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IDENTIFICATION OF DIGITAL LITERACY AND PROBLEM-SOLVING SKILLS IN BIOLOGY LEARNING ABOUT ENVIRONMENTAL CHANGE AND CONSERVATION MATERIAL AT ADABIAH 2 HIGH SCHOOL, PADANG

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Abstract: The 21st century is marked by the development of information technology that is integrated into every aspect of life. To effectively utilize information technology, digital literacy and problem-solving skills are essential. This study aims to identify the digital literacy and problem-solving abilities of phase E students at Adabiah 2 High School, Padang. This research is descriptive in nature. The data produced is qualitative, sourced from questionnaires distributed to 65 phase E students at Adabiah 2 High School, Padang. Based on the identification conducted, it can be concluded that phase E students at Adabiah 2 High School are interested in studying the material on environmental change and conservation. However, they still struggle to understand the material, as evidenced by their inability to determine the causes and effects of environmental issues based on the information they receive. Students have utilized technology, specifically internet access, to learn about this material. However, they do not yet fully possess digital literacy skills, as shown by their inability to differentiate and compare the information gathered in efforts to address the problems of environmental change and conservation.

Keywords: Digital literacy, Problem-solving skills, Enviromental change and conservation

***Abstrak**: Abad 21 merupakan abad yang ditandai dengan perkembangan teknologi informasi yang terintegrasi dalam setiap aspek kehidupan. Dalam memanfaatkan teknologi informasi dibutuhkan kemampuan literasi digital dan kemampuan pemecahan masalah. Penelitian ini bertujuan untuk mengidentifikasi memampuan literasi digital dan kemampuan probem solving siswa fase E SMAS Adabiah 2 Padang. Jenis penelitian ini adalah penelitian deskriptif. Data yang dhasilkan berupa data kuantitatif yang bersumber dari pengisian angket yang disebarkan pada 65 orang peserta didik fase E SMAS Adabiah 2 Padang. Berdasarkan identifikasi yang dilkukan dapat disimpulkan bahwa siswa Fase E SMAS Adabiah 2 Padang tertarik mempelajari materi perubahan dan pelestarian lingkungan. Namun masih kurang mampu memahami materi tersebut dibuktikan dengan masih belum mampu menentukan sebab akibat permasalahan lingkungan melalui informasi yang didapatkan. Siswa sudah memanfaatkan teknologi berupa akses internet mengenai materi tersebut. Namun belum sepenuhnya memiliki kemampuan literasi digital dibuktikan dengan siswa belum mampu membedakan dan membandingkan informasi yang didapat dalam upaya pemecahan masalah perubahan dan pelestarian lingkungan.*

***Kata Kunci:** Literasi digital, Kemampuan pemecahan masalah, Perubahan dan pelestarian lingkungan*

INTRODUCTION

The 21st century is also known as the age of openness or the age of globalization. It is referred to this way because this century has seen the industrial revolution 4.0 (Mardhiyah et al., 2021). The 21st century is characterized by the rapid development of information technology and automation, where many jobs are replaced by machines, including both production machinery and computers (Wijaya et al., 2016). This century marks an era where the acquisition of

information and communication has become easier, transforming how people work, socialize, and learn (Megahantara, 2017). The ease of obtaining information in the 21st century is influenced by advancements in internet technology and gadgets. The use of gadgets such as smartphones, tablets, and computers is commonplace among individuals. In fact, purchasing internet data plans has become a necessity for many to meet their communication and information needs. Information technology has a significant impact on all aspects of life today, as it has become essential for facilitating human tasks (Siregar & Nasution, 2020).

However, the development of information and communication technology presents both opportunities and threats. According to Fitriyadi (2013), the potential benefits of information and communication technology include the emergence of individuals with knowledge and awareness known as digital natives. This term refers to a generation that lives in the digital age, characterized primarily by the internet being an integral part of daily activities (Diputra et al., 2020). However, information and communication technology also poses threats, such as the spread of hoaxes and hate speech on social media, leading to a rise in legal issues for individuals. The advancement of technology cannot be halted, given its inseparability from various aspects of human life. The threats associated with the use of advanced information and communication technology cannot be minimized merely by the implementation of the Electronic Information and Transactions Law (UU ITE) by the government. Therefore, there is a need for equipping individuals with skills known as digital literacy.

Belshaw (2012) in his thesis titled "What is Digital Literacy? A Pragmatic Investigation" states that digital literacy is the ability to understand and use information and communication technology, for example, in supporting education and the economy. According to Lee (2014), digital literacy is the ability to understand and utilize information in various formats from diverse sources presented by computers. As for the skills that indicate a person possesses digital literacy, Wheeler (2012) mentions several, including social networking, transliteracy, maintaining privacy, managing digital identity, creating content, organizing and sharing content, reusing or repurposing content, filtering and selecting content, and self-broadcasting. The benefits of digital literacy, according to Wright (2015), include ten important advantages: saving time, learning faster, saving money, increasing safety, always having up-to-date information, staying connected, making better decisions, improving work productivity, increasing happiness, and having an impact on the world. Digital literacy is essential, especially in the context of the ongoing development of information and communication technology in every aspect of life, particularly in education.

Education is a fundamental need for every human being (Sudarsana, 2015). Along with the changing times, the field of education is also experiencing changes in learning activities. The characteristics of 21st-century learning are related to the utilization of rapidly advancing information technology (Rosnaeni, 2021). Students are accustomed to technology-assisted learning, and to facilitate information acquisition, they need digital literacy skills.

In the context of 21st-century education, students are expected to master the 4C skills, which consist of critical thinking, creativity, collaboration, and communication, along with skills related to the four pillars of life: learning to know, learning to do, learning to be, and learning to live together, to become successful individuals in their lives (Syahputra, 2018). Additionally, life in the 21st century demands various skill sets (Kurniawati et al., 2019). Thus, the education sector is expected to prepare students who possess these skills. According to (Wagner, 2014), some of these skills include critical thinking and problem-solving, collaboration and leadership, agility and adaptability, initiative and entrepreneurial spirit, effective communication both orally and in writing, the ability to access and analyze information, and a sense of curiosity and imagination. Based on this overview, it can be interpreted that problem-solving skills are one of the essential competencies for students in the 21st century.

Problem-solving skills involve a thinking process that encompasses several objectives in performing tasks, addressing obstacles to achieve goals, using one or more strategies to resolve issues, applying knowledge resources, and evaluating outcomes to solve problems (Oktaviany et

al., 2021). In practice, it has been observed that students often cannot anticipate the reasons for an event occurring. This results in a tendency for students to seek help from teachers to solve problems presented in assignments before attempting to resolve them independently. According to (Primayana, 2020), this passivity arises from students' inability to connect new information with previously experienced events, leading to a dependence on teachers for problem-solving. Therefore, the ability to connect new information with experienced events is necessary for enhancing students' problem-solving skills, particularly in the context of the current digital era.

Based on this discussion, it can be concluded that digital literacy and problem-solving are interconnected. Therefore, this research will explore the relationship between digital literacy and problem-solving abilities by identifying the learning conditions of students concerning digital literacy and problem-solving in biology learning on the topics of environmental change and conservation at Adabiah 2 High School, Padang.

METHOD

This research is descriptive in nature. It involves observation, analysis, and description of the research subjects. The conditions identified in this study relate to digital literacy skills and problem-solving abilities. The data collection instrument used in this research is a questionnaire. The subjects involved in this study are 65 students from phase E at Adabiah 2 High School, Padang. The distributed questionnaire contains questions related to students' learning conditions concerning problem-solving skills, digital literacy, and the topics of environmental change and conservation. The data produced is presented in a qualitative descriptive format.

RESULT AND DISCUSSION

The topic of environmental change and conservation is one of the biology subjects studied by students in phase E. Based on the research findings, it was determined that students tend to be interested in learning this material, with a percentage of 35%. However, they struggle to apply this knowledge in their daily lives, as evidenced by a percentage of only 11%. Students still have a limited understanding of the subject, which is reflected in their ability to identify the causes and effects of environmental changes, with percentages of 14% and 11%, respectively. In this topic, students learn about environmental dynamics and the important steps to maintain sustainability. They study the definitions and causes of environmental changes, both those caused by natural processes such as erosion and climate change, as well as those resulting from human activities like deforestation and pollution. They also identify the impacts of these changes on ecosystems, human health, and biodiversity. Furthermore, students are taught principles of environmental conservation, including strategies such as waste management, recycling, energy conservation, and species protection. This material also covers sustainable solutions and the importance of global cooperation to address environmental issues, ultimately aiming to equip students to make informed decisions and actively participate in earth conservation efforts. This topic is dynamic, meaning it evolves over time in accordance with environmental conditions, both locally and internationally.

Therefore, access to information about current environmental conditions is necessary for this topic. Based on the survey results, it was found that students at Adabiah 2 High School in phase E generally engage in discussions about environmental changes with friends and family, with a percentage of 28%. However, students are less involved in activities aimed at addressing environmental problems or expressing opinions and ideas regarding environmental solutions, with a percentage of only 9%.

Utilizing information and communication technology in learning can facilitate students' understanding of this material. According to the survey results, it was found that students still struggle to manage information related to environmental changes, with a percentage of 20%. However, they are able to access this material online, with a percentage of 28%. Yet, students still find it challenging to differentiate between information related to environmental change and conservation accessed through the internet, with a percentage of only 15%. This highlights the

need for digital literacy skills in their education. Digital literacy helps students learn about environmental changes and conservation by providing skills to access, analyze, and disseminate information effectively. Through digital literacy, students can search for and evaluate environmental data, utilize online resources such as educational videos and scientific articles, and collaborate with peers and experts through digital platforms. They can also use social media for awareness campaigns and technology to find innovative solutions. With these skills, students can make data-driven decisions and actively participate in environmental conservation efforts.

Additionally, the topic of environmental change and conservation requires problem-solving skills, as these issues are often complex and require systematic approaches to resolve. According to the distributed survey, it was found that students are still not motivated to review and seek solutions regarding environmental problems, with a percentage of only 15%. They also struggle to compare information obtained from various sources, with a percentage of just 4%. Students need to identify environmental issues, analyze data to understand the causes and impacts, and design effective solutions. This ability also includes evaluating the outcomes of implemented solutions and making adjustments if necessary. Furthermore, problem-solving enables students to collaborate with various stakeholders, integrate different perspectives, and contribute innovatively to conservation efforts. With these skills, students can effectively tackle environmental challenges and contribute to sustainable improvement.

CONCLUSION

Based on the identification conducted, it can be concluded that phase E students at Adabiah 2 High School, Padang, are interested in studying the material on environmental change and conservation. However, they still struggle to understand the material, as evidenced by their inability to determine the causes and effects of environmental issues based on the information they receive. Students have utilized technology, specifically internet access, to learn about this material. However, they do not yet fully possess digital literacy skills, as shown by their inability to differentiate and compare the information gathered in efforts to address the problems of environmental change and conservation.

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