



The Implementation of Problem-Based Learning Model Assisted by PowerPoint Media on Software Material

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A B S T R A C T

The aim of this study is to improve student achievement through the implementation of a problem-based learning model assisted by PowerPoint media among Grade X students of SMA 3 Nasrani Medan. This research employs a classroom action research (CAR) method, which consists of two cycles, each with four stages: planning, action, observation, and reflection. The subjects of the study were 21 students from a Grade X class. Data collection techniques included observation, interviews, tests, and documentation, while data were analyzed using descriptive analysis. The results showed a classical improvement in student achievement. In the pre-cycle stage (before treatment), the average student achievement was 60%. In Cycle I, using the lecture method, it increased to 65%, and in Cycle II, with the implementation of problem-based learning assisted by PowerPoint, it rose significantly to 80%. Based on the results of the study, it can be concluded that the use of a problem-based learning model assisted by PowerPoint media in the first semester can effectively improve student achievement, particularly in learning software-related materials.

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1. Introduction

Information and Communication Technology (ICT) is a broad term that encompasses all technical means used to process and convey information. ICT consists of two main components: technology and communication. Information technology refers to all processes, tools, and methods used to manage, manipulate, and disseminate information digitally. According to the Oxford Dictionary (1995), information technology is defined as the study or use of electronic systems, especially computers, for storing, analyzing, and distributing various types of information, including text, numbers, and images. Furthermore, Rusman et al. (2012) state that information technology involves a series of stages in managing information, including creation, transmission, selection, reception, storage, retrieval, and use of information.

In the field of education, ICT plays a crucial role in supporting the learning process. One of the most essential applications of ICT is computer-based learning, which enables students to access information, engage with learning content interactively, and develop digital skills needed in the modern workforce. Learning about computers has become increasingly important, as it enhances students' readiness to enter the job market.

One of the key topics in ICT learning is software. Software is a set of computer programs that acts as an interface between the user and the computer hardware. There are various types of software,

including: (1) operating systems (e.g., Windows, Linux, MacOS), (2) application software (e.g., Microsoft Word, Excel, PowerPoint), (3) design software (e.g., Adobe Photoshop, CorelDraw), (4) web browsers (e.g., Chrome, Firefox, Opera), and (5) antivirus programs (e.g., Smadav, AVG, Norton). Software plays a vital role in improving productivity and efficiency in various fields, making its mastery important for students.

However, preliminary observations in Grade X at SMA Nasrani 3 Medan revealed that students' learning activity and academic achievement were relatively low. Only around 50% of the students met the Minimum Competency Criteria (KKM). Teachers still relied on traditional lecture methods and textbooks without using interactive media or encouraging student participation. As a result, students tended to be passive, lacked motivation, and did not engage in critical thinking or meaningful learning. The learning process was mostly limited to memorization rather than understanding.

To address this issue, it is necessary to implement a learning model that promotes active participation, critical thinking, and problem-solving skills. One suitable approach is the Problem-Based Learning (PBL) model, which emphasizes student engagement in solving real-world problems through a structured scientific process (Sanjaya, 2008; Akbar, 2019).

To support the PBL model, appropriate media should be used to make learning more effective and engaging. One such media is PowerPoint, which can visually enhance the presentation of learning content and make it easier for students to understand and retain information. According to Ibrahim and Nur (in Trianto, 2007), the PBL model consists of five main stages: (1) orienting students to the problem, (2) organizing students for learning, (3) guiding individual or group investigations, (4) developing and presenting the results, and (5) analyzing and evaluating the problem-solving process. Meanwhile, Hamdani (2011) asserts that effective media stimulates student responses and encourages active participation in learning. Therefore, this study aims to implement a problem-based learning model assisted by PowerPoint media to improve student achievement on software-related material.

2. Research Methods

The method used in this study is Classroom Action Research (CAR). This research was conducted in two cycles, with each cycle consisting of one meeting that includes two main learning activities. Each cycle was implemented repeatedly and systematically to achieve improvements in students' learning outcomes.

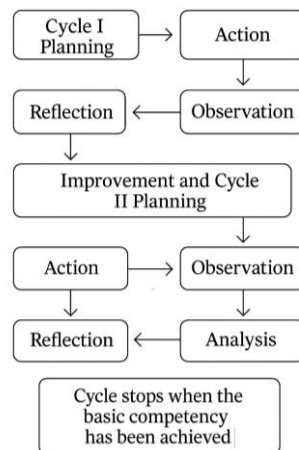


Figure 1. Classroom action research

The procedure of this research follows a cyclic model that involves four main stages, namely:

1. Planning - In this stage, the researcher prepared the learning tools, including lesson plans (RPP), PowerPoint-based instructional media, observation sheets, and student evaluation instruments.

2. Acting - The teaching and learning process was carried out using a problem-based learning model assisted by PowerPoint media, following the designed lesson plan.
3. Observing - Observations were conducted to monitor student engagement, teacher performance, and classroom dynamics during the learning process. This included noting student responses, participation, and any issues that emerged.
4. Reflecting - The researcher and collaborator analyzed the observation results and student performance data to evaluate the effectiveness of the actions taken and determine necessary improvements for the next cycle.

Through this method, the research aims to enhance both student learning activities and academic achievement, particularly in the topic of software in the Information and Communication Technology subject.

This research was conducted at SMA 3 Nasrani Medan, with the participants consisting of 21 tenth-grade students. The learning process was carried out through face-to-face instruction, utilizing PowerPoint as a supporting media. The research took place during the first semester of the 2020/2021 academic year, focusing on the theme "Introduction to Computer Software." Data collection involved both test and non-test methods. The test technique included end-of-cycle evaluations conducted at the end of each cycle to measure students' cognitive achievement. Meanwhile, non-test methods included observations of student learning activities and questionnaires to gather students' responses toward the learning process.

The success indicator of this classroom action research was based on an increase in students' academic performance. The study was considered successful if the average achievement of students reached a minimum of 70% across key indicators. These indicators included students' activity in asking questions, responding to questions, and achieving the Minimum Mastery Criteria (KKM) set at 70%. The data analysis technique used in this study was descriptive analysis, expressed in percentages, by comparing the students' learning activities and academic achievements between Cycle I and Cycle II.

Table 1. Number of students

Class	Gender		Number
X	Male	Female	
	10	11	21

3. Results and Discussion

This Classroom Action Research (CAR) was structured using a cyclical model, where each cycle consists of four key phases: planning, action, observation, and reflection. The reflection results from each cycle serve as a foundation for planning the next cycle. If the reflection indicates that improvements are still needed, then the subsequent actions are refined accordingly. This process ensures that each cycle is a continuation and improvement of the previous one, rather than a mere repetition. The cycles continue until the research problem is effectively addressed and resolved.

This study was conducted in two cycles, with each cycle consisting of one meeting. The allocated time for each face-to-face meeting was 2×90 minutes, totaling 180 minutes across both cycles to complete one topic of instruction. Each cycle included the following stages: planning, implementation, observation, and reflection.

The Classroom Action Research was carried out at SMA 3 Nasrani Medan. The research subjects included 21 Grade X students, comprising 10 male and 11 female students, as well as their classroom

teacher. The research aimed to enhance the learning process and outcomes through systematic instructional improvement involving both teacher and students.

3.1. Result

The first activity involved the researcher conducting a school survey to gather information and identify challenges in the teaching process, particularly in the subject of Information and Communication Technology (ICT), focusing on the topic of computer hardware. This activity was followed by 21 Grade X students from SMA 3 Nasrani Medan. In the planning stage of Cycle I, the activity was carried out using the lecture method. Prior to this, the researcher conducted observations to identify the issues faced in the targeted high school. The next step was administering a test to students to evaluate whether the use of the lecture method improved their knowledge and whether they understood and comprehended the content.

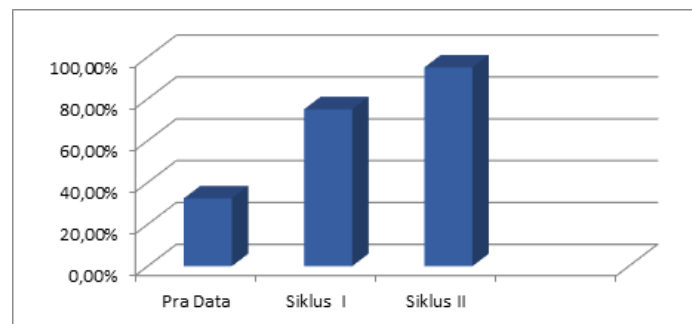


Figure 2. Student learning outcome graph

The first phase of this research involved presenting the material, which included the syllabus, lesson plans, student worksheets, assessment sheets, and student textbooks. The second phase involved implementing actions and observations. Cycle II was conducted with one meeting, allocated 1 x 90 minutes. In Cycle II, the method used was PowerPoint-assisted learning.

Based on the pre-cycle results, from 21 students, 10 students (34.28%) achieved the Minimum Completion Criteria (KKM) score of 70, while 11 students (65.71%) did not meet the KKM, with the class average score being 70.88. In the traditional lecture method, the teacher only used lectures, asking students to listen and take notes when necessary.

The learning was carried out following the Lesson Plan (RPP) over two meetings (2 x 90 minutes). The core competencies in Cycle I were delivered through lecture-based instruction on software topics. After the introduction, the teacher presented the material using the lecture method, following these steps: (1) Introduction: The students were greeted, the class was prepared, and attendance was checked. The researcher explained the learning objectives and motivated the students to engage; (2) Core Activities: The researcher delivered the material, reading the content aloud. The students were given opportunities to share their thoughts or experiences related to the topic, and the teacher called on students to answer questions; (3) Closing: Afterward, the researcher provided a questionnaire to each student to gather feedback on their understanding and experience with the lecture method. The researcher also informed the students about the next session, which would use PowerPoint-assisted teaching, and closed the lesson with a song and a prayer.

Observation results showed that the researcher had implemented the lesson well, with clear teaching goals. However, during the lecture method, some students seemed disengaged, and some were not paying attention or were working independently. Despite this, the results from Cycle I showed an improvement in student performance. The average student performance in Cycle I was 78.38, with 16 students (76.19%) achieving the KKM, and 5 students (23.81%) not meeting it.

Success was achieved in Cycle I as many students showed improved participation, although some were still passive. The reflection identified the following factors affecting participation: (1) Some

students struggled to follow the steps of the lecture method; (2) Many students lacked focus and did not pay full attention during the lecture; (3) Only a few students could fully comprehend the material and solve the problems independently.

In Cycle II, the PowerPoint-assisted method was used. The sequence was as follows: (1) The researcher briefly reviewed the material already presented before continuing with new content using PowerPoint, as in Cycle I; (2) The researcher posed questions; (3) The researcher gave students time to ask questions. Based on observations, there was a notable improvement in student performance. Many students were able to answer questions correctly and were actively participating. The students also demonstrated understanding of the material, as seen in how they solved the given problems.

The evaluation results of Cycle II showed significant improvement in student learning. The average student performance in Cycle II was 82.28, with 19 students (96.88%) meeting the KKM, and only 2 students (3.13%) failing to do so. Success was achieved in Cycle II, as most students demonstrated active participation, while a few were still passive. The reflection indicated that the following factors were responsible for the increased participation: (1) The PowerPoint-assisted method helped make the material more engaging; (2) Students were more focused and interactive during the lesson; (3) More students understood the material and actively participated in solving problems.

In the final evaluation of Cycle II, the average student performance reached 85.37, with 20 students (94.28%) meeting the KKM, and 1 student (5.71%) not meeting the KKM. The participation rate showed significant improvement compared to previous cycles. This success fulfilled the research success indicators, meaning that the actions were deemed successful and did not require continuation.

Based on the data analysis and interpretation, it can be concluded that the implementation of the PowerPoint-assisted method in teaching software content effectively improved student learning outcomes. This improvement was observed from the pre-cycle results to Cycle I and from Cycle I to Cycle II.

3.2. Discussion

There was a noticeable improvement in student learning outcomes, which can be attributed to the enhanced social skills, independence, and attention from the students during the learning process, as well as the cooperation within each group and the independence in solving problems. This improvement is evident from the research results between Cycle I and Cycle II. The evaluation analysis conducted at the end of each cycle showed an increase in student learning outcomes. This can be seen from the students' average scores and the percentage of students meeting the learning mastery criteria, both of which improved in each cycle.

From the data above, it can be concluded that the achievement in learning software content using the PowerPoint method improved in each cycle:

1. Before the intervention, the average student learning outcome was 70.88, with a mastery percentage of 34.28%.
2. After Cycle I, the average score for student learning in software increased to 78.38, with a mastery percentage of 74.80%, though the expected indicators had not yet been fully met.
3. In Cycle II, the student learning outcome improved further to 85.37, with a mastery percentage of 94.28%, achieving the desired indicators. Therefore, this Classroom Action Research (CAR) has been successful.

The average learning outcome for software content in Cycle II was 85.37, with the performance indicator set at 80.0, and the mastery percentage in Cycle II reached 94.28%, exceeding the performance indicator of 90%. Given these results, the performance indicators have been met, and the study will not continue to the next cycle.

4. Conclusion

The use of the PowerPoint-assisted method has significantly improved the learning outcomes of software subjects for 10th-grade students at SMA 3 Nasrani Medan during the 2022/2023 academic year. This is evident from the increase in average scores, from 70.88 before the intervention to 74.80 in Cycle I, and 85.37 in Cycle II. Additionally, the percentage of students achieving mastery rose from 34.28% before the intervention to 74.80% in Cycle I, and 94.28% in Cycle II. Based on these results, the researcher recommends that teachers at SMA 3 Nasrani Medan implement the PowerPoint-assisted method to improve learning outcomes, encourage students to be more active in both individual and group learning, and that the school adopt policies promoting innovative and engaging teaching methods to further enhance student achievement.

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