

Transformation of Physics Learning through Digital Media at Universitas Samudra

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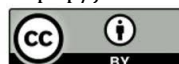
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Abstract

The transformation of learning in the digital era encourages universities to utilise technology in improving the quality of the learning process. This study aims to analyse the transformation of physics learning through the use of digital media in the Digital Learning Innovation course at Samudra University. This study uses a qualitative descriptive approach supported by simple quantitative data. The subjects of the study were 14 2nd-semester students who took courses with a weight of 2 credits. Data collection techniques are carried out through observation, questionnaires, and documentation. The results of the study show that the implementation of digital media such as interactive presentations, learning videos, online learning platforms, and media design applications is able to create a more interactive and varied learning process. The level of student participation in learning is relatively high, with the majority of students in the active and very active categories. The results of the questionnaire showed that students' perception of the use of digital media was in the very good category, with an average score of 4.24. In addition, students can produce digital learning media products with an average score of 85, which is included in the very good category. Thus, the use of digital media has been proven to be able to increase student involvement, motivation, and creativity in physics learning.

Keywords: Digital Learning; Digital Media; Physics Learning; learning innovation; Higher Education

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INTRODUCTION

The development of information and communication technology has brought great changes in various areas of life, including in the world of education. (Sarkar, 2012). Digital transformation in education is one of the strategic efforts to improve the quality of the learning process to be more effective, interactive, and relevant to the needs of the 21st century. In the context of higher education, the integration of digital technology in learning is not only complementary but has developed into a key need in creating innovative and meaningful learning experiences for students. (Selwyn, 2021).

The change in the educational paradigm in the digital era has encouraged universities to adopt various technology-based learning media. Digital media allows for the delivery of more varied material through a combination of text, audio, video, animation, and simulation. This provides opportunities for lecturers to design more engaging learning and encourage active student involvement in the learning process. (Redecker, 2017).

Learning physics as a science discipline is often considered difficult by some students because many concepts are abstract and require a deep conceptual understanding. (Dykstra Jr et al., 1992). Therefore, the use of digital media in physics learning is a potential solution to visualise these concepts in a more concrete and easy-to-understand way. Media such as interactive simulations, experimental videos, and digital-based learning applications can help students understand physics phenomena more effectively. (Zhai et al., 2021).

The use of digital media is also in line with the demands of 21st-century skills that emphasise the ability to think critically, creatively, collaboratively, and communicatively. Through the integration of technology in learning, students not only gain conceptual knowledge but also develop digital literacy, which is very important in the modern world of work. (Siddiq et al., 2024).

In the university environment, the application of digital media in learning is growing along with the increasing availability of technological devices and wider internet access. Lecturers as learning facilitators are required to be able to design learning strategies that utilise technology optimally so that the learning process becomes more dynamic and student-centred (Bond et al., 2020).

Universitas Samudra, as one of the universities in Indonesia, also seeks to transform learning through the use of digital technology. One form of implementation can be seen in the Digital Learning Innovation course, which is held in semester 2 with a weight of 2 credits. This course aims to equip students with the ability to design and develop digital-based learning media that are innovative and relevant to modern learning needs.

In the course, there were 14 students who took part in the learning process. The relatively small number of students provides opportunities for lecturers to apply a more intensive, collaborative learning approach and allows for a more in-depth exploration of the use of various digital media. This condition also supports the implementation of a more flexible and interactive learning model.

Digital media in physics learning can include various forms such as online learning platforms, interactive learning videos, computer-based simulations, and web-based or mobile learning applications. (Girwidz & Kohnle, 2022). The use of these various media can increase the understanding of physics concepts because students can see the visualisation of phenomena that were previously difficult to understand, only through verbal explanations or texts. (Mayer, 2014).

In addition to increasing understanding of concepts, digital media is also able to increase student learning motivation. Research shows that the use of interactive digital media in science learning can increase students' interest in learning and active participation in the learning process. (Sailer & Homner, 2020).

In the context of physics learning in higher education, the use of digital media also allows the application of a project-based learning approach. Students can be involved in the process of creating digital learning media as part of a learning assignment or project. This activity not only improves the understanding of physics concepts but also develops students' creativity and technology skills.



The Digital Learning Innovation course provides opportunities for students to learn various basic concepts regarding the development of digital learning media. Students are also encouraged to develop learning media products that can be used in the learning process of physics and other science fields.

In its implementation, students not only learn theories about digital learning innovations but also directly practice the creation of learning media using various digital applications. This process allows students to gain a more contextual and applicable learning experience.

The use of digital media in physics learning also has the potential to improve students' critical thinking skills. Through digital simulations and visualisations, students can explore various physical phenomena and analyse the results obtained. (De Jong et al., 2013).

In addition, digital media-based learning also supports flexible learning. Students can access learning materials anytime and anywhere through the digital devices they have. This provides opportunities for students to learn independently according to their respective learning speeds. (Hrastinski, 2019).

The transformation of learning through digital media also encourages a change in the role of lecturers from informants to learning facilitators. Lecturers play a role in designing learning experiences that allow students to actively build knowledge through interaction with various digital learning resources. (Laurillard, 2013).

However, the implementation of digital media in learning also faces various challenges. These challenges include the limited digital skills of some students and lecturers, the availability of technology infrastructure, and the readiness of institutions to support digital-based learning transformation.

Therefore, the right strategy is needed in integrating digital media in learning in order to provide optimal benefits. The integration needs to be designed systematically by paying attention to the learning objectives, student characteristics, and existing learning context.

In the context of physics learning at Samudra University, learning transformation through digital media is an important step to improve the quality of the learning process. By utilising various digital media, complex physics concepts can be presented in a more attractive and easier-to-understand manner to students.

In addition, digital media-based learning can also increase student involvement in the learning process. Students are not only recipients of information but also play an active role in exploring, analysing, and developing knowledge through various digital learning activities.

Through the Digital Learning Innovation course, students are expected to be able to understand the basic concepts of digital learning media development and be able to apply them in physics learning. This is important in facing educational challenges in the digital era that demand innovation and creativity in the learning process.

Based on this description, the transformation of physics learning through digital media at Samudra University is an important topic to be studied. This research is expected to provide an overview of the implementation of digital media in learning and its contribution to improving the quality of physics learning in the university environment.

RESEARCH METHODS

This study uses a qualitative descriptive approach supported by simple quantitative data to describe the transformation process of physics learning through the use of digital media in the Digital Learning Innovation course at Samudra University. This approach was chosen because the research aims to systematically describe the implementation of digital media in the learning process and students' responses to the use of these media. According to (Creswell & Creswell, 2018) A qualitative descriptive approach is used to understand learning phenomena in depth based on students' experiences and interactions in an educational context.

The research was carried out at the Physics Education Study Program, Universitas Samudra, in the even semester of the current academic year. The research subjects are students who take the Digital Learning Innovation course in semester 2 with a weight of 2 credits. The number of



students involved in this study was 14 people who actively participated in lectures for one semester.

The object of this research is the process of transforming physics learning through the use of digital media, including the use of interactive presentation media, learning videos, online learning platforms, and digital applications used by students in designing physics learning media. The research focus includes how digital media is used in the learning process as well as how it affects student engagement and understanding.

The data collection technique in this study uses several methods, namely observation, questionnaire, and documentation. Observations are carried out during the lecture process to see firsthand the activities of students and lecturers in using digital media in learning. This observation aims to obtain an overview of learning interactions, student involvement, and the effectiveness of the use of digital media in the learning process.

In addition to observation, this study also uses questionnaires or questionnaires given to students. The questionnaire was used to find out students' perceptions of the use of digital media in physics learning. The questionnaire was compiled using a Likert scale with several indicators such as the ease of use of media, the level of understanding of concepts, learning motivation, and students' interest in digital-based learning. According to (Sugiyono, 2017) The use of questionnaires in educational research can help obtain data on respondents' attitudes, perceptions, and experiences of a learning process.

The next data collection technique is documentation, which is used to collect various supporting data, such as Semester Learning Plans (RPS), lecture materials, student assignment results in the form of digital media products, and documentation of learning activities. This documentation data is used to strengthen the results of observations and questionnaires that have been carried out.

The data analysis technique in this study is carried out through several stages, namely data reduction, data presentation, and a conclusion drawn. The data reduction stage is carried out by selecting and focusing on data that is relevant to the research objectives. Furthermore, the data is presented in the form of a descriptive narrative and tables to facilitate understanding of the research results.

The last stage is concluding, namely by interpreting the data that has been analysed to obtain an overview of the effectiveness of the use of digital media in physics learning in the Digital Learning Innovation course. This analysis process is carried out systematically so that the results of the research can provide a clear picture of the transformation of physics learning through digital media at Samudra University.

With this research method, it is hoped that a comprehensive understanding of how digital media is used in physics learning and how it impacts the learning experience of students in the Digital Learning Innovation course.

RESULTS AND DISCUSSION

Implementation of Digital Media in Physics Learning

The implementation of learning in the Digital Learning Innovation course at Samudra University was carried out for one semester for 2nd-semester students with a weight of 2 credits and a total of 14 students. Based on the results of observations during the lecture process, lecturers apply various digital media to support the learning process, such as interactive presentation media, learning videos, online learning platforms, and digital media creation applications.

The use of digital media aims to increase students' understanding of physics learning concepts and train students in designing innovative learning media that can be used in future learning activities. According to (Mayer, 2014) The use of digital media that combines text, images, and animations can help students understand concepts more effectively than conventional learning methods.

In its implementation, students not only receive material from lecturers but are also given the task of creating digital learning media in groups and individually. This activity provides direct



experience to students in designing innovative learning media. The following table shows the types of digital media used during the learning process.

Table 1. Types of Digital Media Used in Learning

Yes	Types of Digital Media	Description of Use	Learning Objectives
1	Interactive Presentations	Used by lecturers to explain the basic concepts of digital learning	Facilitate the delivery of material
2	Learning Videos	Showing examples of the application of digital media in physics learning	Improve visual comprehension
3	Online Learning Platform	Used for material distribution and task collection	Supports flexible learning
4	Media Design Applications	Used by students to create digital learning media	Developing students' creativity

Based on the table, it can be seen that digital media is used in a variety of ways in the learning process, so that it is able to create a more interactive learning experience.

Based on the results of the study, the implementation of digital media in learning in the Digital Learning Innovation course at Universitas Samudra shows that the use of various media, such as interactive presentations, learning videos, online learning platforms, and media design applications, can support a more varied and interactive learning process. The use of digital media allows lecturers to convey physics learning materials more visually so that abstract concepts can be understood more easily by students.

In physics learning, conceptual visualisation is an important aspect because many physical phenomena cannot be observed directly. Therefore, the use of digital media is one of the solutions to help students understand the concept more concretely. This is in line with the Multimedia Learning theory put forward by (Mayer, 2014) which states that learning that integrates various multimedia elements such as text, images, animations, and audio can improve concept understanding because it utilises various cognitive channels in the learning process.

In addition, the use of digital media also provides opportunities for students to learn more flexibly. Students can access learning materials through digital platforms so that the learning process does not only occur in the classroom but can also be done independently outside of lecture time. According to (Hrastinski, 2019) Digital learning provides greater flexibility for students to access materials and allows for more independent learning.

The implementation of digital media in this study also shows a change in the learning approach from previously lecturer-centred to more student-centred. Students not only receive the material passively, but also engage in various technology-based learning activities. This shows that the use of digital media is able to support the implementation of more active and innovative learning.

Student Participation Rate in Digital Learning

Based on the results of observations during the learning process, student participation in digital media-based learning activities is quite high. Students were seen active in discussions, making digital media projects, and in the process of presenting assignment results. The high participation of students shows that the use of digital media can increase student involvement in the learning process. This is in line with research. (Sailer & Homner, 2020) which states that digital media can increase interaction and student participation in learning. Data on student participation during the learning process can be seen in the following table.

Table 2. Student Participation Rate in Learning

Categories of Participation	Number of Students	Percentage
Highly Active	5	35,7%
Active	6	42,9%
Quite Active	3	21,4%
Less Active	0	0%
Total	14	100%



Based on the table above, the majority of students are in the active and very active categories, with a total percentage of 78.6%. This shows that the use of digital media is able to increase student involvement in the learning process.

The results of the study show that the level of student participation in digital media-based learning is relatively high. Most students are in the active category and are very active in learning activities. This shows that the use of digital media is able to increase student involvement in the learning process.

The high level of student participation can be caused by the use of digital media, which makes learning more interesting and not monotonous. Digital media allows for a more interactive presentation of material so that students are more encouraged to participate in discussions and other learning activities. This is in line with research conducted by (Sailer & Homner, 2020) which states that the use of digital technology in learning can increase student engagement and active participation.

In addition, digital media-based learning also encourages students to be more active in exploring learning materials. Students can search for various additional learning resources through the internet so that the learning process becomes broader and is not limited to the material delivered by lecturers only. According to (Bond et al., 2020) The integration of digital technology in learning is able to create a more interactive learning environment so that students are more cognitively and emotionally involved in the learning process.

The high student participation also shows that digital media is able to create a more collaborative learning atmosphere. Students can work together in completing assignments and learning projects given by lecturers. Interaction between students in this learning process can improve their understanding of concepts and academic communication skills.

Students' Perceptions of Digital Media Use

To find out students' perceptions of the use of digital media in learning, the researcher gave a questionnaire to all students who took the course. The questionnaire consists of several indicators, namely ease of use of media, increased understanding of concepts, learning motivation, and interest in digital learning. The results of the questionnaire analysis showed that most students responded positively to the use of digital media in learning.

Table 3. Student Perception Survey Results

Indicator	Average Score	Category
Ease of use of media	4,21	Good
Understanding of physics concepts	4,18	Good
Learning motivation	4,25	Excellent
Interest in learning	4,32	Excellent
Overall average	4,24	Excellent

Based on the table, the overall average score of 4.24 is included in the very good category. This shows that students have a positive perception of the use of digital media in the learning process.

The results of the questionnaire given to students showed that students' perception of the use of digital media in learning was in the very good category, with an overall average score of 4.24. This shows that students give a positive response to the application of digital media in the learning process.

Indicators that obtained high scores were learning motivation and students' interest in digital-based learning. This shows that the use of digital media is able to create a more interesting and enjoyable learning process for students. According to (Redecker, 2017) The use of digital technology in learning can increase learning motivation because it provides a more interactive and innovative learning experience.

In addition, students also stated that the use of digital media helps them to understand physics concepts better. Visualisation of concepts through learning videos and interactive media



allows students to see physics phenomena more realistically. This is in line with research. (Zhai et al., 2021) which states that the use of digital media in science learning can significantly improve students' conceptual understanding.

Students' positive perceptions of the use of digital media also show that technology-based learning has great potential to be developed in higher education. With the right use of technology, the learning process can be more effective and able to improve the quality of the student learning experience.

Student Digital Learning Media Product Results

One of the main tasks in the Digital Learning Innovation course is the creation of digital learning media products. Students are asked to design physics learning media that can be used to explain certain concepts in a more interesting and easy-to-understand way. Based on the results of student assignment documentation, most students can produce digital learning media that is quite creative and innovative. The media produced includes learning videos, interactive presentations, and animation-based visual media. The assessment of student digital media products can be seen in the following table.

Table 4. Student Digital Media Product Assessment

Assessment Criteria	Average Score	Category
Media creativity	84	Good
Clarity of material	86	Excellent
Visual design	82	Good
Compatibility with physics concepts	88	Excellent
Overall average	85	Excellent

These results show that students are able to develop digital learning media of good quality. This shows that learning in the Digital Learning Innovation course not only increases students' understanding of digital learning concepts but also develops practical skills in designing learning media.

One of the important results in this study is the ability of students to produce digital learning media products of good quality. Based on the results of the assessment of student digital media products, an average score of 85 was obtained, with the very good category. This shows that students can develop creative digital learning media, which are in accordance with the concept of physics learning.

The activity of making digital learning media provides opportunities for students to apply the knowledge they have learned in the form of real products. This process not only improves understanding of concepts but also trains students' technological skills and creativity. According to (Thomas, 2000) Project-based learning can improve students' critical thinking skills, creativity, and problem-solving skills.

In addition, the activity of making learning media also encourages students to integrate physics concepts with attractive visual designs so that the media produced can be used effectively in the learning process. This ability is one of the important competencies that must be possessed by prospective educators in the digital era.

The results of this study also show that students are able to utilise various digital applications to develop innovative learning media. This shows that the learning in the Digital Learning Innovation course not only focuses on theoretical aspects but also provides practical experience to students in designing technology-based learning media.

Overall, the results of this study show that the transformation of physics learning through digital media has a positive impact on the learning process. The use of digital media not only increases student involvement in learning but also develops creative skills and digital competencies that are very important in 21st-century education.

CONCLUSION

Based on the results of research on the transformation of physics learning through digital media in the Digital Learning Innovation course at Samudra University, it can be concluded that the use of digital media has a positive impact on the learning process. The implementation of various digital media, such as interactive presentations, learning videos, online learning platforms, and media design applications, is able to create learning that is more varied, interactive, and easy to understand for students. The results of the study show that the level of student participation in digital media-based learning is relatively high. Most students are in the active category and are very active in learning activities. This shows that the use of digital media is able to increase student involvement in the learning process and create a more interesting learning atmosphere. In addition, the results of the questionnaire showed that students had a very positive perception of the use of digital media, with an average score of 4.24, which was included in the very good category. Digital media is considered to be able to increase learning motivation, students' interest in learning, and help in understanding physics concepts more effectively. Students are also able to produce digital learning media products of good quality, with an average score of 85. This shows that learning not only improves concept understanding but also develops students' creativity and digital competence. Thus, the transformation of physics learning through digital media can be one of the effective strategies to improve the quality of learning in higher education.

REFERENCES

- Bond, M., Buntins, K., Bedenlier, S., Zawacki-Richter, O., & Kerres, M. (2020). Mapping research in student engagement and educational technology in higher education: A systematic evidence map. *International Journal of Educational Technology in Higher Education*, 17(1), 1–30.
- Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (5th ed.). SAGE Publications, Inc.
- De Jong, T., Linn, M. C., & Zacharia, Z. C. (2013). Physical and virtual laboratories in science and engineering education. *Science*, 340(6130), 305–308.
- Dykstra Jr, D. I., Boyle, C. F., & Monarch, I. A. (1992). Studying conceptual change in learning physics. *Science Education*, 76(6), 615–652.
- Girwidz, R., & Kohnle, A. (2022). Multimedia and digital media in physics instruction. In *Physics education* (pp. 297–336). Springer.
- Hrastinski, S. (2019). What do we mean by blended learning? *TechTrends*, 63(5), 564–569.
- Laurillard, D. (2013). *Teaching as a design science: Building pedagogical patterns for learning and technology*. Routledge.
- Mayer, R. E. (2014). Incorporating motivation into multimedia learning. *Learning and Instruction*, 29, 171–173.
- Redecker, C. (2017). *European framework for the digital competence of educators: DigCompEdu*.
- Sailer, M., & Homner, L. (2020). The gamification of learning: A meta-analysis. *Educational Psychology Review*, 32(1), 77–112.
- Sarkar, S. (2012). The role of information and communication technology (ICT) in higher education for the 21st century. *Science*, 1(1), 30–41.
- Selwyn, N. (2021). *Education and technology: Key issues and debates*. Bloomsbury Publishing.
- Siddiq, F., Olofsson, A. D., Lindberg, J. O., & Tomczyk, L. (2024). What will be the new normal? Digital competence and 21st-century skills: critical and emergent issues in education. *Education and Information Technologies*, 29(6), 7697–7705.
- Sugiyono, D. (2017). *Metode Penelitian Kuantitatif, Kualitatif, dan Tindakan*. Alfabeta.
- Thomas, J. W. (2000). *A review of research on project-based learning*. San Rafael, CA, USA.
- Zhai, X., Chu, X., Chai, C. S., Jong, M. S. Y., Istenic, A., Spector, M., Liu, J.-B., Yuan, J., & Li, Y. (2021). A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. *Complexity*, 2021(1), 8812542.