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Unpreparedness of Indonesian Madrasah Teachers in Utilizing Technology for Digital Religious Learning-Teaching

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ABSTRACT

The adaptability of education systems to technological change is a critical and inevitable demand. This study explores the unpreparedness of Indonesian madrasah teachers in adapting to the ongoing digitalization of religious education. Using a grounded qualitative approach with descriptive analysis, data were collected through observations, interviews, and document analysis. The findings reveal that teachers struggle to adapt to digital-based religious instruction, primarily due to difficulties operating technological tools. This unpreparedness is further exacerbated by limited technological infrastructure and low levels of digital literacy among teachers. As a result, the effectiveness of religious education is hindered, and instructional time is often used inefficiently. The study underscores the urgent need to improve technological infrastructure and enhance teachers' digital competencies to better support the digital transformation of education in Indonesia.

Keywords: *Indonesian madrasah teachers; digital literacy; technology integration; religious education; educational readiness*

ABSTRAK

Adaptasi sistem pendidikan terhadap perubahan teknologi merupakan tuntutan yang krusial dan tak terelakkan. Studi ini mengkaji ketidaksiapan guru madrasah di Indonesia dalam beradaptasi dengan digitalisasi pendidikan agama yang sedang berlangsung. Menggunakan pendekatan kualitatif yang mendasar dengan analisis deskriptif, data dikumpulkan melalui observasi, wawancara, dan analisis dokumen. Temuan penelitian menunjukkan bahwa guru kesulitan beradaptasi dengan pembelajaran agama berbasis digital, terutama karena kesulitan dalam mengoperasikan perangkat teknologi. Ketidaksiapan ini semakin diperparah oleh keterbatasan infrastruktur teknologi dan rendahnya literasi digital di kalangan guru. Akibatnya, efektivitas pendidikan agama terhambat, dan waktu pembelajaran seringkali digunakan secara tidak efisien. Studi ini menggarisbawahi kebutuhan mendesak untuk meningkatkan infrastruktur teknologi dan meningkatkan kompetensi digital guru guna mendukung transformasi digital pendidikan di Indonesia dengan lebih baik.

Kata-kata Kunci: guru madrasah di Indonesia; literasi digital; integrasi teknologi; pendidikan agama; kesiapan pendidikan

1. INTRODUCTION

The growing demand for technology integration in education has presented significant challenges for teachers in its implementation. Although technology is expected to facilitate the learning process, it paradoxically introduces new difficulties in the midst of rapid advancements. Technology's rapid evolution poses challenges and opportunities in various aspects of society, where previously technology-native communities are gradually becoming tech-savvy, thereby transforming their proficiency in digital device usage (Pabbajah et al., 2021). The advent of technology has altered various dimensions of social and cultural life within communities (Manson et al., 2017; Naikoo et al., 2018; Uranga, 1999), including education (Pienimäki et al., 2021). Teacher competency as educators is crucial in responding to technological advancements. Based on data from Databoks, Indonesia has 3.3 million teachers spread across the country. Meanwhile, the Minister of Education, Culture, Research, and Technology reveals that Indonesia still has many technologically inept teachers (https://gtk.kemdikbud.go.id/). Accordingly, ICT-based Learning BimTek indicates that 60% of teachers in Indonesia are still not proficient in information and communication technology (ICT) (Estrelle, 2022). Meanwhile, only 40% are tech-savvy. This 40% figure is relatively low, below half of Indonesia's teachers.

The existing studies have explored the relationship between education and technology, resulting in many inquiries from diverse perspectives. Among these studies, there is a notable emphasis on the utilization of technology in the educational process (Escueta et al., 2020; Haleem et al., 2022; Mod et al., 2020; Teräs, 2022)highlighting education's reliance on technology to enhance learning quality (Escueta et al., 2020). Teachers have leveraged educational institutions to access learning materials (Kolomiets et al., 2020; Williams, 2017) and as tools for evaluating student learning outcomes (Junanto, 2019). Meanwhile, students predominantly utilize technology to complete school assignments (Buckley et al., 2019; Genc et al., 2021; Lind et al., 2022), and they can also harness technology as a practical learning resource (Carstens et al., 2021; Crittenden et al., 2019; Fox-Turnbull, 2019). Similarly, the adoption of technology in Islamic educational institutions, such as the emergence of digital madrasas in various regions of Indonesia (Haddade et al., 2023; Juniarni & Ali, 2022; Santosa & Jazuli, 2022) has been observed. However, existing studies have not extensively examined madrasah teachers' challenges regarding technological advancements.

The study aims to address the gaps in research concerning the unpreparedness of Indonesian madrasah teachers in utilizing technology. Consequently, three main questions are posed in this study. First, what are the manifestations of teachers' unpreparedness in using technology in the digital era? Second, what factors contribute

to teachers' unpreparedness in utilizing technology in the religious learning-teaching process in madrasahs? Third, what are the implications of teachers' unpreparedness in technology utilization, particularly in Islamic educational institutions such as madrasahs? These questions serve not only as the focal points of this study but also aim to map out crucial issues faced by madrasahs in the rapid advancement of technology. This study is grounded on the assumption that the development of educational technology does not always align with the competencies of educators. The presence of technology not only serves as a tool to facilitate the religious learning-teaching process but also results in difficulties in utilization due to limited digital literacy among teachers. Thus, educational institutions, especially madrasahs, need to enhance teachers' digital literacy to adapt to the increasingly rapid transformation of technology.

Teacher quality is an aspect crucial for enhancing students' learning outcomes. It is also essential for creating quality education, wherein teachers must possess competencies to implement various teaching processes (Farihin et al., 2022; Teig & Nilsen, 2022). However, with the progression of time, teachers are increasingly expected to master not only subject matter but also the tools or infrastructure used in teaching. For instance, the demands of the industrial revolution include the use of technology (Ramadhan et al., 2022). These demands indicate that some teachers struggle with incorporating technology into their teaching practices. Competent educators can swiftly and effectively respond to every challenge and issue encountered in the student learning environment (Beckmann, 2021). In line with this, Yang et al. (2022) state that the success of the education system in schools is not solely determined by the curriculum or textbook selection but also by the quality of the teaching staff.

One of the internal issues concerning teachers relates to their unpreparedness for change, as stated by Zati (2019), who found that teachers lack proficiency in technology usage and readiness to provide technology-based learning tools. Similarly, Basha et al. (2014) observed obstacles in the learning process in Albania due to inadequate technological resources, limited digital content in the native language, and the dominance of teachers as text-based knowledge and information sources. In their research, Barrett and Pack (2023) discovered that the insignificant use of AI in the learning process is attributed to classroom and institutional unpreparedness. Barrett also suggests the need for explicit guidelines and professional development for teachers regarding AI usage in the educational context due to the tendency of unpreparedness for such changes. Therefore, teachers' unpreparedness has become a significant concern alongside changes in the learning process, encompassing both content and methodological aspects.

Technology has demonstrated significant potential in enhancing productivity across various domains: social, economic, agricultural, and educational. Its utilization in education has transformed conventional learning processes into online-based ones

(Adducul & Gumabay, 2020; Ho, 2018; Baruah, 2018). The implementation of online learning systems has shifted teaching methods from one-directional, where content originates solely from the teacher in the classroom (Salay, 2019), to learner-centered approaches (Student-Centered Learning) (Sohibun & Ade, 2017). Technology integration allows student engagement in knowledge production that is not solely dependent on the teacher. Technology evolves from being solely the subject of study to becoming the medium through which students learn (Teräs, 2022). This shift is evident in various forms, such as the use of learning models like e-learning (electronic learning), Computer Assisted Instruction (CAI), Computer-Based Instruction (CBI), and e-teaching (electronic teaching) (Husain, 2014). Therefore, the utilization of technology represents a significant change that profoundly impacts education.

Technology in education is a systematic and critical approach that utilizes technological methods or tools to address educational issues (Teräs, 2022). However, both positive and negative effects are associated with using technology in education. Positive effects include more efficient learning systems, such as online classes that do not require face-to-face interaction. Online classes like this provide more effective time management as teaching and learning processes can occur anywhere (Jamil & Shah, 2011). Similarly, knowledge production becomes more accessible, with material accessed via the Internet under the guidance of a teacher (Kurt, 2010). Conversely, adverse effects include the tendency for students to become passive, as they may only download notes or assignments without actively engaging in classroom discussions (Kirschner & van Merriënboer, 2013). There is also the risk of marginalized teachers, leading to their disengagement from the teaching process (Beese, 2019). Therefore, the use of technology in education is a choice that should be made with careful consideration and adequate preparation.

2. METHOD

The advancement of technology to facilitate the learning-teaching process in schools still poses challenges for several teachers in Indonesia. Thus, this research discovers teachers' unpreparedness for using technology in religious learning-teaching. It is grounded in qualitative research with a descriptive analysis approach. This approach maps out the difficulties a group of Indonesian madrasah teachers faces in utilizing technology in religious learning-teaching. Data were collected through direct observation in madrasahs, interviews with several teachers, and documentary studies. The gathered data were then categorized based on the needs of this study's issues, particularly regarding how the forms, impacts, and implications of teachers' unpreparedness in technology usage are manifested. The data were subsequently analyzed using the concept of unpreparedness in technology usage in education. The next step involved presenting the data in a narrative descriptive form. The concluding

step was to conclude the data by extracting the essence from the interview data. Additionally, the data were presented in narrative sentences containing meaning related to the issues of this study, particularly concerning teachers' unpreparedness in responding to the rapid advancement of technology.

3. RESULTS AND DISCUSSION

a. Teacher Competence in Religious Learning-Teaching

One of the primary foundations for the development of future education is an educational system organized as a cultural process and empowerment of lifelong learners, organized to provide role models, build willingness, and foster creativity in learners during the learning process (Dardiri et al., 2021; Juhansar, 2021). Teachers are pivotal elements in the education system. Hence, the government conducts evaluations and qualifications for teachers through competency exams. Competence refers to an individual's ability to perform tasks or duties based on skills, knowledge, and attitudes supported by work requirements. Competence is always associated with a teacher's ability related to student understanding, the learning-teaching processes, and self-actualization. Consistent with Huijbers et al. (2017), who have designed a professional competence model for teachers identifying four non-hierarchical, structured competence aspects: knowledge, belief, motivation, and self-regulation. Meanwhile, Skantz-Åberg et al. (2022) state that knowledge, as a critical component of teacher professional knowledge, can be divided into different domains with more specific aspects: content knowledge, for instance, implies a deep understanding of specific content in a discipline.

In education, the presence of technology can be observed in the enhancement of school device performance through various programs, including 1) conducting technology training for teachers and school principals, 2) fostering partnerships with software developers, and 3) establishing operational policies to ensure the effective integration of technology into education (Newby & Cheng, 2020). Learning technology encompasses complex and soft technology related to instructional planning and innovative teaching models (Curran et al., 2019; Mason, 2006). It enables teachers and students to access broader and more varied learning resources (Murkatik et al., 2020). However, despite the benefits, the use of technology is known to have both positive and negative impacts due to the ease of access it provides (Opeña, 2022). Thus, technology in Islamic educational institutions presents opportunities and challenges for teachers to enhance their competencies.

b. Indonesian Madrasah Teachers' Unpreparedness in the Presence of Technology

Unpreparedness refers to a less responsive attitude of a teacher in adapting to instructional technology. In line with this, unprepared behavior can be interpreted as an individual's inability to adapt, resulting in inappropriate behavior. Therefore, adaptation

is crucial for individuals because easy adaptability allows them to acquire new techniques that have not been used before, enabling them to endure any situation. Mey (2018) also conveys a similar sentiment, stating that a leader must be highly adaptable and more sensitive to changes that affect the outcomes. Based on data from interviews and observations, it proves that subject teachers in this study experience unpreparedness in utilizing instructional technology. The research findings identify various forms of unpreparedness experienced by teachers, including difficulties in using technology-based instructional media, technological hesitancy, and incompetence in utilizing technological media for instruction.

The first form of unpreparedness in teachers is difficulty utilizing instructional technology. Teachers face challenges related to instructional media usage, including designing and selecting appropriate media for instruction. Consequently, teachers often prefer manual learning-teaching methods that are perceived as more practical, simple, and easy to use without the assistance of technology, both in the teaching process and task collection. It occurs due to teachers' low proficiency in using technological digital media, causing them to struggle in incorporating media into instruction. Therefore, teachers must utilize appropriate digital media in instruction to stimulate student interest and motivation, making it easier for students to receive and comprehend the material. Magdalena et al. (2021) emphasize that using digital media in instruction enhances learning effectiveness. Using instructional media in the learning-teaching process can spark new interests and motivations for learning (Pabbajah et al., 2021). Moreover, instructional digital media usage is essential as it saves time, simplifying the delivery of new and unfamiliar concepts to students. From the points above, instructional religious digital media is vital for enhancing students' learning-teaching interests.

Secondly, teachers' unpreparedness is demonstrated by their lack of proficiency in using technology. Based on the interview and observation findings, it proves that technological hesitancy stems from a lack of technological literacy. Technological hesitancy is akin to incompetence in operating technology effectively, primarily due to ignorance regarding technological advancements. Astini (2019) further emphasizes that in this digital age, it is essential for teachers to possess basic competency and literacy in utilizing instructional technology. The consequence of inadequate understanding of technology leads to teachers resorting to manual learning-teaching methods, resulting in a less conducive learning environment experienced by students.

Thirdly, another form of unpreparedness among Indonesian madrasah teachers is the lack of proficiency in using instructional technology. Proficiency in digital media is one of the pedagogical competencies that a teacher must possess. Yang et al. (2022) affirm that teachers must utilize technology functionally and incorporate it into instruction. Based on interview findings, one of the factors contributing to teachers' lack of proficiency in using instructional technology is their limited knowledge in the

rapidly evolving field of technology, coupled with a lack of skills in effectively utilizing technological digital media. It aligns with the remarks made by one of the interviewees, expressing fear that using instructional technology in learning-teaching would lead to difficulties in delivering the material. This fear stems from educators' insufficient knowledge in leveraging instructional media. Therefore, every teacher has an equal opportunity to select and determine the instructional technology to be utilized, ensuring that the teaching-learning process can proceed effectively and efficiently. The presence of technology in the instructional process is crucial, making digital media an integral component of learning-teaching. This is possible because using technology as an instructional medium makes teachers more adept at delivering instructional material to achieve learning objectives effectively and efficiently (Pabbajah et al., 2022). Therefore, teachers must also be professional educators who can adapt to evolving advancements in knowledge and technology.

c. Factors Driving the Unpreparedness of Indonesian Madrasah Teachers

The occurrence of teacher unpreparedness or problems encountered by teachers in using or leveraging instructional media does not happen spontaneously; instead, several obstacles contribute to the emergence of these issues. Obstacles refer to barriers, hindrances, or circumstances that restrict and impede an activity, leading to errors (Kristianda, 2020). Research findings indicate that the factors or causes of teacher unpreparedness in utilizing instructional technology faced by teachers in utilizing and incorporating instructional digital media in madrasah are limited availability of instructional technology, instructional digital media, and teachers' technological usage competence. The first factor contributing to teacher unpreparedness is the limited availability of instructional technology. Instructional technology serves as a tool for delivering educational messages. This realization is acknowledged by various stakeholders, including school administrators, teachers, and students. However, issues related to instructional technology arise from these parties. One is the limited availability of instructional technology as a medium, which can fundamentally lead to monotonous learning processes and less effective outcomes (Pabbajah et al., 2020). This limitation can result from the absence of change or new environments experienced by students during learning. Therefore, it is essential to improve instructional technology facilities to support the successful implementation of technology-mediated religious learning-teaching. Similarly, Sandiar et al. (2021) emphasize the crucial role of learning facilities in supporting student learning-teaching activities in schools, underscoring the need to enhance technological facilities. Without adequate resources, implementing digital technology-mediated religious learning-teaching would be challenging. Moreover, using technology in religious learning-teaching can make learners more comfortable and prevent them from feeling bored or monotonous. It occurs because information delivery through advanced technology appears more diverse and modern.

The second factor is the perception that instructional digital media is not essential in religious learning-teaching processes. Some teachers consider instructional digital technology merely as an auxiliary tool. Therefore, they believe it has no impact if not used, leading to the perception that digital media is unimportant. However, instructional technology is crucial in face-to-face learning-teaching activities as a medium. Digital media assists teachers as informants (Wohlfart & Wagner, 2023). As it is well known, the presence of a teacher is an indispensable requirement that cannot be ignored, as teachers are essential components of learning-teaching activities. Teachers have many roles in face-to-face learning-teaching, including being an informant. Teachers must strive to convey the material or message clearly and comprehensibly to students. This implies that teachers must prepare instructional digital technology that can be used to deliver and transform the material. As part of instructional technology, instructional digital media can assist teachers in conducting religious learning and teaching effectively and efficiently.

The third factor is the limited technological competence of teachers, which is often attributed to age-related factors. The limited ability of teachers to use technology is partly due to age-related factors. Therefore, it is expected to find senior teachers with low technological proficiency (difficulty in managing instructional digital technology) in the research setting. Consequently, this condition significantly affects teachers' self-confidence in implementing technology-based religious learning-teaching in the classroom. The reason is that teachers feel embarrassed when they cannot use instructional technology proficiently, leading to a fear of making mistakes when operating technology in front of students. With such conditions, the religious learning-teaching process impacts the delivery of the material, resulting in suboptimal outcomes. Consequently, teachers who feel incapable of using technology lack the motivation to learn it and show no curiosity, leading them to refrain from using technology in the learning-teaching process. In this regard, teachers need to be more proactive in utilizing technology and recognize its importance in education, considering the rapid pace of technological advancement with various features. Thus, teacher competency is required in response to these technological developments. Moreover, an effective supporting system is needed through digital learning-teaching literacy training to enhance teachers' motivation to develop literacy and competence in technology.

d. Implications and Solutions for Indonesian Madrasah Teachers' Unpreparedness

Technology has ushered in conveniences for human work, including tasks within the realm of education. Technology is designed to aid stakeholders' work within schools. However, it becomes a hindrance if schools are not adequately prepared to respond to the presence of technology, as evidenced by the observations of this study. Several madrasah teachers are not yet prepared to utilize technology in the learning-

teaching process. These results affect the inefficiency of religious learning-teaching time. Teachers still employ manual systems in delivering course materials, which is tedious for students. The use of digital technology, on the other hand, renders learning-teaching more efficient (Al-Hunaiyyan et al., 2017; Sabzian et al., 2013). Furthermore, technological unpreparedness impedes the learning process of students at schools. The limited introduction of technological devices in madrasahs affects the scarcity of technological literacy accessible to students. The insufficient technological literacy teachers introduce through the religious learning-teaching process results in a decline in learning-teaching achievement (Brata et al., 2022). Teachers who do not utilize technological devices are unaware that mastery of digital literacy is an unavoidable demand in meeting current teaching competencies. It is in line with what has been stated by Wohlfart & Wagner (2023) that teachers' competencies today are greatly determined by mastery of technological devices. Technology opens the way for broader access to education, thereby reducing educational disparities (Jubba & Pabbajah, 2018). It means that education fulfills everyone's rights without exception.

The first solution that can be implemented is the provision of technological facilities to support learning-teaching in every classroom. In supporting education, facilities that support and are adequate for conducting learning-teaching activities are necessary. Therefore, this solution is proposed due to the inadequacy of school facilities, which undoubtedly makes the learning-teaching process ineffective. Furthermore, comfort and learning-teaching motivation may decrease due to the lack of facilities to support the activities. Hence, there is a need to improve technological facilities that support learning for students in the classroom. Adequate and supportive learning facilities can facilitate teachers, students, and even the school to achieve practical learning goals. It is in line with the assertion by Wohlfart and Wagner (2023), stating that learning-teaching digital technology facilities play a crucial role in supporting students' learning-teaching activities at schools. From this explanation, providing learning-teaching digital technology resources is also crucial to support the success of learning-teaching implementation using technological digital media. In other words, educational institutions need to respond to the demands of the established educational system (Deraman et al., 2022), including the fulfillment of technological infrastructure. Without adequate resources, educational institutions cannot compete and contribute to the progress of the nation's children.

Furthermore, there is a need for regular training programs in the field of instructional technology, e.g., digital technology for teachers at schools, especially subject teachers. Training programs on technology media in the learning-teaching process are conducted to enhance teachers' skills in instruction. This solution is implemented due to the lack of proficiency among teachers in the school regarding digital media technology, particularly in the learning-teaching. Training activities in

instructional technology constitute the most effective solution for expecting teachers to utilize digital media in the learning-teaching processes. Thus, teachers' skills can be enhanced through training, enabling them to be more creative in their learning-teaching activities. Training on instructional technology is an essential process that teachers must undergo to enhance professionalism and fulfill their duties as effective educators capable of conducting learning-teaching activities according to the needs of their students. Indeed, with the rapid advancement of technology worldwide, teachers are expected to keep pace with it. However, many teachers, particularly those in rural areas, are still not accustomed to using the internet and technology in the teaching-learning process. An unpreparedness issue in the field is that some teachers cannot operate digital or instructional digital media, resulting in manual learning, teaching, and assignment collection processes. In line with this, Salsabila et al. (2020) explain that using the internet effectively provides convenience for teachers and students in the learning-teaching process. Similarly, the Minister of Education, Culture, Research, and Technology of the Republic of Indonesia emphasizes the importance of technological adaptation in learning-teaching in this digital era (Ministry of Education and Culture, 2021).

4. CONCLUSION

Technology, which has long been seen as a tool to facilitate teachers in delivering digital instruction, is not entirely embraced. The presence of technology still raises concerns about the unpreparedness of schools and teachers in utilizing technology in educational institutions. This research results indicate that teachers' unpreparedness for the use of instructional digital technology, as seen in Madrasahs, is manifested by the difficulties experienced by teachers in using instructional digital technology, technological hesitation, or lack of literacy in instructional technology use, as well as the inadequacy of teachers in utilizing instructional digital media such as in religious learning-teaching processes. The factors contributing to teachers' unpreparedness for the use of instructional digital technology in the digital age can be mapped into three main aspects: limited instructional digital technology, technological digital media perceived as less critical, and leading subject teachers in schools to tend not to utilize technology in religious learning-teaching. Additionally, teachers' ability to manage instructional digital technology remains very limited. The implications of teacher unpreparedness include hindrance to the religious learning-teaching process, for instance, as instructional delivery remains conventional, requiring a relatively longer time. Solutions to address teachers' unpreparedness in utilizing instructional digital technology can be classified into three main points: firstly, providing technology facilities that support learning-teaching in every classroom. Secondly, conducting regular training programs in instructional digital technology for teachers in schools.

Thirdly, organizing routine training programs in technology for school teachers, especially subject teachers, e.g., religious studies. Additionally, arranging training activities on effective and efficient teaching methods compared to conventional methods would also be beneficial. Indeed, this study is limited by the relatively small sample size of the data sources compared to the number of madrasahs scattered throughout Indonesia. Similarly, data collection was conducted using purposive sampling with several teachers. Therefore, further comparative studies are needed, utilizing larger samples. It would enable mapping the dynamics of the issues faced by Indonesian educational institutions regarding the evolving presence of technology. Consequently, educational institutions can respond to the presence of technology wisely and correctly, impacting students' and teachers' utilization of technology.

5. REFERENCES

Adducul, R. B., & Gumabay, M. V. N. (2020). Crowdsourcing technology for classroom learning. *International Journal of Advanced Trends in Computer Science and Engineering*, *9*(4), 5103–5110. https://doi.org/10.30534/ijatcse/2020/133942020

Al-Hunaiyyan, A., Al-Sharhan, S., & Alhajri, R. (2017). A New Mobile Learning Model in the Smart Classroom Environment: A Holistic Approach. *International Journal of Interactive Mobile Technologies*. https://doi.org/10.3991/IJIM.V11I3.6186

Barrett, A., & Pack, A. (2023). Not quite eye to AI: Student and teacher perspectives on using generative artificial intelligence in writing. *International Journal of Educational Technology in Higher Education*, *20*(1). https://doi.org/10.1186/s41239-023-00427-0

Baruah, T. D. (2018). E-learning as a medium for facilitating learners' support services under open and distance learning: An evaluative study. In *Technology for Efficient Learner Support Services in Distance Education: Experiences from Developing Countries*. https://doi.org/10.1007/978-981-13-2300-3_5

Basha, A., Vilar, P., & Stricevic, I. (2014). Technology and media preferences: Results from some user studies in Albanian public libraries. *Perspectives of Innovations, Economics and Business*, *14*(3), 143–146. https://doi.org/10.15208/pieb.2014.16

Beckmann, J. (2021). Die noodsaak van bevoegde onderwysers in elke Suid-Afrikaanse skoolklaskamer The necessity of competent teachers in each South African school classroom. *Tydskrif Vir Geesteswetenskappe*. https://doi.org/10.17159/2224-7912/2021/v61n3a7

Beese, E. B. (2019). A process perspective on research and design issues in educational personalization. *Theory and Research in Education*. https://doi.org/10.1177/1477878519893963

Brata, W. W. W., Padang, R. Y., Suriani, C., Prasetya, E., & Pratiwi, N. (2022). Student's Digital Literacy Based on Students' Interest in Digital Technology, Internet Costs, Gender, and Learning Outcomes. *International Journal of Emerging Technologies in Learning*. https://doi.org/10.3991/ijet.v17i03.27151

Buckley, J., O'Connor, A., Seery, N., Hyland, T., & Canty, D. (2019). Implicit theories of intelligence in STEM education: perspectives through the lens of technology education students. *International Journal of Technology and Design Education*. https://doi.org/10.1007/s10798-017-9438-8

Carstens, K. J., Mallon, J. M., Bataineh, M., & Al-Bataineh, A. (2021). Effects of Technology on Student Learning. *TOJET: The Turkish Online Journal of Educational Technology*.

Crittenden, W. F., Biel, I. K., & Lovely, W. A. (2019). Embracing Digitalization: Student Learning and New Technologies. *Journal of Marketing Education*. https://doi.org/10.1177/0273475318820895

Curran, V., Gustafson, D. L., Simmons, K., Lannon, H., Wang, C., Garmsiri, M., Fleet, L., & Wetsch, L. (2019). Adult learners' perceptions of self-directed learning and digital technology usage in continuing professional education: An update for the digital age. *Journal of Adult and Continuing Education*. https://doi.org/10.1177/1477971419827318

Dardiri, A., Purwastuti, L. A., & Thontowi, Z. S. (2021). Landasan Filosofis Pendidikan Dalam Perspektif Guru. *Sukma: Jurnal Pendidikan*. https://doi.org/10.32533/05204.2021

Deraman, Pabbajah, M., & Widyanti, R. N. (2022). Respons Lembaga Pendidikan Islam Atas Implementasi Pendidikan yang semakin meningkat. *Al-Iltiza: Jurnal Pendidikan Agama Islam*.

Dwi Amalia Zati, V. (2019). Upaya Peningkatan Kompetensi Profesional Tenaga Pendidik Di Era Revolusi Industri 4.0. *Seminar Nasional Pgsd Unimed*.

Escueta, M., Nickow, A. J., Oreopoulos, P., & Quan, V. (2020). Upgrading education with technology: Insights from experimental research. In *Journal of Economic Literature*. https://doi.org/10.1257/JEL.20191507

Estrelle Rose A. Opeña. (2022). Integration of Information Communication Technology (ICT) in the New Normal Learning: Its Effect on Teachers' Individual Performance Commitment Rating. *EPRA International Journal of Environmental Economics, Commerce and Educational Management*. https://doi.org/10.36713/epra10784

Farihin, Suteja, Muslihudin, Aris, Haqq, A. A., & Widodo, W. (2022). A Skill Application Model to Improve Teacher Competence and Professionalism. *International Journal of Educational Methodology*, *8*(2), 331–346.

Fox-Turnbull, W. (2019). Assisting teachers' understanding of student learning in technology. *International Journal of Technology and Design Education*. https://doi.org/10.1007/s10798-018-9484-x

Genc, Z., Babieva, N. S., Zarembo, G. V., Lobanova, E. V., & Malakhova, V. Y. (2021). The Views of Special Education Department Students on Assistive Technologies in Special Education. *International Journal of Emerging Technologies in Learning*. https://doi.org/10.3991/ijet.v16i19.26025

Haddad, H., Nur, A., Mustami, M. K., & Achruh, A. (2023). Technology-based learning strategies in Digital Madrasah Program. *Cypriot Journal of Educational Sciences*. https://doi.org/10.18844/cjes.v18i1.8179

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*. https://doi.org/10.1016/j.susoc.2022.05.004

Hamsa Ramadhan, A., Muliyani, S., Vana Hafizah, C., & Ar Rahman, M. A. A. R. (2022). Sistem Pembelajaran Berbasis Terknologi Informasi dan Komunikasi. *Edumaspul: Jurnal Pendidikan*, *6*(1), 437–443. https://doi.org/10.33487/edumaspul.v6i1.2286

Ho, W. Y. J. (2018). Mobility and language learning: A case study on using an online platform to learn Chinese as a foreign language. *London Review of Education*. https://doi.org/10.18546/LRE.16.2.05

Huijbers, M. J., Crane, R. S., Kuyken, W., Heijke, L., van den Hout, I., Donders, A. R. T., & Speckens, A. E. M. (2017). Teacher Competence in Mindfulness-Based Cognitive Therapy for Depression and Its Relation to Treatment Outcome. *Mindfulness*. https://doi.org/10.1007/s12671-016-0672-z

Husain, C. (2014). Pemanfaatan Teknologi Informasi dan Komunikasi dalam Pembelajaran di SMA Muhammadiyah Tarakan. *Jurnal Kebijakan Dan Pengembangan Pendidikan*.

Jamil, M., & Shah, J. H. (2011). Technology: Its potential effects on teaching in higher education. *New Horizons in Education*.

Jubba, H., & Pabbajah, M. (2018). Politik Pendidikan Indonesia: Ketimpangan Dan Tuntutan Pemenuhan Kualitas Sumber Daya. *Jurnal Darussalam: Jurnal Pendidikan, Komunikasi Dan Pemikiran Hukum Islam*, *10*(1), 49–60. https://doi.org/10.30739/darussalam.v10i1.267

Juhansar, J. (2021). John Locke: The Construction of Knowledge in the Perspective of Philosophy. *Jurnal Filsafat Indonesia* *4*(3), 254-260. https://doi.org/10.23887/jfi.v4i3.39214

Junanto, S. (2019). Evaluation Model of Expertise Practice Programs for Early Childhood Educator Teachers. *JPUD - Jurnal Pendidikan Usia Dini*. https://doi.org/10.21009/10.21009/jpud.131.10

Juniarni, C., & Ali, N. (2022). Developing Innovation and Based on Smart Madrasah Model in Malang City. *Idarah (Jurnal Pendidikan Dan Kependidikan)*. https://doi.org/10.47766/idarah.v6i1.85

Kirschner, P. A., & van Merriënboer, J. J. G. (2013). Do Learners Know Best? Urban Legends in Education. *Educational Psychologist*. https://doi.org/10.1080/00461520.2013.804395

Kolomiets, O. M., Karpova, O. Y., Kondakchyan, N. A., & Matienko, I. V. (2020). Teaching activities in higher education institutions are based on the psychological theory of the assimilation of educational material by the student. *Andamios*. https://doi.org/10.29092/uacm.v17i43.770

Kurt, S. (2010). Technology use in elementary education in Turkey: A case study. *New Horizons in Education*.

Lind, J., Pelger, S., & Jakobsson, A. (2022). Students' knowledge of emerging technology and sustainability through a design activity in technology education. *International Journal of Technology and Design Education*.

https://doi.org/10.1007/s10798-020-09604-y

Lukman, B., Salawati, F., Raffi, M., & Nova, S. (2017). *Perkembangan Teknologi Kabupaten Bintan*. *1*(2), 1–6.

Manson, S., Matson, L., Kernik, M., DeLuca, E., Bonsal, D., & Nelson, S. (2017). Mapping, Society, and Technology. *Creative Commons Attribution-NonCommercial 4.0 International License*.

Mason, R. (2006). Learning technologies for adult continuing education. *Studies in Continuing Education*. https://doi.org/10.1080/01580370600751039

Mod Istyak Ali. (2020). Importance of Education Technology In TeachingLearning. *Our Heritage*.

Murkatik, K., Harapan, E., & Wardiah, D. (2020). The Influence of Professional and Pedagogic Competence on Teacher's Performance. *Journal of Social Work and Science Education*. https://doi.org/10.52690/jswse.v1i1.10

Naikoo, A. A., Thakur, S. S., Guroo, T. A., & Lone, A. A. (2018). Development of Society under the Modern Technology- A Review. *Scholedge International Journal of Business Policy & Governance ISSN 2394-3351*. https://doi.org/10.19085/journal.sijbpg050101

Newby, T. J., & Cheng, Z. (2020). Instructional digital badges: effective learning tools. *Educational Technology Research and Development*. https://doi.org/10.1007/s11423-019-09719-7

Nurmalasari, Y., & Erdiantoro, R. (2020). Perencanaan Dan Keputusan Karier: Konsep Krusial Dalam Layanan BK Karier. *Quanta*, *4*(1), 44–51. https://doi.org/10.22460/q.v1i1p1-10.497

Pabbajah, M., Abdullah, I., Widyanti, R. N., Jubba, H., & Alim, N. (2020). Student demoralization in education: The industrialization of university curriculum in 4.0.Era Indonesia. *Cogent Education*, *7*(1). https://doi.org/10.1080/2331186X.2020.1779506

Pabbajah, M., Hannani, H., Pabbajah, T. H., & Deraman, D. (2022). Beragama Di Ruang Digital: Pergeseran Orientasi Dari Pemahaman Agama Ke Spirit Beragama. *DIALEKTIKA*. https://doi.org/10.33477/da.v15i2.4028

Pabbajah, M., Jubba, H., Abdullah, I., Pabbajah, M. T. H., & Juhansar. (2021). From the scriptural to the virtual: Indonesian engineering students responses to the digitalization of Islamic education. *Teaching Theology and Religion*. https://doi.org/10.1111/teth.12581

Pienimäki, M., Kinnula, M., & Iivari, N. (2021). Finding fun in non-formal technology education. *International Journal of Child-Computer Interaction*. https://doi.org/10.1016/j.ijcci.2021.100283

Sabzian, F., Gilakjani, A. P., & Sodouri, S. (2013). Use of Technology in Classroom for Professional Development. *Journal of Language Teaching and Research*. https://doi.org/10.4304/jltr.4.4.684-692

Salsabila, U. H., Habiba, I. S., Amanah, I. L., Istiqomah, N. A., & Difany, S. (2020). Pemanfaatan Aplikasi Quizizz Sebagai Media Pembelajaran Ditengah Pandemi Pada Siswa SMA. *Jurnal Ilmiah Ilmu Terapan Universitas Jambi|JIITUJ|*, *4*(2), 163–173. https://doi.org/10.22437/jiituj.v4i2.11605

Santosa, S., & Jazuli, M. F. (2022). The Digital Madrasah as an Idea of IT-Based Islamic Education. *Nazhruna: Jurnal Pendidikan Islam*. https://doi.org/10.31538/nzh.v5i2.2121

Skantz-Åberg, E., Lantz-Andersson, A., Lundin, M., & Williams, P. (2022). Teachers' professional digital competence: an overview of conceptualizations in the literature. In *Cogent Education*. https://doi.org/10.1080/2331186X.2022.2063224

Sohibun, S., & Ade, F. Y. (2017). Pengembangan Media Pembelajaran Berbasis Virtual Class Berbantuan Google Drive. *Tadris: Jurnal Keguruan Dan Ilmu Tarbiyah*. https://doi.org/10.24042/tadris.v2i2.2177

Teig, N., & Nilsen, T. (2022). Profiles of instructional quality in primary and secondary education: Patterns, predictors, and relations to student achievement and motivation in science. *Studies in Educational Evaluation*, *74*, 101170. https://doi.org/https://doi.org/10.1016/j.stueduc.2022.101170

Teräs, M. (2022). Education and technology: Key issues and debates. *International Review of Education*. https://doi.org/10.1007/s11159-022-09971-9

Uranga, M. G. (1999). Knowledge Societies: Information Technology for Sustainable Development. *Journal of Economic Issues*. https://doi.org/10.1080/00213624.1999.11506206

Williams, M. E. (2017). Technology Integration Support Levels for In-Service Teachers. *Journal of Education and Practice*.

Wohlfart, O., & Wagner, I. (2023). Teachers' role in digitalizing education: an umbrella review. *Educational Technology Research and Development*. https://doi.org/10.1007/s11423-022-10166-0

Yang, K. L., Hsu, H. Y., & Cheng, Y. H. (2022). Opportunities and challenges of mathematics learning in Taiwan: a critical review. *ZDM - Mathematics Education*. https://doi.org/10.1007/s11858-021-01326-2

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