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Trends of Educational Technology (EdTech): Students' Perceptions of Technology to Improve the Quality of Islamic Higher Education in Indonesia

Susanto* 

Pascasarjana Institut PTIQ, Jakarta, Indonesia

Evi Muafiah 

Institut Agama Islam Negeri Ponorogo, Ponorogo, Indonesia

Ayu Desrani 

Sekolah Tinggi Agama Islam Sabili, Bandung, Indonesia

Apri Wardana Ritonga 

Universitas Islam Negeri Maulana Malik Ibrahim, Malang, Indonesia

Arif Rahman Hakim 

Institute Agama Islam Negeri Ponorogo, Ponorogo, Indonesia

Abstract. This study aimed to investigate the use of technology in enhancing the quality of Islamic higher education in Indonesia. A mixed-method approach, with a sequential explanatory design, was applied in this research. The participants in the quantitative research were 608 students from 10 provinces in Indonesia, while those in the qualitative approach were 23 students. The quantitative data were collected using a questionnaire, and the qualitative data were collected through interviews. The quantitative data were analyzed descriptively, while the qualitative data were analyzed using the Miles and Huberman model, which included collecting, reducing and displaying the data, and drawing conclusions. The findings showed that students' perceptions of the use of technology in improving the quality of Islamic higher education were categorized into three parts. First, the technology used in enhancing the quality of delivering materials includes LMS (38%), Zoom meetings (30%), Google Meet (18%), and Google Classroom (14%). Second, the technology used in improving the quality of

* Corresponding author: *Susanto*, susanto@ptiq.ac.id

monitoring or learning direction includes WhatsApp (55%), Telegram (25%), Line (9%), and Google Classroom (11%). Third, the technology used to improve the quality of learning evaluation includes Kahoot (9%), Quizizz (10%), Google form (48%), Turnitin (28%), and computer-based tests (5%). In addition, the respondents gave a positive response to the use of technology in learning in Islamic higher education. The use of technology in Islamic higher education shows an increase. It eases the lecturers, students, and other stakeholders to provide a more outstanding quality of Islamic education.

Keywords: education technology, quality of education, students' perceptions

1. Introduction

Modern technology has been widely used in education, ranging from primary to tertiary educational institutions. It supports educators and students in facilitating a better teaching and learning process (Hassan & Hamada, 2017). Universities worldwide use smart devices to provide users with access to class content and materials. User numbers are also steadily increasing (Safsouf et al., 2020). Innovation and technological advances have changed pedagogy and approaches to facilitating and delivering content in higher education worldwide (Sharma et al., 2019). This has also happened in Indonesia.

Massive global developments demand that educational orientation is not limited to learning in classrooms, and students are directed to explore all educational information outside the classroom (Lai et al., 2018). To support this, the concept of intelligent learning or educational technology (EdTech) is promoted as one of the trends with very strong growth in higher education (Bozkurt, 2020). EdTech's advantages involve its flexibility in using a computer or mobile device (smartphone or tablet) (Tobin & Hieker, 2021). By using the Internet, students can access resources anytime and anywhere. It may adapt to each learner's learning needs and preferences (Safsouf et al., 2020).

The growing demand for technology learning drives massive growth for Indonesia's leading EdTech platforms (Bhardwaj et al., 2020). Popular EdTech products offer learning management systems for teacher-student collaboration and online teaching management, as well as interactive classroom tools to host hands-on and interactive learning sessions, such as G-Suite for Education, Microsoft for Education, Zoom, Google Meet, and Google Classroom (Basilaia & Kvavadze, 2020). However, not all students can access EdTech (Amo et al., 2019) because the Indonesian education system is not equipped to increase online learning rapidly (Churiyah et al., 2020).

EdTech is vital for higher education institutions, including Islamic higher education in Indonesia, to increase competitiveness (Au-Yong-Oliveira et al., 2018). As a result of utilizing EdTech, all of the information related to teaching and learning can be accessed easily and quickly by students, teachers, and the community who need it (Suryaman et al., 2020). In addition, EdTech is needed in higher education management (Castañeda & Selwyn, 2018) to manage academic, student, and administration personnel (Shaturaev, 2021).

The potential of EdTech to increase student activeness in the learning process has long been recognized and the involvement of students in educational technology is a focus. EdTech requires good planning and preparation (Foulger et al., 2019) because it can also potentially neglect students and hinder learning. EdTech in online learning, where teachers and students have virtual meetings, may lead to students' deviant behavior (Susanto & Hakim, 2021). Improving the teachers' competence in using EdTech needs to be considered (Fernández-Batanero et al., 2021). One of the problems in teaching and learning is the lack of teachers' competence in choosing media and using educational technology as a learning facility. A teacher plays the role as a facilitator who guides a learner to knowledge (Wu & Nian, 2021).

Along with the development of education and technology issues, research on the use of EdTech increases daily. Some scholars and academics have conducted some research on the internalization of EdTech in the learning process in higher education, including Islamic higher education. It has been found that students' engagement in learning using EdTech grows rapidly when teachers use technology well (Bedenlier et al., 2020). Moreover, Sailer's findings propose a contextual facilitators model as an EdTech-based learning model for higher education with a distance learning system to understand the dynamics and factors that lead to successful learning (Sailer et al., 2021). Shen (2019) also states that EdTech in higher education is an innovation and disruption to conventional learning practices (Shen & Ho, 2019). Nikou's findings emphasize the importance of the attention to the structure of the use of EdTech amid significant changes in higher education, so it provides benefits rather than being merely a symbol (Nikou & Aavakare, 2021).

EdTech can foster a comfortable and flexible learning ecosystem. It also helps students to access information and learning resources. Therefore, its utilization must be increased to obtain a better quality of learning. EdTech should be encouraged and developed, especially in teaching and learning activities in Islamic higher education. Although the use of EdTech has shown an encouraging trend, it must be ensured that such use not only follows the trend of technological developments but also provides interactive, effective, and good quality learning activities in terms of processes and learning outcomes.

This research explored the trend of using technology to improve the quality of teaching-learning activities in Islamic higher educational institutions in Indonesia, which was formulated in three research problems. The first problem is how technology is used to improve the quality of learning materials delivery; the second is how technology is used to improve the quality of monitoring learning activities; and the third is how technology is used to improve the quality of the implementation of learning evaluations. From these three research problems, the researchers obtained complete and comprehensive data regarding the use of technology today in improving the quality of teaching and learning in Indonesian Islamic higher educational institutions.

It is crucial to make the best use of technology to enhance effective, communicative, and quality learning activities in the future. There are three reasons why this research is essential. First, improving the quality of Islamic higher education requires the adoption of technology and information. Second,

to examine trends in the use of educational technology in Islamic tertiary institutions, it is necessary to have accurate data. Third, it is essential to investigate the perception of Islamic higher education students as users.

2. Literature Review

2.1 Educational Technology

Educational technology (EdTech) is technology developed to support more efficient educational needs as well as e-learning and home schooling. Everything that happens in the world of technology has a direct impact on education and learning systems (Bower, 2019) and has an impact on the efficiency of teachers, students, and the education system as a whole (Purnell et al., 2020). EdTech gives access to education to anyone, wherever they are (Ideland, 2021). These advantages help the Sustainable Development Goals (SDGs), as outlined by the United Nations, to realize quality education (Mondejar et al., 2021). By including the role of EdTech, it is very possible that this global agenda will be achieved by providing access to all people to the same educational opportunities (Selwyn et al., 2020), especially with the opportunity to learn from the best teachers in the world (König et al., 2020).

The number of students in Indonesia continues to increase annually. Based on the data from the Indonesian Ministry of Education, Culture, Research, and Technology in the 2019/2020 school year, there were around 50.6 million students (Zhao et al., 2021). A total of 57.9% went to elementary schools, 19.9% to secondary schools, 9.9% to universities, and 12.1% went to vocational schools. There were around 8.3 million students that used technology. The number of young Internet users is also increasing (Park & Kwon, 2018).

Online platforms, smartphone applications, and new learning formats have massively increased access to education and improved the teaching and learning process itself, while online and cloud technologies have presented attractive standardization possibilities for learning content (Zhang & Min, 2020). Now, every school in rural areas can receive the same standards and levels of learning content as schools in urban areas (Hermino & Arifin, 2020). This connection happens not only inter-schools and inter-cities but also inter-countries (Martín-Cuadrado et al., 2021), because EdTech offers developing countries access to follow the education system in more developed countries, both in academic and professional learning activities (Teräs et al., 2020).

EdTech also creates stronger connections between what happens in the classroom and what happens outside the classroom (at home, work world, and so on), making teacher-supported digital educational resources, such as assignments and exam preparation materials, available permanently (Hofer et al., 2022). This creates a structured circuit in the student learning experience.

2.2 Various types of educational technology in Indonesia

There are several types of services offered by EdTech in Indonesia. One type is e-learning, selling learning materials online, delivered through interactive content, on-demand videos, and online live tutoring (Gao et al., 2021). From a material point of view, the scope is diverse, ranging from courses for school students and foreign language learning content to strengthening skills, such as

accounting and programming (Sepulveda-Escobar & Morrison, 2020). Examples of startups in this field include Akademi, Bahaso, Bensmart, CodeSaya, Kode.id, Ruangguru, Vokraf, and Zenius.

E-learning services in Indonesia mostly target general users, followed by K-12 (equivalent to elementary, junior high, and high school levels). Some also specifically present packaged materials for preschools (e.g., Playable, Smart Point), universities (e.g., DQLab), and businesses (e.g., Ringerlaktate). The concept of blended learning is also still being applied by EdTech to this sub-vertical as an anticipatory step towards market readiness, namely by providing a program that combines online and offline (Goodyear, 2020).

Another EdTech service model is the learning management system (LMS) (Fearnley & Amora, 2020). In contrast to e-learning, LMS is designed more to help plan learning activities. Previously, it was widely used institutionally but, over time, it was also designed for personal use. Some LMS platforms only provide an administrative management system for teaching and learning activities, while others also provide a learning material marketplace (Kant et al., 2021). From existing local startup products, LMS was developed to accommodate several market shares, including business (e.g., Codemi, HarukaEdu, RuangKerja), K-12 level (e.g., Kelase, Mejakita, Pintro), universities (e.g., Ngampooz), and the general public. (e.g., ZumiApp) (Shurygin et al., 2021).

3. Methodology

3.1 Research Design and Participants

A mixed-method approach was applied in this study. The design used is the sequential explanatory design, where the research method combines quantitative and qualitative research methods sequentially, where the first stage of the research was carried out using the quantitative method and the second stage was carried out using the qualitative method. They were used to obtain more comprehensive data. The quantitative data were gathered from respondents who used EdTech in Islamic higher educational institutions in Indonesia. Then, the qualitative data depicted their perceptions about using applied technology.

The participants in the quantitative approach were 608 students of Islamic higher educational institutions in 10 provinces in Indonesia, who were established as the sample by using the cluster random sampling technique. The respondents in the qualitative approach were 23 students of Islamic higher educational institutions in Indonesia, who were established as the sample by using the purposive sampling technique. The 23 students were active students studying at various higher education institutions in Indonesia. Below is the distribution of participants in each province.

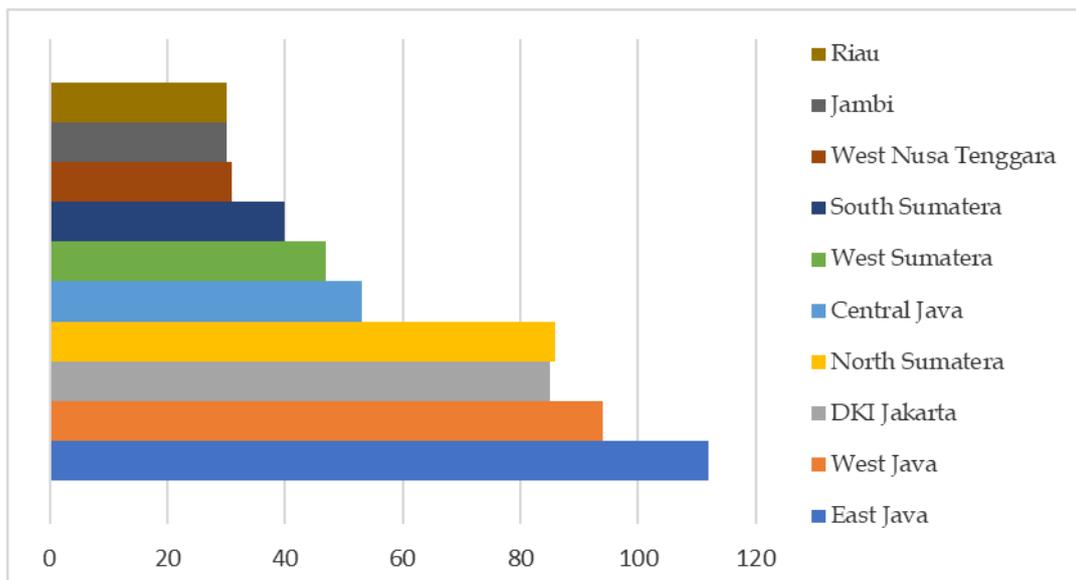


Figure 1. Participants of each province in Indonesia

3.2 Research Instrument

The instrument used for data collection was a questionnaire with several questions about educational technology used in learning in higher education. The questionnaire was tested for validity in learning technology by using SPSS (Version, 26.00). The questionnaire is divided into three parts: the first part deals with the technology to improve the quality of material delivered; the second deals with the technology to improve the quality of learning monitoring; the third deals with the technology to improve the quality of evaluation. The questionnaire contains 13 questions with yes/no alternative answers. The results of the validity and reliability measurement of the instrument was as follows:

Table 1. Instrument validity and reliability

Indicator item	Pearson correlation	No Cronbach's Alpha if item is deleted
Technology to improve the quality of material delivery		
a. Learning management system	0.377	.817
b. Zoom meeting	0.567	.804
c. Google Meet	0.574	.804
d. Google Classroom	0.582	.803
Technology to improve the quality of learning monitoring		
a. Line Group	0.423	.816
b. WhatsApp	0.565	.803
c. Google Classroom	0.538	.807
d. Telegram	0.436	.810
Technology to improve the quality of evaluation		
a. Kahoot	0.518	.812
b. Quizizz	0.560	.803
c. Google Form	0.641	.797
d. Turnitin	0.560	.803
e. Computer-Based Test (CBT)	0.556	.804

The table shows that all question items are declared valid, with r_{Count} greater than r_{Table} . The r_{Table} , determined by the 608 respondents at the significance level of 0.05, is 0.080. This indicated that all items show more than 0.080, meaning the instrument was valid. Furthermore, the reliability of an instrument using the Cronbach alpha questionnaire is declared reliable when the Cronbach alpha is >0.6 . The table shows that the value of the overall question item is >0.6 , indicating the instrument is reliable.

3.3 Data Collection

The data were collected from January to February 2022. The quantitative data were obtained from the questionnaire distributed by Google Forms, while the qualitative data were gathered through telephone interviews. The questions dealt with the use of technology to enhance the quality of material delivery, learning monitoring, and learning evaluation.

3.4 Data Analysis

The researchers analyzed the quantitative data obtained by using the questionnaire descriptively. Meanwhile, the qualitative data were analyzed using the Miles and Huberman model (Huberman, 1992). First, the researchers collected data based on the random distribution of respondents of 608 Islamic higher education students in Indonesia. Second, the researchers classified the data based on the predetermined research problem. In the third stage, the

researchers presented the data according to the specified research problem and then drew the findings. Based on the findings, the research analysis focused on the use of EdTech in Islamic higher education. The data were critically examined by following these three stages.

4. Presentation of Findings

4.1 Technology to Improve the Quality of Material Delivery

The use of technology in education continues to develop along with the development of science and technology. Lecturers continue to adapt themselves to the use of technology in teaching processes to improve the quality of services in Islamic higher education. With supporting technology, the delivery of learning materials can be done online. In fact, with the rapid support of technology and information (ICT) today, Islamic higher education services can innovate to develop multiple virtual-based services in learning, administration, community service, and other services needed.

Materials delivery by utilizing EdTech becomes more exciting and flexible because technology creates more interesting and effortless human activities. The utilization of learning media and technology is one of the breakthroughs that need to be developed and expanded to improve the quality of educational services. The findings of this study indicate that technology is being used in Islamic higher education to improve the quality of the teaching-learning process with various types of platforms, which can be seen in the following figure.

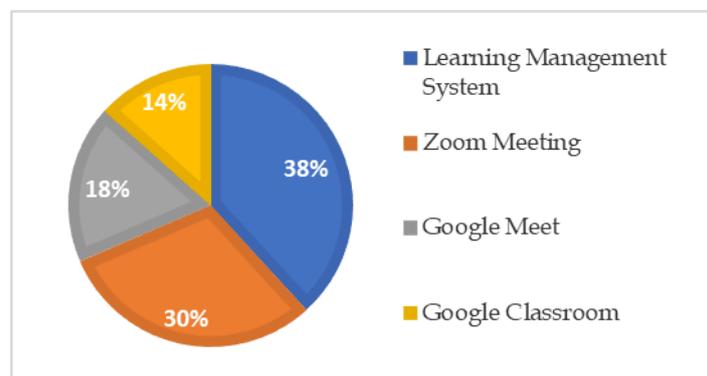


Figure 2. Technology in delivering learning materials

Figure 2 shows the Islamic higher education in Indonesia has utilized educational technology through various alternative platforms to improve the quality of learning materials delivery. The percentage using LMS is 38% and Zoom as a face-to-face online tool is 30%. Meanwhile, 18% of the respondents at Islamic higher education said that they had taken advantage of the feature provided by Google Meet and 14% of the respondents use Google Classroom.

Furthermore, in interviews with respondents related to the use of technology to improve the delivery of the materials in Islamic higher education, a respondent said *“To improve the quality or quality of learning activities, especially before teaching and learning activities take place, we as students are given socialization regarding the use of learning technology on campus, especially on the availability of LMS on campus”* (interview with Fahril on January 16, 2022).

Then, related to the use of technology in the delivery of the materials, another respondent stated that *“The ability of students from the 2020-2021 class in using the LMS and operations is directed through zoom meetings before the start of the lectures for teaching and learning activities, for us as new students who are still new to the operation of the LMS, socialization is not only done once or twice, but socialization is also done by the lecturer who is competent in the subject”* (interview with Mela on January 21, 2022).

The researchers asked the respondents whether or not using technology in lectures could improve the quality of learning materials delivery in Islamic higher education. One respondent confessed that *“Using technology in delivering learning materials certainly makes it easier for us to obtain subject matter from lecturers, especially with the current learning situation, which is still online; technology is highly relied upon to obtain lecture materials for the sake of good continuity of learning”* (interview with Iman on January 19, 2022).

Furthermore, another respondent also said, *“With technology that is growing and getting better, of course, it is very easy for us as students to access learning materials and also not only learn from one reference, we are still allowed to access material from several other technology references under the direction of the lecturer”* (interview with Tika on January 27, 2022).

Based on those descriptive data and the respondents' views, it can be concluded that EdTech is needed to improve educational services in Islamic higher educational institutions in the learning materials delivery. Materials delivery can be improved and packaged by utilizing technology so that the quality of education services is better and adaptive to the needs of the times. Several platforms can be used for EdTech in learning materials delivery, whose use is different from one another in percentages. The highest user percentage is LMS, which is 38%, followed by Zoom (30%), Google Meet (18%), and the lowest percentage is Google Classroom (14%).

Examining the interviews shows that the use of EdTech in delivering learning materials with several types of platforms illustrates that the learning process can attract students' interest because the series of learning activities are not limited by time and space. In fact, it promotes flexible learning. In addition, the use of technology in learning material delivery also provides students with opportunities to seek and obtain various types of learning resources. It has also increased the quality of the learning process.

The readiness of higher education institutions to use EdTech is decisive. Therefore, Islamic higher educational institutions are required to be adaptive to technology-based facilities. The use must be ensured to impact positively on the improvement of the learning quality and on the comfort of students in learning. The respondents' acknowledgement confirms that the use of EdTech in higher education can foster a lively, interesting and varied spirit of learning; it makes students comfortable with learning because the use of technology makes for learning services that are innovative, and modern (interview with Lastri on February 5, 2022).

4.2 Technology to Improve the Quality of Learning Monitoring

Islamic higher education in Indonesia has utilized information technology-based learning to monitor learning activities such as assignment submission, analysis, recording, reporting, and management information about the implementation of learning activities. The quality of learning process monitoring in Islamic higher education is shown in Figure 3.

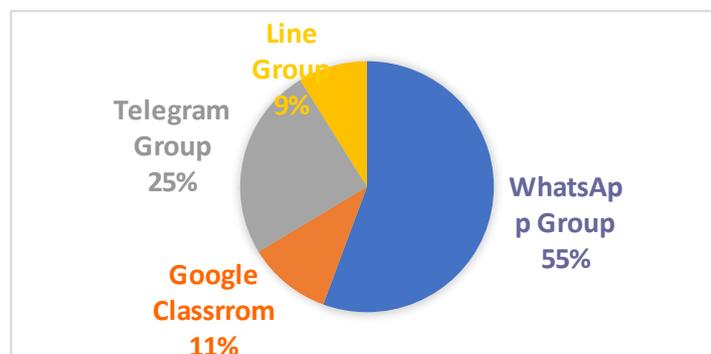


Figure 3. Technology in learning monitoring

Figure 3 shows that WhatsApp is the platform most widely used by lecturers and students to improve the quality of the monitoring of the teaching-learning process. As many as 55% of the respondents stated that they used WhatsApp. Meanwhile, 25% of the respondents stated that they used Telegram to monitor their learning. Line was used by 9% of the respondents, and the remaining 11% used Google Classroom as a medium to improve the quality of learning monitoring in Islamic higher education. WhatsApp is the most crucial choice as it provides various features, such as telephone, voice notes, and video calls, even though the other platforms have almost the same features as WhatsApp does. These features can support the implementation of digital-based learning monitoring in Islamic higher education.

The respondents confirmed that using social media platforms, especially WhatsApp, was a medium to improve the quality of the implementation of learning monitoring. One respondent said, *“From most of the existing technology social media, WhatsApp is an option for lecturers and students to communicate and monitor the implementation of having assignments, both outside and inside the teaching and learning activities”* (interview with Fadli on January 27, 2022). Another respondent said, *“The use of social media, including WhatsApp, telegram, and others, makes it very easy for lecturers and us as students to communicate anywhere and anytime, especially in the current COVID-19 pandemic which makes us unable to meet face to face”* (interview with Annisa on January 27, 2022).

Based on the findings, various social media platforms are used to communicate between lecturers and students to monitor the learning process. It is used from the beginning of learning to the end through special groups for each course. The use of social media for monitoring online and offline learning activities involves distributing KRS syllabus and other learning tools. In addition, it is intended to be used for sharing Google Meet links, materials, and references for monitoring the learning process, and as a discussion forum between lecturers and students, as well as among students.

The respondents from an Islamic university in East Java Province added that social media, such as Telegram, WhatsApp, or personal chats, provides accessible communication between lecturers and students or among students to discuss lecture materials and guidance and to share information related to services on campus (interview with Linda on February 25, 2022).

With regards to the data findings about the use of social media, it should also be noted that social media can bridge the need for information and communication with all parties related to lectures, such as academic staff and other stakeholders. Seeing the dynamics of digitalized education services, it is possible that teaching at Islamic universities in the future will experience very rapid development.

4.3 Technology to Improve the Quality of Evaluation

In addition to improving the quality of teaching and monitoring the implementation of teaching, EdTech is also used to improve the quality of the evaluation of learning outcomes. The results of this evaluation depend on the method and the media used. In learning evaluation activities, lecturers must pay attention to the method or media used to meet the quality standards of evaluation processes. This is done so that the evaluation results have a high level of accuracy to reflect students' abilities genuinely. Based on educational assessment standards, the assessment includes authentic assessment, self-assessment, portfolio-based assessment, daily test, mid-semester test, end-of-semester test, competency level test, and competency level quality test. Some social media platforms are used to improve the quality of the evaluation process for student learning outcomes at Islamic higher education. The media platforms used are shown in Figure 4.

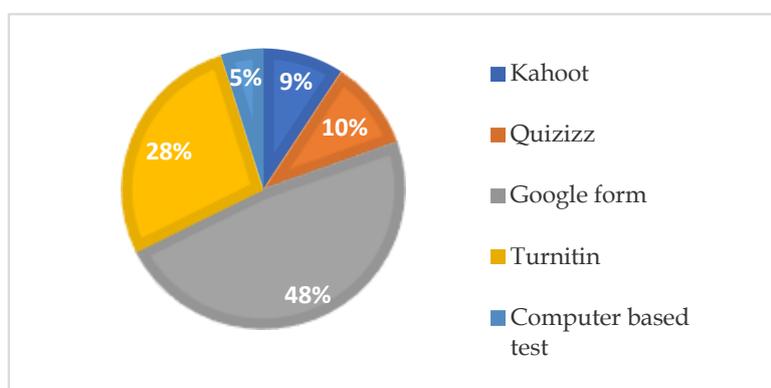


Figure 4. Technology used in learning evaluation

Figure 4 shows the improvement in the quality of the evaluation of student learning outcomes by utilizing the five media platforms of Kahoot, Quizizz, Google form, Turnitin, and the computer-based test (CBT). The most widely used media platforms to improve the quality of evaluation in Islamic higher education are Google Form (used by 48% of lecturers), Turnitin (28%), Quizizz (10%), Kahoot (9%), and CBT (5%).

These findings show that Google Form is the most widely used media platform in Indonesian Islamic higher education today, while the CBT platform is the least used.

As the most used platform, Google Forms is a medium that can collect information from users through personalized surveys or quizzes. The information is collected and automatically linked to a spreadsheet to group the scores or data from the evaluation. In addition, lecturers also use Quizizz to evaluate teaching-learning activities in Islamic higher education. It is a website for creating interactive quiz games that can be used for classroom activities and learning evaluation. It can be accessed on the Playstore for Android users, making it more practical and mobile-friendly. Meanwhile, Kahoot is a game-based learning platform used as a learning technology in schools.

Turnitin is also widely used by several higher education lecturers to improve the quality of learning evaluation. Turnitin is a web-based software system that can identify plagiarism elements in scientific writing. A respondent said that some lecturers used Turnitin to check the validity of student assignments. It is necessary as most lecturers give assignments to students to write papers or other scientific works (interview with Jauharul on January 27, 2022). For Islamic higher education that is advanced and adaptive to technological advances, Turnitin is expected to ensure the quality of student assignments and work.

One of the respondents said, *“Using Turnitin is not only to correct assignments given by lecturers but also to see the originality of ideas, the text of our assignments. It is a requirement for the assignments. We are also encouraged to learn how to write and communicate ideas through scientific writings whose authenticity would be checked before they are submitted”* (interview with Hasan on January 27, 2022). Another respondent also said, *“The sophistication of this Turnitin used in learning positively impacts students not haphazardly plagiarizing or copying and pasting other people’s assignments and works”* (interview with Robi on January 27, 2022).

Finally, CBT is used by lecturers or teachers to evaluate student learning outcomes. It is the use of computers in the tests and assessments of student learning outcomes. The classifications used in assessing learning outcomes include diagnostic assessments, individual tests, and summative tests. CBT is usually used as objective tests for individual students. The presentation and selection of CBT questions are computerized. Each participant who takes the test gets a different set of questions. As shown in Figure 4, as many as 5% of the respondents stated that they used technology to improve the quality of evaluating student learning outcomes at Islamic higher education. Regarding fluency in using CBT, respondents from Islamic higher education in West Sumatra stated that before lecturers used the media to evaluate learning outcomes, students had received socialization and education on how to use it (interview with Nurul on February 27, 2022).

According to the *Oxford Dictionary of English*, perception is sensing and/or interpretation, which tends to be subjective. Based on this view, perception is a person’s response to a particular object based on sensing (Oktavianti & Ardianti, 2019). The study of Ivanaj et al. (2019) shows that the factors that influence the perception of e-learning about service quality are motivated by some factors. They are the attractiveness of the e-learning system, quality assurance to meet students' needs, and attention to users.

Based on the responses or perceptions of students as users of technology-based teaching services, Islamic higher education still needs improvement and innovations in applying technology-based teaching. Thus, Islamic higher education needs to make various breakthroughs and innovations to improve service quality so that technology-based teaching services can be well received by students and provide convenience for learning processes and services. Through these, the quality of education can increase measurably.

The findings also show that Islamic higher education in Indonesia generally responds positively to the presence of EdTech to support the quality of education and teaching services. It is proof that Islam is very open to developing science and technology (Huda et al., 2020). Islam does not prohibit anything that benefits human life, and it even recommends that it be used for more significant interests. Islam emphasizes that every Muslim learns and adapts to the times and adopts technology to improve Indonesia's quality of education services (Salehudin et al., 2021). Thus, theologically, Islam has guided its *ummah* (adherents) to become the best *ummah*, able to utilize science and technology for the benefit of humankind.

The use of technology can be a strategic support to improve the education service quality of Islamic higher education. Three things must be realized. First, lecturers and students must access technology and good quality Internet in classrooms and educational institutions (Ratheeswari, 2018). Second, educational institutions must provide quality materials, be up to date with the times, and be relevant to students' current level of thinking. Third, educators, as learning facilitators, must have good skills in operating EdTech as a medium and source of learning to achieve quality academic standards (Karsenti et al., 2020). The more adaptive the Islamic higher educational institutions are to today's technological advances, the more positive their potential to deliver a better quality of Islamic education output (Tolchah & Mu'ammam, 2019).

5. Discussion

Based on the research findings, technology-based learning can be accepted and recognized as facilitating students and lecturers in teaching-learning activities: sharing and receiving learning materials, monitoring the learning activities, and evaluating learning. The positive responses to the use of technology to improve the quality of learning in Islamic higher education today will positively affect lecturers and students in supporting teaching-learning activities. This is in line with what Abdullah (2017) found that the positive use of technology will have a positive impact on lecturers' and students' science and technology development. The use of the technology acceptance model (TAM) can improve the quality of higher education with technology-based strategic management. The design of the techno university concept can guarantee the quality of Islamic higher education (Jamaluddin et al., 2019).

In addition to using sophisticated technology, students can also have face-to-face interactions for an unlimited period (Lamri & Hamzaoui, 2018). Technology, which is not restricted to time between students and lecturers, can be utilized optimally in learning (Osman & Hamzah, 2017). Stakeholders can use technology as a learning tool in any situation. However, adequate preparation is

needed to use technology for effective learning, including the importance of instructing students to use it properly.

The findings show that students and lecturers utilize media platforms that are already popular and familiar in teaching-learning activities, including materials delivery, monitoring, and evaluation activities. This finding is supported by the results of a survey conducted by Sabzian et al. (2013) who found that students have a positive perception of the use of technology today. They use technology media when they are guided and directed to use and choose the media based on the target competencies (Supriyanto et al., 2020).

Informed by the promising prospects of using technology in various parts of life, large companies, such as Apple, Facebook, Samsung, and Magic Leap, have increased their investment in technology development to improve their accessibility in the future (Howard & Howard, 2017). With technological advances being developed, educational institutions get better benefits because they can develop virtual learning services (Muehllehner, 1981). Therefore, although the findings of this study have shown that the use of technology in improving the quality of Islamic higher education has been implemented, it must constantly be improved upon to achieve a high level of success in supporting teaching and learning activities in Islamic higher educational institutions in Indonesia.

However, several studies comparing the effects of implementing digital learning in some traditional classes have not shown consistent and significant gains in digital learning (Bernard et al., 2004; Gilbert, 2021). In contrast, other research shows that digital classrooms and technology-based learning can outperform traditional classroom learning services (Sevindik, 2010). Another study reveals that technology changes the role of teachers because technology can improve the quality of better learning (Suhr et al., 2010; Sabzian et al., 2013). Thus, the rapid development of technology today has facilitated educators at the primary, secondary, and tertiary levels. Therefore, the spirit of increasing the intensity of the use of technology in improving the quality of the teaching and learning in Islamic higher education must be rekindled.

Levin and Schrum (2013) stated that in schools with successful technology initiatives, there is a change in the way teachers develop curriculum and teaching practices (Glassett & Schrum, 2009). Technology can even change teaching routines, including access to learning resources and advanced learning content; it can improve the quality of learning; it can change the way teachers deliver learning materials (Levin & Schrum, 2013; Shapley et al., 2010).

In the improvement of the quality of Islamic higher education, technology can be applied in the entire educational and learning systems. Technology can be applied through an educational system that combines digital competencies in curriculum and assessment. Furthermore, technology as a learning facility and formative assessment media will help digital literacy and address the complexities and dynamics of education in today's society (Englund et al., 2017).

Various types of EdTech, both software and hardware systems, can be used as formal and informal learning media (Dijck & Poell, 2018). Some studies show that social media generally has the potential to encourage user participation

(Hung & Yuen, 2010). It can be used to improve the quality of education services and it can also help establish seamless virtual professional communication (Zachos et al., 2018).

Teachers still worry about the safety of students, especially primary and secondary school students, because there are many spam, privacy, and information security issues in the use of technology. However, the use of technology to improve the quality of education in Islamic higher education must be developed. At the higher education level, social media can be used without concern for its users (Bates & Poole, 2005), because college students are generally quite mature in their thinking and they are able to use social media wisely. Moreover, information and telecommunication technology is now deeply rooted in the daily life of students and lecturers (Gumport & Chun, 2016). Thus, the use of technology is strategic to improve the quality of services and learning in higher education, including Islamic higher educational institutions (Rustan, 2021).

There are three interrelated elements for quality improvement in Islamic higher education. They are character education, character strengthening, and curriculum development in Social Era 5.0. However, these three elements cannot be separated from the support of educational technology. In the element of character education, the task of a lecturer is to build several programs that integrate the character into learning through media and technology. Meanwhile, the character is strengthened by implementing a curriculum consisting of models and learning strategies, evaluations, and assessments. Curriculum elements are developed through integrated planning that internalizes character strengthening with Islamic values in Social Era 5.0 (Susilawati & Supriyatno, 2020).

In addition, three main factors influence the successful use of technology-based learning: organizational characteristics, instructors, and Internet support. Of these factors, the organization characteristics are the essential factor. Instructors' perception of the benefits of learning technology and ease of access to the Internet support contribute to success (Siritongthaworn et al., 2006). However, the study by Santosa and Devi (2021) reported that the obstacles experienced by technology-based learning included unstable networks and weak student enthusiasm for attending lectures. They often become inhibiting factors for technology-based learning to be effective. To overcome this problem, teachers or lecturers can create exciting and innovative learning innovations so that learning can run well based on the goals to be achieved (Santosa & Devi, 2021).

Based on the findings, students positively perceive the efforts to improve the quality of Islamic higher education through EdTech services and, therefore, it is necessary that Islamic higher educational institutions make various strategic breakthroughs. First, it is necessary to improve the quality of EdTech management on an ongoing basis according to current needs and challenges. Second, it is essential that Islamic higher educational institutions increase the innovation of EdTech services that are attractive to all students with various conditions. Third, it is urgent that Islamic higher educational institutions ensure adequate infrastructure quality assurance.

6. Conclusions

Based on the findings and results of the analysis of quantitative and qualitative data, the following conclusions were made. First, Islamic higher education has utilized technology to enhance the quality of delivering learning materials. It employs some platforms of varying degrees of popularity: 38% use LMS, 30% use Zoom Meetings, 18% use Google Meet, and 14% use Google Classroom. Second, Islamic higher education has employed some social media platforms to improve the quality of monitoring or learning direction. They are WhatsApp (55%), Telegram (25%), Line (9%), and Google Classroom (11%). Third, Islamic higher education has applied EdTech platforms to improve teaching evaluation quality. The EdTech platforms, each of which has different percentage of users, includes Kahoot (9%), Quizizz (10%), Google forms (48%), Turnitin (28%), and CBT (5%).

The respondents positively responded to the use of technology in teaching-learning activities in Islamic higher educational institutions. The use of technology in education has been escalated. It simplifies the work of the lecturers, students, and other stakeholders and it contributes to a better quality of teaching and learning.

This study recommends that other studies examine the overall application of EdTech used in universities in all provinces in Indonesia. It also requires an in-depth study of how effectively this technology is used. Moreover, further studies should focus on the intense, sustainable, and effective application of EdTech in universities. Technology should be used for learning and as educational facilities by considering the readiness of human resources. This will ensure the effective and efficient implementation of EdTech.

7. References

- Abdullah, M. A. (2017). Islamic Studies in Higher Education in Indonesia: Challenges, Impact and Prospects for the World Community. *Al-Jami'ah*, 55(2), 391-426. <https://doi.org/10.14421/ajis.2017.552.391-426>
- Akopyan, M. A., Kotov, S. V., & Ogannisyan, L. A. (2019). Role of Information and Communication Technologies in Modern Rehabilitation Process of Inclusive Education. *Proceedings of the International Conference "Topical Problems of Philology and Didactics: Interdisciplinary Approach in Humanities and Social Sciences"*, 312(Tphd 2018), 10-15. Atlantic Press. <https://doi.org/10.2991/tphd-18.2019.3>
- Amo, D., Fonseca, D., Alier, M., García-Peñalvo, F. J., Casañ, M. J., & Alsina, M. (2019). Personal Data Broker: A Solution to Assure Data Privacy in EdTech. In P. Zaphiris & A. Ioannou (Eds.), *Learning and Collaboration Technologies. Designing Learning Experiences* (pp. 3-14) [Conference proceedings]. <https://doi.org/10.1007/978-3-030-21814-0>
- Au-Yong-Oliveira, M., Gonçalves, R., Martins, J., & Branco, F. (2018). The Social Impact of Technology on Millennials and Consequences for Higher Education and Leadership. *Telematics and Informatics*, 35(4), 954-963. <https://doi.org/10.1016/j.tele.2017.10.007>
- Basilaia, G., & Kvavadze, D. (2020). Transition to Online Education in Schools during a SARS-CoV-2 Coronavirus (COVID-19) Pandemic in Georgia. *Pedagogical Research*, 5(4). <https://doi.org/10.29333/pr/7937>

- Bates, A. W., & Poole, G. (2005). *Effective Teaching with Technology in Higher Education: Foundations for Success*. Jossey-Bass Higher and Adult Education. 77–79. <https://doi.org/10.1177/0741713604268899>
- Bedenlier, S., Bond, M., Buntins, K., Zawacki-Richter, O., & Kerres, M. (2020). Facilitating Student Engagement Through Educational Technology in Higher Education: A Systematic Review in the Field of Arts and Humanities. *Australasian Journal of Educational Technology*, 36(4), 126–150. <https://doi.org/10.14742/AJET.5477>
- Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L., Wallet, P. A., Fiset, M., & Huang, B. (2004). How does Distance Education Compare with Classroom Instruction? A Meta-Analysis of The Empirical Literature. *Review of Educational Research*, 74(3), 379–439. <https://doi.org/10.3102/00346543074003379>
- Bhardwaj, R., Yarrow, N., & Cali, M. (2020). EdTech in Indonesia – Ready for Take-off? *World Bank, May*, 1–84.
- Bower, M. (2019). Technology-Mediated Learning Theory. *British Journal of Educational Technology*, 50(3), 1035–1048. <https://doi.org/10.1111/bjet.12771>
- Bozkurt, A. (2020). Educational Technology Research Patterns in the Realm of the Digital Knowledge Age. *Journal of Interactive Media in Education*, 2020(1), 18. <https://doi.org/10.5334/jime.570>
- Castañeda, L., & Selwyn, N. (2018). More than tools? Making Sense of the Ongoing Digitizations of Higher Education. *International Journal of Educational Technology in Higher Education*, 15(1). <https://doi.org/10.1186/s41239-018-0109-y>
- Churiyah, M., Sholikhah, Filianti, & Sakdiyyah, D. A. (2020). Indonesia Education Readiness Conducting Distance Learning in Covid-19 Pandemic Situation. *International Journal of Multicultural and Multireligious Understanding (IJMMU)*, 7(6), 491–507. <https://doi.org/10.18415/ijmmu.v7i6.1833>
- Dijk, J. van, & Poell, T. (2018). Social Media’s Impact on Education: Tools or Platforms? *The SAGE Handbook of Social Media*, 579–591.
- Englund, C., Olofsson, A. D., & Price, L. (2017). Teaching with technology in higher education: Understanding conceptual change and development in practice. *Higher Education Research and Development*, 36(1), 73–87. <https://doi.org/10.1080/07294360.2016.1171300>
- Fearnley, M. R., & Amora, J. T. (2020). Learning Management System Adoption in Higher Education Using the Extended Technology Acceptance Model. *IAFOR Journal of Education*, 8(2), 89–106. <https://doi.org/10.22492/ije.8.2.05>
- Fernández-Batanero, J. M., Román-Graván, P., Reyes-Rebollo, M. M., & Montenegro-Rueda, M. (2021). Impact of Educational Technology on Teacher Stress and Anxiety: A Literature Review. *International Journal of Environmental Research and Public Health*, 18(2), 1–13. <https://doi.org/10.3390/ijerph18020548>
- Foulger, T. S., Wetzell, K., & Buss, R. R. (2019). Moving Toward a Technology Infusion Approach: Considerations for Teacher Preparation Programs. *Journal of Digital Learning in Teacher Education*, 35(2), 79–91. <https://doi.org/10.1080/21532974.2019.1568325>
- Gao, P., Li, J., & Liu, S. (2021). An introduction to key technology in artificial intelligence and big data driven e-learning and e-education. *Mobile Networks and Applications*, 26(5), 2123–2126. <https://doi.org/10.1007/s11036-021-01777-7>
- Gilbert, J. K. (2021). Positioning models in science education and in design and technology education. *Constructing Worlds through Science Education*, 1982, 125–135. <https://doi.org/10.4324/9780203698778-15>
- Goodyear, P. (2020). Design and co-configuration for hybrid learning: theorising the practices of learning space design. *British Journal of Educational Technology*, 51(4), 1045–1060. <https://doi.org/10.1111/bjet.12925>

- Gumport, P. J., & Chun, M. (2016). Technology and Higher Education: Opportunities and Challenges for the New Era. *INSANIA: Jurnal Pemikiran Alternatif Kependidikan*, 12(2), 263–283. <https://doi.org/10.24090/insania.v12i2.255>
- Hassan, M., & Hamada, M. (2017). Smart Media-Based Context-Aware Recommender Systems for Learning: A Conceptual Framework. *2017 16th International Conference on Information Technology Based Higher Education and Training, ITHET 2017*. <https://doi.org/10.1109/ITHET.2017.8067805>
- Hermino, A., & Arifin, I. (2020). Contextual Character Education for Students in the Senior High School. *European Journal of Educational Research*, 9(3), 1009–1023. <https://doi.org/10.12973/eu-jer.9.3.1009>
- Hofer, S. I., Reinhold, F., & Koch, M. (2022). Students home alone – profiles of internal and external conditions associated with mathematics learning from home. *European Journal of Psychology of Education*. <https://doi.org/10.1007/s10212-021-00590-w>
- Howard, N. R., & Howard, K. E. (2017). Using tablet Technologies to Engage and Motivate Urban High School Students. *International Journal of Educational Technology in Higher Education*, 4, 66–74. <http://educationaltechnology.net/ijet/>
- Huberman, M. dan. (1992). *Analisis Data Kualitatif*. Universitas Indonesia Press.
- Huda, S., Tsani, I., Syazali, M., Umam, R., & Jermstiparsert, K. (2020). The Management of Educational System Using three Law Auguste Comte: A case of Islamic schools. *Management Science Letters*, 10(3), 617–624. <https://doi.org/10.5267/j.msl.2019.9.018>
- Hung, H. T., & Yuen, S. C. Y. (2010). Educational Use of Social Networking Technology in Higher Education. *Teaching in Higher Education*, 15(6), 703–714. <https://doi.org/10.1080/13562517.2010.507307>
- Ideland, M. (2021). Google and the End of the Teacher? How a Figuration of the Teacher is Produced Through an Ed-Tech Discourse. *Learning, Media and Technology*, 46(1), 33–46. <https://doi.org/10.1080/17439884.2020.1809452>
- Ivanaj, S., Nganmini, G.-B., & Antoine, A. (2019). Measuring E-learners' Perceptions of Service Quality. *Journal of Organizational and End User Computing (JOEUC)*, 31(2), 83–104. <https://doi.org/10.4018/JOEUC.2019040105>
- Kant, N., Prasad, K. D., & Anjali, K. (2021). Selecting an Appropriate Learning Management System in Open and Distance Learning: A Strategic Approach. *Asian Association of Open Universities Journal*, 16(1), 79–97. <https://doi.org/10.1108/AAOUJ-09-2020-0075>
- Karsenti, T., Kozarenko, O. M., & Skakunova, V. A. (2020). Digital Technologies in Teaching and Learning Foreign Languages: Pedagogical Strategies and Teachers' Professional Competence. *Education and Self Development*, 15(3), 76–88. <https://doi.org/10.26907/esd15.3.07>
- König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to Online Teaching During COVID-19 School Closure: Teacher Education and Teacher Competence Effects Among Early Career Teachers in Germany. *European Journal of Teacher Education*, 43(4), 608–622. <https://doi.org/10.1080/02619768.2020.1809650>
- Levin, B. B., & Schrum, L. (2013). Using Systems Thinking to Leverage technology for School Improvement: Lessons Learned from Award-Winning Secondary Schools/Districts. *Journal of Research on Technology in Education*, 46(1), 29–51. <https://doi.org/10.1080/15391523.2013.10782612>
- Martín-Cuadrado, A. M., Lavandera-Ponce, S., Mora-Jaureguialde, B., Sánchez-Romero, C., & Pérez-Sánchez, L. (2021). Working Methodology with Public Universities in Peru During the Pandemic - Continuity of Virtual/Online Teaching and

- Learning. *Education Sciences*, 11(7), 351.
<https://doi.org/10.3390/educsci11070351>
- Mondejar, M. E., Avtar, R., Diaz, H. L. B., Dubey, R. K., Esteban, J., Gómez-Morales, A., Hallam, B., Mbungu, N. T., Okolo, C. C., Prasad, K. A., She, Q., & Garcia-Segura, S. (2021). Digitalization to Achieve Sustainable Development Goals: Steps Towards a Smart Green Planet. *Science of The Total Environment*, 794, 148539.
<https://doi.org/10.1016/j.scitotenv.2021.148539>
- Muehllehner, G. (1981). The Impact of Digital Technology on the Scintillation Camera. *Journal of Nuclear Medicine*, 22(4), 389–391.
<https://jnm.snmjournals.org/content/22/4/389.short>
- Nikou, S., & Aavakare, M. (2021). An Assessment of the Interplay Between Literacy and Digital Technology in Higher Education. *Education and Information Technologies*, 26(4), 3893–3915. <https://doi.org/10.1007/s10639-021-10451-0>
- Oktavianti, I. N., & Ardianti, N. R. (2019). A Corpus-Based Analysis of Verbs in News Section of the Jakarta Post: How Frequency is Related to Text Characteristics. *Journal of Applied Linguistics and Literature*, 4(2), 203–214.
<https://doi.org/10.33369/joall.v4i2.7623>
- Osman, N., & Hamzah, M. I. (2017). Student Readiness in Learning Arabic Language based on Blended Learning. *International Journal of Applied Linguistics and English Literature*, 6(5), 83. <https://doi.org/10.7575/aiac.ijalel.v.6n.5p.83>
- Park, E., & Kwon, M. (2018). Health-Related Internet Use by Children and Adolescents: Systematic Review. *Journal of Medical Internet Research*, 20(4), e120.
<https://doi.org/10.2196/jmir.7731>
- Ratheeswari, K. (2018). Information Communication Technology in Education. *Journal of Applied and Advanced Research*, 3, S45–S47.
<https://doi.org/10.21839/jaar.2018.v3is1.169>
- Rustan, A. S. (2021). Digital Communication and Social Media Interaction to Improve the Academic Quality of Islamic Higher Education Lecturers. *Journal of Social Studies Education Research*, 12(4), 144–169. <https://www.learntechlib.org/p/220463/>
- Sabzian, F., Gilakjani, A. P., & Sodouri, S. (2013). Use of Technology in Classroom for Professional Development. *Journal of Language Teaching and Research*, 4(4), 684–692. <https://doi.org/10.4304/jltr.4.4.684-692>
- Safsouf, Y., Mansouri, K., & Poirier, F. (2020). Smart Learning Environment, Measure Online Student Satisfaction: A Case Study in the Context of Higher Education in Morocco. *2020 International Conference on Electrical and Information Technologies, 2020*, 0–4. <https://doi.org/10.1109/ICEIT48248.2020.9113189>
- Sailer, M., Schultz-Pernice, F., & Fischer, F. (2021). Contextual Facilitators for Learning Activities Involving Technology in Higher Education: The Cb- Model. *Computers in Human Behavior*, 121(October 2020), 106794.
<https://doi.org/10.1016/j.chb.2021.106794>
- Salehudin, M., Zulherman, Z., Arifin, A., & Napitupulu, D. (2021). Extending Indonesia Government Policy for E-Learning and Social Media Usage. *Pegem Egitim ve Ogretim Dergisi*, 11(2), 14–26. <https://doi.org/10.14527/pegegog.2021.00>
- Santosa, S., & Devi, A. D. (2021). The Problematics Online Lectures on Human Resource Management Courses (HRM) at The Islamic College Level. *Nazhruna: Jurnal Pendidikan Islam*, 4(2), 261–271. <https://doi.org/10.31538/nzh.v4i2.1452>
- Selwyn, N., Hillman, T., Eynon, R., Ferreira, G., Knox, J., Macgilchrist, F., & Sancho-Gil, J. M. (2020). What's next for Ed-Tech? Critical Hopes and Concerns for the 2020s. *Learning, Media and Technology*, 45(1), 1–6.
<https://doi.org/10.1080/17439884.2020.1694945>

- Sepulveda-Escobar, P., & Morrison, A. (2020). Online Teaching Placement During the COVID-19 Pandemic in Chile: Challenges and Opportunities. *European Journal of Teacher Education*, 43(4), 587-607. <https://doi.org/10.1080/02619768.2020.1820981>
- Sevindik, T. (2010). Future's Learning Environments in Health Education: The Effects of Smart Classrooms on the Academic Achievements of the Students at Health College. *Telematics and Informatics*, 27(3), 314-322. <https://doi.org/10.1016/j.tele.2009.08.001>
- Shapley, K. S., Sheehan, D., Maloney, C., & Caranikas-Walker, F. (2010). Evaluating the Implementation Fidelity of Technology Immersion and its Relationship with Student Achievement. *Journal of Technology, Learning, and Assessment*, 9(4), 1-69. <https://ejournals.bc.edu/index.php/jtla/article/view/1609>.
- Sharma, B. N., Nand, R., Naseem, M., Reddy, E., Narayan, S. S., & Reddy, K. (2019). Smart Learning in the Pacific: Design of New Pedagogical Tools. *Proceedings of 2018 IEEE International Conference on Teaching, Assessment, and Learning for Engineering*, 2018, December, 573-580. <https://doi.org/10.1109/TALE.2018.8615269>
- Shaturaev, J. (2021). Financing and Management of Islamic (Madrasah) Education in Indonesia. *Zeszyty Naukowe Politechniki Częstochowskiej Zarządzanie*, 42(1), 57-65. <https://doi.org/10.17512/znpcz.2021.2.05>
- Shen, C.-W., & Ho, J.-T. (2019). Technology-Enhanced Learning in Higher Education: A Bibliometric Analysis with Latent Semantic Approach. *Computers in Human Behavior*, 104. <https://doi.org/10.1016/j.chb.2019.106177>
- Shurygin, V., Saenko, N., Zekiy, A., Klochko, E., & Kulapov, M. (2021). Learning Management Systems in Academic and Corporate Distance Education. *International Journal of Emerging Technologies in Learning*, 16(11), 121. <https://doi.org/10.3991/ijet.v16i11.20701>
- Siritongthaworn, S., Krairit, D., Dimmitt, N. J., & Paul, H. (2006). The Study of E-learning Technology Implementation: A Preliminary Investigation of Universities in Thailand. *Education and Information Technologies*, 11(2), 137-160. <https://doi.org/10.1007/s11134-006-7363-8>
- Suhr, K. A., Hernandez, D. A., Grimes, D., & Warschauer, M. (2010). Laptops and fourth-grade literacy: Assisting the Jump Over the Fourth-Grade Slump. *Journal of Technology, Learning, and Assessment*, 9(5), 1-46. <https://ejournals.bc.edu/index.php/jtla/article/view/1610>
- Supriyanto, A., Hartini, S., Irdasari, W. N., Miftahul, A., Oktapiana, S., & Mumpuni, S. D. (2020). Teacher professional quality: Counselling services with technology in Pandemic Covid-19. *Counsellia: Jurnal Bimbingan Dan Konseling*, 10(2), 176. <https://doi.org/10.25273/counsellia.v10i2.7768>
- Suryaman, M., Cahyono, Y., Muliansyah, D., Bustani, O., Suryani, P., Fahlevi, M., Pramono, R., Purwanto, A., Purba, J. T., Munthe, A. P., Juliana, & Harimurti, S. M. (2020). Covid-19 Pandemic and Home Online Learning System: Does it Affect the Quality of Pharmacy School Learning? *Systematic Reviews in Pharmacy*, 11(8), 524-530. <https://doi.org/10.31838/srp.2020.8.74>
- Susanto, S., & Hakim, A. R. (2021). The Impact of Virtual Learning Amidst the Covid-19 Pandemic on Students's Susceptibility to Deviant Behaviour. *Proceeding International Conference on Islam and Education*, 1(1), 256-266. <http://proceeding.iainpekalongan.ac.id/index.php/iconie/article/view/172>
- Susilawati, S., & Supriyatno, T. (2020). Development of Islamic College Curriculum in Strengthening Graduates Characters toward Community Society Era 5.0. *Journal*

- of *Advanced Research in Dynamical and Control Systems*, 12(9), 20–26
<https://doi.org/0.5373/JARDCS/V12I9/20202616>.
- Teräs, M., Suoranta, J., Teräs, H., & Curcher, M. (2020). Post-Covid-19 Education and Education Technology ‘Solutionism’: A Seller’s Market. *Postdigital Science and Education*, 2(3), 863–878. <https://doi.org/10.1007/s42438-020-00164-x>
- Tobin, E., & Hieker, C. (2021). What the EdTech Experience in Refugee Camps Can Teach Us in Times of School Closure. Blended Learning, Modular and Mobile Programs Are Key to Keeping Disadvantaged Learners in Education. *Challenges*, 12(2), 19. <https://doi.org/10.3390/challe12020019>
- Tolchah, M., & Mu’ammar, M. A. (2019). Islamic Education in the Globalization Era; Challenges, Opportunities, And Contribution of Islamic Education in Indonesia. *Humanities and Social Sciences Reviews*, 7(4), 1031–1037. <https://doi.org/10.18510/hssr.2019.74141>
- Wu, J. Y., & Nian, M. W. (2021). The dynamics of an online learning community in a hybrid statistics classroom over time: implications for the question-oriented problem-solving course design with the social network analysis approach. *Computers and Education*, 166(December 2020), 104120. <https://doi.org/10.1016/j.compedu.2020.104120>
- Zachos, G., Paraskevopoulou-Kollia, E. A., & Anagnostopoulos, I. (2018). Social media use in higher education: A review. *Education Sciences*, 8(4). <https://doi.org/10.3390/educsci8040194>
- Zhang, Z., & Min, H. (2020). Analysis on the Construction of Personalized Physical Education Teaching System Based on a Cloud Computing Platform. *Wireless Communications and Mobile Computing*, 2020, 1–8. <https://doi.org/10.1155/2020/8854811>
- Zhao, Y., Sánchez Gómez, M. C., Pinto Llorente, A. M., & Zhao, L. (2021). Digital Competence in Higher Education: Students’ Perception and Personal Factors. *Sustainability*, 13(21), 12184. <https://doi.org/10.3390/su132112184>