The Relationship between Digital Literacy and Science Literacy with Understanding the Science Concept of Students

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ABSTRACT

Digital literacy and science literacy are literacy competencies that need to be mastered by students in today's developing era. The purpose of this study is to determine the relationship between digital literacy and science literacy on understanding science concepts with a sample of 36 grade 7 students at SMPN 3 Depok. The results of the study obtained a significant relationship between digital literacy and concept understanding with a fairly strong contribution of 13.72%. Thus, the relationship between science literacy and concept understanding also got significant results, even the contribution of strong relationships with a percentage of 53.29%. The results of the relationship between these variables also concluded that between the independent variables of digital literacy and scientific literacy, the relationship between science literacy has a stronger relationship than digital literacy. .

Keywords: digitic literacy, science literacy, concept understanding

INTRODUCTION

The digital era is developing significantly along with the development of digital science and technology. Science is a systematic attempt to create, construct, and organize knowledge to understand the universe [1]. Digital technology is technology that uses a computerized system connected to the internet[2]. According to Pratiwi and Aminah (2019), the rapid development of science and technology in the 21st century aims to prepare human resources who have creative, critical, collaborative, and communicative skills[3]. However, the challenge for Indonesia in a number of Human Development Index (HDI) data is that it is not encouraging, especially when compared to the ranking of a number of countries in the Southeast Asian region such as Singapore, Malaysia, Thailand, and Vietnam[4]. Facts based on the results of PISA 2015, Indonesia obtained a score of 403 from the average science score of OECD countries is 493[1]. The low acquisition of these results makes it important to strengthen basic skills literacy. The

World Economic Forum in 2015 affirmed that mastery of six basic literacy, namely literacy, numeracy, scientific literacy, digital literacy, financial literacy, and civic cultural literacy is one of the 21st century competencies needed by all world citizens, especially students[4]. Therefore, the six basic literacy implementations in Indonesia consist of digital literacy and scientific literacy.

The survey results of the Indonesian Internet Network Providers Association (APJJI) in 2016 as many as 132.7 million Indonesians out of a total of 256.2 million Indonesians have been connected to the internet. Then, further data from the 2020 national digital literacy index survey in 34 provinces in Indonesia, access to the internet was found to be faster, affordable, and spread to remote areas (Ministry of Communication and Information, 2020). The survey also revealed that the digital literacy of Indonesian people is still at a moderate level (Katadata Insight Center &; Ministry of Communication and Information Technology, 2020)[5]. This shows the widespread use of

digital devices, but not accompanied by efforts to strengthen digital literacy assistance properly[4]. Users who have good digital literacy skills are not only able to operate the tool, but also able to use digital media responsibly[5].

Digital literacy is the ability that a person has in utilizing information and communication technology to find, evaluate, create, communicate information that requires cognitive skills [6]. Mastery of digital literacy skills is very important for students because digital literacy can encourage confidence and competence in the use of technology and develop knowledge by creating curiosity, creativity, and critical thinking so that it is possible to use technology intelligently from the large number of digital resources available[3] . The benefits of digital literacy skills are, easy to get information, easy to communicate, stimulate creativity from the information received, facilitate the learning process[2]. Hague and Payton (2010) revealed the components of digital literacy include: functional skills and beyond, creativity, collaboration, communication, the ability to find and selection information, critical thinking and evaluation, cultural and social understanding, e-safety [3].

In addition to mastering digital literacy skills, science literacy also has special attention because it sees the results of science literacy in Indonesia which has not experienced a significant increase. Science literacy is scientific knowledge and skills to be able to identify questions, obtain new knowledge, explain scientific phenomena, and draw conclusions based on facts, understand the characteristics of science, awareness of how science and technology shape the natural, intellectual, and cultural environment, and willingness to engage and care about science-related issues (OECD, 2016) [1] . The science literacy according to the OECD (2019) consists of three competencies including explaining phenomena with science, designing and evaluating scientific questions, and interpreting data scientifically[7].

Mastery of science and technology faces challenges in the coming life in various sectors[8]. According to Poedjiadi, that someone who has science and technology literacy is characterized by having the ability to solve problems using science concepts obtained

in education according to their level, getting to know the technology products around them and their impacts, being able to use technological products and maintaining them, being creative in making simplified technological results so that students are able to make decisions based on values and culture society[9]. Therefore, digital literacy and scientific literacy are both very important literacy competencies for students to have, through literacy can increase students' understanding of concepts.

Mastery of digital literacy and scientific literacy can improve student learning outcomes[3]. This was examined by Andi M Yusuf, et al (2022) that there is a significant relationship between digital literacy and science literacy on learning outcomes[3]. In addition, Sepriyanto (2020) also revealed that in his research it was concluded that there is a significant relationship between understanding basic concepts of chemistry and scientific literacy skills. So the higher the understanding of basic concepts of chemistry students, the higher their scientific literacy ability [7]. Thus, the results of Husnul and Yusran's (2021) research on the use of digital literacy media affect students' understanding of concepts and science literacy[10]. Based on this description, a survey of the relationship between digital literacy and science literacy was conducted on the understanding of science concepts of students at SMP Negeri 3 Depok.

RESEARCH METHODS

The method used in this study is a survey method with a correlational quantitative type of research, namely examining the relationship between digital literacy and science literacy to the understanding of science concepts. The population of this study was grade 7 students of SMP Negeri 3 Depok. The sample of this study was obtained from one class of 36 students. Random sampling technique. The variables of this study consist of dependent variables, namely understanding the concept (Y) and independent variables of digital literacy (X1) and science literacy (X2). The instruments used in this study consisted of digital literacy questionnaires, science literacy questionnaires, and tests of understanding science concepts on the structure of the earth layer.

The data collection phase was carried out in March 2022. Data analysis using the help of the SPSS 22 for windows program, before the hypothesis test was carried out, prerequisite tests were carried out in the form of normality and linearity tests. Test the hypothesis using multiple correlation analysis provided that if n < 0.05 then Ho is rejected and Ha is accepted. If the value of n > 0.05 then Ha is rejected and Ho is accepted.

RESULTS AND DISCUSSION

Before conducting a correlation test of science literacy and digital literacy to understanding concepts, prerequisite tests were carried out, especially in the form of normality and linearity tests on parametic tests. Test normality using KolmogorovSmirnov test on SPSS program. The following in table 1 obtained normality test data.

Table 1. Normality Test Results

	Concept Understanding	Science Literacy	Digital Literacy
P-Value/Sig.	0.057	0.200	0.038
Conclusion	Tidak normal	Normal	Tidak normal

Based on table 1, the significance of the concept understanding data is $0.057 < 0.05$ so that the concept understanding data is not normally distributed, the science literacy data significance is $0.200 > 0.05$, the data shows that it is normally distributed, then for digital literacy it is obtained $0.038 < 0.05$ so that it means that digital literacy data is also not normally distributed.

The results of the science literacy linearity test on concept understanding and digital literacy on concept understanding were obtained as follows.

Table 2. Linearity Test Results

	Science literacy with concept understanding	Digital literacy with concept understanding
P-Value/Sig.	0.129	0.113
Conclusion	Linear	Linear

Based on the analysis of data obtained from table 2, each independent variable against the dependent variable obtained scientific literacy towards understanding the concept of $0.129 > 0.05$ so that the relationship between science literacy and understanding of the concept is linear. Then digital literacy on understanding the concept obtained $0.113 > 0.05$ also interprets that the relationship of digital literacy to the concept is linear.

However, because the data normality requirements in the parametric statistical test are not met, the researcher cannot continue the data analysis using the Product Moment correlation parametric statistical analysis test [11]. So that correlation analysis is analyzed using the Spearman Rank correlation test on the SPSS program to show the relationship between variables[7]. The following table data of spearman rank correlation test results are obtained as follows

Table 3. Spearman Rank Correlation Test Results.

Digital Literacy with Concept Understanding	P-Value/Sig.	0,026
	Correlation Coefficient	0,371
Science Literacy with Concept Understanding	P-Value/Sig.	0,000
	Correlation Coefficient	0,730

From table 3 it is obtained that the results of each correlation test between independent variables to bound variables are obtained. The relationship between digital literacy and concept understanding is obtained by SIG results. $0.026 < 0.05$ so that a significant correlation is interpreted, then for the correlation coefficient $r = 0.371$ it is interpreted that the contribution has a fairly strong relationship between digital literacy variables and concept understanding with a percentage of 13.72%. The relationship of science literacy to

understanding concepts is obtained sig. 0.000 < 0.005 so it is anticipated that there is also a significant relationship between science literacy and understanding of concepts. Thus the magnitude of the correlation coefficient obtained r = 0.730 is interpreted that the contribution of the relationship is strong with a percentage of 53.29%. The results of the two relationships between these variables also concluded that between digital literacy and scientific literacy, the relationship between science literacy has a stronger relationship than digital literacy.

Based on the data analysis that has been carried out, the results of this study mean that someone who has high digital literacy and scientific literacy skills, then someone also has a high mastery of concepts as well. Vice versa, someone who has low digital literacy and science literacy skills will have low mastery of concepts as well. The results of this study also support previous research Yusuf, M Aridi, et al (2022) the application of digital literacy and scientific literacy can improve students' cognitive learning outcomes[3]. Through digital literacy, students obtain various information that can help them to solve problems with digital content accurately, precisely, and efficiently[12]. Then with scientific literacy and scientific approaches in the form of observing, understanding, applying, analyzing, and evaluating so as to make students also have an increased ability to master understanding learning concepts.

CONCLUSION

The results of this study concluded that the relationship between digital literacy and concept understanding and the relationship between science literacy and concept understanding both have a significant relationship. However, the contribution of concept understanding to science literacy is stronger at 53.29% compared to digital literacy which only has a contribution of 13.72%. So that students who have mastery of digital literacy and high science literacy will be able to

understand higher learning concepts and vice versa.

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