TECHNOLOGY-BASED LEARNING IN MADRASAH: FACING THE CHALLENGES OF THE DIGITAL AGE

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Abstract
The digital era has brought various innovations in all aspects of life, including in the world of education. The integration of technology in the learning system in madrasah is a necessity that cannot be ignored to prepare students to face future challenges. This paper explores how madrasahs can implement technology in the teaching and learning process, ranging from the use of hardware and software, online learning platforms, to educational applications. The research method used is literature review. The results show the importance of technology integration in learning in madrasahs to improve the quality of education and prepare students adequately for the digital era. Despite the challenges, collaboration among education stakeholders is considered crucial in ensuring a successful transition to a technology-based learning system, which in turn will shape a more innovative, interactive learning environment that supports students' overall development.
Keywords: Learning, Technology, Madrasahs, Challenges of the Digital Age.

Introduction

In today's digital era, information and communication technology (ICT) has changed many aspects of life, including in the education sector. The utilization of technology in education is not just about following trends, but has become a necessity to prepare students to face future challenges (Sitopu et al., 2024). With the integration of technology, the learning process can be more interactive, engaging, and easily accessible to all students without being limited by time and space. Technology supports the creation of a conducive learning environment, where information can be shared quickly and efficiently, students can access various learning resources online, and learning can be tailored to individual needs (Guna et al., 2024). In addition, the ability to

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use technology effectively has now become a basic competency that every individual must possess to succeed in their careers and daily lives (Hairiyanto et al., 2024).

Furthermore, technology opens the door to new learning methods that were previously impossible. The use of big data and learning analytics allows teachers to understand and respond to students' learning needs in real-time, personalize learning experiences, and improve learning outcomes (Ali et al., 2024). The presence of artificial intelligence (AI), virtual reality (VR), and augmented reality (AR) in education offers the possibility to make abstract concepts more real and interactable for students, increasing engagement and understanding of learning materials (Kurniawan et al., 2023). Therefore, the integration of technology in education is not only relevant to the needs of the times but also essential for innovation in educational methods, optimizing students' learning potential, and preparing them with the necessary skills for the future (Kurdi, M. S. 2021).

Thus, the integration of technology in the learning process does not only occur in general education institutions, but is also very relevant and important for madrasahs (Ross, 2022). The utilization of technology in education offers opportunities to improve the quality of education through wider accessibility of learning resources, more interactive learning methods, and more engaging learning experiences for students (Tubagus et al., 2023). This need for innovation is especially necessary to improve the quality of education and respond to the challenges of the changing times (Aslan & Shiong, 2023).

Madrasahs as educational institutions that combine general education curriculum with Islamic religious education have a unique position in building the character of students who are not only academically intelligent, but also spiritually and morally strong (Iqbal et al., 2023). In order to achieve this goal, madrasahs need to update their methods to become more relevant to the demands of the digital era that emphasize critical thinking, creativity, and skills in utilizing information technology (Muharrom et al., 2023).

Educational innovation in madrasah is not only related to the use of the latest learning tools and technology, but also includes dynamic curriculum development, student-oriented teaching methods, and professional development of educators. Strengthening infrastructure such as internet connectivity and access to digital devices are the main foundations that must be fulfilled (Abdelaziz et al., 2014). Furthermore, training and capacity building for teachers in using learning technology are important steps to ensure that technology can truly be utilized to improve learning effectiveness (Nurhayati et al., 2020). This innovation is expected to bring madrasahs not only to catch up with other general education institutions in terms of technology use, but also to lead in creating a comprehensive education that integrates science and religious values in a harmonious learning ecosystem (Nurdiana et al., 2023).

However, Madrasahs, as part of the national education system and characterized by the delivery of Islamic religious education, face their own challenges in adopting technology-based learning. This includes updating learning methods, curriculum development, as well as training teachers to utilize technology in teaching and learning activities (Suhid et al., 2021).

Understanding and overcoming these challenges is key to integrating technology in learning in madrasahs, which will not only improve the quality of education, but also make madrasahs more relevant to the needs and challenges of the current digital era (Dito & Pujiastuti, 2021; Nusantara, 2018). Therefore, there is a need for in-depth research to explore experiences, obstacles, and effective strategies in technology-based learning in madrasahs, so that optimal solutions can be found for effective and efficient learning.

This research aims to provide insights on how technology can be integrated in learning in madrasah, document the challenges and barriers faced, and formulate strategic recommendations for the development of technology-based learning in madrasah in facing the challenges of the digital era. It is hoped that the results of this study will contribute to the development of learning models that are not only able to improve the quality of education in madrasah, but also prepare students and teachers to succeed in an increasingly digitized society.

Research Method

The research method used in this research is literature. The literature research method is a research technique carried out by reviewing, analyzing, and synthesizing various relevant sources of information to answer predetermined research questions (Zed, 2004; Sugiyono, 2010). This method is used by researchers to collect references to research topics from various trusted sources, including books, scientific journals, articles, research reports, and relevant online documents. There are several methods that can be used in literature study, one of which is keyword search. Keyword search plays an important role in this process, where researchers search for relevant keywords in catalogs, indexes, online search engines, and databases to find literature relevant to the research topic (Rachmawati, 2017; Rahardjo, 2011).

Result and Discussion
Technology-based learning theory

Technology-based learning theories are educational concepts that include the use of technology to support and enhance the learning process (Makewa, L. N. 2019). One of the theories underlying technology-based learning is constructivism, which emphasizes the construction of knowledge by students through their own experiences. In this approach, technology can be used as a tool that enriches the learning experience, facilitating the learning process by providing a rich context and interactive environment

where students can explore, experiment and build their understanding through meaningful activities. Technology also allows for the personalization of learning, where the content and pace of learning can be tailored to individual needs and abilities (Wahyuningsih, S. 2021).

In addition, educational communication theory initiated by Lev Vygotsky also supports the use of technology in learning. Vygotsky emphasized social interaction in the learning process and how the zone of proximal development (ZPD) can be enhanced through collaboration with others. Technology provides a platform for this collaboration, both in the classroom and through online networks. Using communication technologies such as discussion forums, social media and collaboration groups, students can interact and learn together. Technology also allows access to experts and resources from around the world, opening up new possibilities in collaborative and distance learning (Wardani et al., 2023).

In the digital era, the theory of connectivism has emerged to address the way of learning in the vast network of knowledge provided by the internet. George Siemens, the founder of this theory, sees learning as a process of making connections between scattered information. Technology is not only seen as a tool, but also as the environment in which learning occurs. In this theory, learning occurs when students can navigate through complex networks of information and select relevant information for their needs. Skills such as critical thinking, the ability to assess the reliability of sources, and the ability to maintain and develop personal networks become important. Technology-based learning according to connectivism theory is well suited to the demands of the 21st century, where knowledge is constantly evolving and accessibility of information is key (Indriati, L., & Mai, N. 2022).

Innovative learning models in the digital era

In the digital era, innovative learning models have evolved along with technological advances to meet the changing needs of education. One of the most prominent models is the flipped classroom (Huda et al., 2017). This model inverts the traditional classroom model by utilizing technology to deliver learning materials that are usually given in class (such as lectures) online through videos or reading materials before class. This allows classroom time to be used for more interactive and collaborative activities, such as discussions, practicums, or group projects (Preeti, S. K. 2021). Thus, flipped learning gives students the opportunity to explore the material at their own pace before applying it in a more practical context in class.

Project-based learning (PBL) is another example of an innovative learning approach in the digital age. PBL invites students to work on complex, multidisciplinary projects over several days or even weeks. Through this approach, students learn by applying their knowledge and skills to solve real-world problems or investigative questions collaboratively (Kokotsaki et al., 2014). Technology supports this PBL model

by providing students with tools for more effective research, collaboration and presentation. The advantages of PBL include improving students' critical thinking skills, collaboration, and communication skills, as well as providing a more meaningful and sustainable learning experience (Abdelaziz et al., 2014).

Furthermore, the blended learning model combines face-to-face instruction with online learning to create a more flexible learning experience. This model allows students to access learning materials online anytime and anywhere, while still benefiting from direct interaction with teachers and classmates in a traditional classroom setting. Blended learning is ideal in facilitating individualized learning by adjusting the pace and type of learning materials to suit students' diverse learning needs. The use of educational platforms, apps and other digital tools support the implementation of this learning model by providing rich and easily accessible resources for students (Widjaja & Aslan, 2022).

In conclusion, innovative learning models in the digital era offer abundant opportunities to improve the quality and effectiveness of education. By utilizing technology, models such as flipped learning, Project-Based Learning and blended learning not only make the learning process more engaging and relevant for students, but also support the development of critical skills needed for success in the 21st century. Each model holds the potential to stimulate, personalize, and enrich the learning experience, making education more inclusive and accessible to all.

Madrasahs' challenges in implementing technology-based learning

In the process of implementing technology-based learning, madrasahs face various challenges that require special attention and strategies for successful implementation (Kultsum et al., 2021). The first challenge is the availability of adequate technology infrastructure. Many madrasahs, especially in remote areas, still struggle to provide hardware such as computers, projectors, or stable and fast internet connections (Supartin, 2023). This infrastructure is the foundation of technology-based learning and its absence can hinder effective learning (Zuhri et al., 2020).

The second challenge is teachers' skills and abilities in integrating technology into the learning process. Although many teachers are enthusiastic about the use of technology, not all have sufficient expertise in operating educational tools and applications or designing effective learning materials using technology (Sarmila et al., 2023). Continuous training and professional development are key to overcoming this challenge, so that teachers can feel confident and competent in applying technology in their teaching (Tuhuteru et al., 2023).

Third, curriculum changes and teaching methods adapted to technology-based learning often cause tension. Adapting to a technology-oriented curriculum requires a lot of time and resources (Astuti et al., 2023). Madrasahs must be able to identify and integrate materials that are relevant to the needs of students in the digital era, while

ensuring that the essence of religious values and teachings are maintained (Putra & Aslan, 2019).

Fourth, the challenge of engaging and educating parents or guardians about the benefits and importance of technology-based learning (Aslan & Pong, 2023). Many parents are still used to conventional learning methods and may be skeptical or apprehensive about the use of technology in education. Effective communication and providing successful examples of the application of technology in learning can be an important step in building support from parents (Aslan & Hifza, 2020).

Thus, madrasahs are faced with a series of complex challenges in implementing technology-based learning, ranging from infrastructure availability, teacher skill development, curriculum adaptation, to parental engagement. However, with the right strategies such as teacher training, investment in adequate infrastructure, curriculum revision and effective communication with parents, madrasahs can overcome these challenges and utilize technology to improve the quality of education. Proactive and collaborative measures from all relevant parties will be the key to unlocking the full potential of technology-based learning in the context of madrasah education.

Integration of Technology in the Teaching and Learning Process in Madrasahs

The integration of technology in the teaching and learning process in madrasahs has opened up new opportunities in improving the quality of education. The application of technology involves not only the use of hardware such as computers or tablets, but also the utilization of software, educational applications, and rich online resources to enrich students' learning experience (Megawati et al., 2023). Technology can facilitate access to extensive and up-to-date information, helping students and teachers in a more interactive and engaging learning process. One important aspect of this integration is the use of a learning management platform (LMS) that allows teachers to organize lesson materials, assignments, and tests online, making it easier to monitor students' learning progress more efficiently (Rusiadi & Aslan, 2021).

Furthermore, the use of technology in teaching in madrasahs has encouraged the implementation of more collaborative and participatory learning methods. Online collaboration applications and digital tools facilitate students to work together on projects, discussions and other learning activities without being limited by time and space (Tambak et al., 2022). This not only strengthens their understanding of the subject matter, but also develops important skills such as teamwork, communication and problem-solving. Thus, technology plays a role in preparing students with the necessary skills for future success (Sitepu et al., 2022).

The implementation of technology in education also supports the individualization of learning. With educational apps and platforms that offer progress tracking and customization of learning materials based on each student's needs, madrasahs can better implement a more personalized approach to learning (Zaini et al.,

2023). Students can learn at their own pace, explore their interests, and receive additional support in areas where they need it. Technology allows educators to get to know each student individually, customize teaching methods, and provide more relevant and effective feedback (Syamsiyah, 2024).

However, the integration of technology in madrasah education also poses challenges such as infrastructure readiness, teacher training, and curriculum adaptation (Hakiman et al., 2022). However, with the right approach and support from all stakeholders, technology can be effectively integrated to enhance students' learning experience. This includes investments in infrastructure, teacher training and professional development, and curriculum revisions that support technology-based learning (Abubakari, 2021).

Therefore, the integration of technology in education in madrasahs offers extensive opportunities to improve the quality of learning and prepare students with relevant skills for the future. The teaching and learning process becomes more interactive, collaborative and personalized, all of which contribute to a richer and more meaningful learning experience. While there are challenges, a shared commitment between teachers, students and all relevant parties in overcoming these barriers will enable madrasahs to utilize technology to achieve its full potential in education.

Conclusion

In today's digital era, madrasahs face the challenge of integrating technology in the learning system. The implementation of technology-based learning in madrasah is necessary to enrich the teaching and learning process and prepare students with relevant skills for the future. Technological aspects include the use of hardware, software, online platforms and other digital resources that can help improve interactivity and access to the latest information. In addition, technology facilitates collaborative learning methods and allows for a more individualized approach to education, meeting the diverse learning needs of each student.

However, the transition to technology-based learning is not without obstacles. These include limited technology infrastructure, especially in remote areas, as well as the need to improve teachers' ability to use technology for educational purposes. In addition, there is a need to adapt curricula and teaching methods to suit digital learning media. Madrasahs should also make efforts to educate and involve parents in this transformation process, explaining the benefits and importance of technology for more efficient and effective learning.

Overcoming these challenges requires close collaboration between all parties involved including educational institutions, teachers, parents and the government. Strategies include investing in technology infrastructure, training and professional development for teachers, revising the education curriculum to support the use and integration of technology, and using effective communicative approaches to build

understanding and support from parents. With a strategic and planned approach, madrasahs can overcome the challenges of the digital era and utilize technology to create a more dynamic and engaging learning experience for students.

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