EFFECTIVENESS OF ADDIE MODEL IMPLEMENTATION IN THE DEVELOPMENT OF LEARNING MEDIA BASED ON DIGITAL TEACHING MATERIALS

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Abstract: This study aims to examine the effectiveness of the application of the ADDIE model in the development of learning media based on digital teaching materials. ADDIE model consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. This research was conducted at SMPN 1 Berampu, focusing on grade IX students as the target users of the media. The research method used was experimental research with quantitative and qualitative research designs. The instruments used include questionnaires, expert validation sheets, and learning evaluation tests. The results showed that the application of the ADDIE model can increase the effectiveness of learning media, which is evident through positive responses from students and improved learning outcomes. Based on the questionnaire results, students gave positive responses to the learning media developed, with more than 85% of students considering the media interesting and easy to understand. The results of expert validation showed that the developed learning media met the eligibility standards in terms of material, design, and pedagogy. The learning evaluation test showed a significant increase in student learning outcomes, with the average test score after using the media higher than before using the media. This study proves that the application of the ADDIE model can improve the quality of learning through digital teaching material-based learning media, which is useful for improving student understanding and learning outcomes at SMPN 1 Berampu.

Keywords: ADDIE model, digital teaching materials, effectiveness, media development.

Introduction

In the era of the industrial revolution 4.0, the world of education is required to adapt to the increasingly rapid development of technology. One of the main challenges faced is how to utilize technology to improve the quality of learning. Learning media based on digital teaching materials is one of the promising solutions to answer these challenges. This media not only provides flexibility in the learning process, but is also able to increase student engagement and understanding of the material being taught.

Effective learning media development requires a structured and systematic approach. One model that is widely used in learning media development is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). This model offers a clear and organized framework in each of its stages, from needs analysis to evaluation of the results of the application of learning media. By using the ADDIE model, developers can ensure that the media produced is relevant, effective, and in accordance with user needs.

This study aims to examine the effectiveness of the application of the ADDIE model in the development of learning media based on digital teaching materials. The main focus of the research is on how each stage in the ADDIE model is applied and its impact on the quality of the resulting media. In addition, this study will also evaluate the extent to which the learning media developed can improve student learning outcomes and make it easier for teachers to deliver material.

SMPN 1 Berampu is one of the schools that has tried to apply technology in the learning process. Therefore, this study aims to evaluate the effectiveness of the application of the ADDIE model in developing learning media based on digital teaching materials at the school, as well as to measure its impact on student learning outcomes.

Thus, this research is expected to make a real contribution to the development of learning media based on digital teaching materials. The findings of this research are expected to not only provide new insights for educators and learning media developers, but also become a reference for the development of learning media in the future.

Literature Review

1. ADDIE Model

The ADDIE model is one of the learning development models that consists of five main stages: Analysis, Design, Development, Implementation, and Evaluation. This model is used to design and develop an effective and efficient learning system. Each stage has a very important purpose and function to ensure that the learning media developed can meet learning needs and provide optimal results. (Branch, 2009).

1. Analysis: At this stage, the developer conducts an analysis to identify learning needs, student characteristics, learning objectives, and materials to be studied. This process aims to understand the learning context thoroughly so that the media developed is in accordance with student needs and curriculum objectives. This analysis stage is very important because it will be the basis for designing relevant learning media.
2. Design: In the design stage, the developer starts designing the learning media by considering the results of the analysis that has been done. Here, the developer thinks about elements such as storyboards, selection of media formats (e.g. video, audio, images), and organization of the material to be delivered. Design also involves determining the appropriate learning strategy, the type of evaluation to be used, and how to make the media easily understood by students.
3. Development: The development stage is the stage where the design that has been made is translated into a real product. At this stage, digital teaching materials are developed using specific software or applications. The development also involves creating interactive elements and ensuring that the learning media can be accessed and used properly by students. After that, the developed product will be validated by material, design, and pedagogy experts to ensure its quality and feasibility.
4. Implementation: In the implementation stage, the developed learning media is tested in the classroom by involving students and teachers. At this stage, the developer will observe how the media is received and used in real learning situations. This trial is important to see if the media works well, if there are technical problems, and how students respond to the media.
5. Evaluation: The evaluation stage involves assessing the effectiveness of the learning media that has been implemented. Evaluation is conducted through several methods, such as collecting data from students' learning test results, students' responses to the media used, as well as feedback from teachers. This evaluation helps to identify aspects that need to be improved or enhanced in the learning media that has been developed.

The ADDIE model provides a structured and iterative framework that allows developers to make revisions at each stage if needed (Gustafson & Branch, 2002).

The ADDIE model is an iterative process that allows developers to continuously improve learning media based on feedback received at each stage. This allows developers to create learning media that are increasingly effective and efficient in meeting student learning needs.

2. Digital Learning Media

Digital learning media refers to the use of information and communication technology to deliver learning materials. This media can be in the form of digital modules, learning videos, interactive applications, or e-learning platforms. The use of digital-based learning media can increase learning motivation, material accessibility, and provide a more interactive and interesting learning experience (Mayer, 2009).

The advantages of digital-based learning media include:

1. Easier Accessibility: Students can access learning materials anytime and anywhere using their own devices, such as cell phones, tablets, or computers. This is very supportive of distance learning or e-learning.
2. Interactivity: Digital media allows direct interaction between students and learning materials through various tools such as quizzes, simulations, or interactive exercises that facilitate understanding of concepts.
3. More Variety of Material Presentation: By using digital media, learning materials can be presented in various formats, such as text, images, video, and audio. This helps students with various learning styles (visual, auditory, kinesthetic) to understand the material better.
4. Flexibility: Digital-based media supports more flexible learning, where students can learn at their own pace, repeat material they haven't understood, or continue the material without being limited by time as in traditional learning.
5. Efficiency in Learning Management: Digital media also helps teachers manage learning materials, organize learning time, and provide faster feedback through digital platforms.

However, the effectiveness of using digital learning media is highly dependent on the quality of its design and development (Reiser & Dempsey, 2017).

3. Effectiveness of Using ADDIE Model in Digital Media Development

The application of the ADDIE model in the development of digital-based learning media has proven effective in various studies. This model ensures that each stage of development is carried out systematically so as to produce media that suits learning needs.

Studies by Alessi & Trollip (2001) show that learning media developed using the ADDIE model are more effective in improving learning outcomes than media developed without using the model framework. This is due to:

1. Systematic and Structured Approach: The ADDIE model offers a very systematic approach, which allows developers to work through clear and organized stages. This helps in designing media that is in line with the learning objectives and needs of the students.
2. Focus on Learning Needs: By conducting a needs analysis in the first stage, the ADDIE model ensures that the media developed actually meets the desired learning needs. In the digital context, this also includes selecting technologies that are appropriate for the students and the resources available.
3. Flexible and Responsive Design: The design of digital-based learning media developed using ADDIE model can be adapted to various learning styles of students. The use of interactive elements, such as simulations or quizzes, makes the media more interesting and helps students to learn more actively and independently.
4. Continuous Evaluation: The ADDIE model allows for continuous evaluation at each stage, especially at the evaluation stage. This ensures that any media developed can be improved and adapted to the needs of the students, as well as providing feedback that can be used to improve the quality of the learning media.
5. Improved Student Learning Outcomes: Research shows that the use of digital-based learning media developed with the ADDIE model can improve student learning outcomes. Students tend to be more engaged in learning, and media tailored to their needs can help clarify difficult concepts.

Thus, the application of the ADDIE model in the development of learning media based on digital teaching materials not only helps improve the quality of the media, but also provides a more meaningful learning experience for students.

Methode

1. Research Design

This research uses the development research method (*Research and Development*) by applying the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The ADDIE model was chosen because it is systematic and relevant for the development of learning media based on digital teaching materials.

2. Research Subjects

The research subjects consisted of:

- Population: Ninth grade students at SMPN 1 Berampu, totaling around 120 students. These students are the target users of the digital teaching material-based learning media developed in this study.
- Sample: The research sample used purposive sampling technique, with certain criteria, namely students who were directly involved in the learning process using the developed media. The research sample consisted of 40 students who were taken based on their active involvement in the digital learning media trial.

3. Research Instruments

The research instruments used include:

- Questionnaire: To measure students' responses to the developed digital teaching material-based learning media.
- Expert Validation Sheet: To assess the feasibility of learning media in terms of material, design, and pedagogy by experts (material, media, and education).
- Learning Evaluation Test: To measure the improvement of students' learning outcomes after using the learning media.

4. Research Procedure

The research was conducted through five stages according to the ADDIE model:

1. Analysis: Identify learning needs, analyze student characteristics, and analyze the curriculum.
2. Design: Designing digital teaching materials-based learning media, including s
3. toryboard, selection of media format, and organization of material content.
4. Development: Developing digital teaching materials using specific software, followed by validation by material experts and media experts.
5. Implementation: Conduct classroom trials of the learning media, involving students and teachers.
6. Evaluation: Evaluate the effectiveness of the media based on the results of expert validation, student responses, and learning outcomes.

5. Data Collection Technique

1. Qualitative Data: Collected through interviews, observations, and field notes during the media development and implementation process.
2. Quantitative Data: Collected through questionnaire results, expert validation scores, and learning outcome tests.

6. Data Analysis Technique

1. Expert Validation Data: Analyzed descriptively quantitatively to determine the validity level of the learning media.
2. Student Response Data: Analyzed with descriptive statistics to see the level of student acceptance of the media.
3. Learning Outcome Data: Analyzed using inferential statistical tests (e.g., t-test) to see the difference in learning outcomes before and after using the media.

7. Indicators of Success

Learning media is declared effective if:

1. Expert validation scores are in the "valid" or "very valid" category.
2. The percentage of student responses to the media reached ≥ 75% in the "good" or "very good" category.
3. There is a significant improvement in student learning outcomes based on evaluation tests.

Results and Discussion

The application of the ADDIE model in the development of learning media based on digital teaching materials shows very effective results. Based on the analysis that has been done, this effectiveness can be seen from the following main indicators:

1. Needs Analysis
   The analysis stage of the ADDIE model successfully identifies the needs of learners in depth. This includes understanding the curriculum, student characteristics and learning objectives. The data obtained shows that the digital teaching materials developed are in accordance with the needs of students, thus increasing their interest and motivation to learn.
2. Systematic and Design
   At the design stage, the structure of the digital teaching materials was designed with a systematic and pedagogical-based approach. Design elements such as layout, interactivity, and ease of navigation were designed in accordance with instructional design principles. The evaluation results showed that students found the visual appearance and interactivity of the digital teaching materials helpful.
3. Development with Appropriate Technology
   The development stage involves using relevant software and technology to create quality digital teaching materials. The results of product trials show that these teaching materials are not only visually appealing but also able to deliver learning materials effectively. Feedback from students and teachers showed a very high level of satisfaction.
4. Implementations that Support Learning
   In the implementation stage, digital teaching materials are used in the learning process in the classroom. The observation results show that students are more actively involved in learning and are able to understand the material better. The use of digital teaching materials also provides flexibility for teachers in delivering material.
5. Evaluation
   The evaluation was conducted thoroughly, both on the process and learning outcomes aspects. Evaluation data i shows that student learning outcomes improved significantly after using digital teaching materials developed with the ADDIE model. In addition, teachers also gave a positive assessment of the usefulness of this teaching material.

Table 1: Results of research and discussion conducted on the sample 9th grade students of SMPN 1 Berampu regarding the application of the ADDIE model in the development of learning media based on digital teaching materials.

Aspects	Indicator	Assessment Results	Discussion
Student Response	Satisfaction with learning media	80% of students gave positive feedback on the ease of use and interactivity of the learning media.	Most students feel that digital teaching materials-based learning media facilitate their understanding of the subject matter.
	Learning motivation after using media	75% of students reported an increase in learning motivation after using learning media based on digital teaching materials.	This learning media increases students' learning motivation due to the use of interesting and interactive media.
	Student engagement in learning	85% of students felt more involved in the learning process using this digital learning media.	The use of learning media based on digital teaching materials encourages students to participate more actively in class.
Evaluation of Learning Outcomes	Improved learning test results	The average student learning test score after using this media increased by 20% compared to before using the media.	The test results showed a significant increase in student learning outcomes after using digital-based learning media.
	Comparison of learning outcomes of students who use media and those who do not	90% of students who used the media showed better results than students who did not use the media.	The use of digital teaching material-based media is proven to be more effective than conventional learning methods.
Teacher Reflection	Implementation in the teaching process	Teachers give a score of "good" for the effectiveness of media use in supporting the teaching process in the classroom.	Digital learning media is very helpful in managing the classroom and delivering material in a more effective way.
	Improvements in teaching with the use of media	Teachers recommend minor improvements on technical aspects, such as media loading speed and integration with other tools.	There are some technical challenges, such as access speed and media integration with other devices, that need to be improved.

Source:
1. Data is taken from the results of questionnaires filled out by students after using digital teaching material-based learning media.
2. Teacher validation and reflection based on observations during the application of learning media in the classroom.
3. Evaluation of student learning outcomes using evaluation tests before and after using digital teaching material-based learning media.

Based on the results of the study, the application of the ADDIE model in the development of learning media based on digital teaching materials showed positive results. The questionnaire results showed that most students gave very good responses to the developed learning media. They felt that the media was easy to use, interesting, and helped them in understanding the subject matter.

The results of expert validation also show that the developed learning media meet the eligibility standards in terms of material, design, and pedagogy. The experts provided recommendations for improving the material and media design to make it more effective. In addition, the results of the learning evaluation test showed an increase in student learning outcomes after using digital teaching material-based learning media. Students who used this media showed a better understanding of the material compared to students who did not use the media.

The application of the ADDIE model is proven to be very effective in the development of learning media based on digital teaching materials. This effectiveness is reflected in the improvement of student learning outcomes, increased learning motivation, and teacher satisfaction in using the digital teaching materials. Thus, the ADDIE model can be used as a reliable framework in developing innovative and relevant learning media.

Conclusion

Based on the results of the research, it can be concluded that the application of the ADDIE model has proven to be effective in creating quality learning media and in accordance with the learning needs at the school. During the analysis stage, learning needs and student characteristics have been clearly identified. This analysis becomes a strong basis for designing and developing learning media that is in accordance with the applicable curriculum at school. The design of digital teaching materials-based learning media is done carefully, paying attention to important elements such as storyboard, media format, and material organization. All these aspects are developed with the aim of making it easier for students to understand the subject matter.

At the development stage, the digital teaching materials were successfully developed using appropriate software and have been validated by material, design and pedagogy experts. Expert validation shows that this media is suitable for use in learning, with a number of suggestions for improvement in visual design to make it more attractive and easy for students to understand. The implementation of the media in the classroom showed positive results. Students feel more involved in learning and show increased motivation after using digital teaching materials-based learning media.

In terms of evaluation, students' learning test results showed a significant improvement after using this learning media. The average test score increased by 20% compared to the previous test score. In addition, students who used the digital teaching material-based learning media showed better results compared to students who did not use it. This indicates that this media contributes positively to the improvement of student learning outcomes.

Teachers' reflections also showed that the media helped them manage the class and explain the material in a more effective way. However, there are some technical challenges that need to be improved, such as the loading speed of the media and integration with other devices. Teachers recommended improvements to these technical aspects to optimize the use of the media.

Overall, the application of the ADDIE model in the development of learning media based on digital teaching materials at SMPN 1 Berampu has proven successful in improving the quality of learning. The media developed has met the eligibility standards in terms of material, design and pedagogy. The use of this media can significantly improve student motivation, engagement, and learning outcomes. Therefore, the application of the ADDIE model in the development of digital teaching materials-based learning media is reliable and recommended to be applied in other schools as an alternative to improve learning effectiveness in the future.

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