachers to access information, training, and support that was previously unavailable (Mustajab et al., 2020)[18]. By leveraging digital devices, e-learning platforms, and learning applications, educational technology can overcome physical and logistical barriers and improve the digital skills of students and teachers. This research assesses that the application of educational technology not only improves access to education but also has the potential to accelerate the distribution of academic quality in remote areas. Therefore, it is essential to evaluate the real impact of educational technology in local contexts to formulate effective and adaptive strategies for reducing the digital divide and improving the quality of education.

2 Method

This research uses a qualitative case study approach. This approach was chosen because it aims to understand in depth how to analyze the impact of educational technology on reducing the digital divide in remote areas. This approach allows researchers to explore the perspectives and subjective experiences of the parties involved. This research site is MI Ihyauddiniyah Kecik, Besuk District, and it aims to understand the impact of educational technology on reducing the digital divide in remote areas.

MI Ihyauddiniyah Kecik was chosen as the research location based on several strategic considerations. MI Ihyauddiniyah Kecik is located in a remote area that faces significant educational access and infrastructure challenges, making it a representative example for this study. As an academic institution in an underserved area, MI Ihyauddiniyah Kecik provides the opportunity to evaluate how educational technology can affect the quality and accessibility of education in an environment with limited resources. Additionally, this location allows researchers to observe the effects of educational technology in specific local contexts and identify implementation models that can be applied in similar areas. With a focus on MI Ihyauddiniyah Kecik, this research aims to produce in-depth insights into the challenges and opportunities of educational technology to reduce the digital divide in remote areas.

Participants were selected using a purposive technique; they were chosen with specific considerations and objectives. The reason for using this technique is that researchers need data in the form of information that can only be obtained from informants who certainly have more knowledge about the data that researchers want to get to produce data that meets expectations and is relevant to the title that has been determined. This research involved 9 participants: the Head of the Madrasah, the Deputy Head of Curriculum, the Deputy Head of Student Affairs, the Deputy Head of Facilities and Infrastructure, Teachers, and Staff. The informants have different occupational, educational, and gender backgrounds, so they must provide accurate information about the research theme. Selected participants meet specific criteria, namely that they already know how to understand educational technology towards reducing the digital divide in remote areas and ensure diverse representation in various stakeholder groups, enabling in-depth exploration of the dynamics of the impact of educational technology on reducing the digital divide in remote areas.

Table 1. Research Informants

Participants	**Gender**		**Educational Background**		**Informant Code**
	Male	**Female**	**Bachelor**	**Masters**	
Head of Madrasah	1	-	-	1	Ps
Deputy Head of Student Affairs	1	-	1	-	Rm
Deputy Head of Curriculum	1	-	1	-	AH
Deputy Head of Infrastructure	1	-	1	-	Sh
Teacher	2	1	2	1	AM, RA, SA
Staff	1	1	2		ZN, HS
Amount	**7**	**2**	**7**	**2**	**-**
Total	**9 Participant**				

The interview technique used in this research is a semi-structured interview technique, which means it has an interview guide, although there are interviews outside the guide. At the beginning of each interview, the researcher introduced himself and provided an overview of the interview topic. Agreements were made with participants to record interviews to improve accuracy and thorough documentation. By table 2, the researcher prepared several questions relevant to the research theme as a semi-structured interview. These recorded sessions and the accompanying transcripts served as a valuable resource for careful analysis and interpretation in this study. The researcher prepared several questions relevant to the research theme as a semi-structured interview. These questions were designed to explore the extent of the impact of educational technology on reducing the digital divide in remote areas.

Table 2. Interview Material

Participants	Material
Head of Madrasah	Madrasah strategies in implementing educational technology to overcome the digital divide.
Deputy Head of Curriculum	Technology integration in the curriculum and its impact on student competency achievement.
Deputy Head of Student Affairs	The influence of technology on student motivation and participation in learning activities.
Deputy Head of Facilities and Infrastructure	Readiness and challenges of technological infrastructure in supporting the learning process.
Teacher	Experiences and challenges in using technology to improve the teaching and learning process.
Staff	The role and contribution of staff in supporting the use of educational technology in madrasas.

Each interview lasted 30 minutes. The researcher used a recording device to capture the interview process and make written field notes. Interview results, including participant information, interviewer details, and interview transcripts, were transcribed. Respondents' names were replaced with codes such as AM-AFD (abbreviation for the informant's full name) to protect confidentiality and uphold research ethics.

Based on the interview transcripts, the researcher identified themes based on the research objectives. This process involved identifying themes in the interview data by thoroughly reviewing the interview transcripts several times until the researcher obtained a clear picture of the impact of educational technology on reducing the digital divide in remote areas. Furthermore, after the interview, the researcher assured participants that the interview recording would be kept confidential. This research interview protocol was essential in helping to guide in-depth, semi-structured interviews with participants. Semi-structured designs balance flexibility and an established framework, allowing researchers to delve deeper into a particular subject while remaining open-minded to unexpected results. This protocol serves as a methodological framework, which guarantees the uniformity of data collection procedures during interviews and allows the investigation of the main themes regarding the impact of educational technology on reducing the digital divide in remote areas.

Miles and Huberman's (1994) qualitative data analysis technique involves four steps, starting with the formulation of clear research objectives for the study (Köhler, 2024). This research aims to analyze the impact of educational technology on reducing the digital divide in remote areas. The initial data analysis stage includes collecting research data obtained through observation, interviews, and documentation as research notes. The second step in data reduction is summarizing, selecting key elements, and focusing on essential data that aligns with the research theme. This careful data reduction process aims to present a clear and concise picture of lecturers' career adaptation and work commitment. Next, the third step involves presenting the data through narrative text. The final step in the data analysis process includes drawing research conclusions based on data reduction. These conclusions were carefully crafted to synthesize the data collected. Data validity was ensured through data triangulation and review, which ensured consistency with research findings. To ensure the accuracy of the data collected, source triangulation was carried out by cross-referencing information from previous theories and studies related to various fields of education.

3 Findings And Discussion

Availability of Technology Infrastructure

Availability of technological infrastructure is the leading indicator in reducing the digital divide in remote areas, as stated by Mz as the Head of the Madrasah, "At MI Ihyauddiniyah Kecik, we have several computer units in the computer laboratory that can be used by students and teachers. We also have internet access via Wi-Fi connected to several devices for teaching and learning activities. The internet network at the school is quite adequate,

although it sometimes experiences problems, especially during bad weather. We continue to strive to improve this condition by collaborating with local internet service providers." As Deputy Head of Facilities and Infrastructure, talked Sh about maintaining and updating technological devices and plans to add or update technological infrastructure in madrasas. "The maintenance process is carried out routinely by appointed technicians, while equipment updates are carried out based on priority needs and available budget. We also seek support from various parties, including private and government institutions. We plan to increase the number of computer devices and improve internet connections to make them more stable. This plan is currently in the planning stage, and we hope it can be realized shortly." Furthermore, regarding the use and difficulties of technology in the classroom, AM, as a teacher, stated, "I use technology in the learning process regularly, especially for presenting material and accessing additional information. The use of technological devices helps students better understand the material more interactively. Sometimes, there are technical difficulties, such as an unstable internet connection or a damaged device. However, we can usually overcome this with help from the school or by carrying out simple repairs."

The informant's statement above shows that the availability of technological infrastructure, such as computers and internet access, is critical in reducing the digital divide in remote areas. Although the internet at the school sometimes experiences problems, especially during bad weather, efforts are ongoing to improve it. Maintenance of technological devices is carried out regularly, and there are plans to add computer equipment and improve internet connections. Technology is routinely used in the learning process, although technical difficulties sometimes arise, which can generally be overcome. This emphasizes the importance of adequate infrastructure to support education and reduce the digital divide.

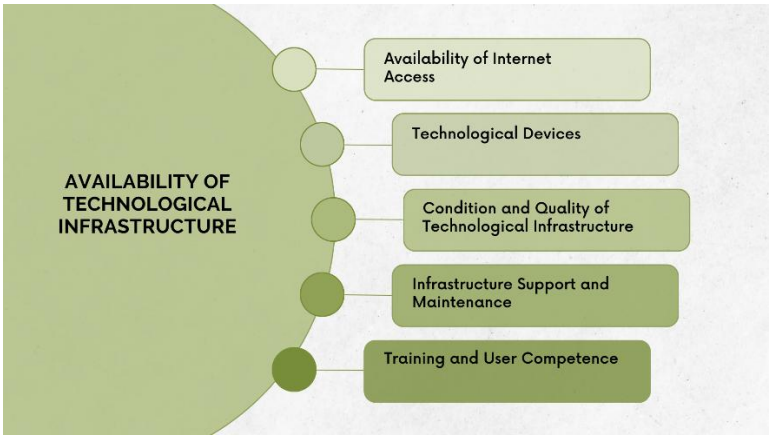

Figure 1. Availability of Technology Infrastructure

The figure 1, Technological infrastructure can be built through the availability of internet access, technological devices, condition and quality of technological infrastructure, infrastructure support and maintenance, user training, and competency. The availability of technological infrastructure involves several essential aspects, including internet access, technological devices, infrastructure conditions, maintenance support, and user training. Fast and stable internet access is the main foundation, enabling users to access digital resources and online services. Adequate technological devices that suit user needs also play a crucial role in the effective use of technology. The condition and quality of infrastructure, such as hardware and networks, must constantly be updated and maintained to ensure optimal performance. Responsive technical support is essential for resolving technical issues and properly functioning infrastructure. In addition, user training and competency are necessary to utilize technology effectively and achieve the desired goals.

The availability of technological infrastructure is essential in analyzing educational technology's impact on reducing the digital divide in remote areas, such as madrasas. Technological infrastructure includes various essential elements, such as internet access,

hardware (such as computers, tablets, and other devices), and supporting facilities, such as electricity and adequate study space (Miftah & Fahrurrozi, 2022). In remote areas, the main challenge is often limited access to this essential infrastructure. Restricted internet access, for example, can hinder educational technology that requires stable connectivity to access digital learning materials, participate in online classes, or use educational applications (Della Aprilia Kartika Putri et al., 2023). In addition, the lack of adequate hardware can cause inequality in learning opportunities, where only some students can make optimal use of educational technology (Agustian & Salsabila, 2021). Facilities such as electricity also play an essential role because a stable source of electricity makes the use of technological devices possible (Yusuf et al., 2023). Therefore, an analysis of the impact of educational technology in madrasas must consider how the availability and quality of technological infrastructure can influence the effectiveness of technology in reducing the digital divide. Integrated and sustainable infrastructure improvement efforts are vital in ensuring that all students in remote areas can access and utilize educational technology equally (Maulido et al., 2024).

Quality and Relevance of Educational Content

Quality and relevance of educational content is one form of reducing the digital divide in remote areas, as explained by AH as Deputy Head of Curriculum: "The educational content used at MI Ihyauddiniyah Kecik is quite good and by the curriculum set by the government. We use recommended textbooks and various digital learning resources relevant to the teaching material. Educational content is updated regularly, following guidelines from the education department and based on the latest developments in education. We also regularly evaluate teaching materials to ensure they suit students' needs." Deputy Head of Student Affairs Rm revealed how students respond to educational content that uses technology and the differences in academic achievement of students who use technology compared to traditional methods: "Students are generally very enthusiastic about using technology in learning. They feel more motivated and interested in material presented through digital media because it is more interactive and varied. Based on our observations, students who frequently use technology in learning tend to have better understanding and academic results than traditional methods. However, this is also influenced by other factors such as teaching methods and student involvement." Therefore, as staff, ZN stated, "The digital educational content used in our school is quite relevant and supports the teaching and learning process. We strive to select content that suits curriculum needs and students' level of understanding. We provide training for teachers and staff on how to use digital content effectively. We also have technical support to help resolve any issues that may arise."

The informant's statement above shows that the educational content used at this school is by the government curriculum, which uses recommended textbooks and relevant digital learning resources. Content updates are carried out regularly following guidelines from the education department and the latest developments in the world of education, with regular evaluation to ensure suitability for student needs. Students at this school generally respond enthusiastically to the use of technology in learning, which makes them more motivated and interested because the material presented is more interactive. Observations show that students who frequently use technology in learning tend to have better understanding and academic achievement than traditional methods. However, this is also influenced by teaching methods and student engagement. In addition, schools strive to select digital content relevant to the curriculum and students' level of understanding and provide training for teachers and staff to use digital content effectively, with technical support to overcome problems that may arise. This emphasizes the importance of quality and relevant educational content in supporting learning and reducing the digital divide in remote areas.

Table 3. Quality and Relevance of Educational Content

Indicator	Description
Internet Access	Percentage of schools that have internet access and connection quality (speed and stability).

Availability of Technology Devices	Number and condition of technological devices (computers, laptops, tablets) per student.
Technical Support and Maintenance	Availability of technical support services and frequency of device maintenance.

The table 3, The Quality and relevance of educational content can be built through internet access, the availability of technological devices, technical support, and maintenance. The Quality and relevance of educational content depend on fast and stable internet access, adequate technological tools, and effective technical support and maintenance. Good internet access ensures content can be accessed smoothly while appropriate devices enhance the learning experience. Technical support and routine maintenance ensure that systems and devices continue to function optimally, avoiding disruptions that could affect the Quality and relevance of educational content.

In analyzing the impact of educational technology on reducing the digital divide in remote areas, the quality and relevance of academic content are essential factors that influence the effectiveness of technology in increasing access and learning opportunities (Sinambela et al., 2024) The quality of educational content in madrasas in remote areas must include accurate, up-to-date material that meets the national curriculum and local needs (Maulido et al., 2024). Quality content improves students' understanding and motivates them to study harder. In addition, the relevance of educational content is significant in ensuring that the material taught is appropriate to the cultural and social context of the region so that students can more easily relate the knowledge gained to their daily lives (Nurrita, 2018). Educational technology, such as e-learning platforms or academic applications, must be designed considering these two aspects to meet high academic standards and provide maximum benefits for students in remote areas (Herlina, 2020). By ensuring that educational content is not only high quality but also relevant, educational technology can play an influential role in reducing the digital divide and increasing learning opportunities in previously underserved areas (Hariro et al., 2024).

Training and Support

The results of an interview with the Head of Madrasah MI Ihyauddiniyah Kecik Besuk stated, "We realize the importance of Technology in education, especially in remote areas like this. Therefore, schools routinely train teachers and staff on using technological devices and educational applications. We also collaborate with external institutions to organize more comprehensive workshops. The training we have held generally goes well and has a positive impact. Teachers and staff are increasingly confident in using Technology to support learning. However, some still require further training, especially regarding the use of more complex software." As Deputy Head of Curriculum, AH emphasizes, "Technology has a vital role in enriching the curriculum and making the teaching and learning process more interactive. We are trying to integrate Technology into every subject, although there are still obstacles to teacher readiness and infrastructure. We provide ongoing support through discussion forums between teachers, where they can share experiences and help each other overcome technical problems. Apart from that, some technicians are ready to help if there are problems in using technological devices." Furthermore, regarding the experience and support in technology training, RA, as a teacher, said, "My experience participating in technology training at this school was quite positive. The training helped me understand how to use technological devices in learning, although several parts were still difficult for me and needed to be studied further. The support provided after training is sufficient. If there is a problem, I can contact a technician or discuss it with other teacher colleagues. However, I hope there will be more opportunities to take part in further training to improve my ability to use Technology."

The informant's statement above shows the school's commitment to increasing the use of Technology in education, especially in remote areas. The school regularly holds training sessions for teachers and staff on using technological devices and educational applications,

with positive results. Teachers and staff are becoming more confident in using Technology to support learning, although some still require further training, especially in using more complex software. Technology Technology has been used in every subject to enrich the curriculum and make teaching and learning more interactive. However, there are still challenges related to teacher readiness and infrastructure. The school provides ongoing support through teacher-to-teacher discussion forums and technician assistance to resolve technical issues. The technology training he participated in was quite helpful in understanding how to use technology technology, although several things still needed to be studied further. Support after training is also considered adequate, but there is hope for more opportunities to take part in further training to increase skills in using technology. This shows that schools are making serious efforts to empower teachers and staff to use technology Technology the quality of education in remote areas.

Training and support are critical components in optimizing the impact of educational technology on reducing the digital divide in remote areas, such as madrasas. In this context, training aims to improve teachers' skills and knowledge in using technology effectively (Fathahillah et al., 2023). Quality training can include technology-based teaching techniques, understanding educational software, and classroom management integrated with technology (Kurniawan et al., 2021). In addition, training must be adapted to the digital literacy level of educators and local infrastructure conditions. Ongoing support, such as the provision of technical assistance, additional resources, and a supportive community of professionals, is also essential to ensure that technology is used in ways that maximize its benefits (Fadilah et al., 2024). Through comprehensive training and consistent support, teachers in remote areas can more effectively utilize educational technology to improve the quality of learning and reduce the digital divide, thereby creating a more inclusive and competitive learning environment (Wahyuni et al., 2020).

Level of Participation and Engagement

The level of participation and engagement is one form of reducing the digital divide in remote areas. As the Head of Curriculum stated, "The level of student participation has increased since we started implementing technology in learning. Students are more enthusiastic about taking lessons because the method is more interactive and interesting. In addition, technology helps them access learning materials outside school hours, which was previously difficult due to limited access to information. The main obstacle is limited infrastructure, such as internet access, which is still uneven, and devices that not all students have. However, we are trying to overcome this by providing school internet hotspots and lending devices to students who need them." Deputy Head of Student Affairs Rm added regarding how educational technology influences student involvement in extracurricular activities and activities outside the classroom "Technology has opened up many new opportunities for students to engage in activities that were previously difficult to access. For example, they can now participate in online competitions or participate in webinars relevant to their interests. However, we also see that not all students have the same opportunities, especially those from disadvantaged families. We see increased motivation, especially in students interested in technology. They are more active in seeking information and participating in technology-based activities. However, there are challenges in ensuring that all students, including those less interested in technology, remain engaged." According to HS staff, "Teachers and staff generally support the application of technology, although some need additional training to feel more comfortable using it. We have held several trainings and workshops to ensure all staff can participate actively. However, there are still challenges in terms of adapting to new technologies and maintaining a balance between traditional and modern teaching methods. Technology has helped reduce the digital divide, but there is still work to be done. Students with better access to devices and the internet have an advantage. However, we work hard to ensure that all students have equal opportunities through various initiatives, such as providing devices at school and additional learning outside of school hours."

The informant's statement above shows that MI Ihyauddiniyah Kecik Besuk has increased student participation and involvement in learning and extracurricular activities with more interactive methods and broader access to subject matter. However, challenges such as

limited infrastructure, access to devices, and differences in opportunities for students from different economic backgrounds are still obstacles. Schools are trying to overcome this problem by providing internet hotspots, lending devices, and holding training for teachers and staff. Technology has helped reduce the digital divide, but there is still work to be done to ensure all students have an equal opportunity to utilize technology for education.

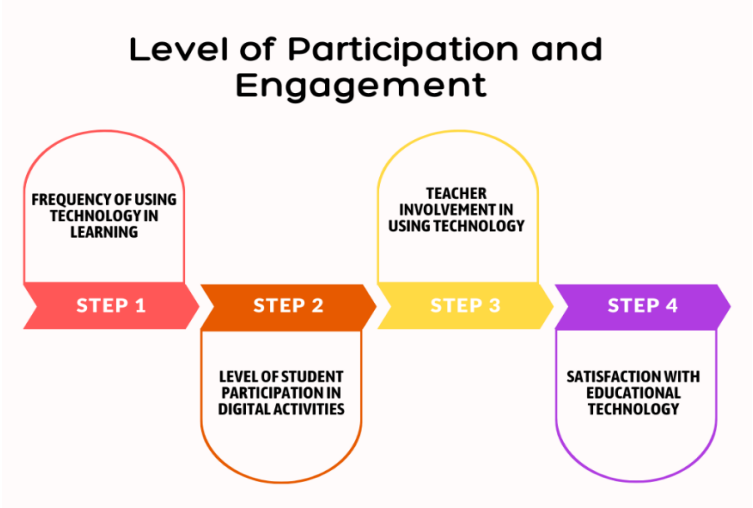

Figure 2. Level of Participation and Engagement

The figure 2, The level of participation and engagement in learning can be increased through several essential factors. The frequency of technology use in learning significantly increases student engagement, as regular use of technology helps create better habits and skills. The level of student participation in digital activities also influences engagement; The more actively students are involved in online activities, the higher their motivation and involvement in the learning process. Teacher involvement in using technology is significant because active and competent teachers can provide a more exciting and relevant learning experience. Finally, satisfaction with educational technology influences how students and teachers feel it supports their learning. High satisfaction levels often encourage more frequent and effective use, increasing overall participation and engagement.

The level of participation and engagement in analyzing educational technology's impact on reducing the digital divide in remote areas, especially in madrasas, is a crucial aspect that reflects the extent to which technology is accepted and used effectively. Participation refers to the active involvement of students, teachers, and the community in utilizing educational technology (Rohmah et al., 2023). In remote areas, challenges related to infrastructure and limited access often impact participation. However, the appropriate implementation of technology, such as digital learning tools and online platforms, can encourage higher engagement by providing access to learning resources that were previously unavailable (Nurfadhillah et al., 2021). On the other hand, engagement includes interaction and deep involvement with teaching materials and learning processes influenced by technology. Educational technology that is implemented well can increase student motivation, enrich the learning experience, and enable more varied and interactive learning methods (Fahrurrazi, 2024). For example, educational applications, learning videos, and online discussion forums can create a more exciting and enjoyable learning environment. In remote areas of madrasas, the evaluation of participation and engagement levels must consider the local context, including technology readiness, teacher training, and community support. With the right approach, educational technology can reduce the digital divide and improve the overall quality of education.

4 Conclusion

Educational technology can significantly reduce the digital divide, especially in the context of madrasas in remote areas. Theoretically, the results of this research support models that state that access to information and communication technology can improve the quality of education and expand learning opportunities for students in areas previously isolated from adequate educational resources. By utilizing technology such as educational software, the internet, and other digital tools, madrasas in remote areas can offer more varied and interactive learning materials and facilitate distance learning that was previously impossible.

The implications of these findings underscore the importance of continued support from governments and related institutions to improve technological infrastructure and provide necessary training for educators. In the future, further research needs to be conducted to explore innovative solutions to overcome the infrastructure and social constraints faced and assess the long-term impact of educational technology in reducing the digital divide in remote areas.

However, several limitations in this study need to be noted. First, adequate technological infrastructure is a crucial factor often limited in remote areas, which can hinder the optimal implementation of educational technology. Additionally, teacher training and technology management challenges usually create additional obstacles to effective implementation. Second, this research needs to fully consider social and cultural aspects that may influence technology adoption by local communities, which may contribute to the current digital divide.

5 References

[1] S. Suratman, *Influences Of Information Technology Development On The Concept Of Shares Ownership Transfer In Scripless Trading In Indonesia Stock Exchange*, vol. 811, no. Icomsh. 2023. doi: 10.2991/978-2-38476-204-0_21.

[2] M. M. E. I. Bali and D. A. Rohmah, "Urgensi Literasi Digital di Madrasah Ibitidaiyah: Minority Logic Analyze di Madrasah Ibtidaiyah Nurul Islam," *EDUKASIA J. Pendidik. dan Pembelajaran*, vol. 4, no. 2, pp. 2465–2476, 2023.

[3] H. Baharun and R. Hasanah, "Quality Improvement in Increasing Public Trust Using the Failure Mode and Effect Analysis (FMEA) Method," *Tarbawi J. Keilmuan Manaj. Pendidik.*, vol. 9, no. 01, pp. 59–68, 2023, doi: 10.32678/tarbawi.v9i01.7982.

[4] D. Liu, L. Carter, and J. Lin, "Towards Connectivism: Exploring Student Use of Online Learning Management Systems During the COVID-19 Pandemic," *Online Learn. J.*, vol. 28, no. 2, 2024, doi: 10.24059/olj.v28i2.4047.

[5] D. Oktavia, M. M. E. I. Bali, H. Rahman, U. Umar, A. Syakroni, and F. Widat, "Exploration of Fine Motor Skills through the Application of Paint," in *WESTECH*, European Alliance for Innovation n.o., 2019, pp. 1–6. doi: 10.4108/eai.8-12-2018.2284038.

[6] R. Hasanah, "Improving Quality Through the Lean Six Sigma Approach," vol. 02, no. 01, pp. 1029–1037, 2024.

[7] L. D. Putra, N. D. Arlinsyah, F. R. Ridho, A. N. Syafiqa, and K. Annisa, "Pemanfaatan Wordwall pada Model Game Based Learning terhadap Digitalisasi Pendidikan Sekolah Dasar," *J. Dimens. Pendidik. dan Pembelajaran*, vol. 12, no. 1, pp. 81–95, 2024, doi: 10.24269/dpp.v12i1.8749.

[8] F. A. Ocha, J. S. Habiby, and M. 'Azam Muttaqin, "Penggunaan Teknologi Augmented Reality dalam Pembelajaran Anak Usia Dini: Studi Eksploratif," *J. Early Child. Educ. Stud.*, vol. 4, no. 1, pp. 73–104, 2024.

[9] M. M. E. I. Bali, M. P. Kumalasani, and D. Yunilasari, "Artificial Intelligence in Higher Education: Perspicacity Relation between Educators and Students," *J. Innov. Educ. Cult. Res.*, vol. 3, no. 2, pp. 146–152, 2022, doi: 10.46843/jiecr.v3i2.88.

[10] D. F. Sholikha, Akhwani, and S. Marwati, "Penerapan Model Pembelajaran Game Bassed Learning terhadap Motivasi Belajar Siswa di SDN Kedungturi," *Natl. Conf. Ummah*, vol. 01, no. 1, pp. 223–229, 2023.

[11] Y. Cahyaningrum, M. R. Cuhanazriansyah, A. Hendrawan, and N. Nafi'ah, "Implementasi Game Based Learning (GBL) Monopoli Digital (MonDig) dalam pembelajaran mahasiswa IKIP PGRI Bojonegoro," *JRTI (Jurnal Ris. Tindakan Indones.*, vol. 8, no. 1, p. 70, 2023, doi: 10.29210/30032935000.

[12] P. Pebrianti, A. Qosyim, and ..., "Analisis Aktivitas Belajar Siswa Dengan Model Pembelajaran Contextual Teaching and Learning Dipadukan Dengan Game Based …," *Pensa E-Jurnal …*, vol. 11, no. 2, 2023.

[13] F. H. Zakariya, R. M. H. Bhakti, and N. A. Ramdhan, "Penerapan teknologi augmented reality dalam pembelajaran morfologi bunga," *Estud. J. Penelit. Multidisiplin Mhs.*, vol. 1, no. 1, pp. 280–289, 2024.

[14] N. Wayan Pitriani, N. Dantes, and Sariyasa, "Game Based Learning Berorientasi Kahoot! Meningkatkan Motivasi Belajar Siswa Kelas V Sekolah Dasar," *J. Kependidikan*, vol. 13, no. 1, pp. 643–650, 2024.

[15] M. Monalisa, "Pengaruh Game Based Learning Mata Pelajaran Informatika Kurikulum Merdeka Terhadap Motivasi Dan Prestasi Belajar," *Padma Sari J. Ilmu Pendidik.*, vol. 3, no. 01, pp. 19–29, 2023, doi: 10.53977/ps.v3i01.908.

[16] M. M. E. I. Bali and N. Holilah, "The Role of Foster Caregivers in the Effectiveness of Online Learning in Pesantren," *Edukasi Islam. J. Pendidik. Islam*, vol. 10, no. 1, pp. 339–362, 2021, doi: http://dx.doi.org/10.30868/ei.v10i01.1178.

[17] M. Mustajab, H. Baharun, and Z. Fawa'iedah, "Adapting to Teaching and Learning During Covid-19: A Case of Islamic School's Initiative of Self-regulated Learning," *Nadwa J. Pendidik. Islam*, vol. 14, no. 2, pp. 241–264, 2020, doi: 10.21580/nw.2020.14.2.6515.

[18] M. Tohet *et al.*, "Characters Education Based Audiovisual for Children in the Coastal Area," *Turkish Online J. Qual. Inq.*, vol. 12, no. 4, pp. 1639–1644, 2021, [Online]. Available: https://www.tojqi.net/index.php/journal/article/view/2514

[19] T. Köhler, "Multilevel qualitative research: Insights from practice," *Eur. Manag. J.*, no. March 2023, 2024, doi: 10.1016/j.emj.2024.03.011.

[20] Z. Miftah and F. Fahrurrozi, "Digitalisasi dan Disparitas Pendidikan di Sekolah Dasar," *Ibtida*, vol. 3, no. 02, pp. 149–163, 2022, doi: 10.37850/ibtida.v3i02.361.

[21] Della Aprilia Kartika Putri, Nanda Aulia Rahmawati, and Rahayu Rahmawati, "Analisis Konflik Dan Dampak Keterbelakangan Dalam Akses Jaringan Internet Dan Listrik Di Desa Terate Yang Terikat Dengan PTPN XII Kotta Blater," *J. Insa. Pendidik. dan Sos. Hum.*, vol. 1, no. 4, pp. 260–271, 2023, doi: 10.59581/jipsoshum-widyakarya.v1i4.1773.

[22] N. Agustian and U. H. Salsabila, "Peran Teknologi Pendidikan dalam Pembelajaran," *Islamika*, vol. 3, no. 1, pp. 123–133, 2021, doi: 10.36088/islamika.v3i1.1047.

[23] M. Yusuf, M. Sodik, S. Darussalam, K. Nganjuk, and U. Blitar, "Penggunaan Teknologi Internet of Things (Iot) Dalam Pengelolaan Fasilitas Dan Infrastruktur Lembaga Pendidikan Islam," *Prophet. J. Kaji. Keislam.*, vol. 1, no. 2, pp. 1–18, 2023.

[24] S. Maulido, P. Karmijah, and P. L. Sekolah, "Upaya Meningkatkan Pendidikan

Masyarakat Di Daerah Terpencil Vinanda Rahmi," *J. Sade. Pembelajaran dan Ilmu Sos.*, vol. 2, no. 1, pp. 3021–7377, 2024.

[25] S. M. Sinambela *et al.*, "Kesenjangan Digital dalam Dunia Pendidikan Masa Kini dan Masa Yang Akan Datang," *J. Bintang Pendidik. Indones.*, vol. 2, no. 3, pp. 15–24, 2024.

[26] T. Nurrita, "Pengembangan Media Pembelajaran Untuk Meningkatkan Hasil Belajar Siswa," *MISYKAT J. Ilmu-ilmu Al-Quran, Hadist, Syari'ah dan Tarb.*, vol. 3, no. 1, p. 171, 2018, doi: 10.33511/misykat.v3n1.171.

[27] Herlina, "Pendidikan Berbasis Teknologi (Permasalahan Dan Tantangan)," *Pros. Semin. Nas. Pendidik. Progr. Pascasarj. Univ. Pgri Palembang*, vol. 3, no. 2, pp. 357–368, 2020.

[28] A. Z. Z. Hariro, N. R. Harahap, P. Puspitasari, F. Ardiyani, W. Melisa, and Juliani, "Mengatasi Kesenjagan Digital dalam Pendidikan : Sosial dan Bets Practices," *J. Nakula Pus. Ilmu Pendidikan, Bhs. dan Ilmu Sos.*, vol. 2, no. 4, 2024.

[29] Fathahillah, Syahrul, Abdul Muis Mappalotteng, Gufran Darma Dirawan, Ayu Lestari, and Saharuna, "Pelatihan Pemanfaatan Teknologi Dalam Pembelajaran," *TEKNOVOKASI J. Pengabdi. Masy.*, vol. 1, no. 2, pp. 143–150, 2023, doi: 10.59562/teknovokasi.v1i2.164.

[30] M. E. Kurniawan, Y. Arafat, and S. Eddy, "285-Article Text-1130-1-10-20210724," *J. Inov. Strateg. dan Model Pembelajaran*, vol. 1, no. 1, pp. 1–8, 2021.

[31] A. D. Fadilah, N. T. Adinda, and I. F. Rahman, "Mewujudkan Pendidikan Inklusif Dan BerkelanjutanDengan Literasi Digital: Peran Teknologi Di Era Sdgs 2030," *J. Ilm. Multidisiplin* , vol. 1, no. 5, pp. 106–121, 2024.

[32] S. Wahyuni, E. Rahmadhani, and L. Mandasari, "Pelatihan Pembuatan Media Pembelajaran Interaktif dengan Menggunakan Powerpoint," *J. Abdidas*, vol. 1, no. 6, pp. 597–602, 2020, doi: 10.31004/abdidas.v1i6.131.

[33] O. T. Rohmah, J. Julia, and A. A. Syahid, "Partisipasi Peserta Didik SD Dalam Proses Pembelajaran Berbasis Teknologi Pada Blended Learning," *Al-Madrasah J. Pendidik. Madrasah Ibtidaiyah*, vol. 7, no. 1, p. 208, 2023, doi: 10.35931/am.v7i1.1818.

[34] S. Nurfadhillah, D. A. Ningsih, P. R. Ramadhania, and U. N. Sifa, "Peranan Media Pembelajaran Dalam Meningkatkan Minat Belajar Siswa Sd Negeri Kohod Iii," *PENSA J. Pendidik. dan Ilmu Sos.*, vol. 3, no. 2, pp. 243–255, 2021.

[35] F. Fahrurrazi, "Meningkatkan Motivasi Belajar Siswa SD Melalui Metode Pembelajaran Interaktif," vol. 2, no. 3, pp. 101–110, 2024.

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