



A Preliminary Study of University Students' Digital Literacy in Protist Course: A Survey Research

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Abstract. Protist course requires students' digital literacy skills to find various Protist problems in various information media. Digital literacy is defined as the ability of an individual to understand and apply information to various electronic media. This study aims to examine the digital literacy of students in the Protist course. A survey was conducted on 136 students who had attended the Protista course at Universitas Negeri Malang. Data were collected using a questionnaire with 29 statements consisting of technical, cognitive, and social-emotional dimensions. The data were analyzed by descriptive analysis. The results of the analysis showed that students obtained a percentage of 66.15% in the technical dimension (high), 46.14% in the cognitive dimension (medium), and 58.79% in the social-emotional dimension (medium). The average overall percentage was 57.03% in the medium category. This finding shows that students already have quite good digital literacy skills, especially related to the use of information technology. The empowerment of students' digital literacy still needs to be improved with innovative digital-based learning strategies.

Keywords: Digital Literacy, Protist Course, University Students'.

1 Introduction

Protist course has its characteristics, so it is important to develop 21st-century skills in Protist learning [1]. The characteristics of Protist materials are that the material is abstract, microscopic or cannot be observed directly, and Protist organisms cannot be identified by students in everyday life [2]. Protists are closely related to human life. Various plant-like protists (algae) are ingredients of toothpaste, pudding, and ice cream [3]. Other algae are also used to make fertilizer [4]. Information about human relations with Protist is very much available in various information media, so it requires digital literacy empowerment [5].

Digital literacy is an important competency to be developed by students in developing the digital world [6]. Digital literacy is important for students in dealing with every information and interaction in cyberspace so that students can evaluate the obtained information [7]. Digital literacy skills require students not only to know how to use technology but also to know the norms for using technology [8]. Students with good digital literacy skills can analyze information and integrate it with new gained knowledge in learning [7]–[9]. Digital literacy in the Protista course is useful when

students analyze information related to Protista on the internet [5]. Protist phenomena often appears on various online platforms, such as diseases caused by Protists [10], Protist environment [11], and the use of Protists as a food ingredient or supplement [12].

The Digital Skills Gap Index identifies very low levels of digital literacy among students in several countries in the world, such as Haiti with a percentage of 12%, Yemen at 21%, Nepal at 24%, Madagascar at 24%, and Tanzania at 33% [13]. Meanwhile, Indonesia has a percentage of digital literacy rate of 52% in the low category. The survey of digital literacy status of students in Indonesia amounted to 70% in the medium category [14].

Students use fewer digital devices during the learning process, so students cannot access and process the obtained information [15]. The use of digital devices to create innovative learning in the classroom still needs to be improved [16]. Students need to understand that using digital devices in the classroom not only knows the technical management of these digital devices but also supports students' cognitive processes in the learning process [17]. Digital literacy also positively correlates with student achievement in the classroom [18]. The purpose of this study is to explain students' digital literacy in Protist course.

2 Method

This study was designed as a survey to describe students' digital literacy in Protist learning. The respondents in this study were 136 biology education students who attended the first-year Protista course at Universitas Negeri Malang, Indonesia. The instrument used in this study was a digital literacy questionnaire [19] given after the Protist course.

The instrument used is valid ($r = 0.200-0.523$) and reliable ($\alpha = 0.799$) based on the results of instrument trials in the field. The results of filling out the questionnaire were analyzed by descriptive analysis by finding the average percentage of each indicator and the average of all indicators of digital literacy. Interpretation of students' digital literacy results based on digital literacy criteria [20] is presented in Table 1.

Table 1. Student digital literacy level criteria.

Percentage (%)	Category (%)
<20	Very Low
20 - <40	Low
40 - <60	Medium
60 - <80	High
80 - 100	Very High

Source: [20]

3 Result and Discussion

The results of the student digital literacy survey in the Protista course at the State University of Malang are presented based on three dimensions, namely technical, cognitive, and social-emotional. A student's digital literacy profile is marked by a percentage score obtained after completing a questionnaire. The digital literacy profile of students is described in Figure 1.

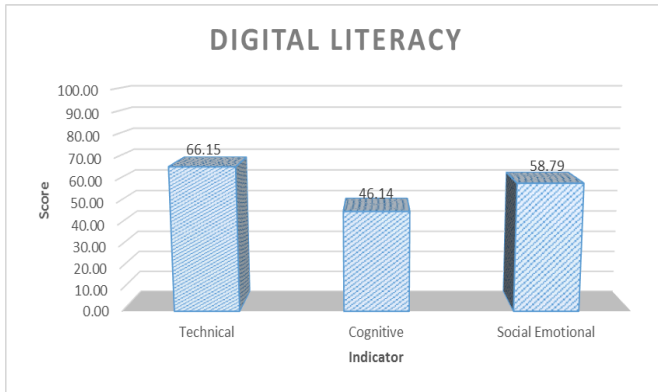


Fig. 1. Diagram of student digital literacy level on each indicator.

The results showed that in the technical dimension, students had an average percentage of 66.15% in the high category. Students can operate technological devices such as gadgets and laptops to search for literature on the Internet. The technical dimension of digital literacy broadly means having technical and operational skills in using ICT for learning and daily activities. Students can use digital devices to find information related to Protist organisms. Information related to Algal bloom [21], red tide [22], or cases related to diseases caused by Protists [23] which are so many on the internet media to study. Students must be able to use input devices and peripherals such as earphones/headsets, external speakers, and smart boards [24]. Knowledge of digital device processing and digital resources is very important for students to have.

The results showed that in the cognitive dimension, students had an average percentage of 46.14% in the medium category. Students need to maximize in analyzing the information obtained on the Internet. Information on the Internet related to Protist is expected to be used to analyze problems and appropriate solutions to solve problems about Protist. Problems about Protists, especially those related to polluted environments [25], are very many and have the potential to be solved by students. Cognitive dimensions of digital literacy models [19] are associated with critical thinking skills in searching, evaluating, and creating cycles of handling digital information. This dimension of digital literacy requires individuals to know ethical, moral, and legal issues related to online commerce and the reproduction of content using digital-based resources (e.g., copyright and plagiarism). Students must have an understanding of multiliteracy and be able to decode text-based information as well as information from images [26].

The results showed that in the social-emotional dimension, students had an average percentage of 58.79% in the medium category. Students still need to be more optimal in behaving and communicating on social media. Students are expected to be able to communicate valid information related to Protists. Protists can be presented as innovative media for online platforms [1]. The social-emotional dimension of digital literacy involves using the Internet responsibly in communicating, socializing, and learning. This social-emotional ability shapes students' character during the learning process [27]. The essence of the three dimensions of the digital literacy framework is that students think critically in analyzing information and can critically evaluate the right information to reference in classroom learning [28].

Digital literacy is important in making students able to process, read, and write information in cyberspace. The use of adequate technology can receive and produce information so that the public can accept it. Students who understand technology not only consume the results of technology but can also produce digital media [29]. Students can evaluate various information in digital media. Students who empower digital literacy skills can also solve various problems faced [30].

The empowerment of complex digital literacy changes the paradigm of students to read information to learn [29]. Along with the times, the content of learning materials increases, and literacy demands also increase. Students are expected to read and write in various disciplines, including in the Protist course. Students must be fluent in recognizing technical vocabulary in computers and the Internet. Digital literacy encourages students to continue reading, writing, and learning in preparation for the current and future era [31].

Digital literacy is very supportive of the way students analyze information obtained from Internet media or social media [32]. Empowering digital literacy in the learning process can improve academic achievement and train students to face the challenges of the 21st century [33]. Students who empower digital literacy can solve problems that occur in the wider community both in cyberspace and in the real world [34].

We are empowering digital literacy using a technology-based learning strategy. Using information technology in the classroom as a medium and source of learning is an opportunity and challenge for teachers in building digital-based learning [35]. The context of the digital-based learning strategy integrates physical and virtual components by combining face-to-face and online self-paced learning [36].

4 Conclusion

The results showed that Biology Education students who took the Protist course at the Universitas Negeri Malang have digital literacy skills in the technical (high), cognitive (medium), and social-emotional (medium) dimensions. Therefore, students' digital literacy still needs to be improved, especially in the cognitive and social-emotional dimensions. The study serves as a foundation for future researchers to empower students' digital literacy through innovative learning in the classroom. The learning strategy that needs to be developed is digital-based learning. The learning strategy that needs to be developed is digital-based learning, which helps students analyze and evaluate information in cyberspace.

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