

Assistance In Designing An Adaptive E-Learning System To Improve Student Learning Outcomes In Dawuan Elementary School

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Abstract. This dedication aims to address issues in learning at SD Negeri 1 Dawuan through the guidance of an adaptive e-learning system. The partner's problem is the low level of student learning outcomes, reflecting the ineffectiveness of the learning process at the school. In an effort to improve student learning outcomes, community service is provided in the form of guidance in developing an adaptive e-learning system tailored to the needs and characteristics of students at SD Negeri 1 Dawuan. The service includes the following stages: first, analysis of the needs and learning problems at the school. Second, the design and development of an adaptive e-learning system that can be tailored to the abilities and learning styles of students. Third, training for teachers and educators in using the e-learning system. Finally, evaluation and assessment of the guidance results. The solutions offered in this dedication are expected to improve overall student learning outcomes. With an adaptive e-learning system, students will receive learning materials that match their needs and abilities. Teachers will also be able to provide more effective and targeted teaching according to each student's learning style. Additionally, this system can monitor individual student learning progress and provide adequate feedback. The results of this guidance show that the implementation of the adaptive e-learning system can significantly improve student learning outcomes. The increase in exam scores and more enthusiastic learning activities are indicators of the success of this guidance. Thus, it can be concluded that guidance on adaptive e-learning systems has the potential to enhance the effectiveness of learning at SD Negeri 1 Dawuan.

Keywords: Adaptive e-learning; Student learning outcomes; Guidance; Learning effectiveness.

1 Introduction

1.1. Situation Analysis

Public Elementary School 1 Dawuan is a formal educational institution. As one of the primary schools in the area, it plays an important role in providing basic education to school-age children. However, in recent years, SD Negeri 1 Dawuan has faced various challenges that affect the quality and effectiveness of the learning process. Some of the problems faced by this partner school include: **Low Level of Student Learning Outcomes:** One of the main problems faced by SD Negeri 1 Dawuan is the low level of student learning outcomes. [1][2] This is reflected in the results of examinations and evaluations which show that academic achievement is not optimal. [3] **Limited Resources:** The school also suffers from limited resources, both in terms of infrastructure, learning tools, and human resources. [3][4] The lack of adequate facilities and amenities can affect the quality of the teaching-learning process. **Differences in Students' Learning Styles and Abilities:**

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Every student has different learning characteristics and abilities. [5][6] However, the lack of learning approaches tailored to individual learning styles can leave some students behind in the learning process. *Limited Teacher-Student Interaction:* The worldwide COVID-19 pandemic has affected the education system, including at SD Negeri 1 Dawuan. Physical restrictions and policy changes regarding face-to-face learning have resulted in limited direct interaction between teachers and students. [7][8] *Lack of Learning Innovation:* The school also needs to face the challenge of presenting interesting and effective learning innovations to increase students' interest in learning. *Teacher Readiness to Use Technology:* The use of technology in learning is becoming increasingly important, but some teachers may still need further assistance and training to integrate the technology in the learning process.[9]

In an effort to improve the quality of learning and overcome the above problems, an adaptive e-learning system is proposed as one of the solutions. The adaptive e-learning system is designed to overcome differences in students' abilities and learning styles, and improve learning interactions in flexible learning conditions, including during the COVID-19 pandemic.

1.2. Problem Formulation

How to improve the quality of learning and overcome these problems through the application of adaptive e-learning system assistance?

1.3. Objectives and Benefits of the Service

The purpose of implementing adaptive e-learning system assistance is to improve the quality of learning in a personalized and responsive manner, as well as overcome challenges that may arise in the context of online learning. Thus, there are several benefits, among others:

- 1) Provide a better learning experience that suits individual needs.
- 2) Accelerate the learning process by focusing on relevant material and challenges that match learners' abilities.
- 3) Encourage individual development by providing specific and relevant feedback.

2 Method

2.1. Stages of Implementation

2.1.1. PKM Activity Plan/Stage

No.	PKM Activity Stages
1	Needs and Problem Analysis
2	Design and Development of Adaptive E-learning System
3	Training and Guidance for Teachers and Educators
4	Implementation of Adaptive E-learning System
5	Monitoring and Evaluation
6	Result Assessment and Documentation
7	Preparation of PKM Report

2.1.2. Who is Involved

- The service team consists of lecturers and students with expertise in educational technology, education, and adaptive e-learning development.
- Principal and teachers at State Elementary School 1 Dawuan.
- Students at State Elementary School 1 Dawuan as the beneficiaries of this assistance.

2.1.3. Indicators of Achievement

No.	Achievement Indicator
1	Significant increase in students' average test scores

2	<i>Increased level of student participation in the learning process</i>
3	<i>Improved interaction between teachers and students</i>
4	<i>Learning support that suits students' individual learning styles</i>
5	<i>Positive evaluations from teachers and students regarding the effectiveness of the adaptive e-learning system</i>
6	<i>Availability of PKM report that presents the results and evaluation comprehensively</i>

2.1.4. Implementation Time

No.	Activity Implementation Time
1	<i>Needs and Problem Analysis 1 Month</i>
2	<i>Design and Development of Adaptive E-learning System 2 Months</i>
3	<i>Training and Guidance for Teachers and Educators 2 Months</i>
4	<i>Implementation of Adaptive E-learning System 2 Months</i>
5	<i>Monitoring and Evaluation 2 Months</i>
6	<i>Result Assessment and Documentation 1 Month</i>
7	<i>Preparation of PKM Report 1 Month</i>

This assistance will be carried out for 13 months by involving various related parties. It is expected that this structured and planned PKM implementation method will make a positive contribution in improving student learning outcomes at Dawuan 1 State Elementary School through the implementation of an adaptive e-learning system that is effective and in accordance with student needs. Periodic evaluation will help ensure the success of the program and provide an opportunity to make adjustments if needed.

2.2. Partner Participation

In the implementation of the program "Adaptive E-Learning System Design Assistance to Improve Student Learning Outcomes of SD Negeri I Dawuan," partner participation has a central role in optimizing the implementation and success of the program. Partners will be actively involved in the system design stage, contribute local understanding, and provide specific insights related to the school context of SD Negeri I Dawuan. Close collaboration between the partner and the adaptive e-learning system development team will ensure that the resulting solution fits the unique needs and challenges faced by students and educators in the environment.

2.3. Division of Roles

The program development team of "Adaptive E-Learning System Design Assistance to Improve Student Learning Outcomes of SD Negeri I Dawuan" consists of three student members who have their respective competencies and assignments to ensure the successful implementation of the program.

First, the first student has the task of involving the design and technical implementation of the adaptive e-learning system. With his expertise in programming and software development, this student is responsible for ensuring the functionality of the system that suits the learning needs of the students. He will also work closely with the school and teachers to integrate the system into the curriculum.

Secondly, the second student's role is to design learning content that suits the psychological needs of students at SD Negeri I Dawuan. With her understanding of learning theory and child development, this student will ensure that learning materials are adapted to stimulate students' interest and motivation to learn. In addition, she will collaborate with teachers to identify effective teaching methods.

The third student will monitor and evaluate the impact of the program on student learning outcomes. Using quantitative and qualitative research approaches, this student will collect data to measure the effectiveness of the adaptive e-learning system. In addition, he will play a role in compiling periodic reports detailing the progress of the program to partners and related parties.

Through synergistic collaboration between the three student team members, it is hoped that this mentoring program can successfully create an adaptive learning environment and have a positive impact on student learning outcomes at SD Negeri I Dawuan.

3 Findings And Discussion

3.1 Finding

Low student learning outcomes in various subjects can be caused by a variety of complex factors. One of the main causes is students' lack of motivation, which may arise due to unclear learning objectives, lack of relevance of the material, or lack of interest in a particular subject. Ineffective teaching methods that do not suit students' learning styles can also hinder their understanding. The mismatch of the curriculum with students' level of understanding and classroom conditions that do not support learning can be serious obstacles. External factors such as unavailability of educational resources, lack of parental support and personal or emotional difficulties can also affect students' learning outcomes. Social and economic inequalities, lack of student engagement in the learning process, and physical or mental health issues also contribute to low academic achievement. It is important to identify and address these factors through collaboration between teachers, students, parents and other relevant parties to create a learning environment that supports and motivates students to reach their full potential.

E-learning brings a number of important advantages and benefits at the primary school level, although it requires customization to suit the needs of young children. One crucial aspect of e-learning is the accessibility and affordability of education. It opens the doors of educational access to students in various locations, especially those in remote areas or hard to reach by traditional educational facilities. Furthermore, the ease of information access allows students to access learning materials and educational resources easily through e-learning platforms, giving them the freedom to learn anytime and anywhere according to their own schedules and rhythms. Flexibility in learning is the next point, where e-learning supports the use of various learning methods, including videos, images, and animations, enhancing student understanding and engagement. Game-based approaches can also be integrated to make learning more fun and interactive. Personalization of learning becomes possible with an e-learning system that can be tailored to each student's ability level and learning style, creating a more personalized and effective learning experience. Monitoring student progress, quick updates of learning materials, and development of digital skills are other aspects gained through e-learning. In addition, e-learning can help address inequalities in access to education, by reducing disparities between regions or community groups, ensuring that every child has the opportunity to receive a quality education. Learning motivation can also be enhanced through the use of interactive elements and technology in e-learning, making learning more interesting and challenging. It is important to remember that the implementation of e-learning in primary schools should be tailored to the developmental needs of children, while still supporting a positive and enjoyable learning experience. The role of teachers and parents remains crucial in providing support and guiding students through the use of e-learning to achieve optimal learning outcomes.

3.2 Discussion

3.2.1 Socialization of E-Learning Design Assistance

In order to improve student learning outcomes at SD Negeri I Dawuan, we would like to convey information about the program "Adaptive E-Learning System Design Assistance." This program development team consists of three students who have different tasks.



Fig 3.1. Teacher invitation

Fig 3.1. we invite teachers, to actively participate in this process. Collaboration between the development team and the teachers is essential to ensure the success of this program. We value your contributions and insights in crafting learning materials, adapting the system to the school curriculum, and providing valuable feedback. Through this synergy, it is hoped that this program can provide maximum benefits for learning at SD Negeri I Dawuan. Figure 3.2. we will hold a meeting to convey the details of the program and listen to your input and constructive ideas. Thank you for your attention and cooperation in realizing the improvement of the quality of learning in this school.

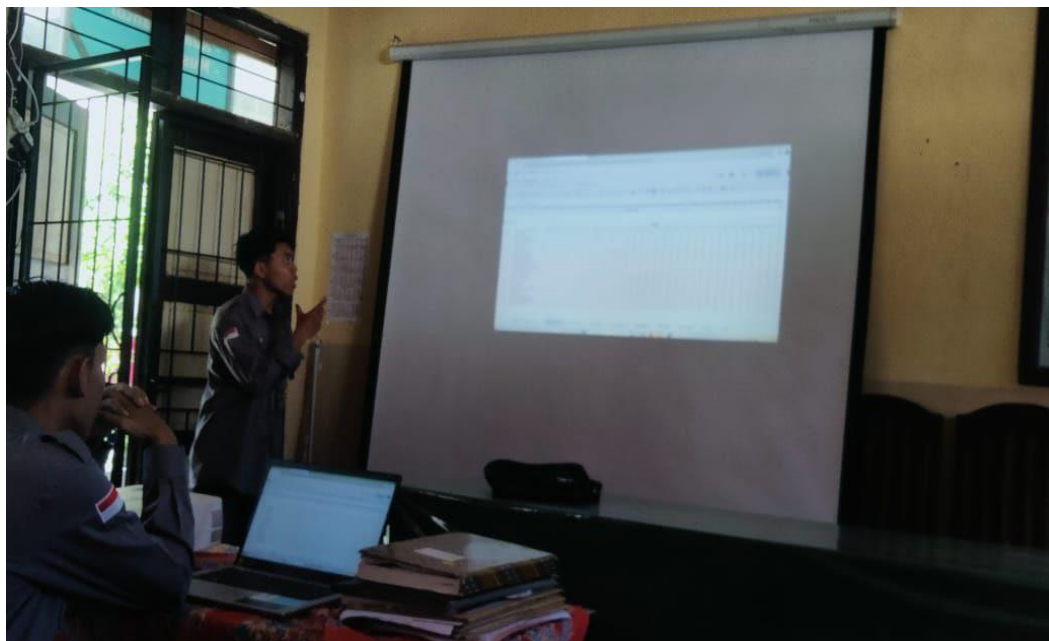


Fig 3.2. Student presentation in front of the teacher

Fig 3.2. Student presentation in front of the teacher From the results of the socialization of the program "Adaptive E-Learning System Design Assistance," we achieved positive responses and very good participation from e-learning users, especially teachers and students at SD Negeri I Dawuan. The use of e-learning is considered interesting and innovative, motivating students to learn in a more interactive way. Teachers welcomed the integration of text and video materials, stating that this variety provides diversity in teaching approaches. In discussions and Q&A sessions, teachers highlighted the accessibility of the adaptive e-learning platform and expressed their hopes for improved learning quality through this program. They also provided constructive feedback regarding the adjustment of learning materials to better suit the needs of students at the primary level. In conclusion, these positive results are an early indicator that this program has great potential to have a positive impact on learning at SD Negeri I Dawuan.

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Table 3.1. E-Learning Users

No	User Description
1	Students View Lesson Meters and Practice Questions
2	Teachers apply materials and questions
3	Principal Motoring learning activities

Table 3.1 explains that students can only access materials in text or video form, while practice questions are available in text form. Teachers have full access to the materials and questions. In contrast, the principal is responsible for monitoring the activities that occur in e-learning.

**TEMA 1
HIDUP RUKUN
KELAS 2
SEMESTER 1**



Figure 3.3. Material in the form of Text

Figure 3.3. Material in text form is expected that by using text documents in e-learning, students can flexibly access, understand, and interact with learning materials, while teachers can utilize e-learning features to monitor and support student learning processes effectively. Figure 3.4. is a screenshot of the material in video form.



Kelas 2 Tematik : Tema 1 Hidup Rukun Subtema 1 Pembelajaran 1

Figure 3.4. Materials in video form

By using video in e-learning, students can experience a more dynamic and visual learning experience. Meanwhile, teachers can utilize interactive elements and present materials in a more engaging way, as well as monitor student interaction to support the learning process effectively.

3.2.2 Program Evaluation

Adaptive e-learning system design assistance can involve various accurate and definite measurements to assess effectiveness, success, and user satisfaction. Here are some methods or instruments that can be used:

1. User Satisfaction Survey:

Instrument : Questionnaire or structured interview.

Method : Collect opinions and feedback from users regarding their experience with the adaptive e-learning system, the extent to which the system meets their needs, and their level of satisfaction.

2. Measurement of Retention and Comprehension of Materials:

Instrument : Knowledge test or evaluation questions.

Method : Involves tests or questions designed to measure the extent to which students can retain and understand learning materials through adaptive e-learning systems.

3. System Usage Analysis:

Instrument : Logs user activity, such as log-in, study time, and interaction with content.

Method : Analyzing user activity log data to understand usage patterns, frequency of access, and time spent by users in the system.

4 Conclusion

Overall, the objectives of the implementation of the adaptive e-learning system assistance have been clearly directed at improving the quality of learning in a personalized and responsive manner, while addressing the various challenges that can arise in the context of online learning. The personalized learning approach aims to tailor learning materials and methods according to each individual's level of understanding and learning pace, creating a more effective and relevant learning experience. The responsiveness of adaptive e-learning systems is key in providing timely and detailed feedback on learner progress, enabling appropriate interventions to improve learning outcomes. By addressing the challenges of online learning, such as the limitations of live interaction, the program provides an innovative solution to ensure effective, efficient and accessible learning for a wide range of learners. Overall, the implementation of this adaptive e-learning system provides a solid foundation for shaping a more inclusive and adaptive educational future.

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