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Initial Study: The Effect of Digital Literacy on Students' Argumentation Skills in Junior High School on the Materials of Motion, Waves and Light

Neni Septiani[1], Darmaji[2], Dwi Agus Kurniawan[3]
[1,2,3]Universitas Jambi, Muaro Jambi, Indonesia
[1]neniseptiani8999@gmail.com, [2]darmaji@unja.ac.id, [3]dwiagus.k@unja.ac.id

ABSTRACT

The purpose of this study was to determine the effect of digital literacy on students' argumentation skills in junior high school on vibration, wave and light materials. The method used in this research is a qualitative method, with the type of research using an initial study obtained by interview, the subjects and samples of this study were science teachers at Muaro Jambi State 1 Junior High School and Muaro Jambi State 33 Junior High School, the sampling technique in this study was purposive sampling technique, the instrument used was an interview with 20 questions, the data analysis used was Mile and Huberman analysis. Based on the research that has been done, the results show that digital literacy can improve students' argumentation skills. So the conclusion of this study is that digital literacy has an influence on students' argumentation skills.

Keywords: Argumentation Skills, Digital Literacy, Science

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Corresponding Author:
Neni Septiani,
Physics Education, Faculty of Teacher Training and Education,
Universitas Jambi,
Jl. Jambi – Muara Bulian No.KM. 15, Mendalo Darat, Kecamatan Jambi Luar Kota, Kabupaten Muaro Jambi, Jambi.
Email: neniseptiani8999@gmail.com

1. INTRODUCTION

Education in Indonesia is an important foundation for the development and future of the nation. (Haliza & Dewi, 2021; Aldila et al., 2023). Despite various reforms, challenges remain in terms of accessibility, quality and equity of education. Government programs to improve the quality of teachers, school infrastructure and curricula have been implemented, but further efforts are needed to reach remote areas and provide equitable education for all (Farhas, 2021; Lega, 2023). Improving the quality of education also needs to go hand in hand with developing skills that are relevant to the demands of the times, so that students can compete globally and contribute positively in realizing the nation's progress. One of the efforts to improve quality is to implement the Kurikulum Merdeka.

Kurikulum Merdeka is a recent initiative in Indonesian education that aims to give schools more freedom to design curricula that suit local needs, student potential and the times. Through this approach, education is expected to be more responsive to the individual needs of students and to explore the unique potential of each region. The Merdeka Curriculum provides opportunities for schools to develop learning programs that are more diverse, inclusive and relevant to today's global challenges, while still maintaining high educational standards (Rohmah et al., 2023). Although it is still in the implementation and evaluation stages, the Merdeka Curriculum promises a more dynamic and adaptive approach in welcoming a more diverse and inclusive educational future (Lubis et al., 2023). One of the skills used is Digital Literacy.

Digital literacy is the ability to use, understand and participate in the digital world effectively (Nahdi & Jatisunda, 2020). In today's information age, this ability is crucial for individuals to access, evaluate and use various sources of information wisely and safely. Digital literacy includes not only technical skills, but also an understanding of internet etiquette, digital safety, and the ability to sort valid information from invalid ones (Nahdi & Jatisunda, 2020). The importance of digital literacy is growing as it affects how we interact, learn and contribute in an increasingly digitally connected society (Setianingsih et al., 2023). With strong digital literacy, individuals can become more independent, critical and skilled in dealing with rapid changes in the realm of technology and information. Students' digital literacy skills are related to argumentation skills.

Argumentation ability is an important skill that involves one's ability to organize and present opinions or views in a logical, cohesive, and persuasive manner (Ariyanto et al., 2020). It involves the ability to frame arguments with relevant evidence, reliable data, and strong logic to support the position or opinion expressed. In addition, argumentation skills also involve good listening skills, accepting other people's points of view, and presenting substantial counter-arguments. These skills not only enrich discussions, but also enable individuals to contribute effectively in a variety of contexts, whether in academic, professional or social settings.

Natural Science subjects at the Junior High School level have an important role in shaping students' understanding of natural phenomena and scientific principles. Science in junior high school explores basic concepts in physics, chemistry, biology, and the environment, and involves students in experimentation, observation, and analysis to understand how nature works and the scientific process (Diniya, 2019). Through a curriculum based on real-life experiences, science in junior high school aims to shape critical thinking, scientific thinking skills, and a deep understanding of the relationship between humans and the environment (Pratiwi et al., 2019; Vercaruz et al., 2023). Thus, this subject is an important foundation for the development of students' science literacy before entering higher education.

Vibrations, waves, and light are closely related concepts in physics (Wulandari & Prihandono, 2019). Vibrations are alternating movements that occur in a medium, while waves are the propagation of vibrations through the medium, either in the form of mechanical waves in a medium such as water or electromagnetic waves in a vacuum. Light, as one form of electromagnetic wave, has the dual nature of being both a wave and a particle called a photon. Through an understanding of vibrations and waves, we can understand various phenomena such as the formation of sound, the propagation of earthquakes, or even the phenomenon of light that forms a spectrum of colors and transforms into various forms of energy that we use daily, such as electricity and heat. By learning these concepts, we can explore the complexity of the universe and apply this knowledge in various fields of science and technology.

Research conducted by Chen et al., (2020) found that the use of digital media can improve student learning outcomes and can also improve students' argumentation skills. With this, teachers can explore the use of digital media in the teaching and learning process so that it can attract interest in learning and will have an impact on student learning outcomes and student abilities. In previous research conducted by Darmaji et al. (2022), where the effect of science process skills on argumentation skills was sought and this study aims to determine the effect of digital literacy on students' argumentation skills. So the difference between this research and previous research is different in the research variables.

Based on the opinions above, the researchers conducted this research with the formulation of the problem, namely how the results of the analysis of the effect of digital literacy on science process skills and argumentation skills. With the purpose of the study, namely to determine the results of the analysis of the effect of digital literacy on science process skills and argumentation skills. So that researchers are interested in conducting research with the title **"Initial Study: The Influence of Digital Literacy on the Argumentation Ability of Students in Junior High School on the Material of Geometry, Waves and Light."**

2. RESEARCH METHOD

This research uses qualitative methods and this type of research uses an initial study obtained through interviews. The subjects and samples in this study were physics teachers at SMP Negeri 1 Muaro Jambi and SMP Negeri 33 Muaro Jambi. The sampling technique used in this study was purposive sampling technique. Purposive sampling is a sampling method in research in which the researcher deliberately selects certain participants or sample units based on certain characteristics or criteria relevant to the research objectives (Astalini et al., 2023; Oktavia et al., 2023). The instrument used in this study was an interview with 20 questions. The data analysis used in this research is Mile and Huberman. This data analysis is commonly used in qualitative research and is a systematic method for analyzing qualitative data that has been collected.

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3. RESULTS AND DISCUSSION

A. Results

The results of the interviews can be seen in the explanation below.

1. In your teaching experience, some students may have difficulty in answering questions on exercises or exams in Physics. Some students may face difficulties especially in understanding more abstract concepts or applying theories to real situations. Difficulties can also arise in understanding formulas, applying math in a physics context, or solving physics problems that require creative thinking.
2. In my teaching experience, some students are able to provide claims supported by relevant data or evidence when answering questions in Physics lessons. These students may be able to relate physics concepts to concrete examples, experimental results, or data they obtain from both literature and practicum. However, there are also students who need further assistance to hone their skills in constructing arguments based on relevant data.
3. The learning behavior of students when participating in learning activities tends to vary. Some students show active involvement, focus, and high enthusiasm in learning, they actively ask questions, engage in discussions, and try to understand the concepts taught. However, there are also students who may need additional encouragement to be actively involved in learning, they may be more passive or need extra help in understanding the material.
4. Teachers use a variety of digital media to support learning, including slide-based presentations such as PowerPoint or to present the material with interesting and easy-to-understand visuals. In addition, teachers utilize learning videos from online platforms such as YouTube to provide applicative examples or more in-depth explanations of material concepts.
5. Learners' behavior when participating in learning by utilizing digital media tends to vary. Some learners show high engagement, actively utilizing various features of digital media such as asking questions through chat platforms, participating in online discussions, and actively using the resources provided. However, there are also students who may need additional assistance in operating or utilizing digital media well.
6. There are some obstacles that may arise in learning by using digital media. Some of them are technical issues such as unstable internet connection, disruption in the online learning platform, or hardware constraints used by students.

B. Discussion

Based on the results of the interviews, it was found that practicum activities in science subjects are an important element in providing students with direct experience related to scientific concepts. Through practicum, students can experience for themselves how theoretical concepts are applied in real situations, such as the use of microscopes in studying cells or experiments on vibrations, waves and light in physics. These activities not only improve students' understanding of the material, but also develop their practical skills and science process skills. However, sometimes there are constraints such as limited time in class hours or a tight curriculum that can be an obstacle in organizing practicums that require more extensive time. In addition, the evolution in lesson plans every year and the development of science triggers the adjustment of materials or the addition of new experiments to stay relevant to the latest developments.

Practical activities in science subjects have a vital role in student education (Daniah, 2020; Casquilho et al., 2023). The interview results show that the hands-on experience students gain through practicum is valuable because they can apply the concepts of scientific theories to real situations. For example, experiments using microscopes help students understand the structure of cells in more depth, while physics-related experiments such as vibrations, waves and light provide practical images that are difficult to obtain through theoretical learning alone. However, there are challenges faced, such as limited time in class hours or a tight curriculum. This constraint often becomes an obstacle in organizing practicum that requires longer time.

Adjustment to the evolution in learning design and scientific developments is also an important factor in the sustainability of practicum activities (Meliani et al., 2021). Continuous developments in science

trigger the need for material adjustments or the addition of new experiments (Adisaputro, 2020). With these developments, it is important for teachers to stay relevant with the latest information so that the practicum organized remains in accordance with the latest advances in the field of science. Although challenges and adjustments continue to exist, it is important to recognize that practicum activities have an irreplaceable role in students' scientific learning.

Digital literacy has a significant impact on argumentation skills in various contexts (Wigati et al., 2023). The ability to access extensive information from various online sources allows individuals to gather diverse perspectives and evidence to support their arguments. With strong digital literacy, one can construct more robust arguments by referring to reliable data, scientific research and relevant information. In addition, the ability to use various online platforms to participate in open discussions or forums allows individuals to practice argumentation skills effectively (Solihin & Muhlis, 2023; Astalini et al., 2023). This enables them to understand other points of view, respond appropriately and enrich their arguments through productive online interactions. Digital literacy also facilitates individuals in understanding the ethics of online argumentation, including how to communicate honestly, politely, and respect the opinions of others in the digital realm.

4. CONCLUSION

From the interview with the subject teacher, it was found that digital literacy can affect argumentation skills. With wider access to diverse information from online platforms, individuals are equipped with the ability to evaluate, select and use reliable sources in crafting stronger arguments. The critical ability to assess the reliability of online information allows them to produce arguments that are supported by valid facts. In addition, digital literacy also enriches the way individuals convey arguments effectively through digital media and enables active engagement in relevant online discussions. Thus, digital literacy not only expands knowledge but also enriches argumentation skills in a digital environment. Argumentation skills also prove to be an integral part of digital literacy, enabling individuals to construct solid arguments by referring to various online sources and participating in discussions that enrich perspectives and uphold the ethics of communicating online. In conclusion, digital literacy can make an important contribution to the development of students' understanding, skills and abilities in the context of science.

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