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The Effect of Using Learning Management System on the Learning Outcome and Motivation of Software Engineering Students at SMKN 2 Cimahi

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ABSTRACT

The study was conducted to develop e-learning using the LMS website as a learning medium for grade XI students majoring in software engineering. This study aims to (1) determine the feasibility of e-learning based on LMS website used as a learning medium for software engineering subjects; (2) determine the differences in software engineering learning outcomes between students who use e-learning media with LMS website and powerpoint; (3) determine the differences in software engineering learning outcomes between students who have high learning motivation and low learning motivation; (4) determine the interaction between the application of e-learning LMS website, powerpoint and learning motivation on learning outcomes in software engineering subjects. This research was conducted at State Vocational High School Negeri 2 Cimahi in class XI-Software Engineering-A with 36 students. The result indicates that there is an increasing motivation of students' learning outcomes. The use of LMS also become an integrated solution that facilitates teachers in distributing learning materials efficiently.

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1. INTRODUCTION

Vocational High Schools require new innovation and creativity in order to build quality human resources in accordance with Indonesia Law Number 20 of 2003 Article 15, namely "Vocational education is a secondary education institution that aims to shape students to be able to work in a particular field". New innovation and creativity are needed in the field of Information and Communication Technology (ICT) so that this goal can be achieved.

According to Sutrisno (2011), the role of ICT is the foundation for effective learning activities, technology can support the learning process, not only in terms of obtaining information but technology can make learning activities more diverse and interactive. One application of ICT in the teaching and learning process is that it can be used as a learning medium. Currently, there are various models of learning media that have utilized facilities from technological advances, one type of learning media that utilizes the development of ICT is web-based learning or e-learning by utilizing content from the learning management system.

E-Learning is a type of teaching and learning process that is designed and developed using the development of technology that can be accessed anywhere and anytime to overcome the limitations between students and teachers. Learning Management System (LMS) is a type of software or platform used for learning activities that contain features to support the e-learning process carried out online. LMS has important features that can be used to support the learning process, including quizzes, assignments, assessments, communication, collaboration, and can upload various formats of types of learning materials. E-Learning with LMS can be used as a medium for the learning process both in class and outside the classroom online. Based on the phenomena that occur in the student environment, namely the widespread use of the internet network, this LMS learning media can be used as a means of supporting learning activities to increase student motivation and abilities in learning activities at school (Pertiwi & Sumbawati, 2019).

SMKN 2 Cimahi has implemented the Merdeka Curriculum in its learning process. Based on the results of observations conducted by researchers with Software Engineering subject teachers, there is an urgency for the Software Engineering department to maximize e-learning in the future, but it could not be implemented because there had been no socialization regarding the use of e-learning for teachers and students. He emphasized that e-learning is important to be used as an alternative media to help the learning process, because e-learning can help teachers in learning.

The learning method used in the process of delivering material is generally using conventional methods with the help of powerpoint media or teachers are still the center of learning who provide lesson materials to students. This can result in a lack of student activity in the learning process (Nurul'Azizah & Wardani, 2019). The Software Engineering subject requires learning media that can foster student learning motivation so that students become more active and have a good impact on student learning outcomes.

In addition to the use of learning methods and media, the influence of motivational factors on students will also have an impact on student understanding and learning outcomes. Learning motivation according to Yamin (2012), is a strength within students that provide encouragement to learn and increase their skills, knowledge and experience. Motivation also triggers students to achieve the desired learning goals, which can be used to measure how far student understand the material taught to them (Wahyuni, Astuti, & Suryato, 2020). Motivation has a role in determining learning reinforcement, clarifying learning objectives and determining learning persistence in students. (Uno, 2011).

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Based on the background above, the author formulates the following problems (1) The feasibility of E-Learning media with LMS in the Software Engineering subject for SMKN 2 Cimahi students in grade XI; (2) The difference in learning outcomes between students who use LMS learning media and students who use PowerPoint media in the Software Engineering subject at SMKN 2 Cimahi; (3) The difference in learning outcomes between students who have high learning motivation and students who have low learning motivation in the Software Engineering subject at SMKN 2 Cimahi; (4) is there an interaction between the application of learning media and learning motivation on student learning outcomes in the Software Engineering subject at State Vocational High School 2 Cimahi.

The following research objectives are then obtained based on the problem mentioned before: (1) to determine the feasibility of E-Learning media with the LMS website. (2) to determine the difference in student learning outcomes between using LMS media and students who use PowerPoint media. (3) to analyze the differences in learning outcomes between students who have high motivation and students who have low motivation. (4) to analyze the interaction between the use of media (website, powerpoint) and learning motivation on student learning outcomes.

2. METHODS

This research was conducted at SMKN 2 Cimahi in grade XI of the 2023/2024 academic year. The subjects of the study were 36 students of grade XI enrolled in Software Engineering at SMKN 2 Cimahi. This type of research is classroom action research (CAR). According to MC Taggart & Kemmis (1981), this CAR procedure consists of three stages, namely planning, action, observation, and reflection. This research is a research conducted by teachers on students and assisted by observers. This research was conducted in two cycles, where each cycle had two meetings. The diagram explaining the CAR process can be seen in **figure 1**:

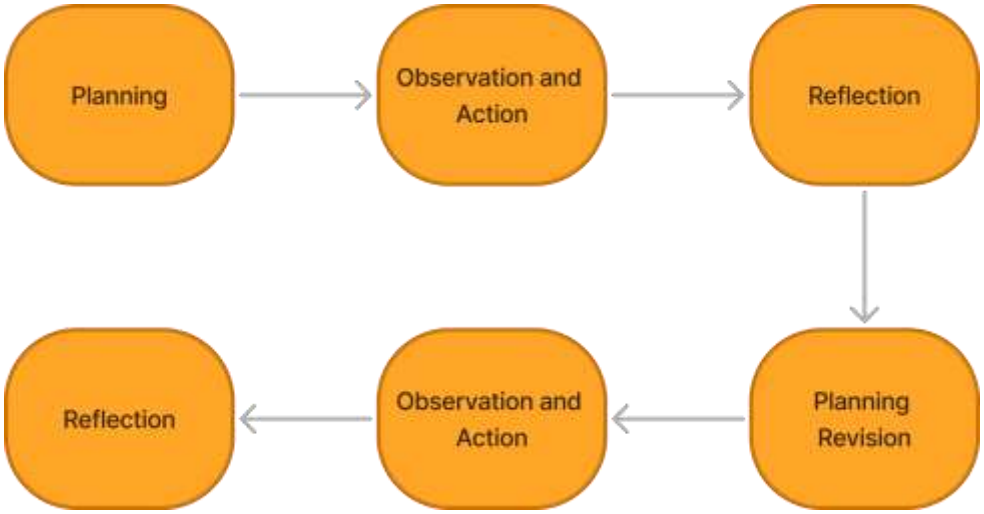

Figure 1. Spiral Model Chart by MC Taggart & Kemmis (1981).

The data collection technique in this study used a test technique by providing questions related to the Database subject and a non-test in the form of an observation sheet in the form of a rubric for assessing student skills in creating a database. The test technique is used to obtain cognitive learning outcomes, while the non-test technique of the observation sheet in the form of a learning rubric is used to obtain psychomotor learning outcomes.

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The data analysis technique in this study uses comparative descriptive analysis. Comparative descriptive is comparing the results of research in cycle I and cycle II. The results of the comparison are to determine the indicators of success and shortcomings in each cycle. Indicators that have not been achieved are corrected in the next cycle. If the shortcomings that have been corrected, in the next cycle will try to improve learning outcomes in the cognitive and psychomotor domains. The benchmark for success in this study can be measured by the following indicators:

1. Percentage of learning outcomes completion of the cognitive domain reaches 75 in criteria For achieving learning objectives,
2. Percentage of learning outcomes completion of the psychomotor domain reaches 75 in criteria for achieving learning objectives.

The learning completion of students in the cognitive and psychomotor domains can be calculated using the **Equation 1** below:

$$p = \frac{F}{N} \times 100\%$$

Equation 1. Learning Completion Percentage Formula

Description:
p = percentage of learning completion
F = number of students who have completed learning
N = total number of students

The following **Table 1** is used as the guide to determine student' learning completion. This study will be considered successful if the overall learning objectives completion achieved 75% or above.

Table 1. Criteria for Achieving Learning Objectives.

Leaning Objectives Achieved	Criteria
86-100	Very Good
76-85	Good
60-75	Sufficient
55-59	Poor
<54	Very Poor

3. RESULTS AND DISCUSSION

The researchers designed the e-learning platform in the form of an LMS (Learning Management System) website for this study. This e-learning is designed with the aim of increasing student motivation and learning outcomes and paying attention to the relevance of learning for grade XI with subjects focused on Software Engineering expertise. The results of the e-learning media device with a website-based LMS for the Software Engineering Expertise Concentration subject for students enrolled in Software Engineering in grade XI at SMKN 2 Cimahi can be seen as follows.

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The homepage or initial display is the first page that appears when accessing the address or the url http://lms-rpl3.id/. To be able to enter or access the course or main menu on this E-learning, users are required to log in first on the login form by entering the username and password that have been registered in the previous registration process. The page can be seen in **figure 2**.

Figure 2. Initial display of the LMS website.

The dashboard page displays the Software Engineering expertise concentration classes and subjects available for students. The page can be seen in **figure 3**.

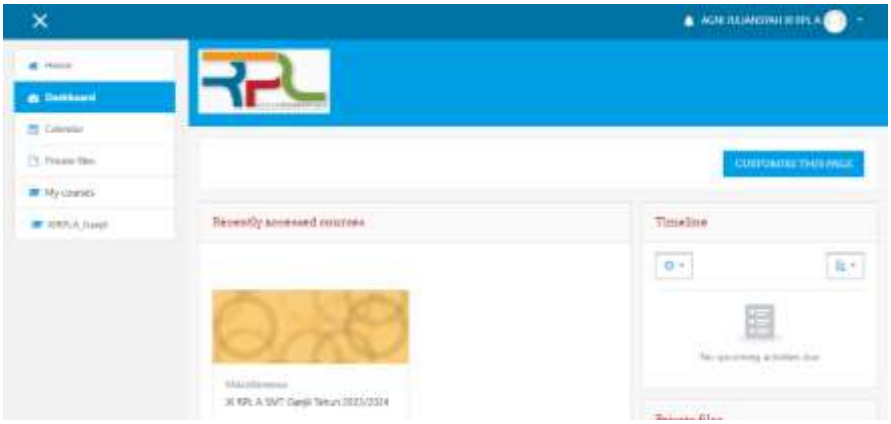

Figure 3. Dashboard Display.

In the Software Engineering course page, there are several menus in the form of learning processing such as Documents, Tests, Learning Paths, Assignments. And the uploaded files or materials can be accessed or downloaded by students. The page can be seen in **figure 4**.

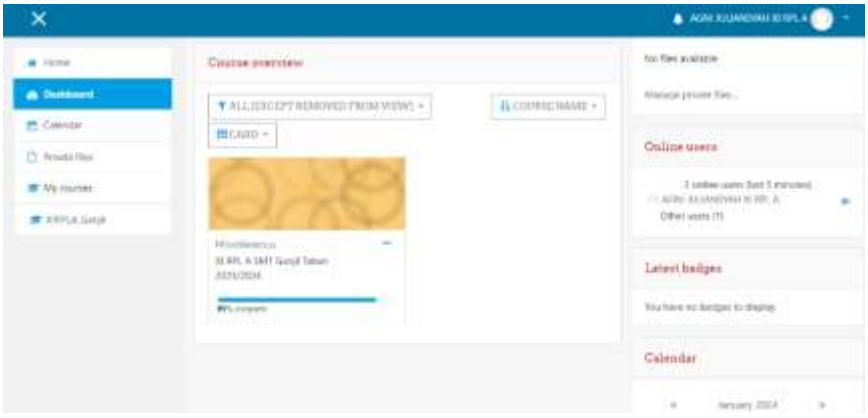

Figure 4. Software Engineering Course Page.

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In the learning path page, student can see the materials that have been uploaded by the teacher which can be accessed and downloaded by students. The page can be seen in **figure 5**.

Figure 5. Learning path display.

To open the material, students only need to click on each sub-material individually. The page can be seen in **figure 6**.

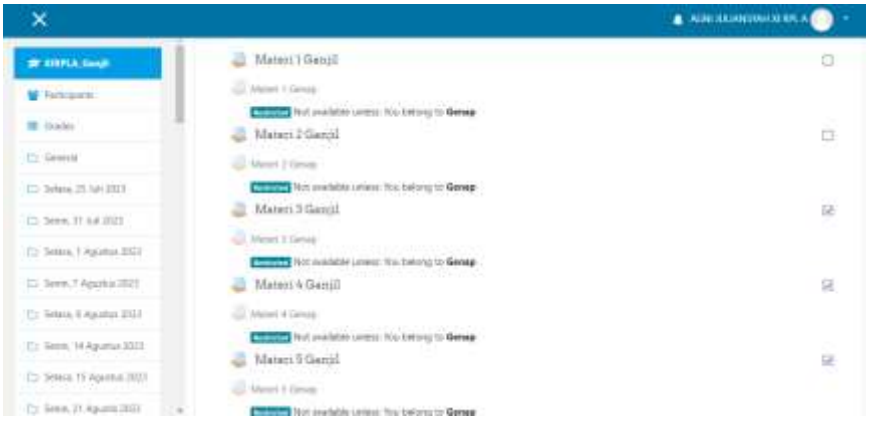

Figure 6. Material Display.

Assignment collection page displays various uploads such as files, images, and texts based on assignments given by the teacher and will be worked on by students. The page can be seen in **figure 7**.

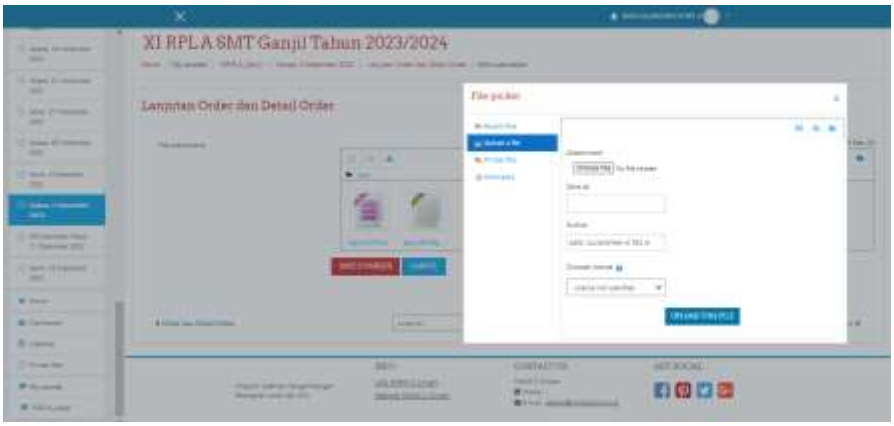

Figure 7. Assignment Collection Display.

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Before using the LMS, the students are given multiple-choice tests to assess student learning outcomes and questionnaires to evaluate the level of student learning motivation at the beginning of the cycle. This evaluation aims to measure the extent to which students understand the material being taught. The **table 2** below shows the student's scores.

Table 2. The result of Cycle 1 Test.

Criteria	Data/ Results	Description
Students' Learning Motivation	The average percentage of students' learning motivation score is 72.81	After being converted to the assessment criteria, students' learning motivation is at “Sufficient” criteria This result does not achieve the desired criteria, which is at 75
Students' Learning Outcomes	The average percentage of students' cognitive learning outcomes is 70.29 and psychomotor is 71.10. so that the average overall score of students' learning outcomes is 70.69.	After being converted to the assessment criteria, students' cognitive and psychomotor learning outcomes are in the “Sufficient” criteria. This does not achieve the desired criteria, which is at 75

Based on the results of the trial, the average score of student learning motivation reached 72.81 in the "Sufficient" criteria, while the average score of cognitive student learning outcomes was 70.29 in the "Sufficient" criteria and psychomotor student learning outcomes were 71.10 in the "Sufficient" criteria. This average score shows that student motivation and learning outcomes for learning materials are still at a “Sufficient” level.

With these data, the researchers implemented e-learning in the form of an LMS website as a learning medium in the Software Engineering expertise concentration subject. The aim is to evaluate the extent to which the feasibility of website-based LMS learning media is in increasing student motivation and learning outcomes. After implementing e-learning in the form of an LMS website, the researchers ran another test in the second cycle to assess the effectiveness of using e-learning in improving learning achievement. The results of the assessment can be seen in the following table.

Table 3. The results of Cycle 2 Test.

Criteria	Data/Results	Description
Students' Learning Motivation	The average percentage of students' learning motivation score is 84.15	After being converted to the assessment criteria, students' learning motivation is in the “Good” criteria.
Students' Learning Outcomes	The average percentage of students' cognitive learning outcomes is 82.45 and psychomotor is 83.37 so that the average overall score of students' learning outcomes is 82.91.	After being converted to the assessment criteria, students' cognitive and psychomotor learning outcomes are in the “Good” criteria.

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Based on the results of the trial that has been implemented with LMS website-based e-learning, it can be obtained that the average score of students' learning motivation reaches 84.15 in the "Good" criteria while the average score of students' cognitive learning outcomes is 82.45 in the "Good" criteria and students' psychomotor learning outcomes are 83.37 in the "Good" criteria. This average score shows that students' motivation and learning outcomes towards the learning material are still at a good level.

In cycle II, students' learning motivation reached 84.15 and students' learning outcomes reached an average score of 82.91. If interpreted into assessment criteria, it is in the “Good” category. Compared to the average percentage of cycle I, there was an increase in motivation and learning outcomes. In cycle I, students' learning motivation only reached an average score of 72.81 and students' learning outcomes reached an average score of 70.69.

In cycle II, learning motivation increased to 84.15 and learning outcomes increased to 82.91, which is still included in the “Good” criteria. Thus, from the description it can be concluded that there was a significant increase in learning activities, students' learning outcomes, and classical completeness in cycle II after corrective actions were carried out. The comparison of the aforementioned data can be seen in **table 4**.

Table 4. Test Results Cycle 1 and 2.

Data	Cycle I	Cycle II
Learning Motivation	72,81	84,15
Learning Results	70,69	82,91

The result from table above can be represented in the form of a graph in **Figure 8** as seen below:

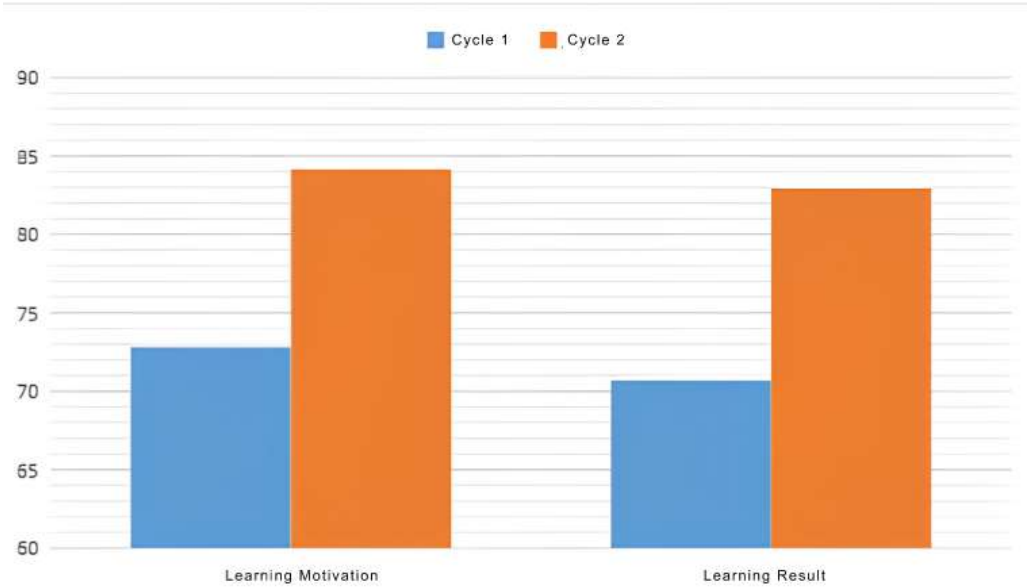

Figure 8. Graph of Test Results Cycle 1 and 2.

4. CONCLUSION

Learning Management System using learning management system (LMS) is a way for educators to increase motivation and students’ learning outcomes. LMS can also become an integrated solution that facilitates teachers in distributing learning materials efficiently. Through LMS, teachers can easily share materials with students. In addition, LMS provides a feature to collect assignments electronically, allowing students to upload their work quickly.

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The assessment process is also simplified through this platform, with the provision of clear assessment rubrics. LMS also supports interactivity by providing questions and reflections, enriching the learning experience.

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6. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors ensure that this article is free from plagiarism.

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