JOURNAL OF BIOLOGY EDUCATION
J O B E

Digital Literacy Level Analysis of Pre-service Biology Teacher Integrated Islamic Values

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ABSTRACT

The aims of this study was to describe the digital literacy level of pre-service biology teachers based application android that can be adopted into biology study and integrated islamic values. Researchers use a quantitative descriptive method with research samples of as many as 60 pre-service biology teachers selected by purposive sampling. The instrument used to encompass data as an online questionnaire contains 25 questions concerning islamic values and 60 questions to determine digital media literacy levels by pointing to indicators developed by the European commission directorate general information society and media; Media integration unit, divided into three categories: (1) use skills (2) critical understanding and (3) communicative abilities. The result shows that the digital literacy levels of pre-service biology teachers in other sacred areas are at a medium level with a percentage of 77.76% for use skills category, 75.71% for critical understanding and 75% for communicative abilities. The integration of islamic values in digital reinforcement is associated with technological progress primarily in admiring the omnipotent divinity of Allah SWT (85.7%) and also increasing faith and gratitude (87%) toward the advancement of digital technology that can be used in biology study.

Keywords: Digital Literacy Level, Islamic Values, Pre-service Biology Teachers, Android App

INTRODUCTION

The concept of literacy merely refers to one's ability to text write, read and apply, but currently developing the concept of literacy is broader into one of the categories of literacy, one of which is digital literacy (Jones, Rodney, Hafner, & Christoph, 2012; Wempen, 2015). Digital literacy is one's ability to understand and use information from various digital sources (Gilster, 1997). In this case it takes a critical capacity for thinking ability to analyze,

select and evaluate information found in a digital media (Muliyati, Bakri, & Ambarwulan, 2018).

It has been a lot of digital studies conducted by researchers from America and Europe over the years. This is known from studies which reveal that there are 843 articles discussing digital literacy studies with single literacy or the collaborations of some faiths (Mathar, 2014). This suggests that studies of digital precipitation are interesting to various experts/researchers, prompting researchers to develop studies on the subject in order to collect data and identify the capability of digital literacy from various communities. The wealth of research on the digital literacy of the americas and Europe is directly proportional to Asia. The percentage of studies on digital literacy in Asia is as low as 8% (Mathar, 2014). Including in Indonesia, research on digital literacy has not yet been done much (Silvana & Darmawan, 2018). Among other things, this find is the basis for researchers to review the topic for digital literacy, in particular a descriptive study that could describe the level of digital literacy of 21st-century pre-service biology teachers.

Digital literacy is one of the necessary qualifications for learning challenges in the 21st century. Among other things, it is useful to mask information from growing digital sources as a result of a phenomenon of media convergence. This media convergence is linked to merging media with information technology into a technology device that makes it easier for users to access information. In other words, the convergence of this media can be maximized as a integration of various media functions into a new media form that is viewed as more sophisticated (Lankshear & Knobel, 2008). The new media is a digital media based Internet. Its appearance triggers an explosion of information, as it can link information from different parts of the world so that it can be easily and rapidly accessible (Prasetyo & Trisyanti, 2018). The presence of the Internet also makes it easy to obtain information some of which relate to the adoption of contemporary learning innovation in primarily digitaly-based learning.

Internet users over the years have actually increased. The majority of user ages range from those of 18-25 to nearly lengthy Internet access (Novianto, Rozi, Burhani, & K, 2020). This suggests that Internet accessants are in the group of ages known as digital mediums, that is, generations born after 1980 along with the birth of digital social networking

technology (Subrahmanyam & Smahel, 2010). Related to the type of technology tools used, 85% of total Internet users use mobile phones, and with a digital category 60 percent native USES mobile phones to access the Internet, including the top dials (Tamburaka, 2013). Research reveals that students use the Internet as social media interacting/communicating through social networks and the need to find scientific information in the form of articles or research journals and other sources of information designed for academic performance (Novianto & Winarko, 2021).

Mobile phones include smart phones that enable students not only to access information via Internet but also to provide features of applications that students can use in a great variety of applications that can be used to promote learning during college that will be adopted when students become educators (Sugihartati, 2014). In this millennial era, an educator may have higher requirements for competence, research collaboration, national and international learning, and be able to create an innovative breakthrough that can enhance the quality of learning and the quality of learners. In order to enhance the quality of learning and morality, a digital and world-view educator is expected to be able to present a learning that utilizes various contemporary innovations in the learning process, enabling it to sustain and embrace millennial generations in Indonesia to be able to follow that development pattern and integrate it with religious aspects. Increased digital literacy can also promote a teacher's professional performance as an educator (Lismawati & Trihantoyo, 2022).

The contemporary, digital innovation in learning subjects is available in the form of an android app that can be downloaded for free through the playstore. The existence of an android app integrated in an average android's mobile phone can support a collect-learning process, being both practical and portable so as to minimize space and time restrictions, can be used anytime and anywhere during Internet access. Some android applications that can be used to support the biology learning process, including a multiple virtual meet applications that help synchronous learning or a diversity of learning management sytem platforms that help asnchronous learning. In addition to these are other helpful applications that can be used in biological studies such as virtual Labs, plant-identifier, augmented reality, virtual reality, and the variety of games-based applications in studies such as kahoot and quizziz.

The artificial application's digital study can be done if the academics involved have good digital literacy. Initial studies made through personal communication with 12 other pre-service biology teachers revealed that only 5 participants had used several such applications, 2 participants had never used, and 5 participants had not been familiar with most of the applications. It is caused by the lack of socialization, training, limited information, and lack of digital insight especially for first-rate students. Given the tremendous benefits and potential of such applications, it would be a shame if potential biological teachers could not make use of them in studies that would either be done in teaching practice or after becoming a teacher in an educational institution because of the lack of training (Laelasari, Sari, & Nuhaya, 2019). It is necessary that further study be done on the digital literacy level of pre-service biology teacher through the digital literacy program integrated islamic values.

METHOD

Researchers use a quantitative descriptive method to describe digital literacy levels of pre-service biology teachers and Islamic values integration through the android app digital strengthening literation program. The respondents in this study are 60 pre-service biology teachers that are chosen by purposive sampling. Purposive technique is the selection of research subjects based on consideration, criteria or characteristics that are determined according to the purpose of research (Moleong, 2012). The instrument in the study is an online-questionnaire containing 60 questions developed by referring to indicators that have been established by the European commission directorate general information society and media; media integration unit (2009).

Table 1. Category and Indicator of Digital Literacy

No	Category of Digital Literacy	Description	Indicators
1	Use skills	the ability to access and operate android applications based media that can be used in biology study	a. media skills b. balanced and active use of media c. advanced media use
2	Critical	the ability to analyze and evaluate	a. understanding of content

	understanding	media content in a comprehensive way		media and its functioning
			b.	knowledge about media and media regulation
			c.	user behavior
3	Communicative Abilities	communication and participation capabilities through the media	a.	establish social relations and participate in community
			b.	produce media content

Questionnaire was given online through the heart survey platform, and the data was quantitatively analyzed to determine the percentage of each category and the digital literation indicator. As for the further percentage results are categorized into digital advanced levels by referring to the criteria presented at Table 2.

Table 2. Digital Literacy Level Criteria

Level	**Descriptive Criteria**	**Range of Percentage**
Basic	Individuals have a set of abilities that allow basic media use. There was a limited media use. The user knows its basic function, using it for specific purposes and to determine tools. The user capacity to analyze critically the information received is limited.	*(≤ 69%)*
Medium	Individual communication abilities through media are also limited. The individual is fluent in the use of media, knows its function and is able to operate it, more complex. Extensive media use. The user knows how to obtain and assess the information needed, also evaluate information search strategies.	*(70-85%)*
Advanced	Individuals are particularly active in media use, aware of and are attracted to the laws that influence its use. The user has a deep knowledge of engineering and language and can analyze the conditions that affect his communicative relationship and message creation. In social circles, the user is able to activate a team that enables him to solve problems	*(≥ 86%)*

Researchers also use instruments related to the integration of Islamic values along with increased literacy reinforcement of 25 questions by referring to indicators: (1) understanding the signs of the method of learning in the Qur'an, (2) linking the Qur'an to the concept of science (biology), (3) analyzing clues of scientific fact that modern science has yet to achieve, (4) admiring the omnipresence of the creation of Allah SWT, and (5) increase faith and gratitude. Further data results from a percentage of Islamic values integration in biological learning through a digital literacy improvement program are

interpreted to the criteria presented at Table 3

Table 3 Form of Integration Islamic Values Category

No.	Percentage Range	Category
1	$85{,}00 \leq X \leq 100$	very high
2	$70{,}00 \leq X \leq 84{,}99$	high
3	$55{,}00 \leq X \leq 69{,}99$	medium
4	$40{,}00 \leq X \leq 54{,}99$	low
5	$0{,}00 \leq X \leq 39{,}99$	very low

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RESULT AND DISCUSSION

Data on digital literacy level of a pre-service biology teacher is particularly in the ability to use andorid digital applications that can be used in biology study is presented at Table 4.

Table 4 Digital Literacy Level of Pre-service Biology Teacher

No	Category	Percentage range	Level
1	Use skills	77,76%	Medium
2	Critical understanding	75,71%	Medium
3	Communicative abilities	75%	Medium
	mean	76,15%	

Based on table 4 it may be known that the digital literacy rate of pre-service biology teachers through the application of digital literacy strengthening already done is at a medium level with a percentage of 77.76% for use skills category, 75.71% for critical understanding and 75% for communicative abilities. This suggests that the implementation of the digital literacy program is viewed as enough potential to assist a potential biology teacher in strengthening the competence it has to do with the knowledge of the various android applications in biology study. As well as research indicates that the ability of those involved in use skills and critical understanding is medium level (Setyaningsih, Abdullah, Prihantoro, & Hustinawaty, 2019). The result also links with the findings of other studies that digital literacy skills for teachers and students can have a positive impact on improving understanding and skills in digital media use, particularly digital media in education (Asari, Kurniawan, Ansor, & Putra, 2019).

Nevertheless, it takes constant, consistent practice to increase one's digital literacy, especially for those of the younger generation, to be more critical and creatively (Silvana &

Darmawan, 2018). This agrees with research findings that state that digital understanding can create a society of structure with critical and creative views and pixies (Sutrisna, 2020). Apart from each category, the competence level of the candidates for biology teachers on artificial digital media can be viewed from every indicator in each category. As for the results presented at Table 5.

Table 5 Digital Literacy Level of Pre-service Biology Teachers for Each Indicators

No	Indicators	Percentage	Level
1	media skills	83,3%	Medium
2	balanced and active use of media	83,3%	Medium
3	advanced media use	66,7%	Basic
4	understanding media content and its functioning	70%	Medium
5	knowledge about media and media regulation	71,42%	Medium
6	user behavior	85,71	Advanced
7	establish social relations and participate in community	83,3%	Medium
8	produce media content	66,7%	Basic

Based on Table 5 it may be known that the media skills, balanced and active use of media, understanding media content and its functioning, knowledge about media and media regulation, and the ability to establish social connections and participate in community are at a medium level, advanced media use, produce media content are at the basic level, and user behavior are at the advanced category. This suggests that the digital literacy of a pre-service biology teacher is viewed as good primarily when it comes to media, understanding media function and regulation, building social relations and demonstrating prudent behavior in media disposal. Consistent with research results that reveal that the average literacy ability of pre-service biology teacher in the matter of access, selecting understanding and distributing information is in medium category (Novitasari & Fauziddin, 2022). Digital literacy skills of pre-service biology teacher can be implemented in everyday life, whether in a family environment, school, community, workplace or other environment (Sujana & Rachmatin, 2019). Digital literacy can also prevent a person from selecting incorrect information and help to select valid information (Isnawati, Zamhari, Yusuf, & Sujoko, 2020).

Another skill that has to be developed has to do with deepening media content and sharpening the skills of prospective biology teachers for skillful use of the media. This is

similar to a study which states that in the 21st century education must continue in accordance with the progress of the times (Trilling & Fadel, 2009). The 21st century skills needed in the business and industrial world are: (1) skills and learning to innovate; (2) life and career; And (3) technological and media skills (Wijaya, Sudjimat, & Nyoto, 2016). The end product of learning is expected to be an information-based learning application (Yazdi, 2012). It is based on the changing paradigm of education from a conventional to modern-day education.

Communicative abilities occur because the learning activities will always use and utilize the Internet. This goes hand in hand with studies that indicate that with computer - based and internet-based applications, the interdependence of the distance and time required for the implementation of education will be overcome because all that is needed will be available online and accessible at any time (Adawi, 2008). Through digital literacy, someone can also access information effectively and efficiently, critically assess information and make more useful use of that information (Sujana & Rachmatin, 2019). This is certainly true of studies that reveal that a person's digital literacy is a crucial factor in the high use of e-resources (Nurjanah, Rusmana, & Yanto, 2017).

In addition to revealing data on the digital literation level of a pre-service biology teacher, researchers have also developed a 25 questionnaire from revealing a strengthening of islamic values by referring to the five indicators of: (1) understanding the signs of the method of learning in the Qur'an, (2) linking the Qur'an to the concept of science (biology), (3) analyzing clues of scientific fact that modern science has yet to achieve, (4) admiring the omnipresence of the creation of Allah SWT, and (5) increase faith and gratitude. As for the result presented at Table 6.

Table 6. Form of Integration Islamic Values

No	Indicators	Percentage	Category
1	understanding the signs of the method of learning in the Qur'an	83,7%	high
2	linking the Qur'an to the concept of science (biology),	81,3%	high
3	analyzing clues of scientific fact that modern science has yet to achieve	84,3%	high
4	admiring the omnipresence of the creation of Allah SWT	85,7%	very high
5	increase faith and gratitude	87%	very high
	mean	84,4%	

Based on Table 6 it may be known that with the strengthening of digital literacy, pre-service biology teacher can live off the Islamic values in relation to technological progress and its implementation in biology teaching, especially in regard to the greatness of Allah SWT and the increased faith and gratitude for the digital technological advancements that can be used in the study of biology. In addition, pre-service biology teachers also show self-awareness of learning signs that have been listed in the Qur'an, developing a positive attitude and also linking Qur'an verses with known biological or digital concepts. Participants' understanding is associated with signs of the learning method in the Qur'an and attitudes that need to be developed, it deals with characteristics in reading literature's sources, upgrading knowledge regarding digital advances that can be used in biology study, applying (such as analogous methods) to enhance understanding in biology or other areas, To exercise patience and discipline in an effort to improve digital literacy. As for the strengthening of Islamic values by linking the Qur'an with the concept of science (biology) and the advance of digital technology, some of which relate to the participants' knowledge of many passages in the Qur'an that relate to the biology and digital technological progress, the quest to find and internalize the Qur'an and make it a source to exercise participants' thinking ability. As for with a form of increased Islamic values by analyzing the scientific fact in the Qur'an that is not yet attainable by modern science, some of which has to do with the belief that the Qur'an is the main source of knowledge in explaining scientific phenomena emerging, many new scientific phenomena are discovered in the Qur'an, belief that there is no dichotomy between science and the Qur'an, There is a scientific fact that has been unable to be explained by science and modern technology and makes the Qur'an a credible source of information that can be proved by science/biology or technological progress.

The form of reinforcement of the Islamic values of the admiration of the omnipotent creation of Allah SWT, which partly relates to the belief that any digital technological advance is one of the majesty of Allah SWT, the lack of pride of competence and knowledge, believes that the omnipotent creation of Allah SWT among them appears in his power to create a human brain capable of creating digital technological innovations, and belief that today's digital technological advances are based solely on the power and will of Allah SWT. As for a form of strengthening Islamic values by increasing faith and gratitude, many of which relate to participants' efforts to enhance digital literacy as a representation of the faith associated with

tholabul ilmi 'a lifetime of faith, belief that there is an divine intervention in any comprehension or new science that obtain, grateful to be born in a digital age that allows participants to access any information, To feel the vast array of digitalization and use it as a vehicle to increase gratitude for Allah SWT, as well as the inward promptings and motivations of participants to learn to create digital applications that can benefit education as an expression of gratitude to Allah SWT.

CONCLUSION

Digital literacy average of pre-service biology teachers is at a medium level with 77.76% for use skills category, 75.71% for critical understanding and 75% for communicative abilities category. The integration of Islamic value is done by understanding the methods of learning in the Qur'an and attitudes that need to be developed, connecting the Qur'an to the concepts of science (biology) and digital technology, analyzing scientific fact in the Qur'an that modern science has yet to achieve, admiring the omnipresence of the creation of Allah SWT and increase faith and gratitude with average of 84.4% of pre-service biology teachers it is viewed as being able to internalize these values.

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