EXPLORING THE LEARNING STYLES AND CHARACTERISTICS OF JUNIOR HIGH SCHOOL STUDENTS IN INTERACTIVE MULTIMEDIA LEARNING ENVIRONMENTS

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ABSTRACT

The 21st century is marked by technological advancements, Information and Communication Technologies (ICT), globalization, and the need for innovation. Fun learning can make students more interested in studying. Learning activities require good literacy and numeracy skills. The success of teaching can be measured by the teacher's accuracy in selecting teaching materials, media, and learning tools used in an engaging and enjoyable environment, so that students enjoy the learning activities. The learning process should be engaging, interactive, enjoyable, challenging, and motivating for students. Additionally, it should provide ample opportunities for students to develop. Analysis of student characteristics and learning styles is crucial for implementation. The purpose of my research is to analyze the characteristics and learning styles of junior high school students related to web-based interactive multimedia learning in junior high school science education. This research was conducted by analyzing the results of questionnaires distributed via Google Forms to students. The data analysis technique used was frequency tabulation and crosstabs. The subjects of the research are 222 seventh-grade students from SMP Negeri 2 Lahat. In this study, the sample size used involves the entire population (the population is the same as the sample), while the research object is Web-Based Learning Multimedia on Climate Change Material in Junior High School Science. The research was conducted at SMP Negeri 2 Lahat in the odd semester of 2024. The results of this study indicate that there is an influence between students' characteristics and learning styles on learning media.

Keywords: *Digital Learning, Characteristic And Student Learning Styles, Interactive Learning Multimedia.*

INTRODUCTION

The 21st century is marked by technological advancements, Information and Communication Technologies (ICT), globalization, and the need for innovation. Therefore, the enhancement of relevant skills and competencies is very important for students (Alhamuddin et al., 2022). Students who are born and developed in the current digital era require teachers with high technological skills (Dakhi et al., 2020). Technology in education is essential in line with the rapid development of science, which requires teachers to ensure that the lessons they deliver can be well absorbed by students, easily understood, and enjoyable (Zulqadri & Nurgiyantoro, 2023).

Fun learning can increase students' interest in studying; good literacy and numeracy skills are needed in learning activities. Education in Indonesia develops three focus areas: writing, literacy, and numeracy (Nur Azizah et al., 2023). The quality of education in Indonesia will be impacted by the low levels of literacy and numeracy (Rakhmawati & Mustadi, 2021). Reading has become an important part of the daily lives of people in developed countries (Dwi Cahyani et al., 2021; Rachman et al., 2021). In the 21st century, literacy is crucial for comprehending increasingly complicated ideas that are present in daily life (Prihandoko, 2021; Salma, 2019) because literacy is the process of analyzing many types of information to obtain a more comprehensive understanding, it must be developed when they are in elementary school (Pratiwi et al., 2021).

According to Kemdikbudristek, on December 5, 2023, the results of the Program for International Student Assessment (PISA) 2022 were released. Indonesia scored 379 in mathematics, 398 in science, and 371 in reading, placing it 68th out of 81 nations, for the previous four years. (2018-2022), students have experienced a decline in learning in the three subjects tested: science, reading, and mathematics. Similarly, based on the analysis of the quality of education report, especially at Lahat in the junior high school level in 2024 through the Computer Based National Assessment (ANBK), it still shows low levels of literacy and numeracy. Each student has potential and needs balanced attention to help them develop fully (Denya Agustina et al., 2019). The fact is that Indonesians are still learning only cognitive abilities (Hayati et al., 2021). Minimum Competence Assessment (AKM) basic skills need to be measured in students to enhance their knowledge and socialization abilities in society. Literacy and numeracy are the foundational abilities assessed in AKM (Fitriani et al., 2022). Literacy is the ability to process knowledge through various stages of thinking. Students who possess good literacy and numeracy skills can have a broader knowledge base (Rakhmawati & Mustadi, 2022). The theory of numeracy has evolved towards a more holistic approach and requires critical thinking (Grotlüschen et al., 2020).

The effectiveness of a teacher is determined by how well they choose instructional resources, media, and learning aids to employ in a fun and stimulating setting so that students look forward to the learning activities (Hartono, Indra Putri, et al., 2022; Hartono, Susanti, et al., 2022; Sary et al., 2023). Teachers must have good skills in mastering technology; by using technology in teaching, learning boundaries, learning monotony, and other issues can be overcome (Alchorni, 2023; El Fazza, 2022; Marjan & Nimah, 2020). Teachers must help students with their learning tasks so that they can comprehend the content and accomplish their objectives more readily. To make the learning process enjoyable and not boring, teachers must be creative and innovative in delivering the material to their students (Rosdiana & Ulya, 2021). In addition, teachers must use learning media to support their teaching. The learning process becomes more creative and innovative, one of which is by using interactive learning. In many countries, teaching methods for science subjects are being extensively developed (Yakub Iskandar et al., 2023).

Rapid developments in technology, economy, and society drive advancements in learning media (Kharisma Dewi et al., 2022). Media are tools that can help convey learning

objectives (Darmayanti & Sugianto, 2022; Kholfadina, 2022; Kireina Bentriska et al., 2022). Flexible learning media is favored by students because it is engaging and easy to use anywhere and anytime, whether individually or in groups (Nurhabibah et al., 2021; Pradita et al., 2024), such as interactive multimedia (Marisda et al., 2020; Yulianci et al., 2021). Interactive multimedia makes learning more active, interactive, and high-quality (Indah Septiani et al., 2020). Multimedia is a combination of various types of media, such as text, graphics, animations, audio, images, and videos (Indah Septiani et al., 2020; Yakub Iskandar et al., 2023). Interactive learning multimedia can maximize student learning activities because it can engage students in learning activities and connect the skills possessed by students (Slamet, 2023). Additionally, interactive media demands active student participation in the learning process, asking them to engage directly with the interactive media's content (Mochamad Cholily & Cahyono, 2019).

The teacher uses textbooks, student worksheets, and PowerPoint as learning media, but the PowerPoint only displays materials and formulas and is not given to the students. Thus, the learning media used by the students is limited to the classroom and is not owned by the students. As a result, students' interest decreases and they become less motivated to learn (Pradananta & Juliani, 2022; Zaini & Nugraha, 2021). The types of interactive learning multimedia currently available are E-Learning-based multimedia, interactive games, interactive videos, software-based multimedia, and web-based interactive learning multimedia.

Web-based interactive learning multimedia is a type of information technology used in the learning process by leveraging technological advancements. Therefore, this enables students to identify problems, organize, analyze, evaluate, and communicate information effectively, as well as helps them optimize their learning and teaching activities. If the material is accompanied by audio, images, animations, and videos, students will find it easier to understand (Pradananta & Juliani, 2022). Interactive multimedia can influence students' imagination and visualization abilities as well as enhance their literacy skills in science education (Lia et al., 2021). Students can receive information, research advice, and decision-making difficulties using interactive multimedia. Students can use interactive multimedia as a learning application anytime and anywhere, accessible via computer or smartphone, and favored by Gen Z (Widodo et al., 2020). Interactive multimedia learning can improve students' learning outcomes, cooperation, collaboration, communication, and help students in the classroom to solve problems, learn from each other, and build social relationships (Kushwaha, 2023; Syarah et al., 2023).

An interesting, interactive, enjoyable, challenging, and motivating learning process for students. In addition, it provides sufficient opportunities for students to develop (Syaflita & Chandra Amelia, 2023). A study shows that interactive multimedia learning can enhance students' understanding of integrated science lessons (Marisda et al., 2020). The use of multimedia makes classroom teaching very productive, engaging, inspiring, interactive, and high-quality while meeting the needs of various students (Marisda et al., 2020). According to research by Saputri, interactive multimedia improves students' cognitive skills better than conventional models (Saputri et al., 2019). Web-based multimedia interactive learning is expected for use in scientific education, especially in junior high schools. Science is the knowledge that studies natural phenomena and events through scientific activities (Maisarah et al., 2023). In science learning activities, there is a need for learning media that supports the implementation and objectives of the learning process. This is because media is part of education as a system and a component of the education curriculum (Maisarah et al., 2023).

Considering the aforementioned description, according to research, innovation in development of Web- Based Multimedia Interactive Learning is needed for student numeracy literacy activities (Evaningtyas, 2023; Faridah et al., 2019). Web-Based Interactive Learning

on Climate Change Material in Middle School Science. Before conducting the research, analysis of student characteristics and learning styles related to interactive multimedia learning is necessary because it is very important in the implementation of teaching, such as identifying various student learning styles and determining which learning media are suitable for current students. The difficulties in learning that teachers face today are increasing, therefore a needs analysis is necessary because it is very important for teachers to understand their students' characteristics and learning styles. Although parents and teachers are very important components, students will continue their education. However, the learning activities will not run effectively and efficiently if a needs analysis for learning media is not conducted (Yılmaz Koğar, 2021). Based on the description above, the researcher concludes that there is a need for learning media that is suitable for students. The aim of my research is to analyze the characteristics and learning styles of junior high school students related to web-based interactive multimedia learning in junior high school science education.

METHODS

This research was conducted by analyzing the results of a survey sent out using Google Forms to students. Data analysis technique used was frequency tabulation and crosstabs. The research subjects were 222 seventh-grade students from SMP Negeri 2 Lahat. In this study, the sample size involved the entire population (the population was the same as the sample), which was obtained by having them fill out the distributed observation sheets. Meanwhile, the research object is Web-Based Learning Multimedia on Climate Change Material in Junior High School Science Lessons. The research was conducted at SMP Negeri 2 Lahat in the odd semester of 2024.
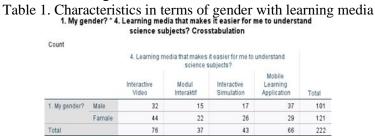
RESULTS AND DISCUSSION

Preliminary analysis implemented on seventh-grade students at SMP Negeri 2 Lahat. The results of this preliminary analysis aim to understand and ensure that the product created meets the needs of the students. The results of this analysis consist of an analysis characteristics and student learning styles.
1. Cross-tabulation analysis between student characteristics and learning media
a. Characteristics in terms of gender with learning media

Considering the outcomes of the cross-tabulation estimation with the variables crossed being the characteristics of students in terms of gender and learning media, which will be presented in detail in the following discussion:

Table 1. Characteristics in terms of gender with learning media

1. My gender? * 4. Learning media that makes it easier for me to understand science subjects? Crosstabulation

Count

		4. Learning media that makes it easier for me to understand science subjects?				Total
		Interactive Video	Modul Interaktif	Interactive Simulation	Mobile Learning Application	
1. My gender?	Male	32	15	17	37	101
	Famale	44	22	26	29	121
Total		76	37	43	66	222

Based on the above estimation, the results show that male students chose learning media with interactive videos 32 people, interactive modules 15 people, interactive simulations 17 people, and mobile learning applications 37 people, while female students chose learning media with interactive videos 44 people, interactive modules 22 people, interactive simulations 26 people, and mobile learning applications 29 people. Based on the category of gender and learning media, the respondents of this research show that male students predominantly choose learning media with mobile learning applications, with 37 students, while female students prefer learning media through interactive videos, with 44 students out of 222. However, overall, both male and female students predominantly chose

interactive video media, with 76 students, and the least favored media was interactive modules, with 37 students out of 222. Male and female students respond very differently to classroom material (Auliya et al., 2021), this is because the brain structures of male and female students are different, which affects the differences in academic achievement between boys and girls (Putu Teguh Treshanadi, 2024). Student success depends on the right learning style (Yusuf Hidayat et al., 2020). So, students' interaction with learning media is significantly influenced by gender differences. Teachers can determine strategies and choose effective and innovative learning media to meet the learning needs of all students, both male and female. The use of approaches that consider these differences can improve overall learning outcomes.

b. Characteristics of the educational background of parents (Father) with learning media

Based on the results of cross-tabulation estimation with the variables crossed being the characteristics of students from the educational background of parents (fathers) and learning media, which will be presented in detail in the following discussion:

Table 2. Characteristics of the educational background of parents (Father) with learning media

2. Background of my father's education? * 4. Learning media that makes it easier for me to understand science subjects? Crosstabulation

Count

		4. Learning media that makes it easier for me to understand science subjects?				Total
		Interactive Video	Modul Interaktif	Interactive Simulation	Mobile Learning Application	
2. Background of my father's education?	SD	5	6	4	6	21
	SMP	10	6	10	4	30
	SMA	46	18	22	37	123
	S1	14	7	5	16	42
	S2	1	0	2	2	5
	S6	0	0	0	1	1
Total		76	37	43	66	222

Based on the above estimation, the results from the respondents show that students with parents who graduated from elementary school amount to 21 people, with 5 choosing interactive video media, 6 interactive modules, 4 interactive simulations, and 6 mobile learning applications. Those with parents who graduated from junior high school amount to 30 people, with 10 choosing interactive video media, 6 interactive modules, 10 interactive simulations, and 4 mobile learning applications. Those with parents who graduated from senior high school amount to 123 people, with 46 choosing interactive video media, 18 interactive modules, 22 interactive simulations, and 37 mobile learning applications. Those with parents who graduated from bachelor's degree amount to 42 people, with 14 choosing interactive video media, 7 interactive modules, 5 interactive simulations, and 16 mobile learning applications. Those with parents who graduated from master's degree amount to 5 people, with 1 choosing interactive video media, no interactive modules, 2 interactive simulations, and 2 mobile learning applications. Finally, those with parents who graduated from doctoral degree amount to only 1 person, who chose mobile learning application. Therefore, overall, students with parents who graduated from senior high school predominantly chose interactive video media (46), interactive modules (18), interactive simulations (22), and mobile learning applications (37), while the least were students with parents who graduated from doctoral degree, which is 1 person.

Based on the category of the educational background of the students' parents and media for learning, the respondents of this research indicate that the majority students' parents are high school graduates, with 123 out of 222 respondents. The preferred learning media among the students are interactive videos (46 students), mobile learning applications (37 students), interactive simulations (22 students), and interactive modules (18 students). Data shows that the economic background of students' parents is not related to the number of students choosing learning media. Middle school students like pictures or symbols. Animated videos are one of the engaging and suitable learning media for middle school studentsbecause the video is interesting and acceptable to today's children (Rosdiana & Ulya, 2021). The use of video-based media has many advantages, one of which is making the delivery of material to

students easier and providing support to teachers (Khasawneh, 2023). Video media can stimulate several senses of the respondents, making it easier to understand about an inactive lifestyle. Thus, educational video media can stimulate respondents' interest and make them more eager to learn (Erniasih & Eko Pramono, 2021).

2. Cross-tabulation analysis between students' learning styles and learning media

Based on the results of the cross-tabulation estimation with the crossed variables being students' learning styles and learning media, which will be presented in detail in the following discussion:

Table 2. Cross-tabulation analysis between students' learning styles and learning media

3. What is my learning style? * 4. Learning media that makes it easier for me to understand science subjects? Crosstabulation

Count

| | | 4. Learning media that makes it easier for me to understand science subjects? | | | | |
		Interactive Video	Modul Interaktif	Interactive Simulation	Mobile Learning Application	Total
3. What is my learning style?	Audio	6	1	5	1	13
	Visual	7	6	5	5	23
	Audio Visual	52	26	30	49	157
	Kinestetik	11	4	3	11	29
Total		76	37	43	66	222

Based on the above estimation, the respondents' results show that students with an auditory learning style chose animated video media 4 times, interactive modules 0 times, virtual simulations 2 times, and mobile learning applications 6 times. Students with a visual learning style chose animated video media 6 times, interactive modules 2 times, virtual simulations 2 times, and mobile learning applications 1 time. Students with an audiovisual learning style chose animated video media 42 times, interactive modules 0 times, virtual simulations 17 times, and mobile learning applications 32 times. Meanwhile, students with a kinesthetic learning style chose animated video media 3 times, interactive modules 1 time, virtual simulations 0 times, and mobile learning applications 1 time. Based on the students' learning styles and media used to improve learning outcomes, the dominant learning style was audiovisual, with 115 out of 143 students choosing animated video media 42 times, mobile applications 32 times, interactive modules 24 times, and virtual simulations 17 times. Teachers must consider how their students learn and provide education that is suitable for their learning environment (Cicha et al., 2021; Nurmalisa et al., 2023). Learning video media is a type of media that uses audio and visual elements to provide effective learning information that helps students understand the subject matter and is designed to attract attention, facilitate understanding, and enhance information retention for students (Azzajjad et al., 2021). Video media is better than visual media that only uses images or text or audio media that only uses sound. This is because of the combination of images, sound, and words, and it can be remembered for a long time, making the conveyed message more attention-grabbing, not boring, and proven to enhance students' understanding (Efendi et al., 2020; Maysella et al., 2021; Sadida et al., 2024). So, the learning media chosen by the students is in accordance with their own learning styles.

CONCLUSION

This research is expected to be the first step before deciding to choose media that is suitable for the conditions of students, which is engaging, enjoyable, and can improve students' learning outcomes. One effective approach to support the learning of middle school students is the use of interactive learning media based on the characteristics and learning styles of middle school students, including high curiosity, a tendency to prioritize visual and technology-based learning, and the need for students to actively participate in the learning process. Many learning styles are used by middle school students, including visual, auditory, kinesthetic, or a combination of the three. Interactive learning media, which includes features such as animations, simulations, videos, and gamification, can support these learning styles.

Students become more motivated, better understand the material, and are more capable of critical thinking due to the dynamic nature of interactive media.

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