THE RELATIONSHIP OF DIGITAL LITERACY TO STUDENTS' COGNITIVE ABILITY IN ECOLOGY COURSE

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ARTICLE INFO:

ABSTRACT

This correlation study aims to determine the relationship between digital literacy and students' cognitive abilities in ecology courses. The subjects of this study were students at the State University of Medan 2018 class of Biology Education who took ecology courses in the 2020/2021 academic year. There were 152 students, and samples were taken using the purposive sampling technique of 61 students. The data were processed with descriptive qualitative research, and the data collection techniques used in this research were a questionnaire. The results showed a relationship between digital literacy and students' cognitive abilities in ecology courses with r = 0.791, and digital literacy contributed (62.6%) to students' cognitive abilities in ecology courses. In conclusion, someone with good literacy will also have good cognitive abilities. The growth of technology for education will continue to develop increasingly over time so that digital literacy in the educational environment is beneficial for students in covering broader and deeper information and will help students to complete their assignments and find accurate information.

INTRODUCTION

The ecology course is compulsory in the Biology Education study program at the State University of Medan, which applies online lectures. Ecology combines various types of science whose materials or materials come from other disciplines such as geography, geology, climatology, mathematics, chemical physics, ethnology, limnology, evolution, microbiology, and other branches of biology (Manurung, 2019). Based on the observations, online learning is challenging for biology students, especially in ecology courses, because the material used is quite complex, and the learning requires field activities. Furthermore, a presumed digital-based learning strategy will reduce meaningful learning experiences (Brata et al., 2021).

Research by Hariyanti et al. (2020) states that learning biology requires practice related to the material being studied. Unclear instructions, limited tools, and practicum at home resulted in a high barrier category of 31.7% among the sub-indicators. Students use search engines such as Google to find information to overcome these obstacles. Publishing electronic sources are the leading choice because it can provide quick and easy access while at the same time being produced in more quantity than the printed form. Electronic publishing also presents various forms of information ranging from text, images, tables, graphs, and others (Ulpah, 2014).

Communication and information technology skills are the core competencies in digital literacy (Bhatt, 2012). A person must be able to have the ability to master digital technology devices with the hope that the individual already has digital literacy skills. According to Gilster (1997), digital literacy comprises four core competencies: searching the internet, hypertext directions, evaluating information content, and compiling knowledge.

Digital literacy plays a vital role in accessing various quality learning resources. Digital literacy is a fundamental key and foundation in the field of education in the future (Sai, 2017). Someone who has digital literacy will be able to help the learning process and get good learning outcomes. According to Santoso (2019), students with digital literacy have more information sources and better learning outcomes.

Digital literacy plays a role in accessing quality learning resources. Determine student learning outcomes can be seen from cognitive abilities. According to Herdita (2017), Cognitive ability is an ability that can improve students' abilities. It depends on what is learned and the factors influencing the learning process. Because the factors that affect learning outcomes are never the same, cognitive abilities can also differ. Cognitive ability is one of the processes in determining student learning outcomes which is carried out by assessing cognitive abilities (Dimyati, 2013)

Based on the description above, the researcher feels the need to research because it is not yet known the relationship between digital literacy students of the Biology Education Study Program on cognitive abilities in ecology courses.

RESEARCH METHOD

This research was conducted from November 2020 to March 2021 at the Department of Biology, Faculty of Mathematics and Natural Sciences, State University of Medan. The population of this study was students of the 2018 Biology Education Study Program who took the Ecology course in the 2020/2021 academic year, which consisted of five classes with a total of 152 students. Samples were taken by purposive sampling of as many as 61 students. This correlation research uses a data collection instrument in the form of a questionnaire—data analysis in the form of a correlation test. The data is processed by quantitative description.

RESULTS AND DISCUSSION

Based on the research results, the average digital literacy score of Unimed Biology Education Study Program students is 90.6, which means that Unimed Biology Education Study Program students have good abilities in searching for information on the internet, using hypertext direction guides, evaluating information content, and compiling knowledge of information on the internet. As explained by Glister (1997), there are four core competencies that must be possessed by someone who is digitally literate. Competence in internet search, hypertext direction guide, evaluation of information content, and knowledge compilation. In more detail, the four digital literacy competencies of Unimed Biology Education students can be seen in Figure 1.
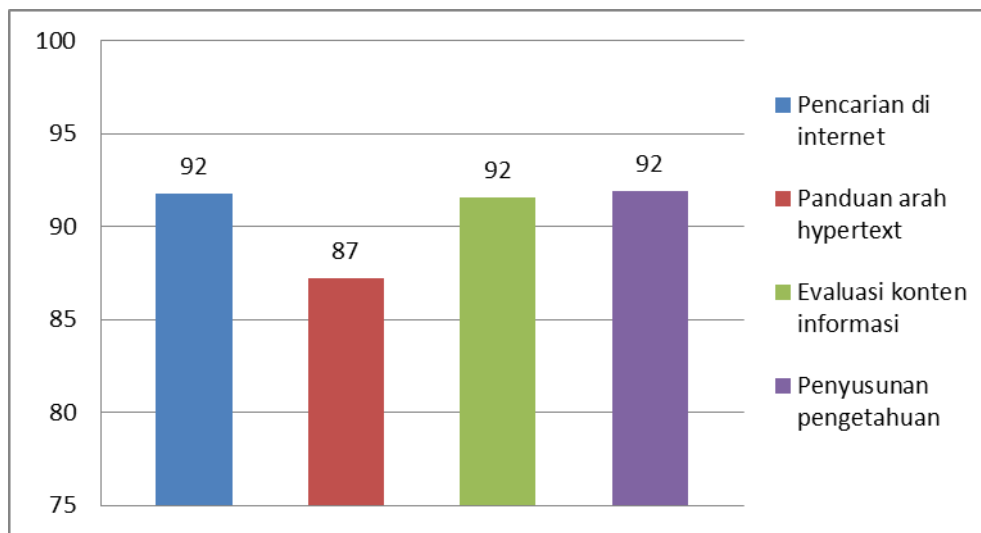
Figure 1. Graphics of Student Digital Literacy Competence in Ecology Course

Based on the analysis results of a search competency questionnaire on the internet. Students can find various information related to ecology course materials using digital technology, search e-journals and e-books using search engines in completing ecology lecture assignments, and use Youtube for streaming. The internet has become a primary need among students to support course activities and assignments. It makes students accustomed to finding information and carrying out various technology activities. In line with Anggono's research (2016), students most often look for information using the internet because it is a potential source that suits their needs.

Based on the analysis of the hypertext direction guide questionnaire, students can distinguish the types and characteristics of the web, such as differences in the appearance of blogs and content, the function of directions links, and know-how http, HTML, and URL work. Unimed Biology Education Study Program students are low on using the boolean technique. The boolean technique is a technique that can make it easier for students to search for information, such as by adding the word "and, or, not." The low use of the boolean technique is due to the lack of student understanding of the boolean technique in searching for information on the internet. Hypertext directions will always be related to searching the internet to explore unstructured links simultaneously in the information search process using digital sources (Herdita, 2017).

Based on the analysis of the information content evaluation questionnaire, students first evaluate the information obtained from digital media by using trusted sources such as journals as a reference in assignments. Students also analyze

the web they visit. Evaluating the source of information obtained will be more valid. In line with Anggono's research (2016), someone who chooses information requires a careful attitude, especially on digital information sources. Students analyze the information obtained by reading all articles on the internet and comparing them with textbooks.

Based on the analysis of the knowledge compilation questionnaire. Students can collect and search for information on the internet which will be assembled into knowledge from various sources obtained. Before compiling it into knowledge, students do cross-checks by comparing one journal to another and conducting group discussions. In compiling knowledge, students make it into the form of power points presented in teaching and learning activities. From the explanation above, it can be said that the Unimed Biology Education Study Program students have good abilities in compiling knowledge. As explained by Kharisma (2017), a person has the competence to compose knowledge if he can assemble or build knowledge into a collection of information from various sources. Not only is this required to compile new knowledge, but this competency also demands the ability to think critically about the information obtained. In order to gain new knowledge, information is searched from various sources, which will then be cross-checked. According to Nurrizqi (2020), knowledge compilation competence includes students' ability to analyze background information, cross-check information, and compile the information obtained.

Having the ability to construct new information from various sources can help students better understand ecological material.

Murdy (2020) explained that the knowledge obtained and used by students for educational purposes can later improve the quality of education.

The success of the ecology lecture refers to the achievement of nine indicators in the course. The results of the percentage indicators have reached the limit of completeness, which means that students have been able to understand the ecological lecture material based on learning achievement indicators in the ecology course. The cognitive abilities of students in ecology courses can be carried out well. It is proven by the percentage of each indicator and the final score obtained by students. Students can understand, explain, identify, analyze, perform algorithms on a question or data, apply concepts, and make reasonable hypotheses. In line with Lusiana (2018), subjects with high cognitive abilities can meet all the criteria for understanding bloom taxonomy indicators in the cognitive domain.

Based on the analysis results, the value of rxy = 0.791, there is a strong correlation between students' digital literacy and cognitive abilities in ecology courses. Unimed Biology Education students with good digital literacy will also have good cognitive abilities. Learning that utilizes technology will increasingly develop so that digital literacy in the educational environment is beneficial for students in covering broader and deeper information. It helps students complete assignments and finds accurate information. According to research conducted by Muna (2020), the application of digital literacy during the Covid-19 pandemic has a positive effect on learning achievement. Factors that cause digital literacy positively affect learning outcomes because students make good use of online learning media. In addition, students also have a desire to advance for their good. The influence of digital literacy on learning achievement is 19.4%. Another research reported that students interested in digital technology had a significantly higher digital literacy score than students who had less interest in digital technology (Brata et al., 2022).

Students who have high learning outcomes and the ability to use the internet well, understand hypertext directions, understand the characteristics of the web being searched, think critically and provide an assessment of the information found on the internet, and identify the completeness of the information obtained, all of which can help the learning process to get optimal learning outcomes (Samputri, 2019).

CONCLUSION

There is a strong correlation between digital literacy and students' cognitive abilities in ecology courses, with 62.6%. Learning that utilizes technology will increasingly develop so that digital literacy in the educational environment is beneficial for students in covering broader and deeper information. It helps students complete assignments and finds accurate information.

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