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Applying the Problem-Based Learning (PBL) Method in Information and Communication Technology (ICT) Education

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A B S T R A C T

Information and Communication Technology (ICT) learning is a process that involves the use of instructional media such as laptops, projectors, the internet, and other digital tools. This study aims to examine students' learning outcomes through the implementation of the Problem-Based Learning (PBL) model in ICT instruction. PBL emphasizes student engagement and critical thinking skills in solving assigned problems. Data collection techniques used in this study were observation and testing. The research subjects consisted of 18 ninth-grade students from SMP Swasta Darma Medan in the 2023/2024 academic year. The results showed that 13 students (72.22%) achieved mastery learning, while 5 students (27.77%) did not. These findings indicate that the application of the Problem-Based Learning model can enhance students' learning outcomes in ICT education.

1. Introduction

Education is a conscious and planned effort to create an effective learning environment and process, enabling students to actively develop their potential in terms of spiritual strength, self-control, personality, intelligence, noble character, and the skills necessary for society, the nation, and the state (Article 1 of the Republic of Indonesia Law No. 20 of 2003 on the National Education System). Nevertheless, one of the major challenges in formal education is the low absorption rate of students during the learning process. Additional contributing factors include the inadequate availability of supporting facilities and infrastructure in schools.

In classroom practice, learning activities often focus heavily on memorization, where students are required to recall and accumulate information without a deeper understanding or connection to real-life contexts. As a result, many school graduates become theoretically knowledgeable yet lack practical application skills (Komag Mas Ariana, 2019).

The rapid advancement of Information and Communication Technology (ICT) has brought significant transformations to the field of education. Innovations in learning methods, instructional media, and processes have created new opportunities to enhance educational effectiveness. Life in the digital era, characterized by widespread technological use, has made access to information faster and easier, significantly impacting education. ICT, encompassing various hardware and software tools used to process, store, and access information, has become integral to modern learning. The expansion

of internet infrastructure further accelerates information retrieval and dissemination. Consequently, the characteristics of today's students differ markedly from those of previous generations (Pitoyo Budi Santoso, 2019).

Given these challenges, it is essential to implement learning approaches that foster creativity and critical thinking skills among students. One such approach is the Problem-Based Learning (PBL) model, which actively engages students in solving real-world problems and encourages them to develop solutions through deep understanding. The application of PBL is expected to optimize students' potential and improve learning outcomes.

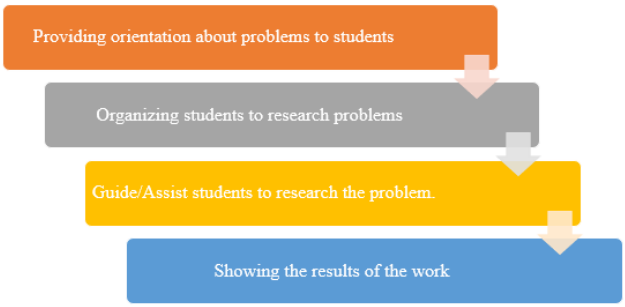

Figure 1. Stages of implementing the Problem-Based Learning method

2. Research Methods

This study employed a qualitative descriptive approach. The qualitative descriptive method aims to present data as they are, based on empirical facts in the field without manipulating or altering the data. The research was conducted at SMP Swasta Darma, located at Jl. Karya Sehati No. 6, Pangkalan Mahsyur, Medan Johor District, Medan City. The study took place during the odd semester of the 2023/2024 academic year, specifically between November and January.

The research subjects consisted of 18 ninth-grade students of SMP Swasta Darma, including 10 female and 8 male students. The object of the study was the implementation of the Problem-Based Learning (PBL) model in Information and Communication Technology (ICT) instruction, particularly on the topic "Devices Used to Access the Internet".

The researcher was directly involved in the classroom by delivering the instructional content, observing student activities, and collecting data based on actual classroom conditions. The data sources in this study were primary data, obtained directly from student participation and responses during the learning process. The research procedure followed four main stages: planning, implementation, observation, and reflection (Wulandari, 2017).

Data collection techniques included direct observation of student engagement during the lesson and a test administered after the implementation of the PBL method. The observation focused on identifying students' responses and levels of participation in the learning activities, while the test aimed to assess learning outcomes and evaluate whether the PBL model contributed to improving students' academic performance in ICT.

3. Results and Discussion

Information and Communication Technology (ICT) learning involves the use of various instructional media, such as laptops, projectors (infocus), and the internet, to enhance the effectiveness of the teaching and learning process. Based on the analysis of the implementation of the Problem-Based Learning (PBL) model in ICT instruction, the results were highly positive. Students demonstrated more effective learning behaviors and provided very favorable feedback toward the applied learning model. Additionally, students' critical thinking skills showed a positive and direct correlation with their learning outcomes, indicating that higher levels of critical thinking were associated with higher academic achievement.

The success of the learning process is influenced by various factors, both internal and external. External factors include the teaching methods and materials used. Therefore, it is crucial for teachers to apply engaging and contextually appropriate learning models to maximize educational outcomes. One model that has proven to be effective in enhancing learning achievement is the Problem-Based Learning approach, which emphasizes student engagement in solving real-world problems.

The results of implementing the PBL model in the ninth-grade ICT class at SMP Swasta Darma are presented in Table 1 below:

Table 1. Students' Learning Outcomes in ICT Instruction

Criteria	Score Range	Number of Students	Frequency (%)
Not Passed	0 ≤ Score < 20	0	0%
	20 ≤ Score < 40	0	0%
	40 ≤ Score < 60	1	5.55%
	60 ≤ Score < 70	4	22.22%
Total Not Passed		5	27.77%
Passed	70 ≤ Score < 80	4	22.22%
	80 ≤ Score < 90	6	33.33%
	90 ≤ Score ≤ 100	3	16.67%
Total Passed		13	72.22%

Based on the data presented in Table 1, it can be concluded that the implementation of the Problem-Based Learning method in ICT classes resulted in highly satisfactory learning outcomes. A total of 13 out of 18 students (72.22%) achieved the passing criteria, while only 5 students (27.77%) did not meet the minimum requirements. The high percentage of students who successfully passed suggests that the PBL method is effective in enhancing student learning outcomes, particularly in technology-based instruction.

4. Conclusion

Information and Communication Technology (ICT) refers to the use of various instructional media, such as laptops, projectors (infocus), the internet, and other digital tools, involving both computer hardware and software components. Based on the results and discussions presented earlier, it can be concluded that the implementation of the Problem-Based Learning (PBL) approach in ICT instruction effectively enhances students' creative thinking skills and improves the academic achievement of ninth-grade students. This success is evidenced by the indicators of teachers' effective instructional practices and the increased active participation of students during the learning process. The application of the PBL model not only emphasizes content delivery but also aims to develop students' critical thinking and problem-solving skills. The research employed a descriptive qualitative method, which involves presenting data based on factual conditions without manipulation. The findings revealed that the number of students achieving the passing criteria was significantly higher than those who did not. A total of 13 students (72.22%) successfully met the passing criteria, while 5 students (27.77%) did not. These results confirm that the Problem-Based Learning method is effective in enhancing students' thinking skills and academic performance in ICT instruction.

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