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An Analysis of Readiness of Teacher At MAN 2 Tapanuli Tengah In Facing Education Digital Transformation

Kurnia Arifah Pasaribu[1], Yunita Nadia
[1] Institut Bisnis Ekonomi Al-Washliyah, Tapanuli Tengah, Indonesia
[2] Kantol Wilayah Kementerian Agama, Kepulauan Riau, Indonesia
E-mail: [1]kurniaarifah77@gmail.com*, [2]qastiqasti@gmail.com

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ABSTRACT

The digital transformation in education requires teachers to be well-prepared in adopting technology as an effective teaching medium and method. The study aims to analyze the readiness of teachers at MAN 2 Tapanuli Tengah in facing the digital transformation of education, focusing on three key aspects: technological competence, attitudes and motivation, and supporting facilities and infrastructure. This research employs a quantitative approach with a descriptive method. Data were collected through questionnaires, interviews, and observations involving 35 teacher respondents. The results indicate that the overall readiness of teachers at MAN 2 Tapanuli Tengah is categorized as "Ready," with an average readiness in technological competence of 71.57%, attitudes and motivation at 79.43%, and facilities and infrastructure at 60.29%. These findings suggest that teachers possess adequate abilities and motivation to adapt to technological changes; however, the school needs to improve the availability of supporting facilities such as stable internet networks and digital devices. This study recommends continuous professional development for teachers and the enhancement of digital infrastructure to ensure the success of educational digital transformation in the madrasah environment.

Keywords: *Teacher Readiness, Digital Transformation, Technological Competence.*

INTRODUCTION

The rapid development of information and communication technology has brought major changes in various aspects of life, including in the world of education. The learning process, which used to be dominated by conventional face-to-face methods, is now starting to shift towards a digital learning system that utilizes various technology-based platforms and media. The government through the Ministry of Education, Culture, Research and Technology has encouraged educational units to carry out digital transformation to improve the quality and access to education, one of which is through the school digitization program and the *Kurikulum Merdeka*.

In this modern landscape, digital multimedia has drastically evolved from mere sound and text into integrated graphics, animation, and video systems that enable users to interact and communicate seamlessly across regional boundaries (Setyaningsih, 2023). Consequently,

interactive digital media must be strategically developed to deliver multimodal learning that can foster crucial 21st-century competencies, such as student engagement and creative problem-solving skills (Yasni et al., 2025).

Madrasah Aliyah Negeri (MAN) 2 Tapanuli Tengah as an Islamic educational institution is also required to be able to adapt and innovate along with the changing times. Digital transformation of education in Madrasah Aliyah is an important step to prepare a generation that not only has a strong religious understanding but also has adequate digital skills to compete in the global era. In this context, teachers play a central role as facilitators, innovators, and drivers of change in the madrasah environment.

To maintain a dynamic learning atmosphere and overcome student passivity, contemporary teachers are demanded to be highly creative in implementing instructional variations, including integrating diverse teaching styles, digital platforms, and adaptive media into their classrooms (Arifin et al., 2025). This instructional management shift is vital because scientific assessments consistently indicate a pressing need for systematic learning strategies that go beyond mere content transmission to actively elevate students' critical and higher-order thinking skills (Sasongko et al., 2025).

According to Venkatesh et al. (2021), the success of technology adoption in research is highly dependent on user readiness, in this case teachers and students. Teachers who have a good understanding of technology tend to be more confident in using it in the learning process. Conversely, lack of technological skills and resistance to change are the main obstacles in the process of digitizing education (Selwyn, 2020). Therefore, support in the form of continuous training and supportive policies are needed so that teachers can develop their skills in using technology optimally (Warschauer, 2021). Furthermore, the role of educators in this digital era expands into facilitating holistic student development, where teachers must also serve as supportive role models who integrate emotional intelligence and character values into the technology-enhanced curriculum (Septyventia et al., 2024).

On the other hand, social and cultural factors also play an important role in teacher readiness for digital transformation. According to Hall and Hord (2019), changes in the education system often experience resistance from those involved, including teachers who may feel comfortable with the conventional methods they have used for years. A positive attitude towards technological innovation is a key factor in the successful implementation of digital transformation. In addition, school policies and support from education stakeholders also play an important role in ensuring the smooth adoption of technology in Learning (Anderson, 2020). This pedagogical mastery over educational technology has become an absolute turning point since global shifts accelerated screen-to-screen learning, establishing digital tools as the primary means to enhance meaningful learning outcomes (Peramtasari, 2023).

However, the implementation of education digitization at MAN 2 Tapanuli Tengah has not been optimal. Based on observations and various reports in the field, many teachers still face obstacles in integrating technology into learning. Some of the factors that become obstacles include teachers' low digital literacy, limited training, lack of facilities, and resistance or fear of using new technology. This condition shows that teacher readiness in facing digital transformation is still a challenge that needs serious attention.

Teacher readiness in facing digital transformation is not only related to technical capabilities, but also includes mental readiness, attitudes towards change, and pedagogical skills in designing effective digital learning. Teachers must be able to utilize digital media to create

learning that is interactive, interesting, and relevant to the needs of students in the digital era. Without adequate readiness, the education digitalization program at MAN 2 Tapanuli Tengah risks becoming a formality without having a significant impact on improving the quality of education.

Based on the importance of the role of teachers in the success of digital transformation, research is needed that is able to analyze the extent of the readiness level of MAN 2 Tapanuli Tengah teachers, both in terms of technological skills, availability of infrastructure, as well as in terms of attitudes and motivation. The results of this study are expected to be used as evaluation and reference material in designing training programs and policies that are more targeted to accelerate the process of digitizing education in MAN 2 Tapanuli Tengah.

METHODS

This research is a descriptive quantitative study that aims to describe and analyze the level of readiness of MAN 2 Tapanuli Tengah teachers in facing the digital transformation of education. Descriptive research is used to describe factual conditions in the field, while the quantitative approach is used to measure the level of teacher readiness based on data collected through research instruments.

The population in this study were all teachers teaching at MAN 2 Tapanuli Tengah who were involved in the digital-based learning process. The sample was taken using the total sampling technique because the number of teachers at MAN 2 Tapanuli Tengah was relatively limited. All teachers who are willing and meet the criteria will be used as research respondents. The data collection techniques in this study are questionnaires, interviews, observation and documentation. The research instrument was prepared to measure the level of readiness of MAN 2 Tapanuli Tengah teachers in facing the digital transformation of education, which includes three main aspects, namely technological competence, attitudes and motivation, and facilities and infrastructure. Each aspect is translated into specific indicators and statements in the form of a questionnaire with a Likert scale.

Table 1. Indicators of Readiness of MAN 2 Tapanuli Tengah Teachers in Facing the Digital Transformation of Education.

No	Variable	Indicators	Item Number
1	Technological Competence	Ability to operate digital devices	1,2
		Ability to use e-learning applications	3,4
		Ability to create digital media	5,6
		Ability to manage digital classrooms	7,8
2	Attitude and Motivation	Enthusiastically participating in technology training	9,10
		Willingness to learn independently	11,12
		Mental readiness to face digital change	13,14
		The convenience of using technology in teaching	15,16
3	Facilities and Infrastructure	Availability of digital devices	17,18
		Internet network availability	19,20
		Availability of learning support applications	21,22
		Facility supports from madrasah	23,24

Note: All items are measured using a 5-point Likert scale ranging from 1 (Strongly Disagree / STS) to 5 (Strongly Agree / SS).

The importance of quantitative data analysis from questionnaire data and qualitative data analysis from interview and observation data were analyzed descriptively to support quantitative data. Furthermore, the item validity test was tested with Pearson Product Moment correlation. The instrument is declared valid if the value of r count> r table at the 5% significance level. And reliability is tested using Alpha Cronbach. The instrument is declared reliable if the Alpha Cronbach value is> 0.6.

RESULTS AND DISCUSSION

Results

This study was conducted to analyze the readiness of MAN 2 Tapanuli Tengah teachers in facing the digital transformation of education by focusing on three main aspects: technological competence, attitude and motivation, and availability of infrastructure. Data were collected through questionnaires filled out by 35 teachers, facility observations, and interviews with the madrasah head and several teachers.

1. Teachers' Technological Competence Readiness

The questionnaire on the technological competence aspect was given to 35 teachers of MAN 2 Tapanuli Tengah to find out the extent of their ability to operate digital devices, use e-learning applications, create digital learning media, and manage digital classes.

Table 2. Recapitulation of Questionnaire Data Teacher Technology Competence Readiness

No	Technology Competency Indicators	Maximum Score	Score Obtained	Percentage (%)	Categories
1	Operating a laptop/PC	175	145	82,86%	Very Ready
2	Using projectors and multimedia	175	135	77,14%	Ready
3	Using Google Classroom	175	130	74,29%	Ready
4	Using Zoom/Google Meet	175	125	71,43%	Ready
5	Creating educational videos	175	115	65,71%	Ready
6	Creating digital modules/teaching materials	175	110	62,86%	Ready
7	Managing digital classrooms	175	120	68,57%	Ready
8	Overcoming technical problems in digital learning	175	115	65,71%	Ready

Based on the questionnaire results, the average teacher readiness in the aspect of technological competence is in the "Ready" category (71.57%). Most teachers are able to operate laptops/PCs (82.86%) and use projectors (77.14%) in learning. Teachers are able to use Google Classroom (74.29%) and Zoom (71.43%) applications for online learning, but the application is still basic. Skills in creating digital media such as videos (65.71%) and interactive modules (62.86%) are still low. Mastery of digital classroom management and the ability to solve simple technical problems also still need to be improved.

According to Toran et al. (2010), technological readiness includes mastery of devices and mastery of digital systems to support learning. Fatmawati (2021) adds that teachers who are able to use digital media creatively will find it easier to adapt to the transformation of technology-based education.

2. Attitude Readniness and Teacher Motivation

Table 3. Recapitulation of Questionnaire Data Attitude Readiness and Teacher Motivation

No	Attitude and Motivation Indicators	Maximum Score	Score Obtained	Percentage (%)	Categories
1	Enthusiastically participating in technology training	175	149	85,14%	Very Ready
2	Willingness to learn Independently about new technologies	175	140	80,00%	Ready
3	Changes in digital learning methods	175	136	77,71%	Ready
4	The convenience of using digital media in learning	175	131	74,86%	Ready

The average questionnaire results showed that teachers' attitudes and motivation were in the "Ready" category (79.5%). 85% of teachers are enthusiastic about digital training and willing to learn new technologies. 80% of teachers have a willingness to learn independently to develop digital skills. 78% of teachers are ready to accept the change in learning model from conventional to digital. 75% of teachers feel comfortable using technology in the learning process.

According to Rogers (2003) in the Diffusion of Innovation theory, technology acceptance is highly dependent on individual attitudes and readiness to adopt changes. Rahayu (2019) also emphasized that teacher motivation is key to the successful implementation of digital education. Without a positive attitude, technological transformation will be difficult to succeed even if facilities are available.

3. Readiness of Facilities and Infrastructure

Table 4. Recapitulation of Questionnaire Data Readiness of Facilities and Infrastucture

No	Facilities and Infrastructure Indicators	Maximum Score	Score Obtained	Percentage (%)	Categories
1	Availability of laptops/projectors in madrasah	175	123	70,29%	Ready
2	Adequate internet network availability	175	97	55,43%	Ready Enough
3	Ketersediaan Adequate e-learning application/platform	175	114	65,14%	Ready
4	Digital facility supports from madrasah	175	88	50,29%	Ready Enough

The average results of the questionnaire show that the readiness of facilities and infrastructure is in the “Quite Ready” category (60.29%). The availability of laptops/projectors (70.29%) is quite good, although their use is still alternating between teachers. Internet availability (55.43%) is the main problem that teachers often complain about, especially during peak hours. Madrasah have provided several learning applications (65.14%), but they are not well integrated. Support for digital facilities from madrasah (50.29%) is still relatively low and needs to be a concern for madrasah management.

According to Lubis (2020), facilities and infrastructure are important factors in realizing digital education transformation. Parsons et al. (2006) in the concept of Digital Readiness emphasizes that infrastructure readiness is an absolute requirement for the success of

educational digitalization. If the facilities are inadequate, then the application of technology will run half-heartedly.

Integration of Research Results

Overall, MAN 2 Tapanuli Tengah teachers are in the “Ready” category in facing the digital transformation of education in terms of competence and motivation. However, the support of facilities and infrastructure is still a major obstacle.

Table 5. Recapitulation of Readiness of Teacher of MAN 2 Tapanuli Tengah

No	Facilities and Infrastructure Indicators	Maximum Score	Score Obtained	Percentage (%)	Categories
1	Availability of laptops/projectors in madrasah	175	123	70,29%	Ready
2	Adequate internet network availability	175	97	55,43%	Ready Enough
3	Ketersediaan Adequate e-learning application/platform	175	114	65,14%	Ready
4	Digital facility supports from madrasah	175	88	50,29%	Ready Enough

Discussion

The empirical findings of this research present several critical insights regarding the digital transformation process at MAN 2 Tapanuli Tengah. First, the data proves that simple mastery of technology is not enough; rather, teachers urgently require specialized professional training focused on creating attractive, interactive digital media to truly enhance the learning experience. Second, the study highlights that the positive attitudes and high motivation displayed by the teachers at MAN 2 Tapanuli Tengah serve as the primary internal forces that can effectively drive and sustain the success of educational digitization. Finally, to prevent this professional enthusiasm from being bottlenecked, the readiness of the madrasah's infrastructure must be improved immediately, which requires comprehensive upgrades in terms of digital devices, stable internet networks, and active administrative management support.

The results show clear alignments and systemic frictions when contrasted against contemporary pedagogical literature. The finding that teachers display high basic competence (82.86% in laptop operations) but limited ability in creating interactive teaching materials (62.86%) underscores a major gap. Literature highlights that simple content dissemination is insufficient; modern instruction demands systematically managed strategies, interactive media like flipbooks, or specialized digital tools such as Nearpod to sustain 21st-century cognitive processes and elevate critical thinking (Sasongko et al., 2025; Yasni et al., 2025). By failing to design rich digital modules, teachers cannot establish the nuanced scaffolding required to build higher-order problem-solving skills (Buwono et al., 2025). This limitation implies an urgent need to transition teachers from passive technology users into active multimedia creators who combine text, animation, and video to enhance student knowledge acquisition (Setyaningsih, 2023).

Furthermore, the high motivation and enthusiastic attitude of teachers (85.14% participation in training) represent a potent internal asset. This willingness to adapt is crucial, as the modern educational climate demands that educators continually refine their methods, manage digital classrooms with emotional intelligence, and integrate sophisticated tools to eliminate student boredom (Arifin et al., 2025; Septyventia et al., 2024). However, this enthusiasm is severely hindered by the "Ready Enough" infrastructure status, particularly

regarding internet stability (55.43%). Educational technology theories indicate that infrastructure readiness is an absolute prerequisite; poor connectivity forces technology-based applications to perform inefficiently (Parsons et al., 2006). Without reliable cloud computing ecosystems or robust institutional networks, implementing sophisticated digital transformation frameworks, exploring Game-Based Learning, or adopting immersive spaces like the Metaverse will remain impossible (Purnama et al., 2024; Raziana & Wibawanto, 2025). Consequently, the gap at MAN 2 Tapanuli Tengah is not driven by teacher resistance, but by an infrastructure deficit that restricts teachers from adopting student-centered models like PBL-ZPD or implementing interactive games that align with current job market requirements (Pawitra et al., 2025; Vitariyanti et al., 2024).

CONCLUSION

The findings and analysis that have been carried out, can be concluded that first, MAN 2 Tapanuli Tengah teachers generally have basic competencies and high motivation in adopting digital technology. However, the results show that teachers still need to improve advanced digital skills, such as creating interactive learning media and effective digital classroom management. Regular training and technology workshops are essential so that teachers are not only users but also creative digital media developers. Teachers who are more prepared need to become mentors for colleagues who still face technical difficulties in order to accelerate technology adaptation.

Second, madrasah plays a crucial role in preparing facilities and infrastructure. The results show that facility support is still limited and the internet network is not optimal. The implication is that madrasah needs to increase the provision of digital devices such as laptops, projectors, and ensure the stability of the internet network in all classrooms. There should be a special budget for strengthening digitalization, such as providing an integrated e-learning platform and easily accessible learning applications. Madrasah needs to build a digital culture in the school environment by providing space and full support to teachers to experiment using technology in learning.

Third, for the Ministry of Religious Affairs or related agencies in charge of madrasah, it is necessary to develop a national program to strengthen the digitalization of madrasah, especially in areas with limited infrastructure. There should be an affirmation policy for madrasah with limited facilities to prioritize device assistance and internet network strengthening. Need to expand access to competency-based digital training that is integrated with the current needs of madrasah teachers.

Fourth, the curriculum at MAN 2 Tapanuli Tengah needs to start integrating digital-based learning systematically, not only as an addition or alternative. Teachers need to be directed to use blended learning or flipped classroom models that combine online and offline learning to maximize the learning process.

The results of this study confirm that the digital transformation of education is not only a matter of teacher ability, but also system readiness and infrastructure support. MAN 2 Tapanuli Tengah teachers are ready to change, but madrasah and education policy must be able to facilitate this change so that it can run optimally and sustainably.

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