



## **Exploring the Integration of Technology in Learning Practices: Study of Faculty Candidates**

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**Abstract:** Elementary education master's program students must complete teaching practice to become lecturers in the future. However, how they integrate and employ technology to support their learning practices is still understudied. This research aims to analyse the integration of technology in research and learning practice. This research employed a qualitative approach with a phenomenological type. The research subjects were students participating in research and learning practice programs who were selected purposively. Data collection was carried out through interviews and documentation. Data was analyzed using interactive analysis. Research programs and learning practices were carried out by utilizing technology in planning, implementing and evaluating learning. Technology-based planning can be seen in teaching materials, teaching media, teaching materials and even the preparation of digital-based teaching assessment instruments. Learning is carried out using a variety of digital technologies. Commonly used learning media include PowerPoint, Canva, video and YouTube. Online quiz applications dominate learning assessment. The findings of this research have urgency in finding patterns of technology integration in lectures. This contributes to the potential for further research regarding the development of technological innovation in learning that needs serious attention to be studied.

**Keywords:** technology integration, learning practices, faculty candidates

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### **Introduction**

The development of information technology from time to time continues to develop and increase, including in the field of education (Ningrum et al., 2022). Information technology in learning activities is necessary for various purposes including learning media (Herwin et al., 2021). Apart from being used as a learning medium, information technology can also be used to develop knowledge (Ahmadi & Maharani, 2019). With good use, it can simplify the learning process, help students understand the subject matter, attract students' attention and improve the quality of learning (Ilyas et al., 2022; Achmad & Utami, 2023).

Lectures can be examples or role models in the proper use and utilization of technology and how to use it correctly. Information technology will make it easier to convey the material being taught and can also make learning more effective and efficient. The use of technology will create innovation in teaching and learning. It can also create a more interesting atmosphere and achieve learning objectives optimally (Sartono et al., 2022; Rahayu et al., 2022; Senen et al., 2021; Saptono et al., 2021).

One of the scientific visions of the Elementary Education Study Program, which also represents Yogyakarta State University's vision, is to produce creative and innovative graduates who implementing their knowledge in the field. One program to achieve this vision is Research and Learning Practices. This program is given to students with experience conducting research and teaching practice as prospective faculties. In carrying out this program, creativity and innovation are among the main focuses to be developed in students.

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The phenomenon in the field shows that not all students can show good creativity and innovation when given the opportunity to practice in the field. It is still found that students are less ready to develop innovations in lecture activities to the fullest. Even though they are provided with lectures in class, the innovation of technology integration in lectures is still not optimal and needs to be improved. The situation gap that is clearly visible in the field is that the institution hopes to obtain good learning processes and results, but this has not been achieved optimally. Several facilities in the classroom have the potential to make a good contribution to learning effectiveness but have not been utilized properly.

The integration of technology in teaching has an impact on the effectiveness and efficiency of learning (Coenders & Verhoef, 2019; Fathoni & Retnawati, 2021). Attention to the use of technology is very urgent (Wiyanarti & Holilah, 2020). With this, the quality of learning will increase and be more meaningful. Technology in learning generally aims to achieve learning goals through the use of modern technology in the context of pedagogy (Syathroh et al., 2021; Hariyanta, Hermanto, & Herwin, 2022). The integration of technology in learning is a very important issue. This is an important basis for realizing innovative learning (Owston, 2007; Todorova & Osburg, 2010; Rofiah, Restiana, & Dewi, 2024)). Technology integration has multi-process characteristics and is a very complex matter. This is because it discusses the dynamics of using several technological tools in learning management (Akcil et al., 2021; Kolil & Achuthan, 2023; Teo, 2009). This shows that studying technology integration will certainly be more complex and involve various technological tools in learning.

This study was carried out to uncover the technology integration carried out by prospective faculty students so far in the Research and Learning Practice Program, which has been spread across various universities. This is very important to find a good technology integration model and solutions to obstacles that are still problems for students today. Apart from that, it is hoped that this study will be an input in curriculum development, especially in the Research and Learning Practice Program and other relevant subjects.

### **Methods**

This research was conducted in the Research and Learning Practice Program for academics who are prospective faculties in Primary School Teacher Education. This research used a qualitative approach. The type of research used was phenomenology. The research subjects were academic students who were being prepared as prospective faculties. Subject selection was carried out purposively. The basis for selecting subjects considers gender representation, including representatives of all collaborating partner universities, activeness in participating in research programs and learning practices and having evidence and demonstrating the integration of technology developed while participating in the program.

The steps in phenomenological research that have been carried out begin with determining the location and individual. In this phase, the research determines the location according to where the practical learning program is implemented. Next, determine the informant approach process and the strategy for selecting informants. Following the type of research, the informants selected are those with experience participating in practical learning programs. The next important thing is data collection, recording field issues, and storing and verifying the data.

Interviews and documentation carried out research data collection. The researcher prepared data collection instruments in the form of interview guidelines and documentation guidelines. Even though this data collection provides certain guidelines, implementation in the field remains open to exploring various potential matters so that the question guidelines are more flexible and can be developed in the field. The data obtained was analyzed using qualitative analysis. Interactive analysis is applied to collect data, verify, and draw conclusions. Furthermore, to prove the credibility of the data, researchers applied triangulation of sources and documents to ensure the validity of the data processed and concluded in this research.

Results and Discussion

Results

This research focuses on three components in learning practice. These components include teaching planning, teaching implementation and teaching evaluation. The first component is teaching planning which is measured to find information about the teaching planning carried out by program participants in carrying out learning practices. The theme that must be answered in this component is how program participants integrate technology into their teaching planning? The results obtained on this theme through interview studies can be presented in the following table.

Table 1. Technology Integration in Teaching Planning

No.	Sub-Themes	Correlation Between Sub-Themes
1.	Program participants include technological elements in planning teaching materials, such as developing digital teaching modules.	Learning is planned by involving technology to facilitate the teaching process. Technology preparation includes aspects of teaching materials, teaching media, teaching materials and even preparing teaching assessment instruments.it
2.	Program participants plan teaching by utilizing learning management system technology either provided by program partners or developed by program participants themselves.	
3.	Program participants include digital learning media in their learning planning.	
4.	Participants prepare an evaluation of learning outcomes based on digital games with material content in accordance with the learning topics that will be discussed in the lesson	

Table 1 explains the teaching planning carried out by research program participants and learning practices. The findings show that the planning carried out by participants involves technology related to achieving teaching goals. Participants utilize their technological abilities and knowledge to develop a teaching plan according to the teaching objectives they want to achieve. This is found in every partner location; of course, this situation meets expectations. Additionally, one of the goals of this research and teaching practice program is how program participants apply their technological knowledge in planning instruction.

The second component that is the focus of this research is the integration of technology in the implementation of learning. This phase aims to reveal how research and teaching practice program participants apply technology in teaching implementation. Apart from that, this phase also checks the suitability between the teaching implementation and the plans that have been found previously. Therefore, the theme studied in this second focus is how research program participants and teaching practices integrate technology during learning? The results related to this component are presented in Table 2 below.

Table 2. Technology Integration in Teaching Implementation

No.	Sub-Themes	Correlation Between Sub-Themes
1.	Learning is carried out using PowerPoint, Canva, videos and YouTube content.	The implementation of learning takes place by utilizing a variety of technologies. Commonly used learning media include PowerPoint, Canva, video and YouTube. Learning management is carried out in various ways, both synchronous and asynchronous, by utilizing digital teaching materials. Meetings are held offline or online using an online meeting platform.
2.	Learning is carried out synchronously and asynchronously by utilizing the learning management system provided by partners (available in the field).	
3.	Participants design their own general learning management systems such as Google Classroom.	
4.	Teaching is carried out online using Zoom meetings and Google Meet.	
5.	Participants prepare teaching materials independently through digital teaching modules.	

The analysis results in Table 2 show that technological tools have become some participants that always apply during the implementation of research programs and teaching practices. However,

variations between participants were found to be different. Participants were found to emphasise integrating technology in their learning media. It was also found that participants emphasized the use of technology in the learning management aspect. In addition, the integration of e-module technology is implemented by research program participants and learning practices. This can be observed in Figure 1 below.



Figure 1. Application of E-Modules in Learning Implementation

Along with technological developments, printed teaching materials are slowly becoming obsolete. Electronic teaching materials are becoming an increasing trend nowadays. One of the findings of this research is as depicted in Figure 1. Electronic-based learning modules are applied in learning activities. This makes the learning process more efficient. Furthermore, cases were also found where participants emphasised using online meetings and applying digital teaching materials. These results indicate conformity with the program's objectives, namely developing participants' pedagogical and technological knowledge.

The final component that is the focus of this research is the implementation of technology-based teaching assessments. After teaching is planned, the next phase is implementation. A learning assessment is carried out to measure the implementation process's success. However, in this research, the assessment phase emphasised the integration of technology. The extent to which research program participants and teaching practices in the field utilize this technology. Results related to this theme are presented in Table 3 below.

Table 3. Technology Integration in Learning Assessment

No.	Sub-Themes	Correlation Between Sub-Themes
1.	Learning assessments utilize online quiz applications such as Quizizz and Kahoot.	Technology integration in learning assessment is dominated by online assessment applications such as Quizizz, Kahoot, online forms, and Mentimeter. Apart from that, the use of assessment features in the learning management system is also applied as a learning variation.
2.	Program participants carry out learning assessments by integrating Google facilities such as online forms, which are arranged to become test instruments.	
3.	Participants use the assessment or quiz facilities contained in the learning management system, either those that are available at partner locations or those prepared by the participants themselves.	
4.	Assessment as learning is carried out by participants using online applications such as Mentimeter.	

Assessment is part of a learning process. The results presented in Table 3 show that research and learning practice program participants have utilized technology in carrying out learning assessments. Various variations of findings were obtained in the field. However, basically the findings are dominated by the use of online quiz applications widely used by practical program participants. The use of online quiz applications is the choice of many participants because of their efficiency in practical use. Apart from that, currently there are many online quiz applications that can be used for free by users and tend to be easier to use in learning. The results of this research found that the online quiz application was the dominant choice for teaching practice program participants to apply in learning assessment. The following is an example of the integration of online quiz technology in implementing learning

assessments. In the learning planning aspect, it was found that program participants made plans involving the potential of technology in learning.

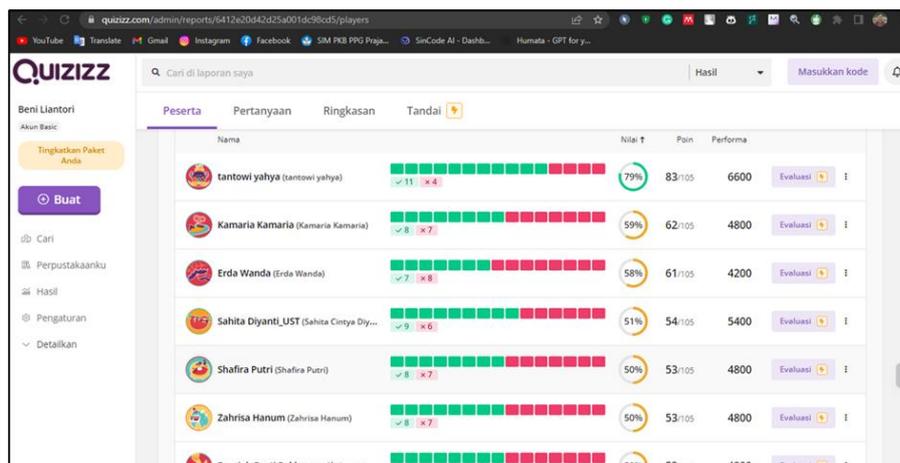


Figure 2. Application of Online Quizzes in Learning Assessment

The large selection of online assessment features provides many opportunities for faculty to carry out digital-based assessments effectively and efficiently. This has been shown in Figure 2. One of the most popular applications used in online quiz applications. Apart from supporting the efficiency of implementing assessments, the integration of digital technology in learning assessments has an impact on the effectiveness of learning in general. Apart from that, integration of learning assessments via Google facilities is also often used. Participants use the assessment features in the learning management system because several Collaboration partner institutions already have learning management system facilities in their respective institutions. The accumulation of the overall use of this technology in assessment has become an innovation that has a positive impact today for both faculties and students as learning participants.

## Discussion

The learning program is a complex process supported by various aspects. Planning, implementation and evaluation are essential in this learning program (Hariyanta et al., 2022). Research and Learning Practices is a mandatory program for prospective academic faculties to provide experience in managing a learning set together with students as actual learning participants. This is a responsibility for program participants to undertake and complete.

This study focuses on integrating technology in the implementation of learning carried out by program participants. This is intended to facilitate the teaching process. Technology preparation includes aspects of teaching materials, teaching media, teaching materials and even preparing teaching assessment instruments. The integration of technology in planning teaching has the potential to improve the quality and efficiency of learning (Coenders & Verhoef, 2019). Learning planning must pay attention to the involvement of technology (Wiyanti & Holilah, 2020).

Educational technology has been widely used and proven to facilitate learning and improve outcomes. Technology is important in communication, storage, and transfer of information, use and production of audio-visual media, and sharing knowledge. This is very much needed to improve the quality of education. Therefore, it is important to apply technology in lectures (Tuma, 2021). In this modern era, learning planning should adapt to developments in digital technology (Edi et al., 2021). This means that learning planning must include elements of technology in learning management (Ilyas et al., 2022). Therefore, in the planning component, findings from research programs and learning practices are already underway by integrating various variants of digital technology. This is a finding that needs to be maintained or even improved for future program implementation.

In the aspect of implementing learning. This researcher's findings show that all learning has taken place involving the involvement of technology. The implementation of learning takes place by utilizing a variety of technologies. Commonly used learning media include PowerPoint, Canva, video and

YouTube. Learning management is carried out in various ways, both synchronous and asynchronous, by utilizing digital teaching materials. Meetings are held offline or online using an online meeting platform. Learning in the 21st Century must involve interactive media (Novriandami et al., 2023; Windiyani et al., 2024). Learning must be able to adapt to technological advances (Bungawati & Rahmadani, 2023; Sajeev et al., 2021). This means that both faculties and students must be accustomed to learning with various technological features to achieve learning objectives optimally.

Apart from planning and implementing learning, the final focus in this research is learning assessment. Learning assessment is an inseparable part of learning (Watling & Ginsburg, 2019). Research findings show that technology integration in learning assessment is dominated by online assessment applications such as Quizizz, Kahoot, online forms, and Mentimeter. Apart from that, the use of assessment features in the learning management system is also applied as a learning variation.

This research's findings are relevant to previous findings showing that currently mobile-based learning assessments are very popular in learning activities (Herwin, Nurhayati, et al., 2022). Not even now, it turns out that mobile technology has been used familiarly since several years ago (Chang & Hwang, 2019; Dearnley et al., 2009; Park et al., 2012; Rahim et al., 2012; Sung et al., 2016). With the many online quiz applications available, users increasingly have more options for integrating technology in carrying out learning assessments. Various benefits can be obtained by engaging with digital and mobile assessments. These include: the potential to raise the motivation of assessment participants in learning, increase the effectiveness of learning and support the efficiency of assessment implementation (Herwin, Senen, et al., 2022). This is an achievement that needs to be improved in future program implementation. Integrating technology in learning is a necessity. This is the basic importance for a prospective faculty member to understand not only the implementation of technology, but also to be able to do it at the planning, implementation and evaluation stages. This study represents that an effective class will be realized if the learning process is more interactive. This can be done by integrating technology in learning.

### **Conclusion**

Research programs and learning practices for academic students who are prospective faculties are carried out by integrating technology in planning, implementing and evaluating learning. Technology features are included in learning planning to facilitate the learning process. Technology-based planning can be seen in aspects of teaching materials, teaching media, teaching materials and even the preparation of digital-based teaching assessment instruments. Learning is carried out using a variety of digital technologies. Commonly used learning media include PowerPoint, Canva, video and YouTube. Learning management is carried out in various ways, both synchronous and asynchronous, by utilizing digital teaching materials. Meetings are held offline or online using online meeting platforms such as Zoom or Google Meet. Learning assessment is dominated by online assessment applications such as Quizizz, Kahoot, online forms, and Mentimeter. Apart from that, the use of assessment features in the learning management system is also applied as a learning variation.

This study recommends various things as a form of follow-up to important findings that need to be explained. First, research programs and subsequent learning practices need to equip participants with learning technology capabilities. This needs to be formally included in the program curriculum. This program needs to emphasize the importance of technological knowledge for faculties. The integration of technology in learning will run optimally if it is supported by good technological knowledge from faculties. However, good knowledge of pedagogy and material content also needs to be supported. This research only focuses on technology integration. Further research is recommended to further examine learning practices in terms of pedagogical knowledge and the content of teaching materials from prospective faculties. Furthermore, this research found various learning technology products produced by participants during the program. This has the potential for further study and a good reference for program participants next year.

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