

The Effectiveness of Digital Media in 21st Century Mathematics Subjects to Improve Learning Outcomes in Boarding Schools

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Abstract

Efforts to improve the quality of Islamic boarding schools are increasingly urgent and unavoidable. The free market era that has rolled out demands the ability to compete from our human resources. The problem of declining math learning outcomes in boarding schools is influenced by the lack of innovation and creativity of boarding school teachers in providing learning facilities for students. This study aims to determine the effectiveness of digital media in 21st Century Mathematics subjects to improve learning outcomes in Islamic boarding schools. The method used in this research is quantitative with a case control approach. Data analysis conducted in this study was carried out by looking at the results of the pretest and posttest after treatment, by looking at the results of the Gain normality test. The sample in this study amounted to 30 people considering that the sample was homogeneous in class VIII. the results of research and discussion of digital media can be seen to increase by 70% in math learning outcomes. Digital media provides a role to make it easier for students to understand concepts such as visualizing complex mathematical concepts, digital media can bring mathematics into the context of real life.

Keywords: Digital Media, Math Learning Outcomes, Boarding School, 21st Century Learning



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INTRODUCTION

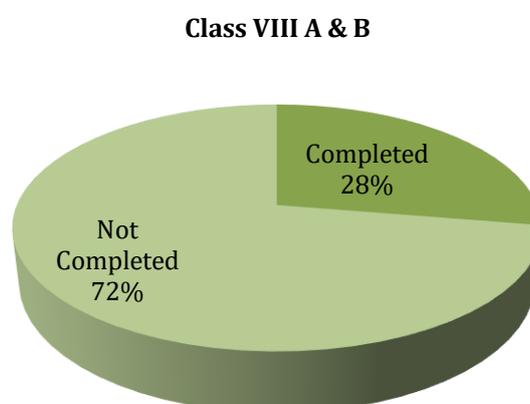
Nowadays, many pesantren have carried out curriculum development, which can be seen in the number of pesantren that combine the pesantren curriculum itself, the curriculum of the Ministry of Education and Culture and the curriculum of the Ministry of Religion. In curriculum development, the curriculum component consists of content, subject matter that is presented in a more understandable and interconnected manner between materials so that it can shape the way santri think (Dessy Firmasari, 2022). Pesantren is an educational institution that is very familiar among Indonesian Muslims. The focus of pesantren education is on religious education, where students learn about matters related to the teachings of Islam. In providing teaching, the kiai prioritize good morals. Because another goal of teaching in Islamic boarding schools is to form noble morals and educate the soul to know its god. This noble character can be seen from the daily life of students who reflect an attitude of piety, obedience, honesty, trustworthiness, and so on. Nowadays, competition in the job market is increasingly difficult and selective because job vacancies are not comparable to prospective workers. The result of this is that qualified graduates are the top priority to be accepted for work over unqualified graduates. Likewise, the services of quality educational institutions are increasingly needed and sought after by the community. Educational institutions must try by all means in order to increase the competence of outputs/graduates and other academic results, this is done in order to prepare themselves for the transformation of times and technology and the joints of life which are getting faster and to face challenges that are getting bigger and bigger, a concrete example of this effort is improving the quality of education (Aisah et al., 2020).

Efforts to improve the quality of Islamic boarding schools are increasingly urgent and unavoidable demands. The free market era that has rolled out demands the ability to compete from our human resources. The ability to compete is only possible if we have quality, without quality, then our human resources will become "workers (laborers)" and lower tier workers" in the free market era (Dessy Firmasari, 2022). The influence of New Media or "New Media" is so great on society individually and in groups. Various studies have proven how powerful the influence of new media is in social life, especially affecting the younger generation, in this case students. The effects include changes in the patterns and forms of communication between children and parents, between teenagers in their friendship environment, as well as between students and lecturers. Changes in mindset that tend to indulge in self-disclosure in new media, especially in social media, as well as the tendency to become more consumptive. This situation has been conveyed by McLuhan with the Theory of Technological Determinism which describes the influence of the media (Kurniawati & Baroroh, 2016).

Along with the development of technology, digital media has been developed in the learning process. Digital media can present contextual, audio and visual learning materials in a more interesting and interactive manner. This is also supported by the development of computer technology which is growing very rapidly (Susanto et al., 2022). The development of information technology in reality does not necessarily make digital media-based learning easier. There is often skepticism and lack of trust in the digitization of learning (Amarulloh et al., 2019). There are many factors that influence whether the digitization of learning will be successful or not, including the design, the role of teachers, and the educational context in the application of technology (Putrawangsa & Hasanah, 2018).

As in the context of education in Islamic boarding schools, the learning methods promoted in Islamic boarding schools tend to apply the classical method, where the main focus of learning is to educate santri (students) in the field of Islamic religion. The classical method commonly used in boarding schools is a teaching method that has been used for generations and tends to be traditional. The tendency of the classical method certainly provides its own problems in the implementation of student learning in Pondok pesentren such as declining learning outcomes, learning motivation, interest in learning, especially in learning knowledge in other fields of science, the results of research findings are known as follows:

Chart 1. Percentage Results of Evaluation of Grade VIII Mathematics Learning A and B



Source: Attached Data

Based on data processing documents of mathematics learning outcomes of classes VIII A and VIII B from 48 students, it is known that 28% of students are complete in mathematics

learning outcomes while 72% of students are not complete. The problem of incomplete math learning outcomes in boarding schools certainly has a reason. Based on observations that researchers found, the cause of the incompleteness was influenced by teaching methods, teacher quality, learning environment, learning motivation, parental support, level of material difficulty, anxiety or stress, lack of practice and understanding of concepts. From the results of observations made at the Ponpes, of course, the influence of the teaching that is applied becomes the initial urgency of the inadequacy of the mathematics learning outcomes of class VIII students at Ponpes.

Fairda Rahmawati, and Ragil Idam Widiyanto Atmojo, 2021 suggest that education in the 21st century is different from the previous century. 21st century education is constructional and utilizes information and communication technology. Learning must be able to develop critical thinking and problem solving skills, creativity and innovation, communication, collaboration. Therefore, teachers must be creative and innovative in creating learning that fosters higher-level thinking in students. One of them is in choosing varied and digital-based learning media in accordance with the development of 21st century education (Rahmawati et al., 2021). Based on these problems, this study aims to determine the effectiveness of digital media in 21st Century Mathematics subjects to improve learning outcomes at Islamic Boarding Schools.

RESEARCH METHODS

The method used in this research is quantitative with a case control approach. The study population was conducted on 48 students in class VIII, while the data collection technique the researcher asked questions to 30 respondents who were selected randomly (random sampling) considering the research sample was homogeneous. Data analysis conducted in this study was carried out by looking at the results of the pretest and posttest after treatment, by looking at the results of the Gain normality test. According to (Hake in Sundayana, 2014: p. 151) "The Gain Normality Test is a test that can provide an overview of the increase in learning outcome scores between before and after the application of a treatment". As for the category, we can use the interpretation of the normalized Gain index (g) according to Hake which has been modified:

Table 1. Interpretation of the N-Gain Index

N-Gain Score (g)	Interprestation
$-1.00 < g < 0,0$	Declining
$g = 0,0$	Stable
$0,0 < g < 0,30$	Low
$0,30 < g < 0,70$	Average
$0,70 < g < 1,00$	High

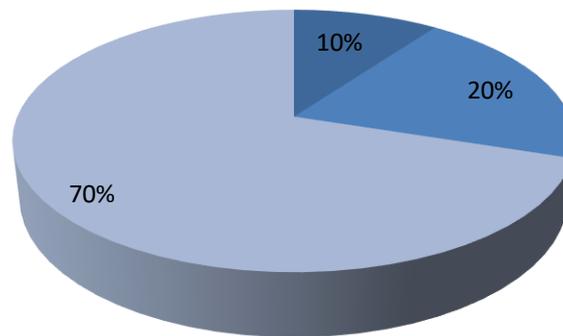
Source: Hake In Sundayana (2014, h. 151)

RESEARCH RESULTS AND DISCUSSION

The results of the study found that the initial data of students in classes VIII a and B decreased in mathematics subjects, the decline in learning outcomes was due to the lack of teacher ability to facilitate learning and learning mathematics in classes VIII a and b, Based on the initial data that researchers found, researchers designed a mathematics learning media for classes VIII a and b, considering the selection of samples by random sampling, researchers chose 30 students as samples to be studied. The results of data analysis that researchers conducted before using digital media and after using digital media, are as follows:

Chart 2 N-Gain Test Results

Ngain Result
■ $0,0 < g < 0,30$ Low ■ $0,30 < g < 0,70$ Average ■ $0,70 < g < 1,00$ High



Source: Attached Data

Based on the results of data analysis conducted by researchers, it is known that there are changes after being given treatment by displaying digital media in mathematics learning in class VIII, it is known that the learning outcomes of students are known to be 21 students 70% have increased with high interpretation, then 20% or 6 students in the interpretation experience an average increase while 10%, 3 students are still said to be low in mathematics learning by using digital media in pesantren huts.

Discussion

Pesantren is one of the oldest Islamic educational institutions in Indonesia. Pesantren is also an educational institution that is still operating and continues to process in line with the progress of the times. Therefore, it is not surprising that in later developments the typology of pesantren can then be categorized into three parts, namely: 1) salaf pesantren; 2) khalaf pesantren; and 3) integrated pesantren. The typology is not meant to separate one pesantren from another, but to mark the characteristics that characterize each pesantren. The existence of Islamic boarding schools until the 21st century shows that the credibility of this institution is still strong and in demand by the Muslim community, even though in its learning activities the pesantren still maintains classical learning methods such as sorogan, bandongan and wetonan. Even though if viewed from the aspect of the development of the times, in the midst of globalization and the birth of modern educational institutions that are contemporary, competition to survive in the world of education is fairly difficult to do. (Nugraha et al., 2021). In order to maintain the typology and credibility of Islamic boarding schools, teachers as subjects in learning can certainly adjust to the development and characteristics of learning, the 21st century which is characterized by the development of information and communication technology has a very significant influence on human life, not least in the world of education. For this reason, the role of the teacher as a facilitator is required to facilitate learning, especially in boarding schools by utilizing digital media. Based on the results of data analysis that researchers conducted by utilizing digital media as a learning facility, it can improve the learning outcomes of VIII grade students in boarding schools with an increase of 70%.

Lyli Bayu Aji and Marhaeni Dwi Satyarini stated that Islamic boarding schools must develop and open themselves to changes that occur in the globalization era according to

technological developments, in order to be able to align themselves with other educational institutions. Pesantren, which have been identified as traditional educational institutions, with one-way learning methods, Kyai as the main authority in the learning process and makeshift facilities that santri must accept as a form of simplicity of life and obedience to ustad, are no longer attractive to some people to study at pesantren. The moderate thinking of young students and the awareness to develop themselves and their boarding schools as modern and quality educational institutions have changed the face of some boarding schools into educational institutions with magnificent buildings, modern technology-based facilities, with graduates who master the religious (Islamic) field as well as other sciences and technology, and are able to compete in the national and international arena (Bayu Lyli, 2020).

Ahmad Azhari argues that following the development of education in the digital era is a necessity that cannot be rejected, considering that students in this era are notebenanya Z and Alpha generations, this generation is considered the most familiar generation with technology. This situation requires stakeholders in the world of education to be ready to face this challenge with innovation, creativity, and technology literacy in education (Azhari, 2021). Research conducted by Siti Badi'ah, Luthfi Salim, Muhammad Candra Syahputra in 2021. Pesantren is often considered an ancient or classical educational institution as a place to study Islam alone and is limited to fiqh, tafsir, hadith, and tasawwuf. However, this is different from the current situation. Along with the times, pesantren have undergone a significant transformation. At this time we can find that pesantren have experienced a comprehensive integration of knowledge. Pesantren should always follow the changing times that are very complex from time to time, with this kind of change being a positive thing for the community in Islamic education, pesantren should be required to keep up with the times, such as advances in technology and information. As an institution that has contributed a lot to society, pesantren must continue to innovate to keep up with technological and information developments so that they continue to develop and contribute to the surrounding community (Salim & Syahputra, 2021).

The results of Tamami's research, Mohammad Naufal Zabidi and Abd. Bassith, 2021 agree with Salim & Syaputra, with the research title of the effectiveness of efforts to improve digital literacy in folk pesantren at Al-Amin Sumber Pucung Malang, with the results of the research The head of the folk pesantren has a strong policy and commitment in optimizing Digital Literacy at the Al-Amin People's Pesantren in Malang Regency, East Java. Including digital infrastructure also relies on internet subscriptions distributed via wifi for free to students and the local environment. Through the optimization of digital literacy, learning in the field of religious studies becomes interesting and dynamic, especially for millennial students who are familiar with various mobile phone products.

The results of this research are also reinforced by research conducted by A. Mawan in 2019. 1) The effectiveness of learning contemporary fiqh ebook Al-Fiqhul Islami wa Adillatuhu is very significant, because by using this application the knowledge and insight of Islamic law about new cases that were not practically found during the time of the Prophet Muhammad but the big concept already exists. 2) This ebook application is very suitable for learning contemporary fiqh in the pesantren environment as teaching material and learning media for Islamic law, as well as to foster the values of tolerance for differences in Islamic law in the madhhabs of Islamic law. Because this ebook teaches all madhhabs of Islamic law without fanaticism to certain groups. 3) Make it easier for students to develop and expand Islamic insights in the field of Islamic law 4) Make it easier for ustadz and teachers of Islamic law material with a comparative model between fiqh madhhabs (Mawan, 2019).

CONCLUSION

Based on the results of research and discussion, digital media can improve learning outcomes, engagement and interest of students. Digital media makes it easier for students to understand concepts such as visualizing complex mathematical concepts, digital media can bring mathematics into the context of real life. The learning system in boarding schools can actually provide space for teachers to innovate, creativity in the learning process.

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