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Development of Problem Based Learning (PBL) Method Based on Local Wisdom in Institutional Accounting Practicum Subject

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Abstract

This research was conducted to address challenges in enhancing students' critical thinking skills at SMK Muhammadiyah 1 Semarang through the development of Problem Based Learning (PBL) method based on local wisdom in the Institutional Accounting Practicum subject. The development method follows Thiagarajan and Semmel's (1974) model with a 4-D development approach, starting from module design to validation by experts and field trials. The aim of this research is to describe the development of PBL method based on local wisdom to improve students' critical thinking skills, and to analyze the validity and effectiveness of the method. The research method uses constructivism theory, focusing on student interaction with the learning environment. The results show that the PBL method based on local wisdom effectively improves students' critical thinking skills. Module validation indicates an excellent category, while field trials received positive responses from students. The improvement in students' critical thinking skills is evidenced by a high N-Gain value, reaching 0.567. These findings suggest that the PBL method based on local wisdom can be recommended as an effective learning approach for the Institutional Accounting Practicum subject at SMK Muhammadiyah 1 Semarang.

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INTRODUCTION

Education is a key factor in shaping competent and competitive individuals (Rahmulyana et al., 2024). However, there are still challenges in the implementation of education in Indonesia, especially at the vocational high school (SMK) level. The learning process in the classroom is not always successful and sometimes faces many obstacles or difficulties influenced by various factors ranging from learning interests to models and methods in teaching and learning (Indah Wahyuni et al., 2023). One of the issues faced is the lack of development of innovative and relevant learning methods to the needs of students (Handayani, 2020). This is evident in the institutional accounting practicum learning at SMK Muhammadiyah 1 Semarang. Conventional teacher-centered learning and the lack of application of local wisdom in learning become obstacles in improving the quality of learning and students' critical thinking skills.

Based on research conducted by (Handayani, 2020), to ensure the smooth running of the learning process and to achieve learning objectives, teachers are required to determine the methods and models of learning that will be used before conducting the teaching and learning process. Kardoyo et al., (2020) in their research stated that the application of problem-based learning methods can improve students' critical and creative thinking skills.

Several previous studies have highlighted the importance of applying Problem Based Learning (PBL) methods to improve students' critical thinking skills. Such as the research conducted by (Ernawati et al., 2023) stating that creative thinking skills can be improved through problem-based learning. Fahrunisa, (2019)stated that the PBL model can improve students' critical thinking skills. This is in line with the research by (Nurpratiwiningsih et al., 2023) which stated that the application of local wisdom in learning at elementary schools can contribute positively to improving the quality of education in Indonesia.

(Asih & Oktarina, 2023) in their research stated that the blended Problem Based Learning model through SIMPEL-12 is effective in improving critical thinking skills in economics subjects for XI IPS grade.

Based on the previous research that has been explained, research specifically developing Problem Based Learning (PBL) methods based on local wisdom for the institutional accounting practicum subject at SMK Muhammadiyah 1 Semarang has never been done. This is an opportunity to provide a new contribution to the development of more effective and relevant learning methods. This research offers the development of PBL methods based on local wisdom to improve students' critical thinking attitudes in the institutional accounting practicum subject at SMK Muhammadiyah 1 Semarang. This method is expected to improve the existing curriculum, improve the quality of learning, and help students develop critical thinking skills needed in real life.

The objectives of this research are: 1. Analyzing the steps of the PBL learning method to cultivate critical thinking attitudes in the Institutional Accounting Practicum subject at SMK Muhammadiyah 1 Semarang. 2. Analyzing the level of validity of the developed PBL method for the Institutional Accounting Practicum learning at SMK Muhammadiyah 1 Semarang. 3. Analyzing the effectiveness of the PBL method based on local wisdom in cultivating critical thinking attitudes of students in the Institutional Accounting Practicum subject at SMK Muhammadiyah 1 Semarang.

Practically, this research is expected to improve students' critical thinking skills, provide input for schools to enhance the quality of education, and provide experience and stimulate creativity for researchers in the learning process. The product specification developed is a PBL method based on local wisdom to support the critical thinking skills of students in the Accounting Department of SMK. The research assumptions include the ability of PBL to develop students' critical thinking skills, while the limitations of the research lie in focusing on class XI at SMK Muhammadiyah 1 Semarang.

RESEARCH METHODS

This study was conducted at SMK Muhammadiyah 1 Semarang using a Research and Development (R&D) design. The research and development design was adapted from the Thiagarajan model, commonly known as the 4-D model. Tiagarajan in (Astuti et al., 2021) explained the development of the 4-D model into 4 stages: define, design, develop, and disseminate. Success in implementing R&D needs to develop a systematic, structured, and measurable framework (Okpatrioka, 2023).

In the preliminary stage, the researcher explored potential problems through literature studies, information collection, and existing learning data. Next, in the planning stage, the researcher produced a conceptual model which was then validated by experts. The results of expert validation in this analysis used descriptive data analysis methods. The development stage produced the stage II model and a revised hypothetical model based on the results of validation by experts. The product trial stage was conducted to test the effectiveness of the PBL method based on local wisdom by analyzing the evaluation results using the Before-After Without Control Group Design. The final stage is the dissemination stage, where after knowing the effectiveness of the developed PBL method based on local wisdom, the researcher produced the final model. To determine the improvement in students' learning outcomes in critical thinking skills after treatment, the Normalized Gain Test (N-Gain) was used.

The data sources used were learning documents, teachers, and students of class XI Accounting at SMK Muhammadiyah 1 Semarang, with a total of 32 students. Additionally, class XI Accounting 2 at SMK Muhammadiyah 1 Semarang with 31 students. Productive accounting teachers, as well as expert lecturers, were also included. The data collection technique involved closed questionnaires with Likert scales to measure the level of agreement or disagreement with statements regarding the learning process, learning tools, and the application of teaching modules.

RESULTS AND DISCUSSION

This study focuses on 1. Institutional Accounting Practicum learning that has been implemented at SMK Muhammadiyah 1 Semarang: 2. Validation of the development of Problem Based Learning (PBL) methods based on local wisdom can improve critical thinking attitudes in learning the subject of Institutional Accounting Practicum at SMK Muhammadiyah 1 Semarang: 3. The effectiveness of Problem Based Learning (PBL) methods based on local wisdom developed for learning Institutional Accounting Practicum at SMK Muhammadiyah 1 Semarang.

The findings to answer the first research objective, the analysis of Institutional Accounting Practicum learning implemented at SMK Muhammadiyah 1 Semarang, indicate that the learning tends to be monotonous with a domination of lecture methods. This causes boredom among students and potentially reduces their ability to think critically. These findings are in line with research (Indah Wahyuni et al., 2023) stating that the activity of students greatly influences learning success in problem-solving, while passivity makes them tend to easily forget information given, resulting in difficulty when faced with problems. This is supported by research (Ayu & Murni, 2023) stating that teachers have not accustomed students to solve critical thinking test questions, so the questions given have not been able to measure students' critical thinking abilities. An analysis of the implementation plan for learning shows that the application of other learning methods, such as discussion, group work, and PBL, is still low. Details can be found in Table 1, which covers the analysis results of the Institutional Accounting Practicum learning plan.

Table 1 Results of the Analysis of the Institutional Accounting Practicum Learning Plan

Smstr	Jml RPP	Learning Methods			
		Lecture	PBL	Discuss	Work in Group
1	16	10	0	4	2
2	16	8	2	3	3
Total	32	18	2	7	5

Source: Archives of SMK Muhammadiyah 1 Semarang

As a result, most students experience difficulties in working in groups, communicating, and solving problems, as reflected in their learning outcomes which have not yet reached the Minimum Competency Criteria (KKM) set. This is evident in the results of the Institutional Accounting Practicum learning in class 11, as listed in Table 2.

Table 2 Results of Institutional Accounting Practicum Learning

Class	XI AK 1	XI AK 2
Number of Students	32	31
Pass KKM	15	13
Percentage	47%	42%
Not Pass KKM	17	18
Percentage	53%	58%

Source: Data from processed results of Institutional Accounting Practicum learning

According to the students' perspective on the learning that has been conducted in the class, data collection was done through questionnaires distributed to the students of class XI at SMK Muhammadiyah 1 Semarang. The students' perspective on learning shows that the learning process is considered inadequate. A detailed analysis of the data can be seen in the following Table 3.

Table 3 Analysis of Students' Perspectives on Institutional Accounting Practicum Learning at SMK Muhammadiyah 1 Semarang

Core Interval	Average Score	Frequency	Criteria
>255	284	2	Very Good
212-254	243	18	Good
171-211	180	39	Fair
136-170	165	4	Poor
<135	0	0	Very Poor
Total		63	

Source: Data on students' perspectives on the learning that has been conducted

Based on the interview results, analysis of existing teaching materials, student perspective questionnaires, and learning outcomes evaluations, it is evident that most students have not reached the Minimum Completion Criteria (KKM), and students perceive the learning process as inadequate. As conducted by (Annafi & Agustina, 2018), researchers acknowledge the need for innovation in learning approaches in their research. Therefore, this analysis serves as the basis for researchers to identify specific needs and design more effective and relevant teaching strategies for students.

This study chose the PBL method because it is considered capable of increasing student engagement in learning and utilizing local wisdom in the preparation of teaching materials. The integration of local wisdom in learning can help students develop identity and environmental awareness, as well as encourage lifelong learning attitudes(Fadli & Irwanto, 2020).

The second objective of this study is to validate the development of a Problem Based Learning (PBL) method based on local wisdom for the subject of Institutional Accounting Practicum at SMK Muhammadiyah 1 Semarang. Validation is carried out through the Thiagarajan and Semmel (1974) research model with a 4-D development approach, in the design, development, and dissemination stages.

In the design stage, researchers detailed the design of institutional accounting practicum teaching modules, considering local wisdom as the basis for formulating learning problems. A series of learning activities that support problem solving and the development of institutional accounting skills were also designed and validated by experts.

Table 4: Aiken's V Index Calculation Results

Item	Validator 1	Validator 2	S_1	S_2	$\sum S$	n (c-1)	Value V	evidence
Item 1-19	83	78	64	59	123	152	0,809	Very Good

Source: Processed expert validation data, 2023

Based on the calculation of Aiken's V Validity Index in Table 4, a V index value of 0.809 was obtained, indicating very high validity as it exceeds the value of 0.8. This result confirms that the expert evaluation of the development of the Problem Based Learning method has strong validity. Furthermore, the validators also provided suggestions and input on the design. These suggestions were accommodated in the revision of the learning design in the teaching module. Improvements were made to ensure that the design aligns with the validators' guidance and meets the

expected quality standards. The results of the improvements made are presented in detail in figure 1.

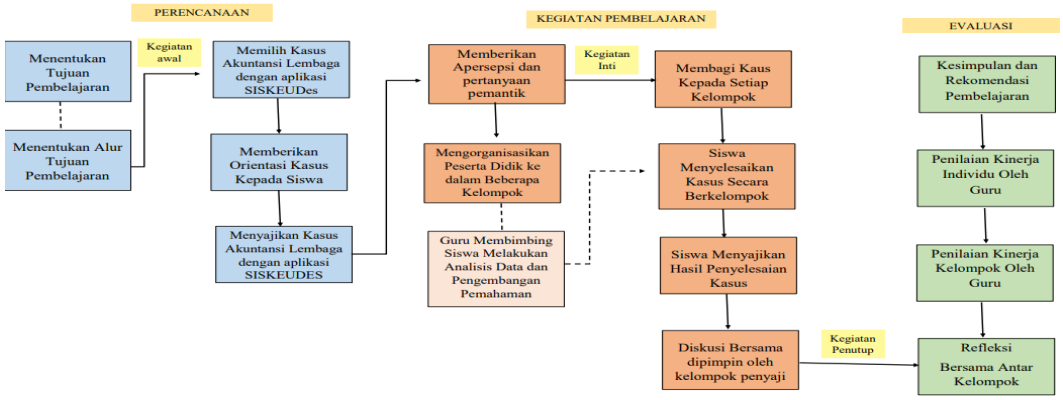

Figure 1: Hypothetical Model of Problem Based Learning Development

In the development stage, the design is implemented into a teaching module. The teaching module is validated to assess its suitability for learning needs and effectiveness in achieving learning objectives. Principles of local wisdom are applied in the content and teaching approach to ensure relevance to the students' environment.

The validation process uses a Likert scale consisting of five response options. The validation results show that the teaching module achieves a feasibility percentage (Va) of 77.33% for expert 1, 76.00% for expert 2, and 84.00% for the practitioner. The percentage results from the validator assessments are depicted in the following figure 2.

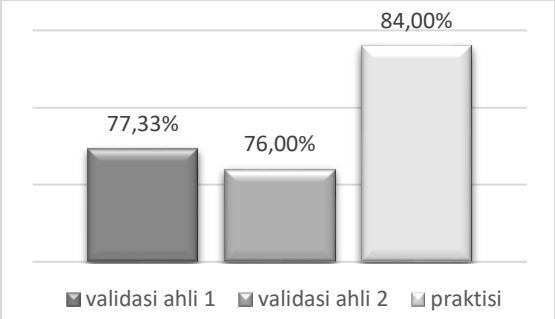

Figure 2: Percentage Results of Validator Assessments of the Teaching Module

After the validation and revision process, the teaching module was tested on both a small group and a large group.

Using previously calculated score intervals, we determined the qualitative category for the small group's total score of 1587. It was concluded that with an average score of 281, which falls within the interval range of the 'very good' category. Then, the researcher conducted a large group trial by adding class XI Accounting 2, which included 63 students. This was to determine the response of the larger group of students to the tested teaching module.

The results of the large group trial validated the development of the institutional accounting practicum module using the Problem-Based Learning (PBL) method based on local wisdom. This process provided deep insights into the students' appreciation of the module. The results of the large group trial showed the feasibility of using the module, with a total score of 1636 and an average of 108, attractiveness with a total score of 1201 and an average score of 95, and the presentation of the teaching module with a total score of 697 and an average score of 92. Based on the previously determined score intervals, it can be said that the total score of 3534 with an average score of 295 falls into the 'very good' category. Based on the results of the small and large group trials, there was an increase in the average scores obtained in terms of feasibility, attractiveness, and presentation of the developed teaching module. The average results of the trials on the small and large groups were categorized based on intervals, which are then presented in a bar chart in Figure 3.

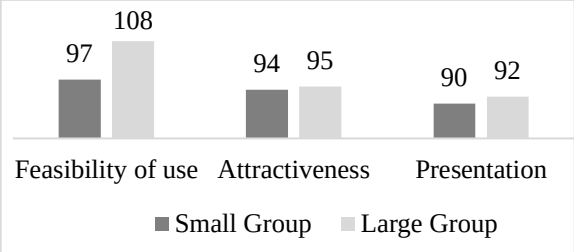

Figure 3. Average Scores of Small and Large Group Pilot Tests

To produce the final model, the hypothetical model that has been tested in both small and large groups was refined based on the suggestions provided. The following are the recommendations the researcher received for the tested model. Students expect the teacher to provide explanations on materials that are relevant to the learning objectives and the context of local wisdom. Students also hope that after solving cases in groups, the solutions will not only be presented and discussed but also presented to ensure mutual understanding among students, facilitating a well-structured and effective discussion. The improvements to the hypothetical model of the Problem Based Learning method based on local wisdom are presented in Figure 4.

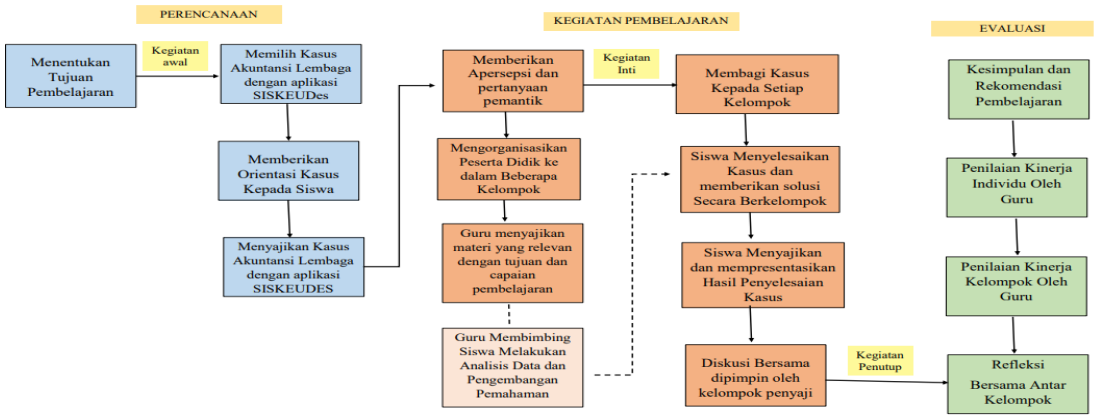

Figure 4 Final Model of Developing Problem Based Learning Method Based on Local Wisdom

The next objective of this research is to measure the effectiveness of Problem Based Learning (PBL) method based on local wisdom in cultivating students' critical thinking attitudes in the subject of Institutional Accounting Practicum at SMK Muhammadiyah 1 Semarang. To achieve this goal, the researcher used a questionnaire related to critical thinking skills, including indicators based on the research (Arif et al., 2019) such as basic clarification, providing reasons for a decision, summarizing, further clarifying assumptions, and coherence. Students were asked to assess the extent to which they engage in these activities using the provided answer scale. Using this observation sheet, the researcher could collect data on students' critical thinking skills before and after the learning process. The following is Table 5, which contains the results of the similarity test of the final data.

Table 5 Results of the Similarity Test of Final Data Means

Independent Sample Test Critical Thinking				
	Levene's Test For Equality Of Variances		t-test for Equality	
	F	Sig	t	Sig (2 tailed)
Equal Variances Asumed	1,435	0,234	10,595	

Source: Processed Data, 2024

Based on the results of the test of equality of final data averages in Table 5, it can be seen that the sig. value (2-tailed) in the equal variances assumed column is 0 or < 0.05. Furthermore, the obtained t-value is 10.595 > t-table value of 1.988861, indicating a significant difference between the average values of the class before and after the treatment. Therefore, it can be concluded

that the use of Problem Based Learning method based on local wisdom can improve critical thinking skills in the subject of Institutional Accounting Practicum for grade XI students at SMK Muhammadiyah 1 Semarang.

After receiving the treatment, the students underwent a post-test to determine the effectiveness of using Problem Based Learning method in the subject of Institutional Accounting Practicum, especially in improving the critical thinking skills of grade XI students at SMK Muhammadiyah 1 Semarang. Before the treatment was conducted, the class was given a pre-test to assess the extent of improvement in student learning outcomes after the implementation of the learning method. The increase in average scores between the pre-test and post-test can be obtained using the Normalized Gain (N-Gain) test. The use of N-Gain aims to avoid misinterpretation of changes in student learning outcomes. The results of the N-Gain test calculation are presented in Table 6.

Table 6 Calculation Results of N-Gain Scores

Average Score		Value N gain	Criteria
Pre-Test	Post-Test		
67,238	86,016	0,567	High

Source: Processed primary data

Based on the N-Gain calculation results table, it is concluded that the use of the institutional accounting practicum teaching module can be considered effective. This is indicated by the N-Gain calculation results from the post-test and pre-test scores, with an N-Gain value of 0.567. This calculation falls into the high category. Based on the above discussion, it can be concluded that the Problem-Based Learning method based on local wisdom can enhance the critical thinking skills of students at SMK Muhammadiyah 1 Semarang. This research is relevant to studies by (Jannah et al., 2022; Primayanti et al., 2019; Satwika et al., 2018) which state that learning using the Problem-Based Learning method can improve students' critical thinking skills. The difference between this research and previous studies lies in the use of local wisdom, the research location, and the subjects studied.

CONCLUSION

Based on the development of PBL method based on local wisdom in the institutional accounting practicum subject for grade XI Accounting at SMK Muhammadiyah 1 Semarang, it was found that this method is effective in improving students' critical thinking attitudes. The steps of developing the PBL method include preliminary studies, module design, and classroom trials. Validation evaluation was conducted through expert validation of material and modules, which showed a high level of validity. The post-test results of the students showed an improvement in critical thinking skills, with an N-Gain score of 0.567. Thus, the implementation of the PBL method based on local wisdom can be considered effective in improving students' critical thinking skills. This confirms that PBL based on local wisdom is an appropriate learning approach to improve the quality of institutional accounting practicum learning at SMK Muhammadiyah 1 Semarang.

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