



TECHNO-PEDAGOGY: WHAT IS THE ROLE OF PROSPECTIVE TEACHERS IN PREPARING FOR LEARNING IN THE DIGITAL ERA?

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Abstract. Digital media is very closely related to life, making its role very important in building life's culture. The role of digital media also affects the style or method of carrying out learning. Therefore, there needs to be an exploratory study in looking at learning using digital media. The purpose of the research is to decrypt the role of digital media in influencing prospective educators' learning styles (students) and explore prospective educators (students) to face learning in the digital age. This research method phenomenology. The subject of study is educational students or prospective educators. Data collection is conducted by open survey and questionnaire methods. Quantitative data were analyzed using descriptive statistics, and qualitative data analysis was performed by reducing data, looking for relationships between themes and levers. The results showed that the digital media's role is vast in building the learning style of prospective teachers. The role is shown with ease of access obtained by prospective teachers and many resources that reference knowledge development. Besides, it turns out that prospective educators can analyze/vaccinate the learning process using digital media. This shows that prospective teachers are ready to face the challenges of learning in the digital age and can make a breakthrough in learning in the digital age.

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A. INTRODUCTION

The challenge of education today is the ability to take advantage of technology in the world of education. Digital literacy skills are indispensable for teachers and students to be technologically literate (Hatlevik & Arnseth, 2012). Technology becomes a tool as well as a servant to meet human needs. *Artificial Intelligence* (AI) (Holmes et al., 2019; Roll & Wylie, No. SK Akreditasi Ristekdikti : 34/E/KPT/2018

2016; Wilner, 2018) Serta *Internet of things* (IoT) (Gul et al., 2017; Moreira et al., 2018; Wilner, 2018) have played a role in the advancement of education. A wide range of digital media has helped the process of implementing education in schools. Rapid technological advances cannot be used if digital literacy capabilities and human capabilities have not been able to use them. So now the ability of digital literacy as an effort in

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answering the challenges of the development of science and technology to face a wide range of challenges in the future is needed by educators (Binkley et al., 2014; Hatlevik & Arnseth, 2012; Hobbs, 2010; Mardina, 2011).

The arrival of the industrial revolution 4.0 presents opportunities and challenges for education, among others, challenges for educators in facilitating students' growth (Ahmad, 2018; Prasetyo & Trisyanti, 2018). Referring to this, it can be understood that quality human resources can only be achieved through quality education (Tilaar, 1998). In facilitating the expectation of education in the digital era, there needs to be an innovation in developing the educational process (Alaloul et al., 2020). One of his efforts was to improve proficiency in digital literacy (Hobbs, 2010). Literacy proficiency in the industrial revolution era 4.0 emphasized reading, writing, and counting skills and emphasized the importance of digital literacy, technology literacy, and human literacy.

Today's implementation of technology-based learning is still constrained by the competence and understanding of educators who do not yet understand the importance of applying. This is in line with students' socio-cultural proximity, which

considers society's real physical, cultural, and contextual realities. Based on this opinion, the development of technology-based learning must always be value-oriented. Educational efforts in building the character of the nation's generation can be realized.

Education in the digital age with the utilization of technology can facilitate distance learning online so that the classroom does not limit the learning process. But in this case. Education in the digital age in its implementation in teacher schools can use a wide range of applications to conduct distance learning online—application in online learning that we can use Learning management system seems Edlink, Edmodo, dojo class. While there is an application to do a video conference, google meet, cisco Webex also zoom to support online learning face-to-face. The use of evaluation in learning can use formative, Kahoot, quizzes, google form, and other applications to support the online learning process in every single education.

Based on this opinion, this should be a foothold in building the paradigm of thinking of all elements, especially universities in innovating learning based on the Techno-pedagogy Approach in developing students' digital literacy.

Herlambang (2018, p. 153) explains that the Techno-pedagogy Approach concept is a technology-based learning concept to answer the challenges of the times. Furthermore, Herlambang explained the application of technology in learning into facilities for students in improving high-level thinking skills.

Pedagogy is an educator's mandatory prowess. In this case, Langeveld (Sadulloh, 2007) suggested that pedagogy is a theory that carefully, critically, and objectively develops its concepts regarding human nature, the nature of the child, the nature of the purpose of education, and the nature of the educational process. The educator's understanding of the students' nature will facilitate students' development in the learning process. One of the efforts to develop students in the digital age is the implementation of technology-based learning.

The development of the times accompanied by technological and scientific advances continues to develop. The rapid progress of the age with the development of technology knows no limits of space and time, so information is easy to obtain. The development of science, accompanied by technological advances, has benefited many people. The development of science and

technology in the educational process must be accompanied by students' abilities to adjust to the development of the times in their lives.

As times progress, education has an important role to play in addressing future challenges. The educational process becomes a way for students as future human beings who will face technological advances (Mehmet Baygin et al., 2015; Tindowen et al., 2017). One way to prepare students in the face of their future through an educational process that prepares students for their lives. Education plays a role in developing students' attitudes, knowledge, and skills (Citra, 2012; Yulianti et al., 2016). Therefore the role of teachers as educators is crucial in growing the potential of students. The competencies of life required in the 21st century are high understanding, critical thinking competencies, creative thinking competencies, collaboration, and communication competencies. Various ways have previously shown that today's most severe problem is the quality of learning designed not to be fully implemented properly. Digital design in the digital age needs to be packed with relevant skills. Therefore teachers need knowledge and skills to design learning digitally. This raises the question, is it

ready for prospective educators (students) to answer the challenges? This needs to be reviewed because of the preparation of creating quality educators.

Previous studies have recommended research on *techno-pedagogy to explore educators' knowledge in preparing digital learning*. Other research also suggests that learners' readiness should be considered to do digital-based learning. Other relevant research shows that there needs to be a review of prospective educators in self-awareness to plan convention learning and digital learning. Therefore, this research explores how digital media influences the learning style of prospective educators (students) and sees how prospective educators (students) want to face learning in the digital age.

B. METHOD

This research uses method phenomenology (Creswell, 2016). The method is used because it feels appropriate in achieving research objectives and answering research questions. The purpose of this research is to decrypt the role of digital media in influencing the learning style of prospective educators (students) and explore the readiness of prospective educators (students) to face learning in

the digital age. The study subject is the student who is the subject of the study selected at random with the criteria of the student from the majors. The research subjects of 1,083 students from priority education majors will be teachers or prospective educators. These students come from various universities/institutes in various cities in Indonesia.

Data collection is conducted with open survey and questionnaire techniques. The instruments used contain digital literacy developed from Hobbs theory (2010). There are several aspects of digital literacy that become instruments, namely access, evaluation, and *share*. Furthermore, the instrument is validated by experts and has a validation result of 0.93, which means good (Azwar, 2012; Retnawati, 2016). Data generated from different instruments are analyzed quantitatively and qualitatively. Qualitative analysis is done with descriptive statistics surveys' percentage. In comparison, the qualitative analysis uses Bogdan & Biklen model (1982) so that the results of the analysis can answer research questions.

C. RESULT

The results show several essential points are students' learning style in the digital age, students' analysis in using

digital media for learning, and disseminating information. Students' learning styles in the digital age will provide information about digital media's role in influencing the student's learning style. Then, analysis students in using digital media for learning and disseminating information will see students' readiness in the face of learning in the digital age.

1. Student Learning Style in the Digital Age

Student learning styles in the digital age can be influenced by several factors, such as what digital media is used and what digital learning resources are used. The results of the study center on what digital media is frequently used (Figure 1.) and what digital learning resources are often used (Figure 2.)

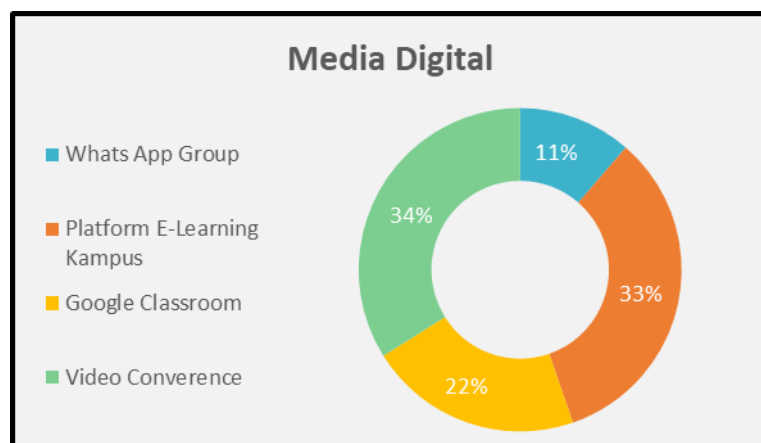


Figure 1. Percentage of Digital Media That Students Often Use

Figure 2. information that Whatsapp Group as *instant messages* has a significant role in the student learning process. This is because *instant messages* are easier to use and often used in daily life. After that, a campus e-learning platform has a significant role in the student learning process after what's app group. The large *role of campus e-learning* platforms is influenced because educators (lecturers) recommend using

this medium to learn. The digital median *google classroom* ranked third as a digital media used to study in this research. Google classrooms as an LMS (Learning Management System) are accessible to diagnose, and the features are relatively complete. Then ranked fourth, there is a video conference as a medium often used by students to study. Video conference is defined as Zoom,

Google Meet, Webex, etc. Video conference is rare because not every meeting needs to be face-to-face for the learning process.

Looking at the results of an analysis of digital media research often used by students for learning can be reviewed in

terms of practicality, ease, features, and needs. Successively this plays a significant role in providing digital media that students often use to study. However, it is also necessary to look at the learning resources that students often use. This can be seen in Figure 2.

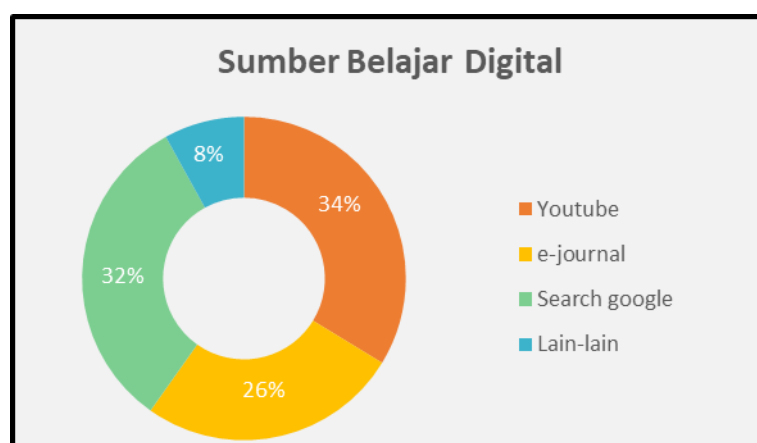


Figure 2. Percentage of Digital Learning That Students Often Use

Youtube and Google have a huge role to play as a learning resource for students. Both have a high percentage of students' learning resources, and the second dominance exceeds 50% of all resources used. This is because both have such high popularity that students often use Youtube and Google as a learning resource. Then e-journal has a

reasonably good percentage of 26% as a digital learning resource often used by students. This is useful because students have begun to be patient that the importance of using sources whose credibility is good and can be accounted for. It is then, other sources only have 8% as the source of learning often used by students.

Table 1. The Right Media and Learning Resources for Students

Facts	Category	Conclusion
<ul style="list-style-type: none"> • Students are more than happy to see and hear • Interesting images become favorites 	Favorite digital media	Digital media such as Youtube and Instagram are more likely to be used because students are more interested in videos and images. Seeing and hearing is a thing that students love to look for information (in addition to learning resources). The right learning resources are often used and youtube favorites from famous and trusted channels. Sometimes educational journals are a convenient resource for students to use and can be held accountable.
<ul style="list-style-type: none"> • Learning resources are easily accessible • Popular and credible 	Favorite learning resource	

Table 1. information about the right digital learning media and resources for students. It turns out that students are more interested in digital media images and more interested in seeing and listening. Youtube and Instagram are among the study recommendations for students because they present pictures and videos that students love. Then the source of study that feels right for students is Youtube and educational journals. Youtube is easy to access, and journals are more credible as a learning resource. This is the basis of Youtube, and the educational journals are preferred by the shiva.

2. Mahasiswa Analysis on The Use of Digital Media for Learning

Students, as prospective educators, have been able to analyze the direction and form of learning in the digital age. They were starting by looking at the motivation of learning in the digital age, looking at device readiness, looking at the effectiveness of learning, the form of the learning process, and the evaluation of learning resources in the digital age. These are described in Table 2. and Figure 3.

Table 2. Student Readiness To Learn in the Digital Age

Facts	Category	Conclusion
<ul style="list-style-type: none"> • Enthusiastic • In the process, it is not easy to focus • Feeling dissatisfied • Too long the duration of learning is bored • Become a burden when there is no direct guidance 	Motivation to learn using digital media	<p>From a motivational point of view, learning/learning using digital media fosters positive enthusiasm. However, for too long, using digital media for learning can also motivate learning, and even bias becomes a burden when the media used is not maximally empowered. An easy-to-use digital media device becomes a device that will significantly help the continuity of learning. Expensive media and networks are one of the obstacles in learning about digital media</p> <p>The transition to digital media use has not been entirely usable; the constraints that digital media has not been able to overcome are essential points in the effectiveness of digital media mastering for learning. Digital media will be easy to use when digital media operations can take place to the maximum. Planning is very blinded to the process of learning with digital media in order to anticipate the appearance of an obstacle. There is currently no proper learning model for learning when using digital media. The limited flexibility of the implementation of learning generated the absence of innovation to improve the quality of learning to impact the discussion process's ineffectiveness. Besides, the other impact</p>
<ul style="list-style-type: none"> • Mahal • Easy to use • Network constraints 	Digital media devices	
<ul style="list-style-type: none"> • Ineffective for previews • Tricky for preparation • Not very laboratory when the 	Effectiveness of using digital media	

<ul style="list-style-type: none"> device is inadequate • Delivery of material is not maximal 		<p>is that it is challenging to develop cooperative learning. Learning materials or resources are easy to obtain, and checks are essential to do in order to maintain the validity of the resources used.</p>
<ul style="list-style-type: none"> • planing is not done properly • No correct model is right for digital media • Learning models do not vary • Ineffective diskusion • Difficult to co-operate 	<p>The learning process of using digital media</p>	
<ul style="list-style-type: none"> • Easy to get a source • Source checking is considered very important 	<p>Evaluation of material sources from digital media</p>	

Table 2. information about students' readiness in the face of digital age learning. Results show that learning using digital media can positively impact, such as increased enthusiasm for learning. Digital media certainly support this that is easy to use and ease of obtaining learning resources. Besides, digital learning also has problems and constraints that do not go unnoticed in its implementation, such as in its learning students become challenging to focus, a duration that is too long to cause

boredom becomes a burden when there is no direct guidance, ineffective for practice, complicated preparation, the material delivered not maximally, learning model does not vary, the discussion becomes ineffective and challenging to the cooperative. Other impacts that arise outside of learning are expensive media and network constraints and ineffective when supporting devices are not maximal. Checking the learning resources used is also very important to know the validity of the resources used.

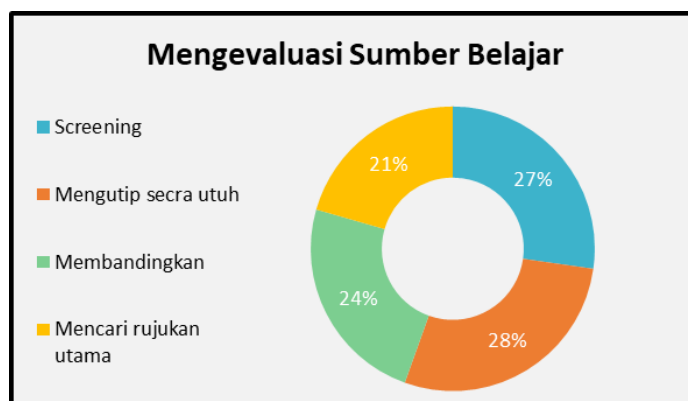


Figure 3. Evaluation of Student Learning Resources

Figure 3. It shows that the evaluation of student learning resources disseminating materials/information obtained four indicators, all of which obtained a percentage in the range of 20% - 30%. The highest percentage is obtained in the overall quoting indicator of 28%, followed by the screening indicator with a percentage not far from the previous 27% component. The next indicator is to compare with the percentage of 24%, and the last indicator is to look for the primary reference with

a percentage gain of 21%. This information indicates that the students are more agile in evaluating the learning resources to be used.

3. Disseminating material/information

Currently, prospective educators (students) ' role is to find learning materials / informal to learn and more than that. Skills in disseminating or sharing learning materials need to be utilized to disseminate information to have good validity and credibility.

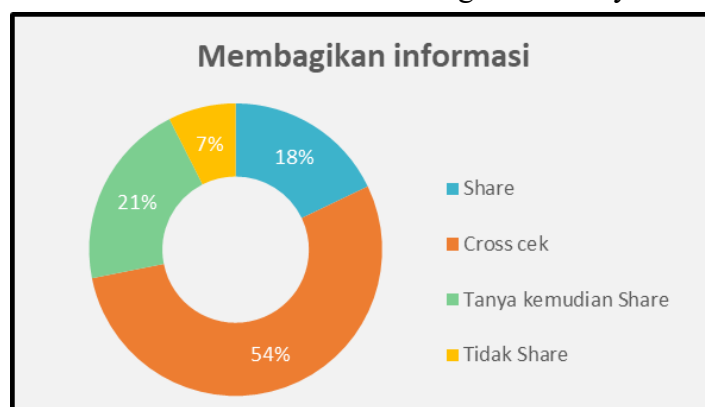


Figure 4. How Students Disseminate Information/Learning Materials

Figure 4. Providing information that cross-checks becomes a way for students to disseminate the most dominant teaching information/materials with a percentage gain that exceeds 50%. Tanya then shares the next indicator with a 21% percentage, followed by a shared

indicator of 18%. The indicator does not share the last indicator, with the lowest percentage gain of 7%. This information indicates that students are more careful in disseminating information/learning materials by looking at the truth source before disseminating.

Table 3. Before Disseminating Indormasi/Learning Materials

Facts	Category	Conclusion
Source checking Reference comparison with the source	Source credibility	Resource credibility is the main thing in finding and promoted information/materials for learning. This is done by checking and referencing comparisons.
Search validity Ask a lecturer/ friend who knows better	Indromasi validation	Validate the information obtained before sharing the information. This is done by asking and validating information to friends, lecturers, or

Table 3. Providing information that the source's credibility and validation of information becomes a significant thing to do before disseminating information/learning materials. Students do the credibility of the source by checking trusted sources and comparing references between sources. At the same time, validation of information is done by students by seeking validity and asking lecturers/friends who know more about the information/learning materials to be disseminated.

C. DISCUSSION

The learning style of each learner is different. However, the latest finding that different learning styles are complicated for educators to make in the same learning process (Kirschner, 2017; Sulistiyarini & Sukardi, 2016). This makes the learning style in each class different each time. However, today's acceleration of technological development influences the right learning style (Kirschner, 2017; Truong, 2016). Similarly, students who will be

prospective educators are also influenced by technology in their learning style.

The role of technology in the students learning style provides a new view in preparing the learning process and equip yourself to learn. The findings suggest that students are more comfortable using digital media that are easy to access, practice, and as important as their needs through the digital age. These findings align with other studies that should be threaded in learning to use digital media should be reviewed from practice, necessity, and accessibility (Ozdamar-Keskin et al., 2015; Sulistiyarini & Sukardi, 2016; Truong, 2016). These aspects become determinants in shaping the student's learning style in choosing the right digital media.

Then the source of learning becomes the thing that can affect the learning style. The findings suggest that the learning resources selected by today's students are determined by easy access, popularity, and good credibility. The research results reinforce this that digital learning resources are determined from easy to access (Henderson et al., 2017), famous and.

The implementation of learning in the digital age needs to be done well by

educators. The findings suggest that if reviewed from the motivation of learning in the digital age, digital media is very enthusiastic about being a positive value for learning. Like other studies, digital learning can provide positive motivation for learning effectiveness (Lin et al., 2017; Mamula, 2015). However, digital media also has negative things because challenging to focus on and easily bored (Akrim, 2018).

The findings on digital learning effectiveness are still challenging for used and complicated to put in place learning; overall digital learning is still challenging to use and complex to make if digital learning is inadequate. This is the same as lin et al. (2017) that digital learning devices will support learning effectiveness. The feed is labeled as such, so there needs to be more prepared in the dissipation of learning devices with digital media. Other findings suggest that learning resources are easy to obtain, and students are accustomed to evaluating the right learning resources with shorted first. Mahasiswa can already preselect the information that is disseminated.

The findings indicate that students as prospective educators are accustomed to learning in the digital age. This is

to analyze their learning process in the digital age. This is the basis that students, as prospective educators, are ready in the face of learning in the digital age.

D. CONCLUSION

The development of technology is high-speed and easy to influence human life, including education. Learning is currently directed at using digital media. Indeed, in addressing this, there needs to be readiness from educators in dealing with these challenges. This will be a challenge, especially for prospective educators, namely students who, in the future, are predicted to complete digital education. To grooming students in the face of it is by improving self-quality through *pedagogical techno*.

The results of this study show that students' current learning style has characterized that students are accustomed to using digital in learning. Students' ease in accessing and accustomed students in using digital media becomes a point more in learning in the digital age. This shows that today's students' learning style is dynamic and can be insanity with the needs of learning in the digital age. This learning style will be the principal capital for students in the face of

learning in the digital age.

The need of students in using digital media becomes an essential capital in equipping students who will be prospective educators to carry out learning in the digital age. Even more so, students can catalyze how they do when doing learners using digital media. The analysis was conducted by students, such as looking at the possibility of the effectiveness of learning using digital media. This is good for students as prospective educators in the future. Through the ability to analyze the effectiveness of defense with digital media, this becomes the primary capital in preparing students to become prospective educators in the face of learning in the digital age.

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