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Does problem-based learning increase accounting students' critical thinking and learning outcomes?

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Abstract

This study examines the impact of implementing a problem-based learning (PBL) model on accounting students' critical thinking and learning outcomes. The design of this study was a quasi-experimental non-equivalent group pre-test and post-test involving 80 accounting students at Wahidin Vocational High School, Cirebon City. The pre-test and post-test results were then tested using the two-group sample t-test and paired t-test methods to test our hypotheses. As a result, we found that the PBL model improved critical thinking and student learning outcomes. In implementing the PBL model, we employed 10 learning steps, from identifying learning objectives, designing problems, encouraging students to research and find solutions to problems, and contextualizing learning outcomes. Finding solutions to problems has proven effective in building critical thinking and student learning outcomes. The discussion process between students when building the right solution to the problem can also build a better understanding and competence in the accounting field. However, teachers need to be facilitators who can encourage student participation in finding solutions and discussions.

Abstrak

Studi ini menguji dampak implementasi model problem-based learning (PBL) terhadap critical thinking dan learning outcome siswa jurusan akuntansi. Desain penelitian ini adalah quasi-eksperimental non equivalent group pretest and postest yang melibatkan 80 siswa jurusan akuntansi di Sekolah Menengah Kejuruan Wahidin Kota Cirebon. Hasil dari pre-test dan post-test tersebut kemudian diuji dengan metode t-test two group sample dan paired t-test untuk menguji hipotesis yang dibangun. Hasilnya, penelitian ini menemukan bahwa model PBL terbukti dapat meningkatkan critical thinking serta learning outcome siswa. Dalam mengimplementasikan model PBL, kami menggunakan 10 langkah pembelajaran dari mulai mengidentifikasi tujuan pembelajaran, mendesain masalah, mendorong siswa untuk meneliti dan menemukan solusi atas masalah, hingga mengintegrasikan hasil pembelajaran secara kontekstual. Proses pencarian solusi atas masalah yang diberikan terbukti efektif dalam membangun critical thinking dan learning outcome siswa. Proses diskusi antar siswa ketika membangun solusi yang tepat atas masalah yang diberikan juga dapat membangun pemahaman dan kompetensi pada bidang akuntansi yang lebih baik. Hanya saja, guru perlu menjadi fasilitator yang dapat mendorong partisipasi siswa dalam proses pencarian solusi dan diskusi tersebut.

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Introduction

Critical thinking has not received special attention in the context of accounting learning (Terblanche & De Clercq, 2021). Accounting students must have high critical thinking (Wolcott & Sargent, 2021). Critical thinking is one of the 21st-century skills needed to improve adaptability and flexibility in processing information (Dwyer et al., 2014). The increasingly complex challenges of the accounting profession in the future require them to be more adaptive and able to examine various financial transaction information critically. According to Cunningham (2014), there are at least five reasons why the accounting profession requires high critical thinking: more complex ways of conducting business, information overload and gaps in information, technological advances, globalization, and escalating regulations. For this reason, educators must continue striving to improve students' critical thinking in accounting learning through various learning models.

One of the learning models assumed to improve students' critical thinking in accounting learning is problem-based learning (PBL) conducted by Barrows & Tamblyn (1980). Although they did not mention that the model was based on a particular learning theory, several learning theories support the birth of the PBL model (Walker et al., 2015). Several learning theories that underlie the PBL model include inquiry learning theory (Dewey, 1938), experiential learning theory (Kolb, 1984), and constructivist learning theory (Piaget, 1966). These theories indicate that the learning process carried out with the PBL model can improve students' critical thinking and learning outcomes.

For example, inquiry learning theory indicates that students will find it easier to understand new knowledge and have sharper critical thinking if the learning process involves real experiences. Dewey (1938) illustrates that students obtain the best knowledge when actively involved with their environment. Dewey (1938) is reinforced by experiential learning theory (Kolb, 1984), which states the importance of experience and reflection in learning. (Kolb, 1984) explained the importance of the four stages in learning, namely, concrete experience, reflective observation, abstract conceptualization, and active experimentation.

Experience-based learning, such as in inquiry learning theory and experiential learning, is an important basis in PBL. As stated by Barrows & Tamblyn (1980), PBL emphasizes the importance of real problems experienced by students as an important process to improve problem-solving skills and critical thinking. The impact of implementing the PBL model on improving critical thinking has been proven by several researchers, including Nirbita & Joyoatmojo (2020), Narmaditya et al. (2018), Fadhilatunisa et al. (2020), Amin et al. (2020), and Suryani et al. (2024). They found that PBL can effectively improve students' critical thinking in various subjects, including accounting. A meta-analysis study by Yu & Zin (2023) found that of the 20 studies they collected, all showed the effectiveness of the PBL model in improving students' critical thinking.

Referring to the constructivist learning theory (Piaget, 1966), the PBL model can improve accounting learning outcomes. From the perspective of constructivist learning theory, students will construct their knowledge effectively through experience and interaction with the real environment. This learning process must be active by involving the assimilation or accommodation of students to new experiences. Therefore, a learning process built on an environment based on problem-solving and exploration of experiences (as in the PBL model) will improve students' learning outcomes. This has been proven by several researchers, one of whom is Nurkhin et al. (2020), who stated that PBL can improve critical thinking, creative thinking, and accounting learning outcomes. Several other studies, including Stanley & Marsden (2012) and Hsu et al. (2016), also found a positive effect of PBL implementation on learning outcomes in accounting.

However, several other researchers doubt that PBL can improve students' critical thinking and learning outcomes. For example, a meta-analysis study by Lee et al. (2016) stated

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that PBL is ineffective in improving students' critical thinking. Several other researchers, including Choi (2004), Manuaba et al. (2022), and Govender (2015), explained that PBL had not been proven to improve students' critical thinking. Referring to Barrows (1996), the implementation of PBL must be adjusted to the objectives of the learning outcomes to be achieved. If, for example, the outcomes to be achieved are more cognitive, then PBL may not necessarily improve students' critical thinking. On the other hand, research by Koh et al. (2008), Hmelo-Silver (2004), Srinivasan et al. (2007), and Savin-Baden (2000) indicates that PBL is less effective in improving learning outcomes.

Based on the contradictions between the results of previous studies, the impact of PBL on students' critical thinking and learning outcomes is still worth re-examining. Therefore, this study attempts to re-examine the impact of PBL on accounting students' critical thinking and learning outcomes at Wahidin Vocational High School (SMK) in Cirebon City, West Java Province. The selection of SMK Wahidin as the research object is inseparable from the learning problems of accounting students at this school. There are at least three learning problems for accounting students at SMK Wahidin. First, the learning outcomes of accounting subjects are not optimal, as evidenced by the low number of students' competencies in the competency test by the Professional Certification Institute (LSP). Second, students tend to have difficulty developing their critical thinking skills when examining and analyzing evidence of financial transactions. Third, there is still a need to increase student enthusiasm for learning accounting.

Method

This study used a quasi-experimental non-equivalent group pre-test and post-test design. This study involved 80 grade XII students majoring in accounting at Wahidin Vocational High School (SMK) in Cirebon City. We divided them into 40 students in the experimental group and 40 in the control group. The selection of these two groups was based on three considerations: relatively evenly distributed academic abilities, student activeness in learning tends to be homogeneous, and student learning outcomes in the two groups tend not to be too different. This study was conducted from July to December 2024.

We implemented the PBL model in learning in the experimental group, while for the control group, the learning model used was conventional, namely using lecture and practice methods. Each group was given the same learning for 12 meetings (1 semester), where at the first meeting, the researcher gave an initial test (pre-test) to determine the students' initial competencies. After six meetings, the researcher gave a post-test to determine how PBL impacted the control and experimental groups' critical thinking skills and accounting learning outcomes.

To implement the PBL model, researchers modified several learning process steps from Barrows & Tamblyn (1980) into accounting learning. There are 10 steps of PBL implementation used, namely: 1) identifying learning objectives, 2) designing problems, 3) dividing students into groups, 4) introducing problems to students, 5) facilitating students to discuss with each other, 6) encouraging students to research and find solutions to problems independently, 7) compiling solutions to problems given collaboratively, 8) encouraging students to present findings in the form of solutions to problems given, 9) reflecting on the learning process, and 10) integrating learning outcomes contextually.

The subject matter or basic competencies in this accounting learning are preparing single-entity financial statements for micro, small, and medium enterprises. To achieve these basic competencies, students need to have competency elements in the form of recording adjusting journal entries, posting adjusting journal entries to the general ledger, recording closing journal entries, posting closing journal entries to the general ledger, and presenting financial statements consisting of income statements, financial position statements, and notes to financial statements. The researcher compiled a pre-test and post-test to measure students'

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learning outcomes based on these competency units. In addition, to measure students' critical thinking, the researcher also compiled a pre-test and post-test, which were compiled based on critical aspects of basic competency achievement, namely accuracy in recording adjustment journals, fairness in presenting financial position reports, fairness in presenting profit and loss reports, and adequacy and fairness in presenting notes to financial statements.

Table 1. Grid of Pre-test and Post-test Learning Outcome Questions

Elements of Competency	Performance Criteria	Level of Thinking	Maximum Grade	No Items
Recording adjusting journal entries	Identifying source documents	C2	6	1
	Identifying accounts that require adjustment	C2	8	2
	Recording adjusting journal entries as required	C1	6	3
Posting closing journal entries to the general ledger	Post-adjusting journal entries as required	C3	8	4
	Presenting general ledger balances after adjustments	C3	8	5
	Preparing trial balances as required	C4	10	6
Recording adjusting journal entries	Identifying accounts debited and credited	C2	8	7
	Recording closing journal entries as required	C1	6	8
	Post-closing journal entries as required	C3	8	9
Presenting financial statements	Presenting general ledger balances after closing the books	C3	8	10
	Presenting a statement of financial position as required	C3	8	11
	Presenting an income statement as required	C3	8	12
	Presenting notes to the financial statements as required	C3	8	13

The maximum score for all pre-test and post-test results in measuring learning outcomes is 100. We use the type of observation practice assignment questions to measure the learning outcomes. The competency elements and performance criteria used in Table 1 refer to the Decree of the Minister of Manpower Number 264 of 2023 concerning the Indonesian National Work Competency Standards (SKKNI) for the category of professional, scientific, and technical activities in the leading group of legal and accounting activities in the field of accounting technicians. Furthermore, the question grid to measure students' critical thinking abilities is as follows:

Table 2. Critical Thinking Pre-test and Post-test Question Grid

Elements of Competency	Performance Criteria	Level of Thinking	Maximum Grade	No Items
Recording adjusting journal entries	Accuracy in recording adjustment journal entries	C5	25	1
Presenting financial statements	Fairness in presenting the financial position report	C5	25	2
	Fairness in presenting the income statement	C5	25	3
	Adequacy and fairness in presenting notes to the financial statements.	C5	25	4

The maximum score for all questions that measure students' critical thinking is 100. The type of questions to measure students' critical thinking, as in Table 2, is descriptive. Similar to the question grid to measure learning outcomes, the question grid in Table 2 is also compiled

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concerning SKKNI 246 of 2023. Each question given will then be tested for validity and reliability. We tested the instrument on 30 students to test its validity. Each question item was tested using the Spearman rank method. We used an r-table value limit of 0.462 for learning outcome questions and 0.576 for critical thinking questions. As for the reliability test, we used the Cronbach's Alpha estimate. The results of the validity test of the question items for learning outcomes are as follows:

Table 3. Validity of Learning Outcome Instruments

No	Pearson	r-table	Validity Criteria	Remarks
1	0.464	0.462	Moderate	Valid
2	0.486	0.462	Moderate	Valid
3	0.477	0.462	Moderate	Valid
4	0.878	0.462	Excellent	Valid
5	0.488	0.462	Moderate	Valid
6	0.519	0.462	Moderate	Valid
7	0.547	0.462	Moderate	Valid
8	0.464	0.462	Moderate	Valid
9	0.858	0.462	Excellent	Valid
10	0.781	0.462	Excellent	Valid
11	0.647	0.462	Moderate	Valid
12	0.466	0.462	Moderate	Valid
13	0.861	0.462	Excellent	Valid

Based on Table 3, it can be seen that all learning outcome question items are declared valid so that they can be used for pre-test and post-test. The results of the validity test of the critical thinking question instrument are as follows:

Table 4. Validity of Critical Thinking Instruments

No	pearson	r-table	Validity Criteria	Remarks
1	0.642	0.576	Excellent	Valid
2	0.637	0.576	Excellent	Valid
3	0.597	0.576	Moderate	Valid
4	0.631	0.576	Excellent	Valid

All test instrument question items used to measure students' critical thinking were declared valid. Furthermore, the reliability of the instrument to measure learning outcomes and critical thinking is as follows:

Table 5. Instruments' Reliability

Variable	Cronbach Alpha	r-table	Reliability Criteria	Remarks
Learning Outcome	0.921	0.423	Excellent	Reliable
Critical Thinking	0.871	0.576	Excellent	Reliable

Table 5 shows that the learning outcome and critical thinking instruments are reliable because they have adequate Cronbach's Alpha values. It means that the research instrument is

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consistent and can measure students' learning outcomes and critical thinking at different times and research objects. Academics can access the instruments used in this study upon request. Thus, we used the two-group samples t-test method to test the research hypothesis. First, we compared the pre-test results between the control and experimental classes. The results of the two-group samples t-test are expected to have no difference. Next, we retested the post-test results between the control and experimental classes. Suppose the mean critical thinking and learning outcomes from the post-test of the experimental class are significantly greater than the post-test of the control class. In that case, it can be stated that the implementation of PBL has a positive and significant impact on improving critical thinking and learning outcomes. We also used the paired t-test method to strengthen the results of the hypothesis testing. The paired t-test is used to confirm whether there is a significant difference between the pre-test and post-test results in both the control and experimental classes.

Results and discussion

Descriptive statistics of the pre-test and post-test results for the control class and experimental class in this study are as follows:

Table 6. Descriptive Statistics

Variable	Obs	Mean	Std.Dev	Min	Max
Control Class					
Critical Thinking Pre-Test	40	42.750	14.848	20	70
Critical Thinking Post-Test	40	63.250	14.916	40	90
Learning Outcome Pre-Test	40	50.000	10.682	25	70
Learning Outcome Post-Test	40	74.500	10.670	50	95
Experiment Class					
Critical Thinking Pre-Test	40	42.250	14.586	20	70
Critical Thinking Post-Test	40	72.250	14.049	50	100
Learning Outcome Pre-Test	40	49.875	11.407	25	80
Learning Outcome Post-Test	40	84.250	10.534	60	100

The current condition of critical thinking and learning outcomes of accounting students from SMK Wahidin can be reviewed from the results of the control class post-test. This is because the learning process at SMK Wahidin has used a conventional model, namely the lecture and practice methods. Based on the post-test scores of the control class, the average learning outcome of SMK Wahidin students has not reached the minimum completion criteria (KKM) of 75. This condition is the reason for the level of competence of accounting students at SKM Wahidin Cirebon in the competency test activities by LSP.

Table 6 also shows that the mean pre-test results of critical thinking and learning outcomes in the control and experimental classes tend not to differ significantly. The mean value for the pre-test results of critical thinking in the control and experimental classes tends not to differ significantly, except for the pre-test learning outcome. Meanwhile, the post-test results of critical thinking and learning outcomes for the experimental and control classes tend to differ quite significantly, but this does not mean that the difference is significant. To examine the significance of the differences between the experimental class and the control class from the pre-test and post-test results, this study used a two-group sample t-test analysis as follows:

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Table 7. T-test two group samples for critical thinking

	Obs	Mean	Std. err.	Std. dev.	t (prob)
Pre-Test					
Experiment	40	42.250	2.306	14.586	-
Control	40	42.750	2.348	14.848	-
Combined	80	42.500	1.635	14.626	-
Diff	-	-0.501	3.291	-	-0.151 (0.561)
Post-Test					
Experiment	40	72.250	2.221	14.049	-
Control	40	63.250	2.358	14.916	-
Combined	80	67.750	1.687	15.093	-
Diff	-	9.000	3.240	-	2.777 (0.003)

Table 7 shows that when the pre-test was conducted, the critical thinking scores for the experimental and control classes were not statistically different (p-value greater than 0.05). However, after the learning process in which the experimental class was given the PBL model and the control class was given a conservative learning model based on lectures and practice, there was a difference in the post-test results. The experimental class got a higher and more significant score than the control class. This shows that the first hypothesis in this study is accepted, meaning that implementing the PBL model has been proven to improve the critical thinking of accounting students.

Table 8. T-test two group samples for learning outcomes

Group	Obs	Mean	Std. err.	Std. dev.	t (prob)
Pre-Test					
Experiment	40	49.875	1.804	11.407	-
Control	40	50.000	1.689	10.682	-
Combined	80	49.938	1.228	10.980	-
Diff	-	-0.125	2.471	-	-0.050 (0.520)
Post-Test					
Experiment	40	84.250	1.666	10.534	-
Control	40	74.500	1.687	10.670	-
Combined	80	79.375	1.299	11.621	-
Diff	-	9.750	2.371	-	4.112 (0.000)

Table 8 shows that the pre-test learning outcome results of the experimental class and the control class are not statistically different. After the treatment in the form of learning with the PBL model, there was a significant increase in the post-test learning outcome of the experimental class. The difference in the post-test learning outcome results of the experimental class and the control class was proven to be statistically significant, reaching 9,750 points. It means that the implementation of the PBL model has been proven to improve the learning outcomes of accounting students in the learning material of preparing financial reports for single entities on the scale of micro, small, and medium enterprises. The difference between the pre-test and post-test for each class can be seen in the following table:

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Table 9. Paired t-test for critical thinking

	Obs	Mean	Std. err.	Std. dev.	t (prob)
Experiment					
Post-Test	40	72.250	2.221	14.049	-
Pre-Test	40	42.250	2.306	14.586	-
Diff	40	30.000	1.132	7.161	26.495 (0.000)
Control					
Post-Test	40	63.250	2.358	14.916	-
Pre-Test	40	42.750	2.348	14.848	-
Diff	40	20.500	1.010	6.385	20.305 (0.000)

The PBL model and the conventional lecture-based and practice model have both been proven to improve critical thinking. This result was obtained from the significant difference in the average pre-test and post-test scores in the control and experimental classes. However, the increase in critical thinking scores in the experimental class tended to be much greater than in the control class, as confirmed by the two group samples' t-test results. This means the PBL model improves students' critical thinking more effectively than the conventional model.

Table 10. Paired t-test for learning outcome

	Obs	Mean	Std. err.	Std. dev.	t (prob)
Experiment					
Post-Test	40	84.250	1.666	10.534	-
Pre-Test	40	49.875	1.804	11.407	-
Diff	40	34.375	0.674	4.265	50.976 (0.000)
Control					
Post-Test	40	74.500	1.687	10.670	-
Pre-Test	40	50.000	1.689	10.682	-
Diff	40	24.500	0.734	4.641	33.387 (0.000)

Paired t-test shows that implementing learning in the experimental and control classes is significant in improving accounting students' learning outcomes. However, the increase in student learning outcomes in the experimental class is much greater than in the control class. In other words, implementing the PBL model is much more effective in improving learning outcomes than conventional lecture-based and practice models.

The Impact of Problem-Based Learning on Students' Critical Thinking

This study successfully found that implementing the PBL model positively and significantly improved students' critical thinking. In accounting learning in this study, critical thinking as intended, is related to students' ability to record adjusting journal entries correctly and present financial reports fairly and sufficiently. Students must use critical thinking when processing financial information to record and correctly adjust journal entries. Meanwhile, to present financial reports reasonably and sufficiently, students must also analyze, calculate, and make decisions in grouping available accounts into financial reports. The ability to analyze, calculate, and make decisions are indicator of critical thinking in accounting. As Wolcott & Sargent (2021) explained, critical accounting thinking includes analyzing, evaluating, and synthesizing information for decision-making.

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In 1980, Barrows & Tamblyn (1980) initiated the PBL model from Barrows' experience while teaching in the medical field. This PBL model was then widely implemented and developed for learning in other fields, including accounting. After being implemented quite a lot, Barrows (1986) compiled a taxonomy of PBL methods based on specific criteria, for example, regarding the types of problems presented, the roles of teachers and students in PBL learning, and the conditioning of the learning environment. In his taxonomy, Barrows (1986) suggested that educators choose one of 6 types of PBL implementation: lecture-based cases, asset-based lectures, case method, modified case-based method, problem-based method, and reiterative problem-based method. To choose one of the six types, educators need to consider the skills that students want to achieve.

According to Barrows (1986), several skills need to be considered when choosing the type of PBL implementation, including hypothesis generation, inquiry, data analysis, problem synthesis, and decision-making. These skills can significantly support the development of critical thinking. For example, inquiry skills involve searching for information, asking critical questions, and examining problems in depth. This is very fundamental in building students' critical thinking. Therefore, although Barrows & Tamblyn (1980) do not explicitly mention the term critical thinking, there is a strong indication that PBL can improve students' critical thinking.

Critical thinking in accounting can be defined as the ability to analyze, evaluate, and synthesize information to make decisions (Wolcott & Sargent, 2021). Decision-making in this context relates to an accountant's decision to determine what accounting treatment needs to be applied to evidence of financial transactions. This is explained by Reinstein & Bayou (1997), who state that accounting students need to calculate and think critically to complete a number of financial transactions in various contexts. Based on this concept, critical thinking is one of the most important skills for accounting students to master.

Referring to the inquiry learning theory, students can build themselves with real experience, meaningful tasks, and problems that bring them closer to real-life conditions. This is also available in the PBL model, which tends to be closely related to the inquiry learning theory (Savery & Duffy, 1995). With inquiry-based learning, students' critical thinking can be improved more effectively (Schunk, 2012). The learning process begins with questions that will be the problem to be solved or a set of observations to be explained (Bateman, 1990). In the PBL model, students are also required to process information as explained in the inquiry learning theory.

According to Lee (2004), in inquiry-based learning, students' critical thinking can be improved. Inquiry learning tends to follow the PBL model, whereas, in the PBL model, learning is opened with specific questions and then ends with general conclusions (Michael & Richard, 2013). In more detail, Barrows & Tamblyn (1980) explained that in the PBL model, students face open, unstructured, authentic problems and are directed to work in teams to identify learning needs and develop appropriate solutions. In this learning, the teacher acts as a facilitator. Meanwhile, referring to Duch (2001), there are three main activities in the implementation of the PBL model, namely: each group of students in the class reports problems in previous learning and current learning, educators provide information related to the description of efforts that can be sought to solve the problem, and discussions in class to discuss each problem being handled by students. On the other hand, Hansen (2006) stated that implementing the PBL model in accounting learning can help students think critically, analyze, and solve complex real-world problems. In addition, the implementation of PBL can also support students to find, evaluate, and use learning resources, work together as a team, and demonstrate practical communication skills.

The significant positive influence of implementing the PBL model on students' critical thinking found in this study confirms the relevance of the inquiry learning theory because the

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PBL model is closely related to the inquiry learning theory (Savery & Duffy, 1995). In addition, this study also supports several previous studies, including Hansen (2006), Suryanti & Nurhuda (2021), Mardi et al. (2021), Nirbita & Joyoatmojo (2020), Narmaditya et al. (2018), Fadhilatunisa et al. (2020), Amin et al. (2020), and Suryani et al. (2024), who also found that the implementation of the PBL model was effective in improving the critical thinking of accounting students. Implementing the PBL model, which is substantial in building students' critical thinking, involves researching and finding solutions to problems. At this point, students are also required to process information to make decisions. Critical thinking in this study was measured based on the accuracy of recording adjustment journals and the fairness in presenting financial reports. This means that an increase in critical thinking can be a trigger for achieving competence in accounting. When associated with the SOLO taxonomy, the increase in critical thinking in accounting from implementing the PBL model can be seen from the increase in students' thinking skills in multi-structural, relational, and extended abstract (Narmaditya et al., 2018).

The increase in critical thinking of accounting students in this study tends to agree with Hansen (2006), who believes that the PBL model can encourage accounting students to think critically. Students' ability to analyze and find solutions to real-world problems can also be improved. In addition, the PBL model can also encourage students' ability to process information by finding, evaluating, and using learning resources. However, educators must be more aware of student participation in the discussion process. Some students are likely not to be involved in the discussion process to find solutions to the problems. The increase in critical thinking due to implementing the PBL model can be an important provision for students to face the complexity of the world of work in accounting. Although the Indonesian National Qualification Framework (KKNI) level for vocational high school graduates is only level 2 (equivalent to the operator profession), the complexity of the work tends to require high critical thinking skills. For example, vocational high school graduates majoring in accounting must analyze and think critically to determine how accounting is treated for these financial transactions. Moreover, vocational school graduates majoring in accounting must also be more adaptive to technology (Dwyer et al., 2014).

The Impact of Problem-Based Learning on Students' Learning Outcomes

This study found that the PBL model improves accounting learning achievement. Compared to conventional learning models, the average difference in learning outcome scores of students who learn with the PBL model reaches 9,750 points. This means that students who learn with the PBL model have a learning outcome score of 12.2% greater than those who learn with the conventional model. Because this conventional model is the learning model used to date at SMK Wahidin, using the PBL model can increase the learning outcome of accounting students by up to 12.2%. The positive and significant influence of implementing the PBL model on the learning outcome of accounting students in this study confirms the relevance of the constructivist learning theory. According to this theory, students will get better learning outcomes if their learning is based on experience and interaction with real-world problems. This aligns with the PBL model, which prioritizes solving real problems and involves discussion and processing information. As explained by Stanley & Marsden (2012), the PBL model is needed to improve the learning outcomes of accounting students because it can encourage students' understanding and competence in processing, analyzing, and making decisions related to appropriate accounting treatments.

Referring to the constructivist learning theory (Piaget, 1966), learning that emphasizes building knowledge based on experience and real-world problem-based interactions will improve students' learning outcomes. This aligns with implementing the PBL model, which prioritizes real-world problems so that students can build their knowledge and competence more meaningfully. In other words, the constructivism learning theory can also explain that

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implementing the PBL model in learning positively affects learning outcomes, including learning outcomes in the accounting field.

According to Stanley & Marsden (2012), the PBL model is needed to improve students' learning outcomes in accounting learning. Stanley & Marsden (2012) also state that the concept of learning by doing in the PBL model is an effective catalyst for providing maximum accounting learning outcomes. Accounting students need to deal directly with real-world problems related to financial transactions. This can support students' understanding of accounting concepts, such as matching concepts, accrual basis, and accounting treatments, such as recognition, measurement, recording, and presentation of financial transactions. The findings in this study support several previous studies, including those conducted by Suandi et al. (2024), Salin (2011), Milne & McConnell (2001), Manaf et al. (2011), Nurkhin et al. (2020), Hsu et al. (2016), and Wyness & Dalton (2018). Their research also found that the PBL model can effectively improve learning outcomes in accounting learning. By implementing the PBL model, accounting students can more easily understand basic accounting concepts such as matching concepts, accrual basis, recognition, measurement, recording, and presentation of financial statements. In addition, using the PBL model can also encourage an increase in student competency dimensions such as contingency management skills and job role environmental skills. On that basis, implementing the PBL model can improve students' accounting competencies, especially in the competency unit of preparing financial reports for single entities with micro, small, and medium business scales.

Conculsion

We experimented to test the effect of implementing the PBL model on accounting students' critical thinking and learning outcomes. The material or basic competency we experimented with was preparing single-entity financial reports for micro, small, and medium enterprises. We divided 80 grade XII students of Vocational High Schools (SMK) majoring in accounting into two groups, namely the control and experimental classes. For the experimental class, we implemented the PBL model; for the control class, we implemented the conventional model with lecture and practice learning methods.

After carrying out the learning process for 1 semester (12 meetings), we found that implementing the PBL model has significantly improved accounting students' critical thinking and learning outcomes. This is confirmed by the significant difference between the post-test results, which show that the experimental class's post-test critical thinking and learning outcome scores are much greater than those of the control class. These results are also reinforced by the paired t-test, which shows a significant increase from the pre-test results to the post-test critical thinking and learning outcomes of the experimental class.

The findings of this study have implications for the importance of implementing the PBL model to improve accounting students' critical thinking and learning outcomes. Students can be more precise in preparing adjustment journals and more accurately and fairly present financial reports of single entities on a micro, small, and medium business scale. Implementing the PBL model in accounting learning can effectively solve the problem of low competence of accounting vocational high school students. Competence in accounting for vocational high school students is their main capital when facing the world of work.

References

Amin, S., Utaya, S., Bachri, S., Sumarmi, & Susilo, S. (2020). Effect of problem-based learning on critical thinking skills and environmental attitude. *Journal for the Education of Gifted Young Scientists*, *8*(2), 743–755. https://doi.org/10.17478/jegys.650344

Barrows, H. S. (1986). A taxonomy of problem-based learning methods. *Medical Education*, *20*(6), 481–486. https://doi.org/10.1111/j.1365-2923.1986.tb01386.x

Barrows, H. S. (1996). Problem-based learning in medicine and beyond: A brief overview. *New Directions for Teaching and Learning*, *68*, 3–12.

ISSN : 2614-3291 (online)
doi: http://dx.doi.org/10.32493/keberlanjutan.v10i1.y2025.p1-13

Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-Based Learning: An Approach to Medical Education*. New York: Springer Publishing Company.
Bateman, W. L. (1990). *Open to Question. The Art of Teaching and Learning by Inquiry.* ERIC.
Choi, H. (2004). The Effects of PBL(Problem-Based Learning) on the Metacognition, Critical Thinking, and Problem Solving Process of Nursing Students. *Journal of Korean Academy of Nursing*, *34*(5), 712. https://doi.org/10.4040/jkan.2004.34.5.712
Cunningham, B. M. (2014). Developing critical thinking in accounting education. In *The Routledge companion to accounting education* (pp. 399–419). Routledge.
Dewey, J. (1938). *Experience and Education*. Indiana: Kappa Delta Pi.
Duch, B. J. (2001). Models for problem-based instruction in undergraduate courses. *The Power of Problem-Based Learning*, 39–46.
Dwyer, C. P., Hogan, M. J., & Stewart, I. (2014). An integrated critical thinking framework for the 21st century. *Thinking Skills and Creativity*, *12*, 43–52. https://doi.org/10.1016/j.tsc.2013.12.004
Fadhilatunisa, D., Rosidah, R., & Fakhri, M. M. (2020). The effectiveness of the blended learning model on the students' critical thinking skills and learning motivation in accounting department. *Lentera Pendidikan : Jurnal Ilmu Tarbiyah Dan Keguruan*, *23*(2), 194. https://doi.org/10.24252/lp.2020v23n2i1.
Govender, S. (2015). Students' perceptions of teaching methods used at South African Higher Education Institutions: part 1. *South African Journal of Higher Education*, *29*(3), 23–41.
Hansen, J. D. (2006). Using problem-based learning in accounting. *Journal of Education for Business*, *81*(4), 221–224. https://doi.org/10.3200/joeb.81.4.221-224
Hmelo-Silver, C. E. (2004). Problem-Based Learning: What and How Do Students Learn? *Educational Psychology Review*, *16*(3), 235–266.
Hsu, C.-S., Yen, S.-H., & Lai, W.-H. (2016). The Effectiveness of Problem-Based Learning in the Accounting Course. *Asian Journal of Finance & Accounting*, *151*(1), 1–26.
Koh, G. C. H., Khoo, H. E., Wong, M. L., & Koh, D. (2008). The effects of problem-based learning during medical school on physician competency: A systematic review. *CMAJ. Canadian Medical Association Journal*, *178*(1), 34–41. https://doi.org/10.1503/cmaj.070565
Kolb, D. A. (1984). *Experiential Learning: Experience as The Source of Learning and Development*. New Jersey: Prentice Hall.
Lee, J., Lee, Y., Gong, S., Bae, J., & Choi, M. (2016). A meta-analysis of the effects of non-traditional teaching methods on the critical thinking abilities of nursing students. *BMC Medical Education*, *16*(1), 1–9. https://doi.org/10.1186/s12909-016-0761-7
Lee, V. S. (2004). *Teaching and learning through inquiry: A guidebook for institutions and instructors*. Stylus Pub LLC.
Manaf, N. A. A., Ishak, Z., & Hussin, W. N. W. (2011). Application of Problem Based Learning (PBL) in a Course on Financial Accounting Principles. *Malaysian Journal of Learning and Instruction*, *8*, 21–47. https://doi.org/10.32890/mjli.8.2011.7625
Manuaba, I. B. A. P., No, Y., & Wu, C. C. (2022). The effectiveness of problem based learning in improving critical thinking, problem-solving and self-directed learning in first-year medical students: A meta-analysis. *PLoS ONE*, *17*(11 November), 1–12. https://doi.org/10.1371/journal.pone.0277339
Mardi, M., Fauzi, A., & Respati, D. K. (2021). Development of students' critical thinking skills through guided discovery learning (Gdl) and problem-based learning models (pbl) in accountancy education*. *Eurasian Journal of Educational Research*, *95*, 210–226. https://doi.org/10.14689/EJER.2021.95.12
Michael, J. P., & Richard, M. F. (2013). Inductive Teaching and Learning Methods: Definitions, Comparisons, and Research Bases. *Journal of Engineering Education*, *95*(2), 123–138.
Milne, M. J., & McConnell, P. J. (2001). Problem-based learning: a pedagogy for using case material in accounting education. *Accounting Education*, *10*(1), 61–82. https://doi.org/10.1080/09639280122712
Narmaditya, B. S., Wulandari, D., & Sakarji, S. R. B. (2018). Does problem-based learning improve critical thinking skills? *Jurnal Cakrawala Pendidikan*, *37*(3), 378–388. https://doi.org/10.21831/cp.v38i3.21548

ISSN : 2614-3291 (online)
doi: http://dx.doi.org/10.32493/keberlanjutan.v10i1.y2025.p1-13

Nirbita, B. N., & Joyoatmojo, S. (2020). Critical thinking accounting students using problem based learning integrating with ICT media. *Economica : Journal of Economic and Economic Education*, *9*(1), 1–7.

Nurkhin, A., Kardoyo, Pramusinto, H., Setiyani, R., & Widhiastuti, R. (2020). Applying blended problem-based learning to accounting studies in higher education; Optimizing the utilization of social media for learning. *International Journal of Emerging Technologies in Learning*, *15*(8), 22–39. https://doi.org/10.3991/IJET.V15I08.12201

Piaget, J. (1966). *The origins of intelligence in children*. New York: International Universities Press. https://doi.org/10.3928/0048-5713-19760201-11

Reinstein, A., & Bayou, M. E. (1997). Critical thinking in accounting education: processes, skills and applications. *Managerial Auditing Journal*, *12*(7), 336–342. https://doi.org/10.1108/02686909710180698

Salin, A. S. A. P. (2011). Outcome-based learning and modified problem-based learning for accounting education. *International Conference on Economics, Business and Management*, *2*, 120–124.

Savery, J. R., & Duffy, T. M. (1995). Problem based learning: An instructional model and its constructivist framework. *Educational Technology*, *35*(5), 31–38.

Savin-Baden, M. (2000). *Problem-based learning in higher education: Untold stories*. Philadelphia: McGraw Hill Education.

Schunk, D. H. (2012). Learning Theories: An Educational Perspective. In *Space Science Reviews* (6th ed.). Pearson Education. https://doi.org/10.1007/BF00751323

Srinivasan, M., Wilkes, M., Stevenson, F., Nguyen, T., & Slavin, S. (2007). Comparing problem-based learning with case-based learning: Effects of a major curricular shift at two institutions. *Academic Medicine*, *82*(1), 74–82. https://doi.org/10.1097/01.ACM.0000249963.93776.aa

Stanley, T., & Marsden, S. (2012). Problem-based learning: Does accounting education need it? *Journal of Accounting Education*, *30*(3–4), 267–289. https://doi.org/10.1016/j.jaccedu.2012.08.005

Suandi, I. K., Santyasa, I. W., Tegeh, I. M., & Sudarma, I. K. (2024). the Effect of Problem-Based Blended Learning and Learning Autonomy on Students' Learning Outcomes in Accounting. *Conhecimento & Diversidade*, *16*(41), 474–491. https://doi.org/10.18316/rcd.v16i41.11512

Suryani, Y., Iskandar, I., Nurfitriani, F. N., Pratiwi, R. T., Hasan, M., Arisah, N., Aeni, N., & Dzhelilov, A. A. (2024). Developing E-Module Accounting Cycle based on Problem-Based Learning (PBL): Can it Improve Students' Critical Thinking Abilities? *Jurnal Iqra' : Kajian Ilmu Pendidikan*, *9*(1), 82–96. https://doi.org/10.25217/ji.v9i1.4535

Suryanti, N., & Nurhuda, N. (2021). The effect of problem-based learning with an analytical rubric on the development of students' critical thinking skills. *International Journal of Instruction*, *14*(2), 665–684.

Terblanche, E. A. J., & De Clercq, B. (2021). A critical thinking competency framework for accounting students. *Accounting Education*, *30*(4), 325–354. https://doi.org/10.1080/09639284.2021.1913614

Walker, A., Leary, H., Hmelo-Silver, C. E., & Ertmer, P. A. (2015). *Essential readings in problem-based learning*. Indiana: Purdue University Press.

Wolcott, S. K., & Sargent, M. J. (2021). Critical thinking in accounting education: Status and call to action. *Journal of Accounting Education*, *56*, 1–19. https://doi.org/10.1016/j.jaccedu.2021.100731

Wyness, L., & Dalton, F. (2018). The value of problem-based learning in learning for sustainability: Undergraduate accounting student perspectives. *Journal of Accounting Education*, *45*, 1–19. https://doi.org/10.1016/j.jaccedu.2018.09.001

Yu, L., & Zin, Z. M. (2023). The critical thinking-oriented adaptations of problem-based learning models: a systematic review. *Frontiers in Education*, *8*, 1–13. https://doi.org/10.3389/feduc.2023.1139987

ISSN : 2614-3291 (online)
doi: http://dx.doi.org/10.32493/keberlanjutan.v10i1.y2025.p1-13