Article

Response-based Education Digitization Model

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ABSTRACT:

The technology that is developing currently creates new problems in the world of education. Educational institutions must respond quickly to this technological development. Seeing how educational institutions, especially madrasah, respond to technological developments is one of the goals of this research. A questionnaire was used to collect information. The analysis used in this research is quantitative descriptive analysis. The study's results show that the teacher's response to the digitalization of madrasah was enough.

Key words: *digitalization of education, digital literacy*

INTRODUCTİON

The era of the industrial revolution 4.0 has had a major impact on changes in the world rapidly and globally, so that social responsibility is no longer optional but a strategic need that requires all education providers to be able to adapt to changes driven by information technology as agents of change (Bayram, 2021; W. F. Crittenden et al., 2019; García-Pérez et al., 2021; Kim, 2019; Rusydiyah et al., 2020; Zhao et al., 2021). Digital education and the introduction of digital technology into the educational process reached its peak during the COVID-19 pandemic, affecting all lines of education and becoming a global problem (Dominggus et al., 2021; Turan et al., 2022; Vlasova et al., 2020; Zhao et al., 2021).

Digital technology has become an integral part of education, so students need to acquire more skills to navigate information in a digital environment. Students must be able to understand, access, manage, and evaluate information from information technology-based sources. adaptability and flexibility for meaningful learning and academic performance to prepare them for a rapidly changing future, mainly due to disruptions that are changing the educational landscape(Anthonysamy et al., 2020; Chan et al., 2017; Churchill, 2020; Kim, 2019; Rusydiyah et al., 2020).

The digital divide and lack of access to more sophisticated technologies such as word processing, computing, navigation, editing, applications, and educational innovation are becoming new challenges (Caverly et al., 2019; Dziuban et al., 2018) Concerns about the digital divide are not only related to devices

or the Internet, but also to the ability of people to use digital media for meaningful and accountable social practices (Kumpulainen et al., 2020).

(Tang & Chaw, 2015; Titova et al., 2019; Zhao et al., 2021), so technology use must be professionally developed through tutoring and the underlying educational pedagogy(Amhag et al., 2019b; Ilomäki et al., 2016).

Digital learning requires students to have self-regulation skills, acquire digital literacy, and have high digital fluency (Anthonysamy et al., 2020), because digital literacy requires a set of skills that are interdisciplinary and integrative—not just skills using software or digital devices but various cognitive skills, conceptual skills, motor skills, sociological skills, inquiry, critical thinking, and complex creativity—that individuals need to work effectively in a digital environment to improve future decision making (Churchill, 2020; V. Crittenden & Crittenden, 2016; Gündüzalp, 2021; Kumpulainen et al., 2020; Pang et al., 2018; Sharma et al., 2020).

Increasing digitization and digital literacy are global challenges that widen inequality between students, as the poorest students are less likely to have the tools to access online education (Anthonysamy et al., 2020; Reddy et al., 2021; Zhao et al., 2021) The influence of cutting-edge technology has the potential to disrupt the digital world and information technology in an integral world of education (V. Crittenden & Crittenden, 2016; W. F. Crittenden et al., 2019; Hu, 2019). Digital literacy has four indicators: computer, information, visual and media literacy (Anisimova, 2020). UNESCO describes digital literacy as a set of skills needed to work with digital media and to process and search for information (Wilson, Grizzle, Tuazon, Akyempong & Cheung, 2011). Digitization that is not supported by pedagogical strategies and methods can fail to digitize learning and increase student engagement and interaction (Yehya, 2021).

The structural components of digital intelligence are high critical reasoning and ability to reflect, the ability to communicate effectively, which involves the ability to establish and maintain social contacts (which in turn implies high emotional intelligence), and a high level of self-regulation(Vladimirovna Solovieva et al., 2020). All stakeholders must be able to respond to these challenges. China, with its imitation culture, has become one of the countries that has succeeded in facing and responding to the Industrial 4.0 revolution through innovation in the field of education (Gleason, 2018), so that China has succeeded in becoming one of the digitalization giants on par with America. Digitization of education, especially for PAI, has led to disruption, such as students who are addicted to gadgets and do not focus on learning (Kusnandi, 2019), so that students need to be equipped with moral values and personality traits (Rahmawati, 2018). This study is important because it is expected to provide a new discourse on the digitalization model of education in madrasah.

Levels of digital maturity consist of: Level 1: Basic. Schools are not aware of the possibility of using ICT in learning and teaching or, Level 2: Early. There is awareness of the possible use of ICT in learning, teaching, and management processes, but it is not yet implemented in management processes (Level 3: e-Enabled). The school recognizes the possibility of using ICT in all its activities and participates in a small project that focuses on ICT and guides the development of its strategic documents and the integration of ICT into these documents, Level 4: Confidence. The school clearly recognizes the advantages of using ICT in its activities and integrates ICT implementation into strategic documents as well as in daily activities, such as ICT projects, Level 5, e-Adults. The school very clearly recognizes and requires the use of ICT in all activities in its strategic document and development plan (Begicevic Redjep et al., 2021).

Several studies have been conducted on digitalization in education, such as (Amhag et al., 2019a; Bayram, 2021; Chan et al., 2017; Churchill, 2020; Dirckinck-Holmfeld et al., 2019; Gafurov et al., 2020; Lobanov, 2020; Trends et al., 2020; Vlasova et al., 2020) but in the field of Islamic education there are not many models of digitizing education based on the response of the community, teachers, schools. This study is different from other studies because it looks at how the community feels about digitalization in madrasah and how they feel about it.

Methods

Research Design

This research is scale development research designed with a descriptive survey model. In a descriptive survey study, the researcher asks a series of questions to explore the opinion of a broad audience on a particular topic or subject. They coded and analyzed their answers in standard categories and generalized the results to similar groups of students (Fraenkel, Wallen, & Hyun, 2011). In this study, Cohen, Manion, and Morrison (2007) used a descriptive survey model because a large sample was needed to find out how teachers felt about planning trips to places where students could learn outside of school. Validity, reliability, and item analysis were carried out to test the madrasa digitization instrument, which was compiled by researchers in accordance with expert opinion.

Sample and Data Collection

The respondents of this study were the principals and teachers of State Madrasah Aliyah in the Central Java region, totaling 192 teachers and 65 madrasah principals.

In this study, a questionnaire technique was used to collect data. The indicators of this research are: 1). 2). Digitization policy in schools consists of 4 sub-indicators and 5 questions. Digitization in Learning consists of 1 sub-indicator and 11 questions (3). The Education Digitization Strategy consists of 1 sub-indicator and 1 question (4). The education digitization infrastructure consists of 6 sub-indicators and 6 questions. 5) The Education Digitization Model consists of 1 sub-indicator and 1 question, 6). Human Resource Readiness as many as two sub-indicators and five questions, 7). The impact of the digitalization of education is measured by four sub-indicators and 14 questions. The indicators and sub-indicators can be seen in the following table.

Table 1. Indicators and Sub-indicators of Education Digitization Instruments

No	Aspect	Indicator
1		Support System: School Policy(Begicevic Redjep et al., 2021; Mitescu-Manea et al., 2021; Saari & Säntti, 2018).
2		Implementation of Digitization: Digitizing Learning, Strategies used in Digitization (Lobanov, 2020)(Lobanov, 2020), Infrastructure/Devices used(Amhag et al., 2019a; Guillén-Gámez & Mayorga-Fernández, 2021; Lacka & Wong, 2021; Perrin & Wang, 2021; Trends et al., 2020), Digitization Model(Polding et al., 2008), Human Resources.
3		Evaluation: Positive impact, negative impact (Labadze et al., 2021; Sysoieva, 2021; Vlieghe, 2016).

Table 2. Examples of data collection instruments using the questionnaire method

No	Question
1	Have you received socialization/trained on digitalization programs in schools related to PAI?
2	Have PAI teachers implemented digitalization in schools in PAI learning?
3	Can the digitalization program in schools support the achievement of PAI learning objectives?
4	Have you received socialization/trained on digitalization programs in schools related to PAI?
5	Can the digitization program at school support your learning?

The instrument developed was validated by credible experts (Seville & Mayo, 2022) consisting of university professors, researchers, and policy experts. Suggestions from experts are considered to complete the contents of the instrument related to relevance, scope, and sequence of the instrument. Experts were contacted personally by telephone or email to explain the purpose of the study.

The data collected includes: (1) age, gender, years of service, position; (2) knowledge and practice of digitizing education; (3) the practice of digitizing education; (4) difficulties experienced; and (5) suggestions

for improvement through open-ended questions to participants. The questions are open-choice, single or multiple, with a rating scale of 1 to 5. The statistical analysis used is descriptive qualitative. Qualitative variables presented with numbers (n) and percentages (%) and quantitative variables with (m) and SD standard deviation, answers to open-ended questions were analyzed separately according to the content analysis guide (Sebbani et al., 2021).

Analyzing of Data

This data analysis used descriptive qualitative and multivariate statistics with Structural Equation Modeling (SEM) through the application of AMOS 25(Anthonysamy et al., 2020). Based on the validity test, the results showed that the research questionnaire instrument was very valid at a significance level of 99% as shown in the following table:

Table 3. Validity Test Results

Total_X1	Pearson Correlation	1	.840 **	.742 **	.712 **
	Sig. (2-tailed)		.000	.000	.000
	N	65	65	65	65
Total_X2	Pearson Correlation	.840 **	1	.774 **	.840 **
	Sig. (2-tailed)	.000		.000	.000
	N	65	65	65	65
Total_X3	Pearson Correlation	.742 **	.774 **	1	.725 **
	Sig. (2-tailed)	.000	.000		.000
	N	65	65	65	65
Total_X4	Pearson Correlation	.712 **	.840 **	.725 **	1
	Sig. (2-tailed)	.000	.000	.000	
	N	65	65	65	65
Total_Y1	Pearson Correlation	.581 **	.632 **	.723 **	.577 **
	Sig. (2-tailed)	.000	.000	.000	.000
	N	65	65	65	65

**. Correlation is significant at the 0.01 level (2-tailed).

The results of the reliability test with Cronbach's Alpha obtained a value of 0.955, which indicates the questionnaire has very high reliability. The higher Cronbach's Alpha, the higher the estimated reliability. The questionnaire is said to be reliable if the value of Cronbach's alpha is greater than 0.6.
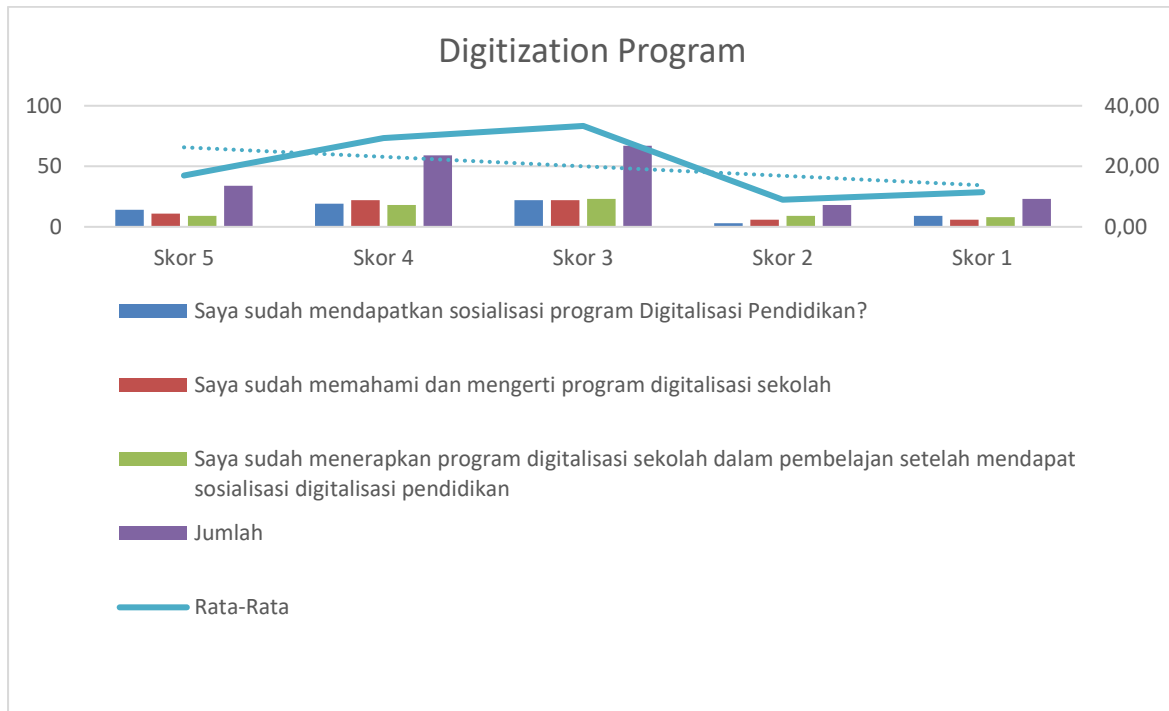
Table 4. Reliability Test Results

Reliability Statistics

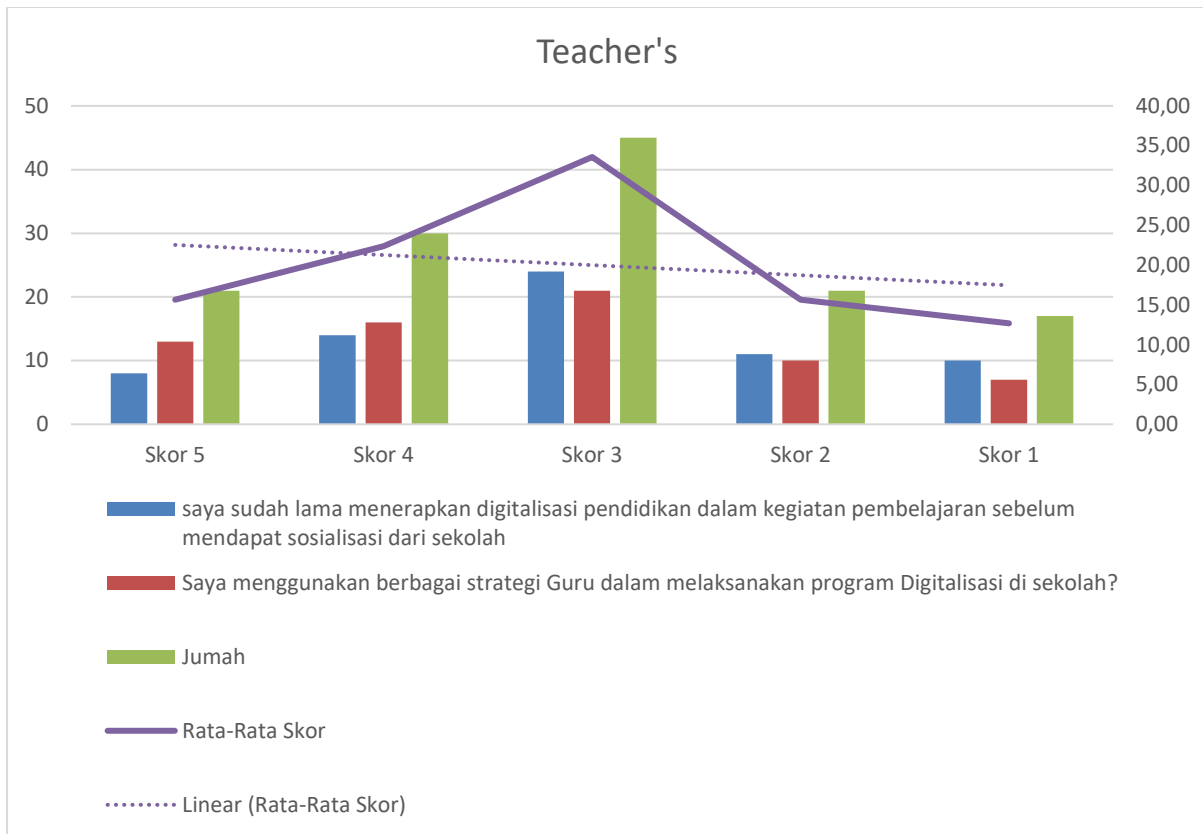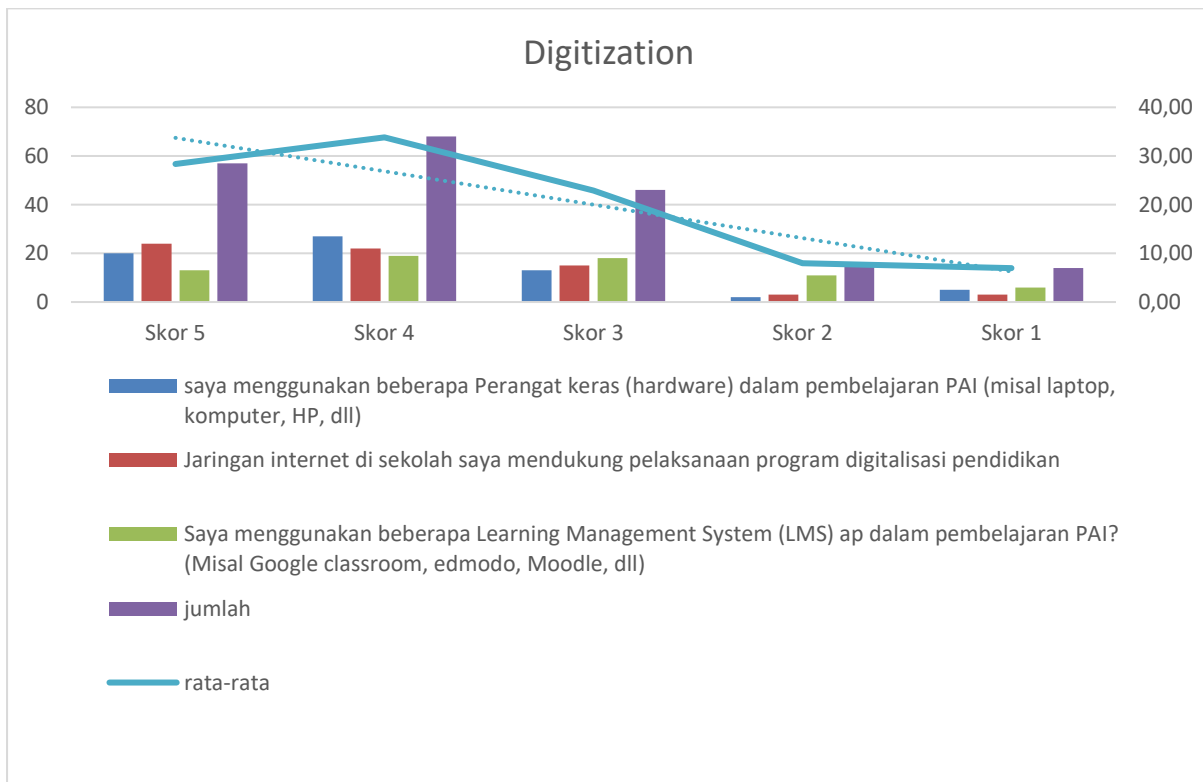|	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
	.954	.954	12

Results

Program Socialization

Graph.1 Digitization Program Socialization
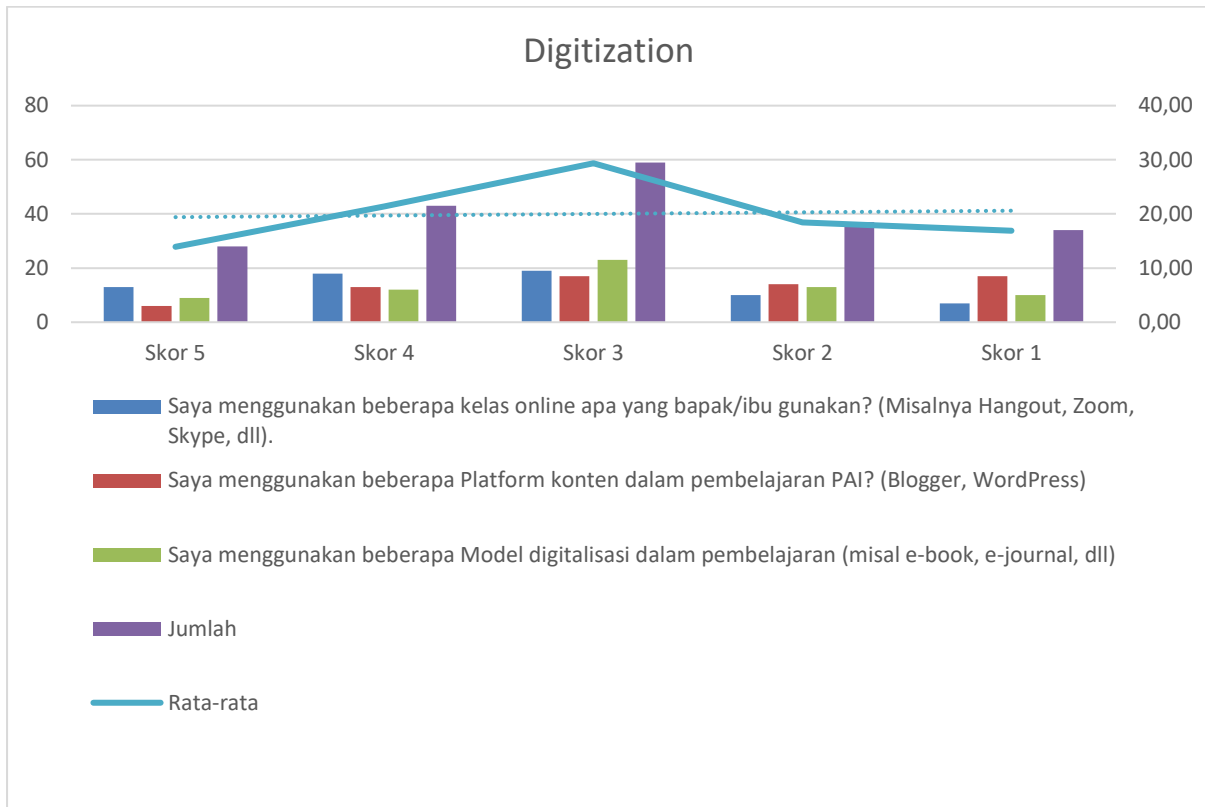
Master's Understanding
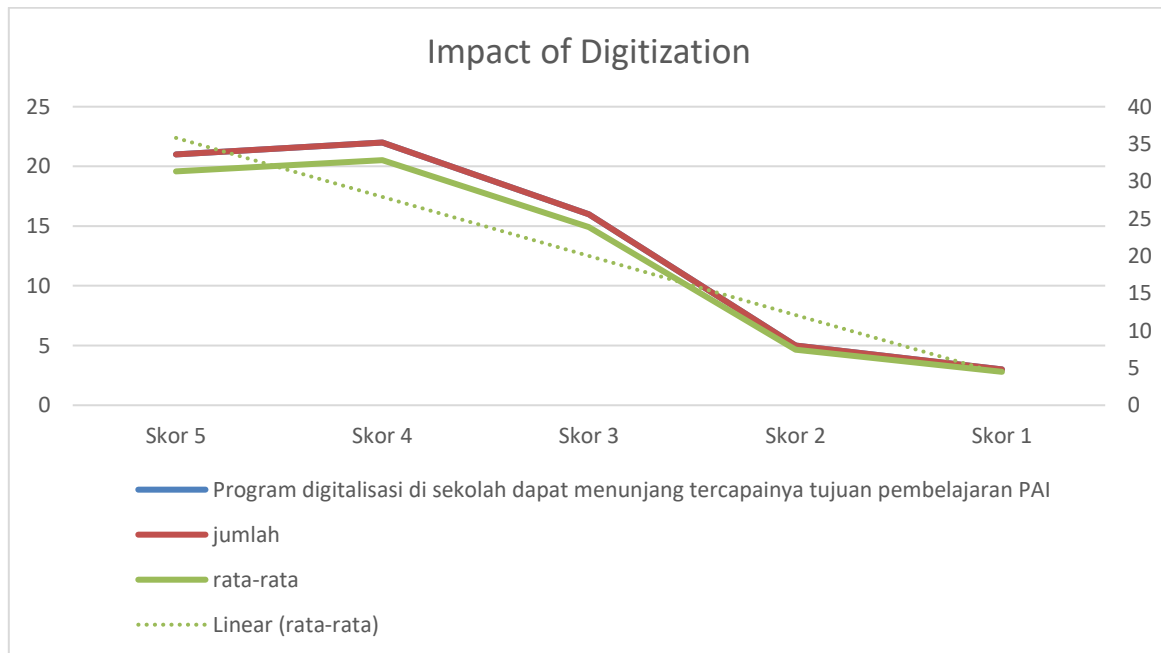
Graph 2. Teacher's Understanding of Digitalization

Infrastructure

Graph.3 Digitization Program Infrastructure

Digitization Model

Graph.4 Model of the Digitization Program

Program impact

Graph.5 Impact of the Digitization Program

Discussion

Program socialization (graph.1) is the first indicator of madrasa digitization. The highest average result is 33.33% on a Likert scale. Digitization program socialization is an important thing in learning that is taking place today, especially in the era of COVID-19, which forces learning to take place online. This shift to online learning should not be underestimated, with internet-based teaching being fairly new in Asia and of low quality, with the exception of Japan and Singapore (Perrin & Wang, 2021; Ramirez, 2020). This opinion (Perrin & Wang, 2021; Ramirez, 2020) is in line with the results of this study. In the socialization indicators, teachers stated that they received socialization from the digitization program with a sufficient category of 33.3% on a Likert scale of 3, and on a Likert scale of 1 with a category of Very Less by 11.44%.

Teachers' understanding of digitalization (graph.1), the highest average of 33.8% of respondents stated that they received sufficient program socialization on a Likert scale. A total of 16% stated that they lacked understanding of the digitization program. This is identified in research (Amhag et al., 2019a; Avidov Ungar & Forkosh Baruch, 2016) as an inhibiting factor in the implementation of digitization due to lack of time and lack of ICT knowledge and skills.

The way teachers use technology (graph.1): On a scale from 1 to 5, 35.3% of respondents said they got enough information about how to use technology, while 13.2% said they didn't get any information at all (Likert scale 1).

Master's Understanding

Teacher understanding (Graph.2) is the next indicator of madrasa digitization. The highest average result is 33.58% on a Likeret scale 3 with a sufficient category. Teachers have implemented digitalization in learning. The highest average of 35.8% of respondents stated that they had applied it in learning with sufficient intensity. On a Likert scale of 14.9%, teachers stated that they had never implemented digitalization in learning. The strategy applied by the teacher in implementing digitization (Graph. 2) obtained the highest average result of 31.3% of teachers using 2 strategies in learning on a Likert scale 3, and on a Likert scale 1, an average of 14.9% using only one strategy. In learning, the use of digitalization strategies (Herrmann et al., 2021) in learning is influenced by the digital competence of teachers. Besides, the impact of applying digitalization in learning must also be watched out for, such as student creativity, student interaction, and quality control of learning (Marek et al., 2021; Matraeva et al., 2020).

Infrastructure

Infrastructure is the next indicator in madrasa digitization (Graph 3). The highest average result is 33.83%, with a sufficient category on the Likert scale. This is in line with (Alhubaishy & Aljuhani, 2021; Parchoma et al., 2020; Perrin & Wang, 2021) which states that educational institutions must provide adequate learning infrastructure and teachers need to design learning that provides opportunities for students to learn better. Even though (Gezici et al., 2021; Mitescu-Manea et al., 2021) stated that schools can lend tools to individuals to support learning, technology has become an integral part of learning.

On a Likert scale of 1, as many as 40.3% of respondents stated that they used some hardware in learning on the Likert 3 scale, and 3% only used one type of hardware in learning. on a Likert scale of 1 In line with the research above (Amhag et al., 2019; Koehler et al., 2013), it is necessary to use several supporting devices in learning because there is no single device that can solve problems in learning, although (Herrmann et al., 2021) there needs to be a limit in the use of digital technology.

Next is related to internet network support in the implementation of digitalization (Graph 3). In madrasah, as many as 35.8% stated that the school internet network was very good and very smooth on a Likert scale of 5, and as many as 4.5% stated that there was no internet network in schools on a Likert scale of 1. The LMS used by teachers (Graph 3) obtained an average data of 28.4% of teachers stated that they used several types of LMS on a Likert scale 3, and an average of 9% sometimes used one type of LMS in learning on a Likert scale 1. In view (Gezici et al., 2021), the internet access gap is a major problem in online learning.

Digitization Model

The digitization model becomes the next indicator in madrasa digitization (Graph 4). The highest average result is 29.35% on a Likert scale with sufficient category. Online classes used by teachers (Graph 4) As many as 28.4% of teachers use two online classes in learning. 26.9% of teachers say they use several online classes in learning. 13.4% say they use various kinds of online classes in learning. The rest only use one online class in learning (14.9%) and sometimes use only one online class (10.4%). Regarding the content platforms used by teachers in learning (Graph 4), 25.4% of teachers stated that they used 2 learning content platforms, 19.4% stated that they used several content platforms in learning, and 9% of teachers stated that they used various content platforms in learning. The remaining 20.9% stated that they used one type of content platform in learning, and as many as 25% of teachers stated that they only occasionally used one type of content platform in learning. Lobanov (2020) states the need for cross-platform use in learning because digital technology can intensify the educational process and increase the speed and quality of perception, understanding, and assimilation of new knowledge.

Regarding the digitalization model applied in madrasas (Graph 4), the results show that as many as 34.3% use 2 digitization models in learning; 17.9% of teachers state that they use several digitalization models in learning; and 13.4% of teachers state that they use various digitalization models. In learning, the remaining 19.5% of teachers stated that they only used one digitalization model in learning, and 14.9% of teachers stated that they only occasionally used one digitalization model in learning.

Program impact

A total of 32.8% of teachers stated that digitalization of madrasas supported the achievement of learning objectives (Graph 5). 31.3% of teachers stated that digitization of madrasas greatly supported the achievement of learning objectives; 23.9% stated that digitization of madrasas was sufficient to support the achievement of learning objectives; the rest stated that the digitization program was inadequate to support the achievement of learning objectives. Madrasas have little influence in supporting the achievement of learning objectives, and 4.5% stated that the digitalization of madrasas does not support the achievement of learning objectives in madrasah.

The results of this study offer further research related to the digital mastery of teachers in the school environment, in particular the role of the government in schools that are managed independently by the community, so that the gap between schools managed by the government and managed by the community can be minimized.

Conclusion

Technological developments that have led to the era of the digital revolution must be responded to quickly, precisely, and accurately by all stakeholders in the world of education, especially managers of educational institutions (principals) and educational practitioners (teachers) so that education can be a solution to the digital revolution.

The results show that currently the response to the digitalization of madrasas is in the sufficient category, meaning that when technology developments are very fast and in the Digital Revolution category, stakeholders can be said to be less responsive to existing changes, so that the capacity and capability of teachers is especially related to the mastery and utilization of technology. (Digital literacy) in learning needs to be improved.

Educational institutions should provide supporting facilities that can be used by teachers, students, and educational personnel, especially in providing facilities for students or teachers who have access gaps to technology.

In addition, it is necessary to pay attention to the impact of digitalization on education, such as control over the quality of learning, limited interaction, and increased teacher burden since these will affect the quality of education.

Recommendations

Based on what we found in our research, schools need to make sure they have the right resources and infrastructure to deal with this digital age. Teachers who have sufficient understanding of utilizing digital

technology in learning need to be provided with training in utilizing digital technology in learning. We suggest to stakeholders and the government that they conduct intensive training for teachers in educational institutions managed by the community.

Limitations

Given the limited data in our study, the next researcher can conduct research with a different design.

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