

The Relationship Of Digital Literacy Ability With Students' Cognitive Learning Outcomes

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Abstract

The development of technology and information in the 21st century affects all components of life, which makes people make sudden transitions. Digital literacy is urgently needed in the world of education to equip students' abilities and skills in 21st century learning. The ability needed is a person's ability to use digital technology and information appropriately and responsibly. However, the rapid development of technology has a negative impact on its users. This study aims to determine whether there is a relationship between digital literacy skills and students' cognitive learning outcomes. This type of research is correlational quantitative. The population of this study was class XI MAN Temanggung with a total of 182 students. The sampling technique with simple random sampling was 72 students of class XI MIPA. Data collection techniques with questionnaires, tests, interviews and documentation. The results showed that there was no significant relationship between digital literacy skills and the cognitive learning outcomes of Temanggung MAN students in excretion system material with a significant value of $0.307 > 0.05$.

Keywords: student learning outcomes, digital literacy, 21st century learning

INTRODUCTION

Education plays a role in advancing and prospering life. Education makes humans have good morals and is helpful for the country. Education is a primary need because humans are born knowing nothing. Education is a place for someone to share their abilities and knowledge. Quality education increases human resources (HR), who are alert to the development of science and technology (IPTEK). The quality of education is determined by several things, especially literacy culture (Kharizmi, 2015). Prerequisites for 21st century skills such as literacy culture are crucial in education. 21st-century skills need to implement digital literacy in collaborating to solve problems and nationalism (Kalolo, 2019). Literacy must be owned by students so that their knowledge is valuable. Success in utilizing technology and information is literacy (Dewayani & Retnaningdyah, 2017).

21st century skills such as literacy culture are crucial in education. 21st-century skills need to implement digital literacy in collaborating to solve problems and nationalism (Kalolo, 2019). Literacy must be owned by students so that their knowledge is valuable. Success in utilizing technology and information is literacy (Dewayani & Retnaningdyah, 2017). 21st century students need to acquire basic literacy skills, one of which is digital literacy, in facing future challenges, according to the 2015 World Economic Forum agreement. Digitalization that is developing in education requires students to master digital literacy. The 2017 National Literacy Movement released by the government requires education to instill literacy values in developing students' abilities. The 2013 Curriculum Policy supports the implementation of Information Communication Technology (ICT)-based learning processes (Marzoan, 2014).

Results of the Program for International Student Assessment (PISA) 2018 Indonesia Indonesia is classified as low level, with a score of 397, where 70% is in reading, 71% in mathematics, and 60% in science. Indonesia's low PISA rate makes the government try to maximize technology and communication to support effective and efficient learning. Therefore, the government requires schools to make reading habits for students to develop literacy (Kemendikbud, 2019).

Biology is a compulsory subject for high school students interested in Mathematics and Natural Sciences (MIPA). Biological material can be presented and combined with 21st-century digital patterns (Jayawardana, 2017). Biological material contains complex discussions, such as the excretory system. Excretory system material involves abstract physiological processes such as filtration, re-absorption, and augmentation processes which include relatively many sub-chapters and are too complex, according to students (Aprilianti, 2013). Learning strategies in digital format help students' interests in facilitating students' memories (Afandi, 2016).

Digital literacy is critical to master because students are already involved in technology and digital media, and not all students are equipped with the knowledge, skills, and understanding of using technology and digital media (Hague & Payton, 2010). Digital literacy is a skill, knowledge, and understanding that enables critical, creative, intelligent, and safe practice when using digital technology in all areas of life (Hague & Payton, 2010). Digital literacy is exploring, observing, uniting, and disseminating issues (Mustofa & Budiwati, 2019). Four core competencies in digital literacy, namely Internet Searching, hypertextual navigation.

Students must understand digital literacy because it can encourage self-improvement in the use of technology and can sort the information obtained to benefit the general public (Hague & Payton, 2010). Components of digital literacy are mandatory when consuming digital media, consisting of four components: basic literacy, info knowledge, ICT skills, and attitudes and perspectives of information users (Irhandayaningsih, 2020).

The learning process and learning outcomes are inseparable units. Learning outcomes have a crucial role in the learning process and become a benchmark for how far students understand a competency as measured by knowledge, behavior, and skills. Learning outcomes include cognitive, affective, and psychomotor domains (Rusman, 2015). Learning outcomes are the results of the learning process embedded in behavior changes. Changes include cognitive, affective, and psychomotor domains (Husamah et al., 2018). The cognitive aspect comprises six aspects: knowledge, understanding, software, analysis, production, and evaluation (Nana Sudjana, 2009). The cognitive domain emphasizes intellectual aspects, such as knowledge and thinking skills, including Low Order Thinking Skills (LOTS), such as remembering (C1), knowing (C2), and applying (C3). Higher Order Thinking Skills (HOTS), namely the ability to analyze (C4), evaluate (C5), and create (C6) (Anderson & Krathwohl, 2002).

In her research by Bella Elpira (2018), the application of digital literacy in education can significantly affect the quality of learning. This is also in line with Rahayu's research (2021), which provides a correlation between digital literacy and student achievement. Supported by Giovanni's research (2019) that digital skills will have an effect, and there is a significant correlation between digital literacy and student learning achievement. However, Billy Antoro's research, et al. (2021), shows no effect of literacy activities on student learning achievement.

MAN Temanggung implements ICT-based learning and the national literacy movement, supported by relatively complete school facilities. The results of the initial observation, which was carried out on April 15, 2022, through documentation and interviews in class XI for the 2021/2022 academic

year, it was found that the learning outcomes of students in the Final Semester 1 Examination were not optimal. Of the total number of 182 students, only 1% (3 students) were in an outstanding category, 58% (105 students) were in a suitable category, and 41% (74 students) were in a suitable category. This study focused on the relationship between digital literacy skills and cognitive learning outcomes of Temanggung MAN students on excretion system material. According to previous studies, no research examines the relationship between digital literacy skills and cognitive learning outcomes of students in Biology class XI MIPA semester 2 KD 3.9. Based on this description, it is necessary to conduct research titled "Correlation of Digital Literacy Capabilities with Cognitive Learning Outcomes of Students at MAN Temanggung on Excretion System Material". This study aims to determine the relationship between digital literacy skills and the cognitive learning outcomes of Temanggung MAN students in the excretion system material.

RESEARCH METHODS

The method used in this research is quantitative correlation which examines the relationship between digital literacy skills and students' cognitive learning outcomes. The population of this study was all students of class XIMIPA MAN Temanggung, many as 182 students, and the sampling used the Slovin formula.

$$n = \frac{N}{1 + N(e)^2}$$

$$n = \frac{182}{1 + 182(10)^2}$$

$$n = \frac{182}{1 + 182(0,01)^2}$$

$$n = \frac{182}{1 + 1,82}$$

$$n = \frac{182}{2,82}$$

$$n = 64$$

The minimum size of research respondents is 64; in this study, 72 were taken. Data collection techniques included digital literacy questionnaires, cognitive learning outcomes test questions, interviews, and documentation. The digital literacy questionnaire consists of 20 questions guided by the Likert model attitude scale. The cognitive learning outcomes instrument consists of 20 questions. The questions consist of semester two material for class XI KD 3.9.

The first research stage is to test the validity of the digital literacy instrument. Cognitive learning outcomes instrument was tested. The next research phase was data collection which was carried out in May 2022. Data analysis used the help of the SPSS 16 for windows program, Microsoft Excel, and the Anates A4 application. Prior to testing the hypothesis, prerequisite tests were carried out in the form of normality and linearity tests. Hypothesis testing uses multiple correlation analysis with the provision that if $n < 0.05$ then H_0 is rejected and H_a is accepted. If the value of $n < 0.05$ then H_a is rejected and H_0 is accepted.

RESULTS AND DISCUSSION

The prerequisite test is carried out before testing the hypothesis: the normality test, linearity test, and product-moment correlation test. The normality prerequisite test shows that the data is normally distributed, with a significant value of the data carried out ($0.235 > 0.154$). The linearity prerequisite test shows a significance value of $0.777 > 0.05$, and it is known that the two variables have a linear relationship. The moment product correlation test shows that digital literacy and students' cognitive learning outcomes are not correlated because the significance results are $0.307 > 0.05$.

Table 1. Hypothesis Test Results

		Digital Literacy	Learning Outcomes
Digital Literacy	Correlation Coefficient	1	0,122
	Sig. (2-tailed)	0,307	
	N	72	72
Learning Outcomes	Correlation Coefficient	0,122	1
	Sig. (2-tailed)	0,307	
	N	72	72

Testing the data hypothesis with the SPSS 24 application obtained $t_{count} = 0.122$ and $t_{table} = 0.235$, because $t_{count} < t_{table}$, meaning that H_a is rejected and H_o is accepted that there is no significant relationship between digital literacy abilities and students' cognitive learning outcomes.

In general, digital skills have a good impact on learning outcomes, but not all cases produce the same analogy (Zhafira et al., 2021). Nationalism, critical thinking, and creativity are indispensable for students in the 21st century in using digital media (Kalolo, 2019). Communities in developed countries utilizing digital literacy capabilities are more innovative than those in developing countries, such as Indonesia (Cunningham, 2019). The fact is that many young people in Indonesia only exist on social media and only seek validation from others (Nasrulloh, 2016). Developing countries need better structural and technical skills to maximize existing technology and information (Delponte et al., 2015).

In a book entitled "The Meaning of the 21st Century a vital Blueprint for Ensuring our Future", James Martin believes that all aspects of the world are undergoing sudden and revolutionary changes (GV Pavlenko, 2020). Education is one of the areas affected and has a noticeable effect on the world of education which can bring revolutionary changes to the learning process, for example, e-libraries, e-learning, electronic journals, and e-books (Kurniawati, 2016). The emergence of new ideas in the all-digital world of education can help the learning process (Wulan et al., 2015). Despite having a good impact, digital media raises various problems. Winner revealed that three paradoxes result in disrupted learning, namely:

1. *The Paradox of Intelligence* is that humans become lazier.
2. *Paradox of Lifespace*, namely freedom of expression without ethical restrictions.
3. *Paradox of Technology and Democracy*, namely the spread of unhealthy information (Fajrin, 2015).

According to the paradox above, digital literacy skills are needed so that they can be helpful, especially in education. In addition, at MAN Temanggung, learning biology only uses modules and whiteboards, where biology is very suitable to be combined with digital media needed in this century (Jayawardana, 2017). This is also supported by Afandi's research (2016) that learning strategies, models, methods, and media are suitable for digital packaging, increasing student interest and facilitating student understanding. In addition, consistently implementing digital literacy supports 21st-century learning to provide 21st century skills.

The Temanggung MAN frees all teachers to teach according to their creativity. According to researchers, high digital literacy does not guarantee the success of student learning outcomes because students' digital literacy style is not in education but just general knowledge. Student literacy which is less than optimal, results in no relationship between literacy and student learning outcomes (Antoro et al., 2021). If students take advantage of digital platforms to facilitate learning and as a source of reference, 21st-century learning will work adequately and positively affect student learning outcomes (Burnett, 2009). Limited research on digital literacy in Indonesia makes it difficult for researchers. An imbalance between digital media and education in learning still occurs (Reddy et al., 2020). Monitoring is needed for students, specifically in utilizing digital platforms, so that they can be used appropriately and responsibly (Voogt et al., 2013).

CONCLUSION

The relationship between students' digital literacy skills and cognitive learning outcomes of students at MAN Temanggung is not correlated with a significance value of $0.307 > 0.05$. This is because of "The Revolutionary Suddenness," that all aspects of the world are undergoing sudden and revolutionary changes. Education is one of the areas affected and clearly affects the world of education in the learning process.

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