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An Investigation into the Effect of Problem-Based Learning on Learners' Writing Performance, Critical and Creative Thinking Skills

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ABSTRACT

Background: In addition to mastering writing skills, university graduates are also expected to be able to develop two 21st-century skills: critical and creative thinking skills. These two skills play an important role so students can survive and compete in the disruptive era.

Purpose: Although there have been many experimental studies using the BL model in learning to write, the existing research is still inadequate in investigating the effect of PBL model on L1 writing performance, critical, and creative thinking skills.

Method: This study used a sequential mix-method design consisting of a quantitative method in the initial phase, followed by a qualitative method in the final phase. The participants of this study were students from the Islamic Banking Study Program at UIN Sultan Maulana Hasanuddin Banten, numbering as many as 61 students. By using a random sampling technique, researchers selected 2 groups of participants from 5 existing groups. The data was collected using questionnaires, essay writing tests, assessment rubrics, and interviews. Next, the researcher ran paired sample t-tests and one way ANCOVA, in order to analyze the data quantitatively. In addition, the researcher also analyzed data from semi-structured interviews using thematic analysis techniques.

Results: The results showed that students taught using the PBL model could significantly improve writing performance, critical thinking skills, and creative thinking skills when compared to conventional models used in the control class. In addition, the results from the interviews also strengthened the quantitative findings by showing that students had positive attitudes and perceptions of learning to write. In other words, students who were taught with the PBL model gave a positive response and attitude because they felt motivated to learn to write.

Conclusion: This research is expected to increase knowledge about how students can improve writing performance, critical thinking, and creative thinking. In addition, it is hoped that these findings can be an alternative in choosing writing learning methods.

KEYWORDS

Creative thinking skills, critical thinking skills, problem-based learning

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INTRODUCTION

There are many factors which influence the current change in the direction and paradigm of education. These include the very rapid social and technological changes impacting educational orientation. The Industrial Revolution 4.0 and Society 5.0 have radically changed the face of world education as an aspect of human life. Thus, higher education today must equip its graduates with the various basic skills for this century. Previous studies stated that creativity is the primary skill that supports their students' future success (Leasa et al., 2021; Thomson, 2017). Creativity is one of the four primary skills in the 21st-century known as the four CS. They stand for critical thinking, creativity, communication, and

collaboration (Care & Kim, 2018; Partnership for 21st Century Learning, 2016; Saimon et al., 2022; Syahril et al., 2022; World Economic Forum, 2015).

At the present time, creative thinking skills are still rare in the main focus of university education and the learning process. Given the importance of these skills, universities must prioritize teaching creative thinking skills so that their graduates can compete in the world of work (Ritter et al., 2020). Most universities still emphasize the knowledge aspect and ignore learning creative thinking skills. Several studies claim that current university graduates do not have good creative thinking skills, so they have difficulty competing in the current era of society 5.0 (Catarino et al., 2019; Dilekci & Karatay, 2023; Tam, 2023; Yustina et al., 2022).

The importance of creative thinking skills has encouraged various groups in the education sector to integrate them immediately into the education system, especially at university level. Several studies have published their findings which state that creative thinking skills make a significant contribution to improvement in various aspects, such as business, development research, arts, science, and technology (Arifani & Suryanti, 2019; Ozdas & Batdi, 2017; Rauf et al., 2021). Creativity has received the attention of education experts due to the emergence of two key issues. There is a significant decline in human creativity, and the topic of creativity is not a matter of scientific study (Chen et al., 2019; Jones & Richards, 2015; Khodabakhshzadeh & Hosseinnia, 2018).

In addition to thinking creatively, university graduates must also master critical thinking skills. In the last few decades, the role of these skills has received outside attention from several interested parties, ranging from teachers, researchers, and stakeholders to educational observers (Helaluddin et al., 2023; Tam, 2023; Yustina et al., 2022). With these skills, students can apply their logic and reasoning appropriately to what they have to do through specific procedures (Lailiyah & Wediyantoro, 2021; Sarwanto et al., 2021). Ashfar et al. (2017) stated that critical thinking skills are the students' ability to think independently and systematically, indicating the perfection of their thinking. Furthermore, some experts agree on the definition of critical thinking skills as a form of mental activity, processes, and strategies for new concepts, make decisions, and solve problems (Cui & Teo, 2023; Onoda, 2022).

In the language teaching curriculum, critical thinking skills are essential to receive attention from teachers (Nold, 2017; Zhang, 2018). Critical thinking skills in language are related to students' understanding of language. This is seen as a semiotic source in analyzing, evaluating, and organizing communicative discourse (DeWaelsche, 2015; O'Hallaron et al., 2017). With critical thinking skills, students can evaluate evidence and facts, test arguments and reasons, and make logical conclusions (Fisher & Frey, 2015; Mbato, 2019).

In addition to these two particular skills, university graduates must also be able to master general skills. In a global context, writing performance has become a competitive aspect with a fundamental essence in modern society. Writing performance is one of these general skills (Wu et al., 2019). The ability to write in this context includes foreign language skills and writing in the first language, Indonesian.

In achieving the three learning outputs (writing performance, critical, and creative thinking skills), teachers need immediately to address the selection and use of an appropriate learning model. Learning experts and practitioners recommend problem-based learning (PBL) models. Various works of literature claim that this learning model can be used to develop various skills such as: (a) critical thinking skills, (b) learning outcomes, (c) writing skills, and (d) other skills (Dastgeer & Tanveer Afzal, 2015; Ritter & Mostert, 2017; Sari et al., 2021; Sidauruk et al., 2020). This learning model can also provide real experiences or simulations for students to become autonomous and independent learners (Heuchemer et al., 2020).

When compared with other learning models, the two previous studies prove that the PBL model motivates students to lifelong learning and meaningful experiences (Bosica et al., 2021; Qondias et al., 2022). In the context of Education 4.0, the PBL model can encourage students to interact actively and intensely in class during the learning process (Aslan, 2021). Caires-Hurley et al. (2020) stated that the PBL model is closely related to integrating social issues into language learning, such as decolonization, multiculturalism education, equality and equity in education for the community, as well as social justice. In several previous studies, the PBL model has been shown to improve writing performance (Cahyaningrum & Widyantoro, 2020; Dastgeer & Tanveer Afzal, 2015; Handoyo et al., 2021; Sari et al., 2021; Sidauruk et al., 2020), critical thinking skills (Amin et al., 2020; Birgili, 2015; Fita et al., 2021; Hussin et al., 2019; Narmaditya et al., 2018; Orozco & Yangco, 2016), and students' creative thinking skills (Hidayah et al., 2021; Nulhakim et al., 2020; Rahman & Hendrawijaya, Seibert, 2021; 2020; Ulger, 2018). Although some of these studies have investigated the effect of the PBL model in improving the three aspects which are the topics of this study (writing performance, critical thinking, and creative thinking), some things have escaped the reach of researchers. In particular, there is still a research gap on the PBL model on students learning to write Indonesian (L1 writing). In other words, no research has investigated the impact of the PBL model on improving writing performance, critical thinking skills, and creative skills in learning to write in the first language (L1). Thus, the two formulations of the problem in this study are:

1. Compared to the non-PBL model, how effective is PBL in developing students' writing performance, critical thinking, and creative thinking skills?

2. What are the students' attitudes and perceptions of the PBL model in learning to write Indonesian?

LITERATURE REVIEW

Problem-Based Learning

The PBL model was introduced to the public in 1969 at McMaster University as a type of student-centred learning method. The model is based on a theory which states that students can acquire new knowledge by applying pre-existing knowledge (Idowu et al., 2016; Waite et al., 2020). This model seeks to generate student learning objectives by themselves using the case study method and sharing information with colleagues.

PBL aims to direct students to overcome their problems in the real world (Aslan, 2021). Therefore, the design of the PBL model allows students to face the problem through scenarios. The teacher designs the scenario in a simple, clear, and unstructured way for them to face. Several factors make PBL difficult to implement: (a) allocating time in preparing materials, (b) the difficulty of controlling more than one study group, (c) an inappropriate curriculum, and (d) difficulties in managing student information. for problem situations (Nicholl & Lou, 2012; Savery & Duffy, 1995). One of the PBL models that teachers widely use is the model put forward by Arends (2008). This consists of several stages, namely: (a) introduces various contextual problems to students, (b) regulates existing problems to students, (c) guiding students individually and groups, (d) making assignments from the teacher and presenting them, and (e) reviewing and considering ways to solve problems.

Writing Ability

Writing is a primary activity in everyday life and is one of the academic goals of language learning. In addition, writing is the most challenging skill to teach students because of the complexity involved in this activity. This means that writing activities involve various processes related to the use of language and cognitive aspects (Kim & Graham, 2021). Students who do writing activities bring up and synthesize ideas from their memory. Theoretically, writing is a very complex cognitive activity and consists of various cognitive components (Sarica & Usluel, 2016). This is caused by the many aspects that must be aligned in writing activities, such as language, genre, text, composition, and communication (Roscoe et al., 2020). In essence, writing is the same as a communication method used when talking to people. It is a form of expression, thought, experience, and others (Miller, 2010).

Critical Thinking Skills

In a range of academic literature, critical thinking is the most essential skill which must be taught to students as a provision to compete in the global era.

This means that schools and campuses as educational institutions need to implement the pursuit of these skills into their curriculum (Changwong et al., 2018 Critical thinking generally refers to a person's ability to use his thinking activities to produce better attitudes and behaviour (Mehta & Al-Mahrooqi, 2015). In addition, this skill is also likened to a vessel for generating new ideas obtained through analyzing, understanding, and synthesizing activities (Bouanani, 2015).

From the perspective of contemporary language teaching, writing activities and critical thinking skills can be integrated, especially in tertiary institutions when learning to write Indonesian. Nadri & Azhar (2016) provide arguments about the relationship between writing activity and thinking skills. In other words, students can freely express their thinking abilities using language media (writing). These findings are similar to the results put forward by Alidmat & Ayassrah (2017). They confirm that students' thinking skills can be maximized through learning to write since writing activities require good thinking skills. Finken & Ennis (2001) developed an instrument to assess critical thinking skills called the FRISCO model. There are six main components in the assessment model: (a) focus, (b) reason, (c) inference, (d) situation, (e) clarity, and (f) overview.

Creative Thinking Skills

Creative thinking is another basic skill belonging to 21st-century skills. Creativity is a form of interaction between personal mental activity and other contributing factors, such as motivation, knowledge, social and cultural environment, and problem-solving concepts (OECD, 2019; Suherman & Vidakovachi, 2022). Thus, it can be concluded that creativity refers to solving problems by thinking creatively. In simple terms, creativity is synonymous with the ability to solve problems (Forte-Celaya et al., 2021).

The definition of creative thinking is a mental process related to a person's interaction with their experience to understand aspects of a situation and decide on new solutions to the problems they face (Lin & Wu, 2016). Another definition of creative thinking is a very complicated individual mental activity used to find solutions or create new products. This creative thinking skill has several characteristics, namely cognitive, emotional, and ethical elements which form specific states of mind. Aldossari (2021) emphasized that creative thinking is synonymous with individual abilities to produce abilities such as intellect, flexibility, and originality.

Furthermore, these skills can generate as many ideas as possible about the problem. Eemerging ideas are closely re-

lated to a flexibility and originality which cannot be repeated. Although it has been the focus of the education sector to date, there has yet to be a consensus regarding the best method for teaching these skills in the Education curriculum (Zhang et al., 2022). These skills are mostly taught through an integrated course-learning process. One process is to integrate skills into learning to write, which is per se very closely related to the ability to think creatively.

METHOD

Research Design

Researchers used a mix-method design in response to the two research questions above. This design combines quantitative and qualitative research designs, in order to obtain holistic and comprehensive research findings (Creswell & Plano-Clark, 2007; Dawadi et al., 2021; Park et al., 2021). Specifically, researchers use a sequential mix-method design where qualitative findings are intended to strengthen previous quantitative findings (Berman, 2017; Rahimi & Fathi, 2021).

Participants

The study involved 61 students (28 males and 33 females) of the Islamic Banking Department at the Faculty of Islamic Economics and Business at UIN Sultan Maulana Hasanuddin Banten taking Indonesian Language Courses, especially in the sub-discussion of academic writing. The participants were grouped into two classes: the experimental class (30 students); and the control class (31 students). The control and experimental classes were determined randomly from 5 existing classes. Based on their writing ability, the participants had a level of ability that was at the lower middle level. Participants were first-semester students aged between 17 to 20 years.

Furthermore, in the qualitative phase, the researcher randomly selected ten students from the PBL model class to be interviewed. Interviews were not conducted with all participants in the experimental class, since qualitative research does not look for generalizations but for an in-depth perspective on the research theme. With a relatively small number of participants, it has the potential to explore more deeply and comprehensively.

Instruments

Essay Writing Test

This research uses a pre-test and post-test in the form of essay writing assignments to determine students' writing performance. The teacher assigned participants from both groups to write 300-450 word essays on Islamic banking in Indonesia. The essay theme was determined by the fact that the participants were students majoring in Islamic banking and already had basic knowledge through main competency courses. However, participants could also choose the same or different themes between the pre-test and post-test. The time allotted for each test was 90 minutes. In general, there are three main components in essay writing essay, as proposed by Oshima & Hogue (2006) namely: (a) the introductory paragraph, (b) the body paragraph, and (c) the concluding paragraph.

Writing Assessment Rubric

Assessment of an argumentative essay is another instrument in this study used to measure students' writing performance. In this study, the researcher is also a lecturer who teaches the L1 writing lesson. The rubric has four assessment aspects: task achievement, coherence & cohesion, lexicon, and grammatical accuracy (Winarti et al., 2021; Wu et al., 2019). In this rubric, researchers can give four as the highest score and one as the lowest. Thus, a student's highest possible total score is 16, and the lowest is 4.

In order to achieve instrument validity and reliability, researchers used inter-rater reliability, aimed at eliminating the subjectivity of the assessment, since it involves two or more raters (Conkin et al., 2020; Soemantri et al., 2021). In this measurement, there are two lecturers to participate in providing an assessment of student writing. A total of 10 student writings were randomly selected to be assessed. The measurement results using Pearson product-moment showed a score of 0.85. These results indicate that the scoring rubric used in this study is consistent.

Critical Thinking Skills in Writing Rubric

The third instrument in this research is the assessment of critical thinking in writing. This rubric measures students' critical thinking skills from various aspects based on the development of the Illinois Critical Thinking Essay Test (ICTET) by by Finken & Ennis (1993). Thus, using this rubric, researchers can score 24 as the maximum and six as the minimum. In order to avoid subjectivity in the assessment, inter-rater reliability is carried out by involving two teachers as assessors. The measurement results using Pearson product-moment obtained r = 0.92.

Creative Thinking Skills in Writing Rubric

The next instrument in this research is the rubric of creative thinking skills in essay writing. This rubric was developed by researchers based on several aspects of the assessment proposed by experts (Abedi, 2002; Almeida et al., 2008; Kholisiyah et al., 2018; Seidinejad & Nafissi, 2018). There are four aspects of assessment in this rubric, namely: (1) fluency, (2) flexibility, (3) originality, and (4) elaboration. The highest score for each aspect is four, and the lowest is 1.

Thus, the highest score possible for students to achieve is 16, and the lowest is 4. Similar to the two previous instruments, the rubric for assessing critical thinking skills is also tested by running an inter-rater test. Reliability with Pearson Product-moment and resulted in a score of .90.

Semi-Structured Interview

Another instrument in this study was an interview with a semi-structured design with five questions relating to the application of the PBL model in teaching writing (Indrayadi et al., 2021; Roshanbin et al., 2022). The topic of the interview questions to the students relates to several aspects, namely: (a) students' general responses to the PBL model, (b) students' views of the PBL model, (c) the effect of the PBL model in improving writing skills, (d) other positive impacts of the PBL model apart from writing ability, and (d) how important the PBL model is to be applied in class.

Furthermore, the interview aims to explore the perspective of a person or group of people to understand and interpret the social reality around them (Pessoa et al., 2019). The type of interview chosen in this study is a semi-structured interview, since it allows researchers to explore students' experiences more deeply about learning to write with the PBL model. Some researchers recommend this type of interview because of several considerations, including: (1) the interview process is not rigid, (2) other questions can be added to confirm participants' answers, and (3) the atmosphere can be more relaxed because it resembles an ordinary dialogue (Ebadi & Rahimi, 2017; Guthrie, 2019; Lee et al., 2019; Pham & Usaha, 2016).

Data Analysis

Quantitative Analysis

In the quantitative analysis phase, the researcher analyzed data from the pre-test and post-test using SPSS 25.00. First, a paired sample t-test was run to investigate application of the PBL model to the three targeted aspects: writing performance, critical thinking, and creative thinking skills. Furthermore, the researcher also carried out the one-way ANCOVA test to find out the difference in the scores of the two groups in improving these three aspects.

Qualitative Analysis

In the qualitative phase, researchers used thematic analysis techniques to analyze data from interviews (Boyatzis, 1998). Data from respondents is converted into interview transcripts and then codified based on open thematic coding. In general, this type of coding aims to obtain information or main themes related to students' perceptions and attitudes about writing classes using the PBL model. The analysis technique consists of activities to find, identify, and interpret concepts and themes from the data that has been collected (Ghanbari & Nowroozi, 2022; Terry et al., 2017). The thematic analysis in this study consists of six steps, namely: (a) recognizing and identifying the data that has been collected, (b) making codes from the data, (c) searching for themes, (d) analyzing various themes that have opportunities more significant, (e) defining and interpreting the theme, and (f) making the result report (Braun & Clarke, 2006; Celik & Dogan, 2022; Percy et al., 2015).

Trusthworthiness

In qualitative studies, trustworthiness is an important factor in supporting the data's quality and credibility. For this reason, researchers use member checking techniques to determine the accuracy of research findings (Creswell, 2008). The technique is done by submitting interview transcripts to the participants as a form of cross-checking the interview results. This aims to allow participants to determine whether the transcript is under what was conveyed in the interview session.

The aspect of consistency also determines reliability in this study. In order to achieve this level of consistency, the researchers involved other people as coders. Three coders were involved in this study who confirmed the assessments of the other coders. Thus, the three coders have the same view and interpretation of the data codes. The main requirement as a coder in this study is more than 10 years experience in language teaching.

Regarding data credibility, especially in qualitative studies, researchers also apply confirmability. That is, confirmability relates to all forms of research objectivity, describing the accuracy of the data obtained from the participants. In this case, a lecturer was appointed as an external auditor. The external auditor provides a comprehensive and objective assessment of the qualitative research findings. Thus, other parties are involved in assessing the research findings so that they are not biased and are not merely a researcher's perspective (Creswell, 2008; Lincoln & Guba, 1985; Polit & Beck, 2012).

Procedure

The procedure carried out in this study still relates to the sequential mix-methods design by prioritizing the quantitative design first, followed by the qualitative design. A qualitative design was carried out to explain, describe, and corroborate previous quantitative findings. In the quantitative phase, the research process lasted for nine meetings (9 weeks) with a meeting frequency of 1 time a week. The researcher allocated 100 minutes at each meeting according to the provisions in force at UIN Sultan Maulana Hasanuddin Banten, Indonesia. On the other hand, for the interview session, the researcher needed about 150 minutes, with an estimated in-

terview time of 15 minutes for each student. In general, the research procedure is shown in Figure 1.

In order to differentiate the forms of treatment of the two groups (experimental and control), the researchers designed the syntax or learning stages that the two groups had to go through. The following two tables summarize and present the complete syntax (learning stages) for both groups (experimental and control) during the treatment process.

RESULTS

As previously stated, this study uses a sequential explanatory mix-method design. Data collection and analysis activities are carried out using two methods: placing the quantitative method in the initial phase and the qualitative method in the final phase. The results of the study are described as follows.

Figure 1

Research Procedure

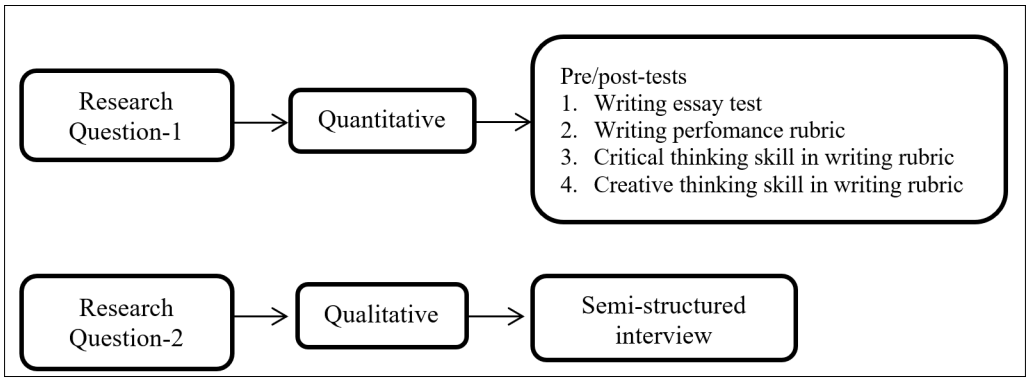

Table 1

Treatment Procedures in Experiment Class

Meeting	Stages	Problem-based learning model
1		Pre-test
2	Introducing students to problems	The lecturer introduces the scenario of learning to write Indonesian essays using the Zoom application; Lecturer conveys material about essays (definition, essay structure, purpose of essay writing); The lecturer displays several examples of essays in the field of Islamic banking.
3 & 4	Organizing students to study	The lecturer divides the class into several groups (each group consists of 5 to 6 students); The lecturer breaks down each group into a breakout room on the Zoom application; Each group is asked to choose one of the writing topics on Islamic banking and discuss what topics are interesting to be raised in the text; The lecturer asks each group to develop an outline of writing and continues by writing an essay collaboratively.
5 & 6	Presenting group work or artifacts	Each group presents their essay by adding pictures, videos, illustrations, etc; Students respond to other groups' writings (theme, language, arguments given).
7 & 8	Analyze and evaluate work	The lecturer provides input and suggestions to all groups in detail; Each group revises and edits the writing based on the responses given by other groups and the lecturer; Each group collects the revised results of their writings via WhatsApp Group or email.
9	Post-test	

Note: From "Learning to teach", by R.I. Arends, 2008. Copyright 1991 by McGraw-Hill.

Table 2

Treatment Procedures in Control Class

Meeting	Stages	Non-PBL model
1		Pre-test
2	Pre-writing	The lecturer introduces the scenario of learning to write Indonesian essays using the Zoom application; Lecturer conveys material about essays (definition, essay structure, purpose of essay writing); The lecturer displays several examples of essays in the field of Islamic banking.
3, 4, & 5	Main activities: write essays and present them.	The lecturer asks students to choose the topic of writing about Islamic banking in Indonesia; The lecturer randomly appoints students to present their writings; Lecturers give suggestions and comments after students finish presenting their writings.
6, 7, & 8	Revise, edit and present them.	The lecturer asks each student to revise and edit his writing based on the suggestions that have been given; The lecturer randomly selects students to present their revised writings.
9	Post-test	

Table 3

Descriptive Statistics

	Group	$\overline{X}$	N	Std. deviation	Std. error mean
Pre-Writing Performance	PBL	7.23	30	.679	.124
	Non-PBL	8.52	31	.926	.166
Post-Writing Performance	PBL	12.93	30	1.484	.271
	Non-PBL	10.00	31	.966	.174
Pre-Critical Thinking	PBL	12.57	30	1.832	.335
	Non-PBL	12.68	31	1.851	.332
Post-Critical Thinking	PBL	19.23	30	.335	18.55
	Non-PBL	14.48	31	.340	13.79
Pre-Creative Thinking	PBL	8.17	30	1.234	.225
	Non-PBL	7.68	31	.945	.170
Post-Creative Thinking	PBL	13.17	30	1.315	.240
	Non-PBL	9.90	31	1.248	.224

Quantitative Analysis

In the quantitative analysis phase, researchers must determine whether the instrument has the expected level of validity and reliability, so that the tool is suitable for data collection. In other words, measuring the instrument's reliability level ensures that this research instrument is feasible to use. The writing assessment rubric using Pearson Product Moment obtained a reliability level of 0.85, while the critical thinking rubric was 0.92. In addition, another instrument in the form of a creative thinking assessment rubric obtained a reliability level of 0.90.

Table 3 is the result of the t-test which shows that the difference in the average score in the pre-test session is slightly different. The initial abilities of the two groups are the same or tend to be homogeneous. On the other hand, in the post-test session, there was a significant difference between the mean scores of the two groups. This indicates that applying the PBL model in the experimental class is far more effective in improving these three aspects: writing performance, critical thinking skills, and creative thinking skills. The next step is to test whether the score is categorized as significant. In order to test the improvement in these three aspects, the researcher ran a paired sample t-test, as shown in Table 4.

Table 4 shows that there is a change in the average score on writing performance [t = -20.052, *p* < .00], critical thinking skill score [t = -18.205, p < .00]. The average creative thinking skill score [t = - 17.381, p < .00] was significant in the group using the PBL model. This indicates that the three skills (writing performance, critical thinking, and creative thinking) increased significantly from pre-test to post-test. Thus, these results also indicate a significant change in the average value of the three variables in the PBL model class from pre-test to post-test.

Furthermore, the researcher also ran another test, namely the one-way ANCOVA test, to investigate the differences between groups with PBL and traditional models in improving the three skills by controlling for covariates (pre-test). Before performing the one-way ANCOVA, the researcher also conducted a preliminary examination to ensure no violations such as normality, linearity, homogeneity of variance, regression slope homogeneity, and reliable covariates measurement. The inspection results showed no data breaches in some aspects and allowed for further analysis.

Next, Table 5 is the result of one way ANCOVA testing on student writing performance. This type of test aims to determine the level of difference in the scores of the two groups which apply treatment with different models. From Table 5, it can be concluded that there is a significant difference between groups with PBL and traditional models when it comes to improving writing performance [F = 46.434, p = .000, partial eta squared = .616]. In conclusion, the use of the PBL model has a potential effect in improving students' writing performance when compared to the conventional model. Furthermore, from Table 5, information can also be obtained that the partial eta squared value is 0.616. These conditions indicated that the PBL model contributed 61.6% to improving student writing performance.

Table 6 results from one-way ANCOVA testing for the second aspect, namely critical thinking skills. The test results indicated significant differences in the critical thinking skills aspect score when comparing the experimental and control groups [F = 55,520, p = .000, partial eta squared = .657]. Strictly speaking, the potential effect of the PBL model is greater than that of the conventional model. Regarding the partial ETA squared score, the researcher concluded that the PBL model contributed significantly to an increase in students' CTS aspects of 65.7%.

Furthermore, the researcher also ran the same test, in order to identify the magnitude of the difference for the third aspect, namely creative thinking skills. Table 7 shows that the groups with the PBL and traditional models differ sig-

Table 4

Paired Samples t-test

		$\overline{X}$	Std. deviation	Std. Error Mean	t	df	*p*
PBL	Pre- and Post Writing Performance	-5.700	1.557	.284	-20.052	29	.000
	Pre- and Post Critical Thinking	-6.667	2.006	.366	-18.205	29	.000
	Pre- and Post Creative Thinking	-5.000	1.576	.288	-17.381	29	.000
Non-PBL	Pre- and Post Writing Performance	-1.484	.996	.179	-8.298	30	.000
	Pre- and Post Critical Thinking	-1.806	2.400	.431	-4.190	30	.000
	Pre- and Post Creative Thinking	-2.226	1.746	.314	-7.099	30	.000

Table 5

ANCOVA: Investigated the Differences between the Two Groups in Improving Writing Performance

Source	Type III SS	df	*MS*	*F*	*p*	Partial eta squared
Group	137.299[a]	2	68.650	46.434	.000	.616

Table 6

ANCOVA: Investigated the Differences between the Two Groups in Improving Students' Critical Thinking Skills (CTS)

Source	Type III SS	*df*	*MS*	*F*	*p*	Partial eta squared
Group	360.642[a]	2	180.321	55.520	.000	.657

Table 7

ANCOVA: Investigate the Differences between the Two Groups in Improving Creative Thinking Skills

Source	Type III SS	*df*	*MS*	*F*	*p*	Partial eta squared
Group	162.438[a]	2	81.219	48.660	.000	.627

nificantly in improving students' creative thinking skills [F = 48.660, p = .000, partial eta squared = .627]. The partial ETA squared score of 0.627 indicates that using the PBL model contributes 62.7% to improving creative thinking skills. Thus, the selection of the PBL model in learning is very appropriate because it has a more positive impact when compared to the control class in improving students' creative thinking skills.

Qualitative Analysis

Based on the second research question, the purpose of this study is also to obtain an in-depth student perspective on applying the PBL model in learning to write. The use of a sequential explanatory mix-method in this study positions the qualitative findings as a support for the quantitative findings made in the initial phase. The quantitative findings stated that the group with the PBL model outperformed the traditional model group in developing writing performance, critical thinking, and creative thinking skills. Qualitative data collection and analysis were conducted with students in the PBL model group, in order to clarify the research findings through further semi-structured interviews.

Ten students were involved in the interview phase, randomly selected from the experimental group (the group that received treatment with the PBL model). Using thematic analysis techniques, the researcher designed five semi-structured interview questions, in order to find the main themes that emerged. The interview questions related to students' responses to the PBL model and the effects they felt during learning. In general, four main themes were found in this qualitative phase, namely: (a) motivation in writing, (b) confidence in completing assignments, (c) attention to detail, and (d) time or efficiency in writing.

First, students acknowledged an increase in motivation to learn to write after using the PBL model in learning to write. That is, the first central theme to emerge from these qualitative findings is the impact of using the PBL model on the enthusiasm and desire of students to learn. For example, a student of the Islamic Banking Study Program believed that the experience of learning to write using the PBL model made him feel comfortable studying together with his team. Answer P7 states that:

> *"By learning like this, I feel comfortable and not burdened because I can work well with each other"*

Another theme revealed from the results of the interview was the increasing confidence of students in writing essays. Students' self-confidence emerged after receiving support from their teammates when they discussed and carried out brainstorming activities. The students believed that the PBL learning model could reduce self-confidence and anxiety in writing. This is in line with the statement of participant 2 below.

> *"I feel very happy because learning to write in this way can build self-confidence. In fact, I feel less pressured during learning to write" (P2).*

> *"I feel confident in giving advice to friends because I believe that by helping each other, I can produce much better writing" (P8).*

The next theme that was revealed was related to detail attention. In this case, the students felt they had many benefits with the PBL model in determining various small details in writing. These small details include identifying the topic, organizing ideas, aspects of language, and others. Students were able to analyze their writing from the smallest (micro) to the largest (macro) aspects of writing. The macro level of writing is related to selecting themes, organization, and essay form. At the same time, the micro level of writing includes using punctuation marks, selecting words and terms, vocabulary, and others. The following statements from participants support this theme of detail attention:

> *"My teammates helped a lot in correcting and providing suggestions on my draft. This makes me confident in the quality of the essays that I have written" (P10).*

> *"From the advice of my friends in the same group, I got additional knowledge about small things that I have been ignoring, such as the use of punctuation marks, choosing the right words to the title of the article" (P5).*

The fourth theme of the interview analysis stated that the PBL model was able to help students better manage their time in writing. They were able to use their time more efficiently because the PBL model guides them in several more systematic stages. The following are excerpts of interviews with students who support this theme.

> *"In my opinion, learning to write with this method saves time. Previously, I always had difficulty writing because it was difficult to come up with good ideas."*

Overall, writing essays using the PBL model is very helpful for students in several aspects. In addition to improving the quality of writing, learning to write was also able to increase their motivation and confidence in writing. This is based on several activities in the PBL model that have been proven to help them learn to write better.

DISCUSSION

The main objective of this study ws to investigate the effect of the PBL model and the conventional model on three primary skills, namely: (a) writing performance, (b) critical thinking, and (c) creative thinking abilities. In addition, the second objective of this study wasto obtain a comprehensive and in-depth description of the attitudes and perceptions of students when participating in learning to write using the PBL model. As previously stated, this study applies a sequential explanatory mixed-methods design by conducting a quantitative analysis followed by a qualitative analy-

sis. First, the study results show that students, who receive treatment with the PBL model, experience higher scores on the three primary skills (writing performance, critical thinking, and creative thinking skills) than the conventional model. Furthermore, this study's second finding shows that students like learning to write with the PBL model.

The main results of this study provide additional empirical facts that the use of the PBL model can increase students' writing performance, critical thinking, and creative thinking skills. Indirectly, this study supports several previous studies that have investigated the impact of the same model on improving these three skills. In several previous studies, the PBL model has been shown to improve writing performance (Cahyaningrum & Widyantoro, 2020; Dastgeer & Tanveer Afzal, 2015; Handoyo et al., 2021; Sari et al., 2021; Sidauruk et al., 2020), critical thinking (Amin et al., 2020; Fita et al., 2021; Hussin et al., 2019; Narmaditya et al., 2018), and students' creative thinking skills (Hidayah et al., 2021; Nulhakim et al., 2020; Rahman & Hendrawijaya, 2020; Ulger, 2018).

In association with previous research, several researchers have investigated the application of the PBL model in teaching writing. Good writing performance is always associated with raising contemporary issues related to real life. In other words, students are expected to be able to improve learning outcomes and implement them in the contextual situations they experience (Awan et al., 2017).

As already mentioned in the procedure section, the treatment for the experimental class uses the PBL model developed by Arends (2008). There are five stages in the PBL model, namely: (a) introducing various contextual problems to students, (b) managing existing problems for students, (c) guiding students individually and in groups, (d) making assignments from the teacher and present it, and (e) review and consider ways to solve problems.

The PBL model has also been proven by previous research as an appropriate learning model for aspects of critical thinking skills. With the PBL model, students can improve their ability to express opinions by searching, processing data, thinking, working together, and communicating (Suarniati et al., 2019). With the PBL model, students have a more significant opportunity to be active in solving their problems (Alrahlah, 2016; Gorghiu et al., 2015). With the five syntaxes in the PBL model, students are guided to carry out various activities to analyze and evaluate as part of critical thinking indicators (Gholami et al., 2016; Samejima et al., 2015). Other studies also provide evidence that applying the PBL model in teaching writing can direct students to real problems and then create solutions to overcome these problems (Saputro et al., 2020; Tortorella & Cauchick-Miguel, 2018).

In addition, the PBL model is also categorized as an appropriate learning model used to improve students' creative thinking skills. In other words, this model can encourage students' creativity because it has several learning activities, such as group discussions, teamwork, and presenting ideas (Ersoy & Baser, 2014; Talens, 2016). In addition, studi lainnya mengklaim bahwa penerapan model PBL dalam pembelajaran menulis bahasa Indonesia dapat meningkatkan keteranpilan berpikir kreatif mahasiswa karena menyajikan skenario permasalahan yang tidak mainstream yang berkaitan dengan dunia nyata

(Ulger, 2018). Compared to other types of problems, real-world problems can encourage students to use divergent thinking in solving problems through various investigations (Orozco & Yangco, 2016). In this learning scenario, teachers can direct their students to collect information, investigate problems, solve problems, and determine new solutions (Birgili, 2015).

In this learning scenario, teachers can direct their students to collect information, investigate problems, solve problems, and determine new solutions (Ozdas & Batdi, 2017). With these skills, students are accustomed to being flexible and able to see opportunities so that they can face challenges and changing times (Ritter & Mostert, 2017; Thomson, 2017).

Based on these findings, the researcher claims that using the PBL model in learning to write can improve students' writing performance, critical thinking skills, and creativity. This is reinforced by qualitative findings that indicate positive attitudes and perceptions towards implementing the PBL model in teaching writing. Thus, the researcher concludes that the research hypothesis (H1), which predicts the effect of implementing the PBL model on these three aspects, is accepted. Previous studies also support this finding by presenting their findings on the impact of the PBL model on writing performance, critical thinking, and creative thinking skills (Aslan, 2021; Birgili, 2015; Hannigan, 2015; Ulger, 2018). However, these four studies did not include a qualitative design in their study activities.

The researcher suggests that students work together in the PBL model through the Zoom application to develop their writing. With teamwork or collaboration, ideas and writing themes can be developed based on brainstorming activities to achieve their maximum level of writing ability. In addition, teachers are also advised to design a learning environment based on the PBL model to mediate and improve the three primary skills in this study, namely students' writing performance, critical thinking skills, and creativity. This finding also provides input for policymakers and lecturers of university Indonesian language courses. In other words, they can apply the findings of this study in developing various skills based on the PBL model.

Furthermore, there are several important recommendations for future research to explore further the impact of the PBL model to support skill improvements or other aspects, such as writing self-efficacy, writing motivation, communication

skills, and collaborative skills. Secondly, we also recommend a longitudinal study to explore improving writing performance, critical thinking, and creative thinking skills using the PBL model over a more extended period. Finally, further research is suggested in the use of other learning applications to investigate this PBL model's impact (besides the Zoom application).

The researcher also describes this study's limitations that need improvement. The limitation of this research is the use of one learning application (Zoom) not supported by other learning applications. Since this research was carried out at the end of the pandemic, Indonesian government policies still prohibited offline learning. In addition, researchers maximize the use of these applications by controlling each stage of learning intensely so that the research data is of good quality.Another limitation in this study is the number of samples: only 61 students. This number is persuasive. Of course, it is not easy to estimate this result for other populations. For this reason, more participants need to be involved, in order to increase generalization.

Despite all these limitations, of course, this research has several novelties. In the relevant previous studies, no researcher has investigated the PBL model in learning to write Indonesian, in order to improve writing performance, critical thinking, and creative thinking skills simultaneously. Most research on this theme has mainly been done on second language learning (English). Another novelty in this study lies in the clarity of aspects of the three learning outcomes that were investigated in more depth. Specifically, the four components of assessment in writing performance are (a) the existence of cohesion and coherence between paragraphs, (b) the completion of the tasks appropriately assigned, (c) lexicon, and (d) grammatical accuracy. On the other hand, this research also investigates six components of critical thinking skills in writing, namely supporting reasons, reasoning, focus, integration, and conventions. Furthermore, for creative thinking skills, four aspects that are explored more deeply are: fluency, flexibility, originality, and elaboration.

CONCLUSION

In addition to writing skills as a general skill, critical and creative thinking skills are muich needed by students in the modern era. These three skills can be developed simultaneously in learning to write using the PBL model. Several learning steps (syntax) in the PBL model are a determining factor in increasing critical and creative thinking skills. In general, this research aims to record facts about the impact of the PBL model on the four sub-sections of writing performance (task achievement, coherence & cohesion, lexicon, and grammatical accuracy). Students' critical thinking skills are also explored more deeply in six aspects, namely: (a) supporting reasons, (b) focus, (c) organization, (d) reasoning, (e) integration, and (f) conventions. Furthermore, in the aspect of creative thinking, four sub-components are measured by researchers. They consist of (a) flexibility, (b) fluency, (d) elaboration, and (d) originality. Finally, this study explored students' perceptions and attitudes towards their experiences in writing class using the PBL model.

The research findings indicate that using the Zoom application-based PBL model has great potential to enhance the three aspects of the skills addressed in this study. Qualitatively, this study also shows that students positively respond to applying the PBL model in learning to write Indonesian. Compared to the conventional model, the application of the PBL model is more effective in improving these three skills. Furthermore, for future research, the researcher suggests that applying the PBL model can improve other aspects of education, such as writing self-efficacy, collaboration skills, communication skills, and others. Other recommendations relate to the number of participants and the duration of the study (longitudinal research), in order to fulfil the generalization aspect.

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DECLARATION OF COMPETITING INTEREST

None declared.

AUTHORS' CONTRIBUTION

Helaluddin: Conceptualization, Data curation, Methodology, Writing – original draft.

Misnah Mannahali: Formal analysis, Funding acquisition, Supervision.

Duwi Purwati: Funding acquisition, Software, Validation, Writing – review & editing.

Alamsyah: Project administration, Funding acquisition, Methodology, Writing – review & editing.

Hengki Wijaya: Funding acquisition, Visualisation, Supervision, Writing – review & editing.

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