Investigating Pre-Service Teachers' Intention to Use Digital Technology in Teaching Post Covid 19 Outbreak

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Abstract

This study aims to investigate pre-service teachers' perception and attitude toward the utilization of digital technology in teaching after the Covid-19 outbreak in Indonesia through Technology Acceptance Model (TAM) approach. This study used Explanatory Sequential Mixed Method. The subjects were 114 students from three education programs in STIT Maskumambang and STAI Daruttaqwa Gresik (Islamic Education Program, Early Childhood Islamic Education Program, and Elementary School Education Program). The research data were collected through online questionnaire. To obtain the data in depth, three students from each program were randomly selected to conduct interview. Then, the data were qualitatively and quantitatively analyzed by using SmartPLS 3.0. Based on the results of study, it revealed that pre-service teachers intended to use digital technology in teaching process although Covid-19 outbreak was over. It was proven by the highest mean of the four components of TAM; Perceived Usefulness (Mean=3.60), Perceived Ease of Use (Mean=3.71), Attitude towards Digital Technology (Mean=3.56), and Intention to Use Digital Technology (Mean=3.29). Besides, several students stated that digital technology became a characteristic of the 21st century learning which could not be abandoned by the teachers and remained to be applied and integrated in teaching learning process.

Keywords: Pre-Service Teachers; Digital Technology; Technology Acceptance Model; Post Covid-19 Outbreak

INTRODUCTION

The COVID-19 outbreak has left an indelible mark on the field of education, catalyzing a rapid and unprecedented shift towards remote and online learning. During the height of the pandemic, teachers worldwide were compelled to adopt digital technologies hastily, often with minimal training or prior experience. This sudden disruption not only highlighted the importance of digital tools in sustaining educational continuity but also revealed the significant challenges faced by educators in effectively integrating technology into their pedagogical practices (Hebebci et al, 2020).

As the education system navigates the post-pandemic landscape, it is crucial to examine the long-term implications of this digital transformation (Brunetti et al., 2020), particularly for pre-service teachers. These individuals, enrolled in teacher education programs, are preparing to enter the profession at a time when digital technology plays an increasingly pivotal role. Understanding pre-service teachers' intention to use digital

technology in teaching post COVID-19 outbreak is essential to inform teacher education programs, curriculum development, and support mechanisms.

The Technology Acceptance Model (TAM) by Davis (1989) provides a robust theoretical framework to investigate individuals' acceptance and utilization of technology. This model posits that perceived usefulness and perceived ease of use are key determinants of an individual's intention to use a particular technology. Applying the TAM to the context of pre-service teachers' intention to use digital technology in post-pandemic teaching scenarios offers valuable insights into the factors that shape their attitudes and beliefs.

Many studies focus on the use of technology in teaching during Covid-19 pandemic such as Al Kodri (2020), Asghar, et al. (2021), Alan, et al., (2020), Kilinçer (2021), Hong et al., (2021) and Paetsch & Drechsel (2021). Lack of studies focused on the utilization of technology post Covid-19. Meanwhile, continuity of technology use in pedagogical practices takes very significant roles for the success of teaching learning process. Therefore, this present study tries to fill the gap. Most of the studies applied quantitative approach in TAM research design. On the other hand, to give a comprehensive insight towards pre-service teachers' intention to use digital technology, this study employs explanatory sequential mixed method design. Besides the quantitative data are presented, qualitative data follows to explore pre-service teachers' perception and attitude by interview in depth.

Furthermore, this article aims to introduce a TAM approach to explore pre-service teachers' intention to embrace digital technology in teaching post COVID-19 outbreak. By examining the perceived usefulness and ease of use within the TAM framework, this study seeks to display the pre-service teachers' perception and attitude towards digital technology use in teaching. Additionally, it aims to highlight the evolving role of digital technology in teacher education programs and identify potential gaps and areas for further research.

Through an in-depth analysis of pre-service teachers' intention to use digital technology post-pandemic, this study will contribute to the broader understanding of the impact of the COVID-19 outbreak on educational practices. Furthermore, it will provide valuable insights for teacher education programs, policymakers, and other stakeholders involved in preparing the next generation of educators. By leveraging the TAM framework, this research aims to inform the development of effective strategies and interventions that foster the successful integration of digital technology into pre-service teacher education.

In conclusion, this article serves as a stepping stone for further investigation into pre-service teachers' intention to use digital technology in teaching post COVID-19 outbreak. Through a TAM approach, we can deepen our understanding of the evolving educational landscape and equip pre-service teachers with the necessary skills and mindset to effectively integrate digital tools into their future classrooms. Ultimately, this research objective is to investigate pre-service teachers' perception and attitude towards the use of digital technology in teaching post Covid-19 outbreak.

METHODS

This study employed an explanatory sequential mixed method design to provide a holistic understanding of pre-service teachers' intention to use digital technology in teaching post COVID-19 outbreak. The combination of quantitative and qualitative data will allow for a more comprehensive exploration of the research question (Creswell, 2012) and provide valuable insights for teacher education programs and policymakers. 114 pre-service teachers from three education programs (Islamic Education Program (PAI), Early Childhood Islamic Education Program (PIAUD), and Elementary School Education Program (PGMI)) in STIT Maskumambang and STAI Daruttaqwa Gresik participated in this study.

In the quantitative phase, a structured questionnaire by Carl (2021) was used to depict pre-service teachers' technology acceptance as Davis' model (1989) proposed. It was adapted and translated into Indonesian to make respondents easily understand and answer the given statements. There were 15 items in the questionnaire covering four components of TAM; perceived usefulness (6 items), perceived ease of use (4 items), attitude towards use (3 items), and intention to use (2 items). All items are valid and reliable tested by using SmartPLS 3.0. Afterwards, the data were analyzed and statistically described.

In the qualitative phase, interview was conducted to explore the findings obtained from the quantitative phase. There were 9 pre-service teachers purposively selected from three different study programs. Each major was represented by 3 respondents. The interview guideline consisted of five questions referring to the conceptual framework and the research questions of this study. The interview data were then analyzed through these steps; data condensation, data display, and drawing and verifying conclusion (Miles et al., 2014). As a result, the interpretation of the findings obtained from both phases, quantitative and qualitative, was integrated and discussed further.

RESULTS AND DISCUSSION

Having finished collecting and analyzing the data from questionnaire, it can be presented as table 1 follows to show the respondents' profile. It can be seen that most of the respondents are female with 93 pre-service teachers or 81.58% of total respondents participated in this study.

Table 1 the demographic data of respondents

Major	Gender		N	Percent
	Male	Female		
PAI	12	47	59	51.75
PIAUD	1	14	15	13.16
PGMI	8	32	40	35.09
Total	21	93	114	100

Table 1 shows that more than 50% of research subjects are pre-service teacher from PAI department, 35.09% are from PGMI department, and the remains are from PIAUD department in which females dominating the respondent numbers. Although the

number of research participants is imbalanced between male and female, but it can draw how the pre-service teachers' perception on the use of the technology is after Covid-19 pandemic.

The findings of two phases, quantitative and qualitative, are respectively integrated and presented. Table 2 displays the pre-service teachers' responses to the questionnaire regarding how they perceive digital technology usefulness. Most of pre-service teachers perceive that digital technology is still beneficial for teaching learning process. From the six statements, three items are classified into adequate agreement; item number 1, 2, and 6. They perceive that digital technology can promote to reach class learning objectives. It even enables to build learner-content interaction besides helps teacher conduct formative assessment in classroom. It was in line with a research conducted by Elmahdi, et al. (2018). They revealed that technology can support teaching and learning process by offering formative assessment of learners' skills and knowledge.

Table 2 The mean scores of perceived usefulness on digital technology

No	Items	Mean	SD
1	promotes the achievement of class learning objectives.	3.92	0.76
2	enables learner-content interaction	3.79	0.74
3	enables active learning.	3.50	0.81
4	enables learner-instructor interaction	3.46	0.81
5	enables learner-learner interaction	3.36	0.90
6	enables formative assessment	3.57	0.77

The above findings are also revealed through interview session in which pre-service teachers admitted that digital technology is much relevant and important in the teaching learning process. It is believed to make interactive classroom design and is considered to present an effective teaching. Here are some pre-service teachers' statements regarding this points (E refers to Excerpt):

(E1) In my opinion, digital technology is necessary and relevant in teaching though Covid-19 pandemic is over. [.....] By digital technology, learning content can be interactively and attractively designed in classroom. Moreover, teaching effectiveness can be presented. One of digital technology that can be utilized by teacher is artificial intelligence (AI). It may be adaptively employed in the context of learning activities.

(E2) I think technological tools are still needed in teaching although Covid-19 outbreak has been over. There are many benefits of using technology in teaching. Teachers can use browse subject content

through Smartphone and present it to students. It provides many learning sources to study. [.....] Teacher can use Youtube videos as learning sources, for instance.

Those pre-service teachers' opinions are in line with what Mishra & Koehler (2006) emphasized that the use of technology in teaching can provide an effective instruction in classroom. Therefore, the 21st century should not only master the pedagogical content knowledge but they should also be knowledgeable in technology. As Gündogdu and Alkayalar (2021) stated that the 21st century should not only master the pedagogical content knowledge but also they should be knowledgeable in technology.

Afterward, Table 3 presents how pre-service teachers perceive the ease of digital technology use in teaching post Covid-19 outbreak. They predominantly perceive that digital technology is easy to use in teaching practices. They also recognize that they can easily learn new digital tools and teach by using the digital devices. It can be seen from the mean values of item number 1 and 2 (M=3.64 and M=3.98). They even consider that digital technology is clear and understandable.

Table 3 The mean scores of perceived ease of digital technology use

No	Items	M	SD
1	has been an easy tool for me to learn.	3.64	0.81
2	has been an easy tool for me to teach	3.98	0.84
3	is clear and understandable.	3.64	0.72
4	would be easy for me to master.	3.58	0.87

In qualitative phase, it is also found that pre-service teachers perceive ease of using digital technology in teaching after Covid-19 pandemic. They reported that some digital tools are easily operated by means of tutorial videos posted in Youtube or Video. They can learn how to utilize the tools as one of the pre-service teachers stated in the following excerpt;

(E3) A variety of digital technology can be easily accessed through internet or *Playstore*. Teachers can learn how to operate it by means of tutorial videos posted in Youtube or Tiktok. By following the instruction, I know how to use Canvas to make a poster and make an online test through Quizizz. [.....]Now, teachers are assigned to use technological tools for effective teaching.

However, some pre-service teachers perceive that using digital tools for teaching is somewhat difficult. It needs particular skill. Not all teachers can operate the technology-driven devices. As Adipat et al. (2021) stated that teachers' competences were limited. The integration of technology in teaching and learning skills can bring out efficiency and a better link with students. Thus, teachers required to have enough skill to make meaningful learning. On the other hands, they believed that they can be skillful

in utilizing technology in teaching if they want to learn as they stated in the following excerpt:

(E4) In my opinion, utilizing digital technology in teaching needs technological knowledge. Teachers need to acquire and integrate pedagogical skills and technological literacy. Therefore, it is not easy. Teachers need to learn more how to do that. [.....] but, if there is a will, then there is a way.

(E5) Integrating digital technology in teaching will be easy if the school accommodates the teacher needs. School should facilitate what the teachers and students need especially technological devices to support the teaching learning process. [.....] School can make a workshop event to train and elevate teachers' technological skills.

From the excerpts above, it implies that some pre-service teachers consider that using digital technology is not simple. They need technological skills in order that they can operate the technological tools work in pedagogical settings. It was in line with previous study (Haleem et al., 2022). They revealed that one of challenges of digital technologies in education was teachers felt difficulty while operating it because they did not have experience in it.

Pre-service teachers' attitude towards the use of digital technology can be seen on table 4. They believe that digital technology meets their needs in teaching. It serves them better in delivering subject materials to the students. As Jihan, et al. (2023) stated that technology can assist teachers to provide material for students. Some of them also identified that the digital technology tools they use are compatible with the recent devices utilized in teaching. It can be understood from mean values of the three items respectively (M=3.57, M=3.66, and M=3.44). Those are above average on the neutral attitude.

Table 4 The mean scores of attitude towards using digital technology

No	Items	M	SD
1	was the best choice for content delivery	3.57	0.84
2	is compatible with the hardware devices I use	3.66	0.80
3	is a tool I would like to use to meet teaching objectives	3.44	0.78

The findings above are in line what some pre-service stated in interview sessions as follows:

(E6) I felt enthusiastic to use digital tools in teaching since it can create an attractive learning climate that is needed by students. [.....] Furthermore, it can also lessen students' boredom and burnout in

classroom. By integrating technology in teaching, it is such a fresh air for students.

(E7) [.....] it is really helpful. Digital technology can present interesting and joyful learning activities in classroom. I guess, it is good for all teachers to master technological skill in order that they can utilize the tools in teaching. Feel like challenged to try [.....]

(E8) I am really contented to use digital technologies in teaching. [.....] Prepared for being the 21st century teachers, technology is a part of our teaching journey. I can leave it away.

Based on the excerpt above, it can be deduced that pre-service teachers are aware of the importance of technology use in teaching. They understand that integrating technology in pedagogical practices is a must in the 21st century education. It was in line with Scherer, et al. (2017) who stated that pre-service teachers' attitude and beliefs toward digital technology were related each other because it provided them with valuable information about the development of technology, pedagogic, and content knowledge. Moreover, they are pleased to use the digital tools in teaching because it can create an attractive learning climate. As Haleem, et al. (2022) stated that digital tools can improve classroom atmosphere and can make teaching and learning process more interesting. They also feel challenged to explore the technological tools to be integrated in teaching.

The last component is pre-service teachers' intention to use digital technology after Covid-19 pandemic. Table 5 shows that they will definitely utilize digital technology in teaching to reach the learning objectives although the pandemic is over. However, they do not have any good plan to use it as often as possible. This can be seen from the mean values of the two items; M=3.49 and M=3.09. The last mean value indicates that majority of pre-service teachers do not apply technological tools in every moment of teaching.

Table 5 The mean scores of intention to use digital technology

No	Items	M	SD
1	is a tool I will definitely use to meet teaching objectives	3.49	0.90
2	Plans to use digital technology as often as possible in teaching	3.09	0.89

In qualitative phase through interview, some pre-service teachers will definitely use technology in teaching as they consider it helps teacher teach effectively. They believed that technology can present an interactive classroom setting. It was in line with a research conducted by Mtebe & Gallacher (2022). They stated that that digital technology remained to use after Covid-19 outbreak was over because it was useful and satisfied in teaching learning process. Here are some reasons why they still have intention to use digital technology in teaching post Covid-19 outbreak:

(E9) By aids of technology, students learning outcomes are relatively high. It is because students are interested and astonished in technology-driven activities.

(E10) Teachers should train students' technological skills. It is really needed by students in the 21st century. Therefore, the teaching learning activities should utilize technology. Teachers are demanded to understand how to operate a variety of technology in teaching and to present an interactive and meaningful learning process.

(E11) [.....] teaching by technology can increase students' creativity. Therefore, optimizing use of technology in teaching is a must.

The use of technology in teaching enhances learning experiences, expands access to resources, promotes personalized instruction, fosters collaboration and communication, prepares students for the digital age, and streamlines administrative processes. Embracing technology in education can significantly transform and improve the educational landscape, empowering students with the skills and knowledge necessary to thrive in an increasingly digital world. The findings above were relevant with previous studies (Mandal, 2018; Scherer, 2017). In 21st century, teachers required to acknowledge how to provide digital technology and how to make students engaged it in learning. It meant that technology could support students' learning in 21st century. The use of technology also could improve teaching and learning process.

CONCLUSION

This study offers an insight on pre-service teachers' perception, attitude, and intention to use digital technology in teaching post Covid-19 outbreak. The results of the study indicate that pre-service teachers' perception of the usefulness of digital technology is on average level. When they perceive technology as valuable in enhancing instructional practices, improving student engagement, and facilitating learning outcomes, they are more likely to develop a positive intention to incorporate it into their teaching practices. Additionally, the study highlights the pre-service teachers' perception of ease of using digital technology in teaching. Most of pre-service teacher consider that digital technology is easy to learn and used in teaching. The findings also underscore pre-service teachers' overall attitude towards technology. A positive attitude, viewing technology as a beneficial tool that enhances teaching and learning, is associated with a stronger intention to use it effectively in future classrooms. However, Most of the pre-service teachers do not plan to use the digital tools in very often.

These findings emphasize the importance of providing pre-service teachers with appropriate training, support, and opportunities to develop their technological skills and confidence. Teacher education programs need to incorporate targeted interventions, professional development initiatives, and hands-on experiences to foster positive attitudes and intentions towards technology integration. It is evident that pre-service teachers' perception, attitude, and intention to use digital technology in teaching are closely interrelated and influenced by various contextual factors, including prior experiences, exposure to effective technology integration, access to professional

development, and institutional support. By addressing these factors, teacher education programs can better prepare future educators to effectively leverage digital tools in their teaching practices and meet the evolving needs of 21st century learners.

In conclusion, this study highlights the importance of pre-service teachers' perception, attitude, and intention towards technology in shaping their readiness to use digital technology in teaching after Covid-19 outbreak. By understanding and addressing these issues, teacher education programs can play a crucial role in preparing digitally competent educators who can effectively integrate technology to enhance teaching and learning experiences in the classroom.

REFERENCES

Adipat, S., et al. (2021). An overview of educational technology for preservice teachers in the digital age. *Shanlax International Journal of Education, 9*(4), 136-145.

Al Kodri, M. N. (2020, December 17-18). *The role of digital technology in sustaining online learning during the pandemic Covid19*. UHAMKA International Conference on ELT and CALL.

Alan, Y., Biçer, N., & Can, F. (2020). Perspectives of pre-service teachers on distance education: Covıd-19 process. *Revista Argentina de Clínica Psicológica*, *29*(5), 1972-1984.

Asghar, M. Z., Barberà, E., & Younas, I. (2021). Mobile Learning Technology Readiness and Acceptance among Pre-Service Teachers in Pakistan during the COVID-19 Pandemic. *Knowledge Management & E-Learning*, *13*(1), 83-101.

Brunetti, F., Matt, D. T., Bonfanti, A., De Longhi, A., Pedrini, G., & Orzes, G. (2020). Digital transformation challenges: strategies emerging from a multi-stakeholder approach. *The TQM Journal*, *32*(4), 697-724.

Carl, K. (2021). Teachers' sense of efficacy and technology acceptance during the COVID-19 pandemic. *Issues in Information Systems*, *22*(4).

Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*. Pearson Education, Inc.

Elmahdi, I., Al Hattami, A., Fawzi, H. (2018). Using technology for formative assessment to improve students' learning. *The Turkish Online Journal of Educatioanl Technology, 17*(2), 182-188.

Gündogdu, B., & Alkayalar, A. (2021). Early teacher identity and initial teaching beliefs of EFL pre-service teachers during the pandemic: What changed? *Eurasian Journal of Teacher Education*, *2*(3), 196–227.

Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers, 3*, 275-285.

Hebebci, M. T., Bertiz, Y., & Alan, S. (2020). Investigation of views of students and teachers on distance education practices during the Coronavirus (COVID-19) Pandemic. *International Journal of Technology in Education and Science*, *4*(4), 267-282.

Hong, X., Zhang, M., & Liu, Q. (2021). Preschool teachers' technology acceptance during the COVID-19: An adapted technology acceptance model. *Frontiers in Psychology*, *12*, 691492.

Jihan, Iswantara, N., Murniarti, E., Nindiasari, H., & Arini, I. (2023). Reviewing the effectiveness of educational technologies in enhancing student learning outcomes. *International Journal of Science Review, 5*(1), 223-232.

Kilinçer, Ö. (2021). An Investigation of Pre-Service Music Teachers' Attitudes towards Online Learning during the COVID-19 Pandemic. *International Journal of Technology in Education and Science*, *5*(4), 587-600.

Mandal, S. (2018). The competencies of the modern teacher. *International Journal of Research in Engineering, Science and Management, 1*(10), 351-360.

Miles, M., Huberman, A. M., & Saldana, J. (2014). *Qualittaive data analysis: A methods sourcebook (3rd ed.)*. SAGE Publications.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers college record*, *108*(6), 1017-1054.

Mtebe, J. & Michael, G. (2022). Continued usage intentions of digital technologies post-pandemic through the Expectation-Confirmation Model: the case of a Tanzanian university. *The International Journal of Education and Development using Information and Communication Technology, 18*(1), 125-145.

Paetsch, J., & Drechsel, B. (2021). Factors Influencing Pre-service Teachers' Intention to Use Digital Learning Materials: A Study Conducted During the COVID-19 Pandemic in Germany. *Frontiers in Psychology*, 4953.

Scherer, R., Tondeur, J., Siddiq, F. & Baran, E. (2017). The importance of attitudes toward technology for pre-service teachers' technological, pedagogical, and content knowledge: Comparing structural equation modelling approaches. *Computers in Human Behavior*, *80*, 67-80. https://doi.org/10.1016/j.chb.2017.11.003