INNOVATIVENESS OF MADRASAH PRINCIPALS IN DEVELOPING DIGITALIZATION IN STATE TSANAWIYAH MADRASAH

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ABSTRACT

This study aims to analyze the innovativeness of madrasah principals in developing digitalization in State Tsanawiyah Madrasah in Jambi Province. Along with the development of information and communication technology, digitalization has become an absolute necessity in improving the quality of learning and administration in madrasahs. This study uses a qualitative approach with a case study method in three State Tsanawiyah Madrasah, namely State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, State Tsanawiyah Madrasah 1 Kota Jambi, and State Tsanawiyah Madrasah 1 Merangin. Data were obtained through observation, in-depth interviews, and document analysis. The results of the study indicate that innovative madrasah principals have an important role in encouraging digitalization with various initiatives such as technology training programs for teachers and education personnel, as well as socialization to parents about the importance of digitalization in education. However, obstacles such as limited resources and infrastructure are still the main obstacles in the development of optimal digitalization. In addition, this study also found that the success of digitalization in State Tsanawiyah Madrasah is highly dependent on the leadership of madrasah principals who have a strategic vision, are able to innovate, and manage change well. Innovative madrasah principals can maximize the potential of digitalization to create a more modern and adaptive learning environment to the development of the times. This study is expected to provide insight for policy makers in formulating the right strategy to support digitalization in madrasahs, as well as being a reference for madrasah principals in developing innovation in the educational environment

Keywords : Innovativennes; Principals; Digitalization; Madrasah

INTRODUCTION

Education has an important and strategic role in ensuring the continuity and development of the nation's life, with the aim of preparing citizens to face the future. Therefore, whether or not the future of a country is good is largely determined by education, which is a process of changing the attitudes and behavior of individuals or groups through teaching and training (González-Salamanca et al., 2020; Green et al., 2020; Palomino et al., 2021). Ki Hajar Dewantara stated that education functions as a guide and mentor for students so that they can grow according to their potential. Education must create humans who are ready to live amidst change, so that they are not eroded by the currents of the times (Markus et al., 2023). Ibn Khaldun mentioned three goals of education: first, providing opportunities for the mind to be active and work, which is important for individual maturity and benefits for society; second, gaining knowledge as a tool to live well in society; and third, obtaining employment to earn a living. From an Islamic perspective, education is the process of conveying information that is absorbed by individuals, forming ways of thinking, behaving, and acting in relation to Allah SWT and fellow human beings (Solikhah, n.d.). Tayar Yusuf defines Islamic religious education as a conscious effort by the older generation to transfer knowledge, skills and abilities to the younger generation, so that they become pious Muslims, have noble character, and understand and practice Islamic teachings (Zuhaeriah et al., 2020).

The many functions and benefits in education require management that requires good managerial skills to achieve national education goals, especially in facing the demands of the globalization era which emphasizes the importance of improving the quality of education as a means to build and forge human resources (Komalasari et al., 2020; Miranda et al., 2021; Shaturaev, 2021). The quality of human beings is obtained from quality education, and Islam regulates all aspects of human life so that everything is done neatly, correctly, orderly, and regularly (Bahrowi, 2022; Riinawati, 2022; Tahir, 2020). The education process must be followed properly and must not be done carelessly, because everything requires good, precise, and directed management so that the goals to be achieved can be achieved effectively and efficiently (Apiyani, 2024; Ernest, 2021; Nwanakezie & Ogona, 2021). The manager, who in this context is identified as the head of the madrasah, is the leader who regulates and is responsible for the results of the work of resources in the madrasah environment (Herman et al., 2022; Novarina et al., 2023; Wiratmoko et al., 2021). According to T. Hani Handoko, managerial practice is an activity carried out by a manager, and managerial skills are the ability to plan, organize, lead, and control the implementation of an organization to achieve certain goals (Rahman, 2022). This is in line with Terry's statement that management is a process consisting of planning, organizing, implementing, and controlling, which is carried out to achieve predetermined goals by utilizing human resources and other resources.

The success of education in Madrasahs is highly dependent on the managerial of the madrasah principal, who with the skills they have can improve the quality of the institution and demonstrate good leader performance (Mutohar & Trisnantari, 2020; Rifai & Zahro, 2023; Wulandari, 2020; Zaini & Syafaruddin, 2020). Effective leadership needs to be applied at all levels of the organization so that subordinates can work with high enthusiasm. In the era of digitalization that changes the paradigm of education, State Tsanawiyah Madrasah (MTsN) must quickly adapt to utilize the potential of information and communication technology (ICT) in improving the quality of learning and administration (Ahmad et al., 2021; Lisyawati et al., 2024; Rais et al.,

2024). In this case, the madrasah principal acts as a leader and agent of change who can inspire and facilitate innovation, with the success of digitalization highly dependent on the ability of the madrasah principal to lead with a clear vision and manage change towards more modern and adaptive learning. Innovative madrasah principals can identify the needs and potential for using technology in the learning and administration process. They encourage teachers and staff to think creatively in utilizing technology to improve the efficiency and effectiveness of the teaching and learning process (Mukaromah et al., 2022; Nurkhasanah et al., 2023). In addition, innovative madrasah principals are also able to build cooperation with various parties, including the government, non-governmental organizations, and the technology industry, to support the digitalization program at MTsN.

In State Tsanawiyah Madrasah s (MTsN) in Jambi Province, the role of the principal in facing the challenges of digitalization is very important, considering the unique geographic and demographic characteristics of the area, including the many remote locations. The success of digitalization depends not only on the technological infrastructure but also on the ability of the principal to overcome obstacles, such as the availability of infrastructure, understanding of digital security, and data protection. Initial observations indicate that many principals do not fully understand the potential of digitalization in improving the quality of learning; for example, at State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, the computer laboratory has not been optimally utilized. At State Tsanawiyah Madrasah 1 Kota Jambi, there are no teachers with a background in information technology, which hinders the integration of technology into learning. In addition, at State Tsanawiyah Madrasah 1 Merangin, parental concerns about the use of technology and low digital literacy are also obstacles. Therefore, training is needed to improve teacher competence and support from parents in the process of digitalizing education.

Facing the digital era, madrasahs must utilize technology optimally, but observations in several State Tsanawiyah Madrasah in Jambi Province revealed various challenges in implementing digitalization. In State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, although it has achieved A accreditation and has a computer lab, its use is still limited. A similar thing was found in State Tsanawiyah Madrasah 1 Kota Jambi, where there were no teachers with an information technology background. In addition, in State Tsanawiyah Madrasah 1 Merangin, parents of students showed fear of using technology, accompanied by low digital literacy and infrastructure constraints. Therefore, the role of the madrasah principal's innovation is very important to create creative solutions, such as training programs for teachers and socialization to parents about the benefits of technology. By collaborating with related parties for infrastructure development, the madrasah principal is expected to become an agent of change that encourages more effective and competitive digitalization. The title of the proposed dissertation research is "Innovativeness of Madrasah Principals in Developing Digitalization in State Junior High Schools in Jambi Province." Before formulating the problem, a grand question needs to be added to clarify the focus of the research

METHOD

This study uses a qualitative method with a descriptive approach, which is carried out in natural conditions to obtain accurate data on the innovativeness of madrasah principals in developing digitalization at State Tsanawiyah Madrasah in Jambi Province, especially at State

Tsanawiyah Madrasah 1 Tanjung Jabung Barat, State Tsanawiyah Madrasah 1 Jambi City, and State Tsanawiyah Madrasah 1 Merangin. Qualitative research is a research method used to research in natural object conditions, (as opposed to experiments) where the researcher is the key instrument, data collection techniques are carried out by triangulation (combination), data analysis is inductive, and qualitative research results emphasize meaning rather than generalization (Busetto et al., 2020; Priya, 2021). The research subjects include madrasah principals, teachers, educators, education personnel, students, and other relevant parties, with the madrasah principal as the main informant. Data sources consist of three categories: Person (oral or written answers from informants), Place (static and animated displays), and Paper (documents in the form of letters, numbers, images, or symbols). The main data sources include the head of the madrasah, educators, students, related documentation, and the atmosphere in each madrasah.

Data collection techniques are the main steps in research to obtain valid and reliable data. In this study, the methods used include observation, interviews, and documentation at State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, State Tsanawiyah Madrasah 1 Kota Jambi, and State Tsanawiyah Madrasah 1 Merangin. Observations were carried out in a participatory manner, where researchers were involved in the daily activities of data sources to record behavior and physical conditions, meeting agendas, the atmosphere of the teaching and learning process, and digitalization activities. Interviews were conducted through oral questions and answers to obtain information from informants. In addition, documentation refers to records of past events, either in the form of writing, pictures, or monumental works, which function as a complement to observation and interview methods in qualitative research.

Data analysis in qualitative research involves the process of organizing and sorting data into patterns, categories, and basic descriptions to find themes and work capacities that are in accordance with the data. According to Miles and Huberman, analysis is carried out interactively and continuously until the data reaches saturation, including three steps: data reduction, data presentation, and drawing conclusions (Afif, 2023). Data reduction includes selecting relevant data, coding, and initial interpretation, while data presentation can be done in the form of tables, graphs, or the like to facilitate understanding. The conclusions drawn are temporary and can change based on evidence obtained during the data collection process. To ensure the validity of the data, qualitative research applies techniques such as extended participation, observational rigor, and triangulation. Extended participation increases the researcher's familiarity with the subject, while observational rigor helps identify relevant elements in the situation being studied. Triangulation, which compares data from different sources, methods, or perspectives, strengthens the trustworthiness of the information obtained. By using these techniques, researchers can ensure that the data collected is valid, reliable, and objective.

RESULTS AND DISCUSSIONS

Digitalization at the State Junior High School of Jambi Province

a. Initial Conditions of Digitalization

Digitalization of education has become one of the important steps in improving the quality of learning in Indonesia, including in State Tsanawiyah Madrasah. In the era of increasingly advanced information technology, the integration of technology in the learning process in schools

or madrasahs is no longer an option, but an urgent need. This is also realized by State Junior High Schools in Jambi Province, which have begun to adopt various digital innovations in their education system. However, the implementation of digitalization in the educational environment, especially in madrasahs, still faces various challenges. Uneven technological infrastructure, digital literacy that still varies among educators and students, and obstacles in implementing training programs are some of the factors that influence the success of digitalization. The digitalization that has been implemented in State Tsanawiyah Madrasah in Jambi Province is:

Digitalization in State Junior High Schools in Jambi Province has begun to be implemented, but it is not evenly distributed across all schools. Based on an interview with the principal of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, although there is already a computer lab and internet access, network quality and power outages are the main obstacles: "We already have a computer lab and internet access, but there are still obstacles in terms of the quality of the internet network." The level of digital literacy varies, with teachers and students in schools with more complete facilities being more accustomed to using technology, as expressed by Igus Susanti, S.HI, "We realize the importance of using technology, but still have difficulty integrating it." Although some schools, such as State Tsanawiyah Madrasah 1 Jambi City, have held digital literacy training programs, Drs. Muhammad Dahri said, "Our teachers are very enthusiastic, but not all schools have the same opportunities." In the use of learning technology, Amanatus Solihah, S.Ag stated, "We have started using e-learning applications, but limited internet access and devices make the process less than optimal." However, students feel more motivated to learn with technology, as conveyed by Marhadi, a Grade VIII student, "We are happy to be able to learn using computers, but at home we can't always access the internet." The results of interviews, observations, and documentation show that limited infrastructure, varying digital literacy, and budget and internet access challenges are obstacles, although efforts to increase digitalization through training and technology integration continue to be made.

b. Digitalization Initiative by the Head of Madrasah

Madrasah principals play a key role in leading the digitalization efforts in madrasahs, not only following government policies but also innovating to overcome challenges such as budget constraints and technology access. In terms of technological device procurement, Drs. Muhammad Dahri, Principal of State Tsanawiyah Madrasah 1 Kota Jambi, stated, "We are working hard to equip madrasahs with adequate technological devices," indicating an active effort to seek funding solutions through grants and cooperation with the private sector. In addition to procurement, madrasah principals also focus on maintaining existing devices, allocating funds for routine maintenance so that devices continue to function optimally. Regarding infrastructure development, Tri Sulistiyo S.Pd. MA, Principal of State Tsanawiyah Madrasah 1 Merangin, emphasized the importance of internet connectivity, "We are investing in improving internet infrastructure," with steps such as installing high-quality modems and routers. Although madrasahs in urban areas are more advanced in technology access, madrasah principals in remote areas remain committed to advancing digitalization, innovating by using satellite services or collaborating with local internet providers, despite still facing obstacles of unstable internet access. The annual report documentation shows that the head of the madrasah continues to take innovative steps to obtain better technology and infrastructure support by collaborating with various parties.

c. Human Resources Training and Development in Madrasah Digitalization

One of the keys to the successful implementation of digitalization in State State Tsanawiyah Madrasah in Jambi Province is the efforts of the principals in developing human resource (HR) competencies through ongoing training for teachers and students. The principal of State Tsanawiyah Madrasah School 1 Tanjung Jabung Barat stated, "We realize that without proper training, the technology we have will not provide optimal benefits," reflecting the importance of training in the use of e-learning platforms such as Google Classroom and Moodle. Amanatus Solihah, S.Ag, said that this training helps teachers integrate technology into learning. However, not all teachers have equal access to training, especially in remote areas. On the other hand, Drs. Muhammad Dahri, Principal of State Tsanawiyah Madrasah 1 Jambi City, emphasized the importance of digital literacy for students, "We strive to provide our students with digital literacy provisions from an early age," with training programs that include the use of hardware and productivity applications. Observations show that students are enthusiastic about participating in the digital literacy program, although internet access at home is still an obstacle. In addition, Mhd. Tang, S.Ag., M.Pd.I, Principal of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, emphasized the development of specific skills such as coding and graphic design, "We want our students to not only be users of technology, but also become creators of technology." This shows that the principal of the madrasah plays an active role in ensuring the development of digital competencies that do not only focus on the use of technology, but also on creative skills that are relevant to future needs. However, the challenge of access to training and technology, especially in remote areas, still needs to be addressed to ensure that digitalization can run evenly across madrasahs.

d. Use of Digital Learning Platforms at State Tsanawiyah Madrasah in Jambi Province

The use of digital learning platforms in Jambi Province State Tsanawiyah Madrasah is an important component in the digitalization of education, with the principal as the driver of innovation. Mhd. Tang, S.Ag., M.Pd.I, Principal of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, explained that E-Learning has been used to organize assignments and communication between teachers and students, "Through this platform, students can collect assignments online." Although E-Learning increases interaction, Suhartarto, S.Pd, a teacher at State Tsanawiyah Madrasah 1 Merangin, highlighted the challenge of unstable internet access in remote areas. In addition, the development of digital learning materials, such as e-books and videos, has begun to be implemented. Hidayani, S.Pd, Informatics Teacher at State Tsanawiyah Madrasah 1 Jambi City, stated, "We started making learning videos so that students can study independently at home." However, Drs. Muhammad Dahri, Principal of State Tsanawiyah Madrasah 1 Jambi City, admitted that not all teachers have the skills to create digital content. Limited student access to devices and the internet outside of school is also an obstacle, as complained by Noval, a Grade IX student at State Tsanawiyah Madrasah 1 Merangin, "In the madrasah we can use computers, but at home I can't always access the internet." Overall, although the use of digital platforms has a positive impact on the learning process, the challenges of internet access and devices in some madrasahs still need to be overcome so that digitalization can run evenly and effectively.

The Innovation of Madrasah Principals in Developing Digitalization at State Tsanawiyah Madrasah in Jambi Province.

a. Procurement of Digital Technology Devices

Important innovations initiated by the head of the madrasah at the Jambi Province State Tsanawiyah Madrasah include the procurement of digital technology devices, the construction of a stable internet network, and the development of an integrated management information system. Drs. Muhammad Dahri, Head of State Tsanawiyah Madrasah 1 Jambi City, stated, "We have tried to equip our madrasah with adequate digital technology devices," to support learning and administration. Mhd. Tang, S.Ag., M.Pd.I, Head of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, added that the provision of modern devices is very important for digital transformation, "This allows us to optimize the use of technology in various aspects." In addition, Tri Sulistiyo S.Pd. MA, Head of State Tsanawiyah Madrasah 1 Merangin, emphasized the importance of stable internet access, "We have invested in building a reliable internet network infrastructure." Mhd. Tang also stated, "We work with internet service providers to ensure reliable connectivity." In terms of management, Drs. Muhammad Dahri emphasized, "We have developed an integrated madrasah management information system," which allows for the management of various aspects digitally. Mhd. Tang added that the system increases effectiveness and efficiency, "and improves the quality of service for all stakeholders." With the provision of devices, a stable internet network, and an integrated management system, madrasas can be better prepared to face global challenges and provide quality education services in the digital era.

b. Integration of Technology in Learning in Madrasahs

The integration of technology in education at State Tsanawiyah Madrasah in Jambi Province has become an urgent need to produce learning that is relevant to the digital era, with a focus on the development of digital learning content, the use of online learning platforms, and the use of technology in every stage of the learning process. Mhd. Tang, S.Ag., M.Pd.I, Head of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, stated, "We have tried to develop various digital learning content," including e-learning and learning videos, to improve the quality and attractiveness of learning. Drs. Muhammad Dahri, Head of State Tsanawiyah Madrasah 1 Jambi City, added, "We encourage teachers to develop interesting and interactive digital learning content," which can increase student motivation. In addition, Tri Sulistiyo S.Pd. MA, Head of State Tsanawiyah Madrasah 1 Merangin, shared his experience in utilizing online learning platforms, "This allows us to provide materials, assignments, and assessments digitally." Mhd. Tang also emphasized that the use of technology in delivery, assignments, and assessments is very important, "We continue to encourage teachers to utilize technology in the learning process." By implementing these innovations, madrasas have succeeded in creating an interactive, flexible, and engaging learning environment, preparing students to face an increasingly digital and connected world.

c. Improving Teacher and Staff Competence in Madrasahs

Improving the competence of teachers and staff at State Tsanawiyah Madrasah in Jambi Province is an important priority to face the digital era, with school principals implementing various innovative strategies, including organizing training and workshops, facilitating technology-based professional development, and creating a culture of knowledge sharing. Drs. Muhammad Dahri, Head of State Tsanawiyah Madrasah 1 in Jambi City, stated, "We routinely hold training and workshops for teachers and staff to improve their competence in using digital

technology," which includes the use of software such as Google Classroom and Zoom. Tri Sulistiyo S.Pd. MA, Head of State Tsanawiyah Madrasah 1 Merangin, added, "We strive to provide training and workshops that are in accordance with the needs of teachers and staff in integrating technology in the school," to ensure they have adequate competence. Mhd. Tang, S.Ag., M.Pd.I, Head of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, also said, "We encourage and facilitate teachers and staff to participate in technology-based professional development programs," such as online training and digital certification. In addition, Mhd. Tang emphasized the importance of creating a culture of knowledge sharing, stating, "We are trying to create a culture of sharing knowledge and best practices in utilizing technology in madrasas," which allows teachers and staff to learn from each other and exchange experiences. These initiatives have strengthened the capacity of madrasa residents to utilize digital technology, built an important foundation for the success of the digitalization process, and improved the quality of learning and administration in madrasas.

d. Collaboration with Stakeholders in Madrasah

Collaboration with various stakeholders is a key strategy in the development of State Tsanawiyah Madrasah in Jambi Province, where the principals of the madrasahs establish partnerships with local governments, other educational institutions, and involve parents and the community in various digitalization programs. Mhd. Tang, S.Ag., M.Pd.I, Principal of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, stated, "We have collaborated with the local government of Tanjab Barat to get support in developing digital infrastructure," which greatly helps realize the vision of technology-based madrasahs. Tri Sulistiyo S.Pd. MA, Principal of State Tsanawiyah Madrasah 1 Merangin, added that collaboration with the local government provides valuable support, "We have established close collaboration to develop the madrasah into a modern educational institution." In addition, Drs. Muhammad Dahri, Principal of State Tsanawiyah Madrasah 1 Jambi City, said, "We have established partnerships with several madrasahs and other schools to share experiences and best practices," which enriches innovation in digital technology integration. Mhd. Tang also emphasized the importance of parental and community involvement, stating, "We believe that parental and community involvement in the use of technology can support the digitalization process in madrasas." With these collaborative steps, madrasas have succeeded in creating an inclusive education ecosystem, where the government, educational institutions, parents, and the community contribute to improving the quality of education in the digital era.

e. Development of Innovation Culture in Madrasahs

The development of a culture of innovation in State Tsanawiyah Madrasah in Jambi Province has become a strong foundation for the implementation of sustainable digital solutions, with principals implementing strategies to encourage creativity, provide rewards, and create an environment that supports experimentation. Drs. Muhammad Dahri, Principal of State Tsanawiyah Madrasah 1 in Jambi City, stated, "We strive to create an environment that supports the creativity and initiative of the school community," which encourages innovative technology-based ideas. Tri Sulistiyo S.Pd. MA, Principal of State Tsanawiyah Madrasah 1 Merangin, added, "We provide awards and appreciation to teachers and staff who have demonstrated innovation," which aims to further motivate them. Mhd. Tang, S.Ag., M.Pd.I, Principal of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, also emphasized the importance of creating an environment that supports experimentation, stating, "We understand that innovation does not always run smoothly, so we provide space for the school community to experiment." Through these steps, the madrasah has

succeeded in building a dynamic educational ecosystem, where every individual feels valued and encouraged to innovate, preparing them to face the challenges of the digital era with a proactive and creative attitude.

f. Strengthening Digital Literacy in State Tsanawiyah Madrasah

Digital literacy has become an important skill in State Tsanawiyah Madrasah in Jambi Province, with various innovations to strengthen it among students, including integration into the curriculum, special training, and technology-based projects. Tri Sulistiyo S.Pd. MA, Head of State Tsanawiyah Madrasah 1 Merangin, emphasized, "We realize that digital literacy is a very important skill for students in today's digital era," which encourages schools to integrate digital skills in learning. Drs. Muhammad Dahri, Head of State Tsanawiyah Madrasah 1 Jambi City, added that they provide digital literacy training programs and workshops, "These activities include training in the use of technological devices and education on digital ethics." Mhd. Tang, S.Ag., M.Pd.I, Head of State Tsanawiyah Madrasah 1 Tanjung Jabung Barat, shared that schools provide space and facilities for students to develop innovative projects, "We organize technology competitions or festivals that involve students." In addition, education on digital ethics and security is also a focus, where students are taught how to behave in cyberspace and protect personal data. Through these steps, the madrasah has succeeded in equipping students with relevant skills and encouraging them to become responsible digital citizens, positively impacting the overall quality of education. The innovation of the Madrasah Principal has not been able to develop digitalization at the Jambi Province State Tsanawiyah Madrasah.

a. Limited Access and Technology Infrastructure

Limited access to technological infrastructure in State Tsanawiyah Madrasah in Jambi Province is a major obstacle to the development of digitalization, as expressed by the Principals in interviews. The first problem is limited internet access, with one Principal in Merangin Regency stating, "We really want to implement digital learning, but internet access in our area is very poor." Field observations showed that internet facilities were limited to the administration room, while classrooms were not covered by Wi-Fi networks. In addition, the lack of technological devices was also a significant obstacle; a teacher at State Tsanawiyah Madrasah 1 Tanjung Jabung Barat complained, "We only have 5 computers for learning purposes, and even then they are often used for administrative work." Geographical challenges also contributed, with the Principal of State Tsanawiyah Madrasah 1 Merangin stating, "We only rely on cellular networks, and even then the signal is very weak." The lack of supporting infrastructure, such as adequate computer labs, also exacerbated the situation; an IT teacher stated, "Our computer labs are very inadequate." The impact of all these obstacles is seen in the quality of learning, where a student at State Tsanawiyah Madrasah 1 Merangin stated, "We often feel left behind compared to our friends in the city." Therefore, collaborative efforts are needed from the government, internet service providers, and the community to improve technological infrastructure and teacher capacity, so that the digitalization of education can be realized evenly and provide maximum benefits for all students.

b. Lack of Teacher Training and Capacity Building

The research highlights that a lack of training and capacity building for teachers poses a significant barrier to digitalization efforts in Madrasah Tsanawiyah Negeri in Jambi Province, despite the strong desire from school management to integrate technology into the learning process. Several heads of madrasah acknowledged the importance of digitalization but expressed challenges in preparing their educators. One head stated, "The biggest problem we face is the lack

of training for our teachers, many of whom are not mentally or technically ready to adopt technology." Teachers echoed this sentiment, with one from State Tsanawiyah Madrasah 1 Kota Jambi lamenting, "The training we receive usually lasts only one or two days and is more theoretical than practical," highlighting the need for ongoing, relevant training. Furthermore, the absence of practical application in training leads to a gap between theoretical knowledge and actual implementation, as many teachers feel unprepared to use technology effectively. One teacher noted, "I know technology can make learning more engaging, but I feel inadequately trained to use it," indicating that this lack of confidence drives them back to traditional teaching methods. Additionally, support for continuous development is crucial; one head of madrasah emphasized, "Ongoing guidance is vital. Teachers need support when starting to implement technology in the classroom." Observations confirmed that teachers who received ongoing support were more likely to embrace technology in their teaching, contributing to successful digitalization. Therefore, the study concludes that substantial investment in relevant training and continuous support for teachers is essential to realize the full potential of digitalization in enhancing educational quality in these madrasahs.

c. Budget Limitations and Financial Support

He development of digitalization in Madrasah Tsanawiyah Negeri in Jambi Province faces significant challenges, with budget limitations being the most critical. According to interviews with school principals and teachers, many schools struggle to allocate sufficient funds for necessary technological equipment, such as computers, projectors, and network infrastructure. One principal expressed, "We really want to integrate technology into learning, but our budget is very limited. We even struggle to buy new computers, let alone other devices like projectors or tablets for students." Observations show that most schools have outdated equipment, with only one or two computers, often over five years old, and in some cases, the limited technology is shared between classrooms, reducing teaching efficiency. Further exacerbating the problem is the lack of external financial support from the government and private sector. As one principal remarked, "We have submitted several proposals for technology procurement assistance, but it's very difficult to get support." Even when external funding is available, it is often insufficient to cover the school's full needs, leading to unequal access to technology. Another obstacle is the ineffective use of existing budgets, with schools sometimes purchasing irrelevant technology, like software that doesn't align with the curriculum. A teacher highlighted, "Sometimes, there's a budget for technology, but it's not used optimally. For example, we bought software that is rarely used because it doesn't fit the curriculum or is difficult for teachers to understand." Furthermore, the process of securing additional funding is slow and bureaucratic, causing delays in the procurement of much-needed technology. One principal shared their experience: "We applied for additional funding for new computers, but the process was long and complicated, and we had to wait until the following year to get the funds." The combination of internal budget constraints, minimal external support, inefficient budget use, and lengthy bureaucratic procedures underscores the urgent need for reform in how digitalization initiatives are supported and implemented in these schools. Addressing these issues is critical to ensure students receive the digital education necessary for future success.

d. Lack of Policies that Support Digitalization

Many heads of madrasah have expressed that policies from the education department or the Ministry of Religious Affairs at the district level do not fully support digitalization initiatives. While there are directives to integrate technology into education, these are not accompanied by

clear guidance or support, leading to confusion and uncertainty in implementation. One head of madrasah emphasized, "We truly need a clear strategic plan for how to carry out digitalization; without detailed guidance, our efforts feel directionless." The absence of a comprehensive digitalization strategy results in ad hoc implementations, leading to uncoordinated processes and suboptimal outcomes. Additionally, support from the government is often inadequate; another head stated, "We hear about various government assistance programs for digitalization, but the application process is complicated, and the support we receive is often insufficient." Observations revealed that many madrasah struggle to access information about available programs, which hampers their ability to implement technology effectively. Furthermore, inadequate policies for training and development hinder educators' readiness to adopt new technologies. One teacher noted, "We receive some training on technology, but it's not in-depth, leaving us unprepared to use it in the classroom." Observations confirmed that training is often one-off and does not cover all necessary aspects. Policies regarding infrastructure maintenance are also lacking, with one head explaining, "We often receive new devices from assistance programs, but there are no clear policies for their maintenance and upgrading." This leads to many devices being outdated or damaged without proper care. The lack of effective evaluation policies means that schools cannot assess the impact of technology on learning, as one teacher mentioned, "We don't have a clear system to evaluate whether the technology we use is positively impacting learning." Lastly, reliance on external funding creates instability, as another head stated, "We are heavily dependent on external funding for technology purchases, making our planning unstable." This dependence inhibits long-term planning and undermines the sustainability of digitalization efforts. Overall, the lack of supportive policies in various aspects, from strategic planning to funding and training, significantly hinders the digitalization process in Madrasah Tsanawiyah Negeri in Jambi Province, necessitating the development of more comprehensive policies and stronger support from all stakeholders involved.

The Benefits of the Principal's Innovation in Developing Digitalization at the State Tsanawiyah Madrasah of Jambi Province

1. Enhancing Learning Efficiency

The digitalization initiatives led by Madrasah principals have significantly improved the efficiency of the learning process. Technology allows for faster and more engaging delivery of materials through digital platforms, interactive applications, and online resources, leading to better time management for teachers and more enriched learning experiences for students.

2. Fostering Student Independence

Digitalization has also promoted student autonomy by providing access to educational resources anytime and anywhere. Students are encouraged to take control of their own learning, using digital tools to explore subjects independently, develop problem-solving skills, and reduce reliance on teachers for guidance.

3. Enhancing Teaching Effectiveness through Technology

Teachers at State Tsanawiyah Madrasah Jambi have increasingly integrated digital tools like multimedia presentations, educational videos, and online quizzes into their lessons. This transition from traditional methods to tech-enhanced teaching has made lessons more engaging, interactive, and easier for students to comprehend, especially for complex concepts.

4. Expanding Access to Educational Resources

Digitalization has significantly broadened access to learning materials. Teachers and students at State Tsanawiyah Madrasah Jambi now utilize digital resources such as online articles, global research papers, and multimedia content. These resources enhance the depth of learning and provide diverse perspectives that go beyond conventional textbooks.

5. Increased Transparency and Accountability through Digitalization

The adoption of digital systems in State Tsanawiyah Madrasah Jambi has significantly enhanced transparency and accountability in various aspects of school administration, including financial management, human resource processes, and asset management. Digital financial systems allow detailed and open reporting of expenditures and aid funds, ensuring that all transactions are trackable and auditable in real-time. This creates a more transparent environment where stakeholders, including parents and local government, can access important data on school operations.

6. Improved Collaboration and Communication

Digital tools have facilitated effective collaboration and communication among teachers, students, and parents. Platforms like learning management systems and project management applications enable teachers to collaborate more efficiently, share curriculum materials, and plan lessons. These tools also enhance interaction between teachers and students, allowing for faster feedback and support. Additionally, communication between the school and parents has become more transparent, with online access to students' academic progress and direct communication channels with teachers

Discussion

Based on previous research and similar studies, the digitalization efforts in State Tsanawiyah Madrasah in Jambi Province reflect common challenges and opportunities in the broader context of educational technology integration in Indonesia. Earlier studies, such as those by Okoye et al., (2023), have highlighted the uneven distribution of technological infrastructure and varying levels of digital literacy among educators and students as critical barriers to effective digitalization. Additionally, research by Tugwell & Maduabuchukwu (2020) emphasized the importance of continuous professional development for teachers to ensure they can utilize digital platforms like e-learning effectively. These studies also point to a significant gap in digital access between urban and rural schools, a trend mirrored in Jambi Province, where limited internet connectivity and access to devices, particularly in remote areas, hinder the full realization of digital learning. However, as indicated in both prior research and the case of Jambi, efforts by school leaders to innovate and seek external partnerships for technological resources show promise in addressing these disparities. Ultimately, successful digitalization requires not just the availability of technology but also sustained training and equitable access to infrastructure across all schools.

The innovations in madrasah leadership in Jambi Province reflect broader trends in educational digitalization seen in previous studies. Research by Demartini et al., (2020) highlights that successful digital transformation in schools often relies on proactive leadership, where principals play a critical role in procuring digital devices, securing stable internet infrastructure, and fostering a culture of innovation and collaboration. Similarly, studies by Statti & Torres (2020) emphasize that digital literacy programs, teacher competency development, and stakeholder

collaboration are key factors in ensuring the effective integration of technology in schools. However, challenges such as unequal access to resources, particularly in rural areas, mirror findings from earlier studies, which show that disparities in infrastructure and digital competency training can hinder the full realization of educational digitalization. Despite these obstacles, Jambi's madrasah leaders have taken significant steps in training staff, integrating technology in learning, and collaborating with local governments, all of which align with successful strategies from prior research in advancing digital education.

The challenges faced by madrasahs in Jambi Province regarding digitalization align with previous research on obstacles to educational technology integration in rural or underfunded regions. Studies by Okoye et al., (2023) highlight that limited access to technology infrastructure, inadequate teacher training, budget constraints, and lack of supportive policies are common barriers in educational digitalization, particularly in remote areas. These issues are exacerbated by poor internet connectivity, insufficient digital devices, and a lack of sustained capacity building for educators, as seen in similar rural settings across Indonesia. The lack of clear policy guidance and strategic frameworks from the government also aligns with previous research, which underscores the need for comprehensive, well-coordinated digitalization strategies at both local and national levels to ensure successful implementation (Cross & Adler-Milstein, 2022). These findings suggest that without targeted interventions to address infrastructure, training, funding, and policy issues, the digital divide in education will persist, limiting the effectiveness of digital learning innovations.

The benefits of digitalization observed in the madrasahs of Jambi Province align with earlier research on the positive impacts of technology integration in education. Studies by Sadiq et al., (2024) have demonstrated that digitalization enhances learning efficiency by providing faster and more engaging material delivery, as well as fostering student independence through self-paced learning tool. Similarly, Pinto & Leite, (2020) found that digital tools expand access to a broader range of educational resources, giving students the ability to explore diverse perspectives beyond traditional textbooks. Furthermore, the shift toward digital systems has improved transparency and accountability in school administration, as demonstrated in studies like those, who noted that digital financial and administrative tools create more open, trackable, and auditable environments. Lastly, digitalization has been shown to improve collaboration and communication among teachers, students, and parents, a benefit widely reported in research, highlighting the role of learning management systems in facilitating more transparent, effective interactions between all stakeholders in the education process

CONCLUSIONS

This study aims to analyze the innovation of madrasah principals in developing digitalization in State Tsanawiyah Madrasah in Jambi Province, considering the importance of digitalization in improving the quality of learning and administration along with the development of information and communication technology. Madrasah principals play a strategic role as agents of change by conducting technology training for teachers, socializing with parents, and collaborating with external parties to overcome infrastructure limitations. However, this study also found challenges such as limited technology infrastructure, lack of teacher competence in information and communication technology (ICT), and parental resistance to the use of

technology. The success of digitalization is highly dependent on the leadership of innovative madrasah principals, who are able to adapt to change, manage resources optimally, and build a culture of innovation in the madrasah environment. With support from the government and increased digital literacy among parents, it is hoped that madrasahs can transform into modern and competent educational institutions in facing challenges in the digital era. This study is expected to contribute to the development of policies that support digitalization in madrasahs and become a reference for madrasah principals in developing educational innovations

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