



EDUCATIONAL TRANSFORMATION THROUGH LEARNING MEDIA BASED ON INFORMATION TECHNOLOGY IN GEOGRAPHY SUBJECT OF NATURAL DISASTERS

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Abstrak

Penelitian ini bertujuan untuk mengevaluasi penggunaan media pembelajaran berbasis teknologi informasi (TI) dalam pengajaran geografi pada pokok bahasan bencana alam di SMAN 13 Konawe Selatan. Observasi dan kuesioner digunakan untuk mengidentifikasi praktik pengajaran yang diterapkan guru dan persepsi siswa terhadap media berbasis TI. Hasil penelitian menunjukkan bahwa guru telah memanfaatkan teknologi seperti PowerPoint dan proyektor untuk membantu penyampaian materi, namun penggunaan media yang lebih interaktif, seperti video animasi, masih jarang dilakukan. Analisis angket keterlibatan siswa mengungkap bahwa sebagian besar siswa merasa lebih terlibat dalam pembelajaran berbasis TI, dengan 40.4% menyatakan setuju dan 39.8% sangat setuju bahwa media ini meningkatkan keterlibatan mereka. Meskipun hasil ini menunjukkan potensi positif, keterbatasan dalam keterampilan guru untuk mengembangkan dan mengimplementasikan media TI menjadi tantangan utama. Penelitian ini menekankan perlunya pelatihan dan dukungan fasilitas yang memadai agar guru dapat mengoptimalkan penggunaan teknologi dalam pembelajaran. Kesimpulan penelitian ini menegaskan bahwa media pembelajaran berbasis TI dapat meningkatkan keterlibatan dan pemahaman siswa, namun perlu dukungan tambahan untuk penerapan yang lebih efektif. Temuan ini memiliki implikasi penting dalam pengembangan strategi pembelajaran yang lebih interaktif dan relevan dengan kebutuhan pendidikan modern.

Kata kunci : Media pembelajaran; Keterlibatan siswa; Pendidikan; Teknologi informasi

Abstract

This study aims to evaluate the use of information technology (IT)-based learning media in teaching geography on natural disasters at SMAN 13 Konawe Selatan. Observation and questionnaires were used to identify teaching practices applied by teachers and students' perceptions of IT-based media. The results showed that teachers had utilized technology such as PowerPoint and projectors to help deliver materials. However, using more interactive media, such as animated videos, is still rare. Analysis of the student engagement questionnaire revealed that most students felt more engaged in IT-based learning, with 40.4% agreeing and 39.8% strongly agreeing that this media increased their engagement. Although these results show positive potential, limitations in teachers' skills to develop and implement IT media are a significant challenge. This research emphasizes the need for adequate training and facility support for teachers to optimize the use of technology in learning. The conclusion of this study confirms that IT-based learning media can improve student engagement and

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understanding, but additional support is needed for more effective implementation. The findings have important implications for developing learning strategies that are more interactive and relevant to the needs of modern education.

Keywords: *Learning media; Student engagement; Education; Information technology*

I. Introduction

Digital developments in education have significantly changed classroom teaching methods. The advancement of information technology (IT) not only affects the way students obtain information but also changes the teacher's approach to delivering subject matter. Geography subjects, which are generally taught through conventional methods (Anggraeni & Wasitohadi, 2014), now have the opportunity to utilize IT-based learning media to improve students' understanding of complex topics, such as the phenomenon of natural disasters. Natural disasters are important material because of their relevance to everyday life, especially in Indonesia which is vulnerable to various types of disasters (Dien & Andani, 2021; Oktaviani et al., 2019; Taufan Maulana & Andriansyah, 2024).

In geography learning, the topic of natural disasters often presents its challenges. The material requires not only theoretical understanding but also detailed visual knowledge. Traditional teaching methods are usually unsuccessful in providing real-life depictions of the processes and impacts of natural disasters. According to Wati et al. (2023), integrating information technology into learning can improve students' understanding and learning effectiveness. Although this potential has been identified, the application of information technology (IT)--based learning media for the topic of natural disasters in the geography curriculum is still not fully utilized.

The use of technology in learning, such as PowerPoint and projectors, has become a common practice in many schools (Herlina & Saputra, 2022; Mira & Putri, 2022), including in SMAN 13 South Konawe. These technologies assist teachers in delivering materials and displaying simple animations that can support students' understanding. However, conventional teaching methods such as lectures and the use of textbooks still dominate (Azis et al., 2022), and the media used are often limited to videos taken from platforms such as YouTube. This approach tends to be less effective in capturing students' attention and providing deep understanding. The integration of more advanced IT-based learning media, such as animated videos and digital simulations, is expected to overcome these limitations and create a richer and more contextualized learning experience.

Previous interviews with geography teachers at SMAN 13 South Konawe revealed that although they realize the benefits of IT-based media in improving learning quality, limitations in technology mastery and ability to develop media are the main obstacles. Teachers recommended the use of more interactive IT media, such as animated videos on natural disasters, to improve teaching effectiveness and student

engagement (Ega Safitri & Titin, 2021; Hamdiyah & Puspitasari, 2023; Sari et al., 2021).

Previous studies have shown various benefits of technology in the learning process. For example, research by Astini (2019) and Restika et al. (2021) revealed that the use of technology such as augmented reality (AR) in teaching can increase student understanding and engagement. However, these studies have not explored how to effectively apply IT-based learning media to natural disasters. Meanwhile, research by Caramay et al. (2023) and Warsito et al. (2022) highlighted that interactive learning media can increase student motivation and participation, these studies did not specifically discuss the effectiveness of these media in natural disaster learning.

This research has high urgency given the importance of developing learning approaches that not only improve student understanding but also support teachers in utilizing technology effectively to deliver complex material, such as natural disasters. Natural disasters are not only physical phenomena that require scientific understanding but also have significant social and economic impacts. The integration of information technology (IT) in learning enables students to gain a more in-depth and visual understanding of the processes, distribution, and impacts of natural disasters. This is in line with the goal of education to equip students with relevant knowledge and skills to face global challenges.

The urgency of this research is supported by observations and interviews which show that, although basic technologies such as PowerPoint and projectors have been used at SMAN 13 Konawe Selatan, the implementation of more interactive IT-based learning media, such as animated videos and digital simulations, has not been optimized. The main obstacle identified is the limited skills of teachers in developing and utilizing IT-based media. This challenge needs to be overcome to realize a more effective and in-depth learning process.

This research aims to evaluate the role of IT-based learning media in teaching geography, focussing on natural disasters. It also seeks to understand how teachers' ability and understanding in developing and using IT-based learning media can influence students' engagement and understanding. In addition, this study aims to identify the obstacles teachers face in implementing IT-based learning media so that it can make a practical contribution to the development of more effective and innovative learning strategies.

This research offers a different approach from previous studies by examining the application of IT media as a whole, including the use of animated videos and interactive simulations. Most previous studies have focussed on only one type of IT media without exploring the potential of combining different media to comprehensively improve students' understanding of natural disasters. Therefore, this research is expected to make a significant contribution to developing more innovative and

effective geography learning strategies, as well as a practical guide for teachers in utilizing IT to improve teaching quality and student understanding.

II. Research Method

This research applied a qualitative approach using observation and in-depth interview techniques as explained by Hidayat and Munandar (2022) and Ritiaw et al. (2021). This approach was chosen to assess the effectiveness of using information technology (IT)-based learning media in improving geography teachers' skills in teaching natural disaster materials. The research focus was on teachers with a purposive sampling method (Etikan, 2016; Isaac, 2023; Thomas, 2022), given the lack of understanding in developing animation-based learning media. Therefore, the questionnaire was more directed to teachers to evaluate their understanding and application of IT-based media. The student engagement questionnaire was also used as additional data to support the research findings.

This research was conducted in one of the senior high schools (SMA) in Kendari City, Southeast Sulawesi Province, namely SMAN 13 South Konawe (Irayanti et al., 2022), which has adequate computer laboratory facilities and internet access. The research activities lasted six months, from January to June 2024, including the preparation, implementation, data collection, and analysis phases. The research subjects consisted of geography teachers and students of class XI social studies at the school. The research subjects were taken from teachers and students at SMAN 13 South Konawe. The teacher was chosen as the main subject, while the students were used to support the observation of learning engagement.

This research was conducted in several stages as follows:

1. Preparatory stage: Preparing research instruments, including questionnaires for teachers, and developing IT-based learning media (such as animated videos about natural disasters). The questionnaire was chosen based on the development by Ramadani, D. G. (2020).
2. Learning implementation stage: Geography teachers teach using IT-based media for three weeks, while the lecture method and textbooks (Amalia et al., 2023; E. S. Hidayat & Tarsono, 2021; Putri et al., 2023) are still used for comparison.
3. Data collection stage: Data collection was conducted through questionnaires to teachers on their understanding and use of IT media, and by observing students' engagement during learning. In-depth interviews were also conducted to explore teachers' experiences and constraints in implementing IT-based media.

The main research instruments included a geography comprehension test, a student engagement questionnaire, and an observation sheet. The student engagement questionnaire was designed using a 1-5 Likert scale by Rachmawati et

al. (2023) and Sinaga et al. (2022) which assesses the level of readiness and use of IT media by teachers. Observations were used to record teacher activities and student interactions during the learning process. The Likert scale table (Mumu et al., 2022; Yamashita, 2022) used is presented in Table 1.

Table 1. Likert Scale

Statements	Score	Categories
Strongly Disagree	1	Sangat Rendah
Disagree	2	Rendah
Neutral	3	Sedang
Agree	4	Tinggi
Strongly Disagree	5	Sangat Tinggi

Data analysis in this study was carried out descriptively qualitatively (Jusnani et al., 2021; Suarni et al., 2022), referring to the results of questionnaires filled out by teachers and students. The teacher teaching ability questionnaire contains various indicators that evaluate the extent to which teachers practice variety and technology-based teaching methods, as well as how they manage interactions and provide encouragement to students during the learning process. Based on the results of this questionnaire, the data was analyzed to identify the frequency of application of technology-based learning strategies, such as audio-visual media, and strengthening student engagement.

On the other hand, the student engagement questionnaire uses a Likert scale to measure students' perceptions of the use of IT-based learning media in geography subjects, especially on the subject of natural disasters. The statements in this questionnaire cover aspects of student interest, ease of understanding the material, learning motivation, and the effectiveness of visualization in improving student understanding. The data from this questionnaire was analyzed to illustrate how much influence the IT media has in increasing students' engagement and participation, as well as how relevant the media is in supporting their learning process.

III. Results and Discussion

A. Observation Results

Based on observations made at SMAN 13 South Konawe, teachers have utilized technology such as PowerPoint and projectors to support the delivery of learning materials, especially in visualizing the process of natural disasters. The use of this technology helps to provide a clearer picture to students. However, the application of animation-based learning media that is more interactive is still not fully implemented. Teachers still rely on lecture methods, textbooks, and videos taken from YouTube,

which are often less effective in attracting students' attention and do not fully support an in-depth understanding of concepts.

The results of the questionnaires filled out by teachers show that despite efforts to use interactive teaching methods, some important aspects still need to be improved. Teachers consistently hold question-and-answer sessions and provide positive feedback to students, but more complex media, such as animated videos, is only done occasionally. The creation of interesting learning media is also done with a low frequency, which indicates a limited mastery of technology and media development by teachers.

Previous interviews with geography teachers revealed that they realize the importance of using IT-based media in improving teaching quality. Teachers recommended the use of more interactive learning media, such as animated videos, to provide a better learning experience for students. However, constraints such as lack of skills in creating and implementing IT-based learning media are the main barriers.

This result shows that despite the awareness of the importance of technology in learning, teachers face challenges in its implementation. Therefore, more intensive training and facility support is needed to help teachers develop and use IT-based learning media more effectively. This step is important to significantly improve student engagement and understanding so that learning becomes more interactive and relevant to the needs of modern education.

B. Analysis of Students Engagement

To evaluate the level of student engagement, a Likert scale questionnaire was used in the experimental group, and the results can be seen in Figure 3.

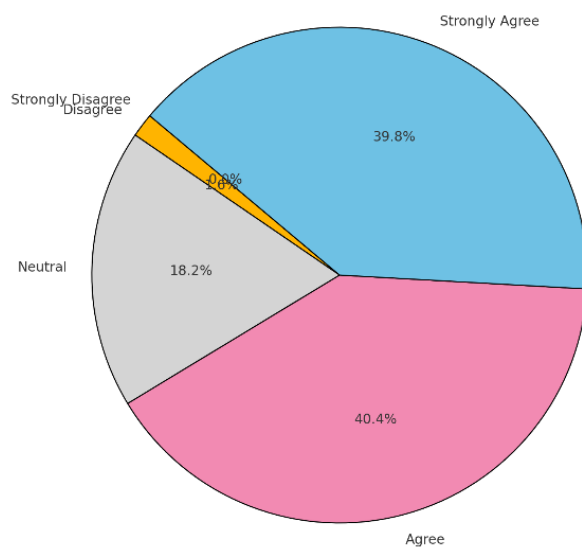


Figure 3: Distribution of student engagement in IT-based learning

Figure 3 shows the distribution results of students' involvement in information technology (IT)-based learning shown in the pie chart above, it can be concluded that most students have a positive perception of IT-based learning. A total of 40.4% of students agreed that they were involved in IT-based learning, while 39.8% strongly agreed. This shows that the majority of students feel the benefits and increased involvement in the learning process that uses technology as a supporting medium.

In contrast, only 18.2% of students were neutral, indicating did not have a significant or strong opinion regarding their engagement in IT-based learning. This could indicate that some students may need more experience or exposure to this method to form a clearer opinion. Meanwhile, only 1.6% of students disagreed or strongly disagreed, meaning only a small proportion of the student population felt that IT-based learning had no significant impact on their engagement.

These results indicate that IT-based learning is well-received by most students and has great potential to increase their participation and engagement in the learning process. This finding supports the importance of technology integration in learning to create a more interactive and effective educational environment. In addition, these results confirm that the utilization of IT-based media in geography learning, especially on complex topics such as natural disasters, can have a positive impact on students' understanding and engagement.

C. Discussion

The results of this study revealed that the use of information technology (IT)--based learning media plays an important role in improving student engagement in geography subjects, especially regarding natural disasters. Observations at SMAN 13 South Konawe showed that teachers have utilized technology such as PowerPoint and projectors to visualize materials. Although this approach helps to provide a clearer picture, the use of more interactive animation-based media is still limited, and traditional methods such as lectures and textbooks still dominate. Questionnaires filled out by teachers confirmed that there are efforts to implement more interactive teaching methods, although innovative media such as animated videos is still rare. Interviews also revealed limited mastery of technology as the main challenge in optimally implementing IT-based media.

The student engagement questionnaire shows a positive response to IT-based learning, with 40.4% of students agreeing and 39.8% strongly agreeing that they feel more engaged. These percentages indicate that most students feel increased participation and interest in learning. In contrast, only 1.6% disagreed, signaling that a minority of students still felt a lack of engagement, while 18.2% were neutral, which may be due to a lack of experience in this method. These results support previous research findings that emphasize the importance of technology in improving student engagement and understanding (Fachmi et al., 2023; Hariyono, 2023; Said, 2023). However, this study also highlights that teachers need more intensive training and

support to improve their skills in developing and using IT-based learning media. Such support is expected to help create a more interactive and effective learning process, thus strengthening students' understanding of complex material.

IV. Conclusion

This research shows that the use of information technology (IT)-based learning media has a positive impact in improving student engagement in geography learning, particularly on the topic of natural disasters. Although technologies such as PowerPoint and projectors have been used by teachers at SMAN 13 South Konawe to support material visualisation, the application of more interactive media, such as animated videos, is still limited. This indicates that, although there is awareness of the importance of using IT in learning, limitations in IT-based media development and implementation skills are a major challenge for teachers.

Questionnaire results show that the majority of students feel more engaged in IT-based learning, with most agreeing and strongly agreeing on the effectiveness of this media. However, there is still a small proportion of students who are neutral or disagree, signalling the need for more varied experiences and approaches to ensure all students benefit optimally. This research confirms that to optimise the use of technology in learning, teachers need adequate training and support facilities. With this step, it is expected that learning can become more interactive, effective and able to improve students' understanding of complex material, such as natural disasters, more significantly. The findings provide important implications for the development of learning strategies in the digital era, where the utilisation of technology can be one of the solutions to improve the quality of education.

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