

The Effects of Problem-Based Learning on the Writing Skills of Students Across Various Personality Types

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Abstract—Problem-based learning (PBL) is an approach where group discussions and collaboration are apparent during problem-solving activities. Accordingly, learners' personality types that affect the way they think, feel, behave, and interact may potentially have a role in PBL classrooms. This study tries to reveal the possible roles personality types play in PBL by investigating the effects of PBL on the argumentative essay writing of both extroverted and introverted students. This study employed a quasi-experimental design by randomly selecting students in academic writing courses for both the experimental and comparison groups and involving them in the intact classes. The findings revealed that the students in the PBL group scored higher than those in the guided writing group. Moreover, the extroverted students in the PBL group achieved higher mean scores than the extroverted students in the comparison group; however, the difference was insignificant. On the contrary, the statistical analysis showed that the introverted students in the experimental group outperformed those in the comparison group. This is to say that the introverted students taught using PBL had better skills in writing argumentative essays compared to those taught using guided writing techniques. This finding implies the need to use suitable teaching strategies that facilitate both extroverts and introverts in developing their writing skills while also sharpening their communicative and social skills.

Index Terms—problem-based learning, essay writing, personality types

I. INTRODUCTION

Higher education institutions have placed critical thinking skills as some of the most fundamental skills to possess in the 21st century (Yuan et al., 2021; Lin, 2018). These skills are defined as the ability to analyze the causes and effects of a problem and to propose solutions for them (Hallinger & Lu, 2011; Othman & Shah, 2013). As a result, problem-solving activities within a collaborative approach are utilized to develop students' skills in thinking critically, indicated by the ability to analyze the causal effects of a real-life issue and solve it (Soland et al., 2013). Studies reveal that this approach facilitates the development of students' knowledge about an issue; improves their reasoning skills; increases learning engagement where students work collaboratively to explore a problem and generate solutions; and develops problem-solving skills (Hallinger & Lu, 2011; Ho et al., 2014; Li & Liu, 2021; Kok & Duman, 2023).

Studies have been conducted to investigate the roles of PBL in the field of language teaching and learning, and research has revealed that PBL contributes to the development of students' abilities in writing argumentative essays (Li, 2013; Othman & Shah, 2013; Jumariati & Sulisty, 2017), an increase in EFL students' reading comprehension (Lin, 2017), and an improvement in problem-solving skills in English language teaching (Kok & Duman, 2023). The PBL approach prepares students for facing real-world problems by equipping them with the skills to solve problems, practice higher-order thinking skills, and perform both self-direction and learning reflection (Hung, 2013). This approach also develops students' interpersonal skills since they interact with other members of the PBL group to communicate, negotiate, and collaborate (Ho et al., 2014).

When it comes to PBL in English as a Foreign Language (EFL) classrooms where group discussions and collaboration are apparent, the roles of extroverts and introverts remain unclear due to the lack of studies investigating these roles in PBL settings. Interestingly, personality types are among the factors that affect students' strategy use while learning a foreign language (He, 2019; Oxford, 2003) although Dörnyei (2006) claims that the association between personality factors and learning achievement is often indirect. In fact, during learning, the personality types of learners will affect the way they think, feel, behave, and interact. Likewise, Johnson and Finucane (2000) assert that in any PBL group, different personality types are obvious, and therefore, their contributions to the group process are unequal. Consequently, it is reasonable to include students' personality types in the current study to respond to such claims.

Based on the hypothesis proposed by Cummins (Ellis, 1994) that extroverts prefer working in groups and enjoy spoken interactions, it can be hypothesized that extroverts may be more active and dominant in PBL group discussions than their introverted counterparts. On the other hand, introverts who prefer to work alone and tend to be thoughtful in

making decisions are assumed to be passive in PBL group discussions. This tentative hypothesis on the roles of personality types in PBL needs to be verified as this study's investigation focuses on the argumentative essay writing skills of both extroverts and introverts to better understand the potential of PBL in EFL classrooms across individual differences.

II. LITERATURE REVIEW

Problem-based learning (PBL) is a teaching and learning approach that engages students and encourages them to collaboratively solve a problem through cause-effect analysis and propose a viable solution (Savery, 2006; Hung, 2013). This approach is currently gaining attention in the field of teaching English as a Foreign Language. As a result, some research has been carried out on the roles of PBL in this field with results showing that students taught using PBL gained better scores in argumentative writing compared to those taught in the traditional way (Othman & Shah, 2013). Other research found that PBL improved students' scores in writing argumentative essays significantly especially pertaining to offering strong arguments to support their claims (Li, 2013). Furthermore, although there was no real significant difference between critical thinking test scores and argumentative writing scores, students' critical thinking skills improved after they were taught using PBL (Li, 2013).

To write argumentative essays, the skills of establishing a good claim, offering relevant reasons, providing evidence, acknowledging a counterclaim, refuting a counterclaim, and providing reasons for the refutation are required (Johnston, 2000; Smalley et al., 2001). The development of these micro-skills is accommodated during the implementation of PBL through the stages of problem presentation, problem analysis, research, and reporting which helps students in learning. However, the nature of PBL requires group work to build knowledge of the problem, collect information, share information, and propose a solution to the problem. Accordingly, students' personality types, which determine the way they think, behave, learn, interact, and make decisions (Johnson & Finucane, 2000) are assumed to play a role in the students' learning in PBL groups.

The notion of personality types including introversion and extroversion was first introduced by psychoanalyst Carl Jung (Lieberman & Rosenthal, 2001; Swanberg & Martinsen, 2010), but has since widened to cover more characteristics such as intuitive sensing, feeling-thinking, and judging-perception (Lieberman & Rosenthal, 2001; Sharp, 2008; Swanberg & Martinsen, 2010). Among the various personality types, introversion and extroversion are the most widely focused on in research on second or foreign languages because these are fundamental to the theories of personality (Dörnyei & Skehan, 2003; Dörnyei, 2006; Dewaele, 2013). Within these personality types, students have distinctive ways to process information, behave, and communicate ideas.

There is a universal, yet not absolute, behavioral pattern that determines extroverts and introverts. Extroverts are often characterized as those who like to try new things, obtain great energy from the external world, and like to interact with many people. On the other hand, introverts are those who like to consider things before doing them, derive energy from their inner world, tend to be solitary, and have only a few close relationships with other people (Oxford, 2003; Sharp, 2008). The differences in how extroverts and introverts process information, behave, and communicate can be explained based on biological perspectives. As proposed by Eysenck in 1967, the brains of extroverts tend to have lower levels of dopamine, while introverts tend to have higher levels of it (Dewaele & Furnham, 1999; Kumari et al., 2004). Consequently, extroverts are unenthusiastic and more resistant to stressful situations; they tend to enjoy activities that involve greater sensory stimulation, whereas introverts are over-enthusiastic, and thus they tend to avoid stressful situations (Lieberman & Rosenthal, 2001; Dewaele, 2013). Additionally, the blood pathways of introverts' brains are longer and more complicated than those of extroverts which makes the linguistic units of information line up before being processed, consequently slowing down brain processing (Lieberman & Rosenthal, 2001; Dewaele, 2013; Dow, 2013). Accordingly, when compared to extroverts, introverts need more time to process information and react, particularly when offering their opinions.

There are two hypotheses introduced by Cummins in 1979 on which most research on extraversion and introversion has been based which are pertinent to basic interpersonal communication skills (BICS) and cognitive academic language proficiency (CALP) (Ellis, 1994). Within these skills, Cummins argues that BICS is critical for oral fluency, whereas CALP is relevant to literacy skills such as reading and writing (Ellis, 1994; Dow, 2013). The first hypothesis is that extroverts are better at acquiring basic interpersonal communication skills than introverts. Within this hypothesis, extroverts are viewed as individuals who prefer to socialize which allows them more practice in their spoken communication skills and eventually improves their oral fluency. Meanwhile, the second hypothesis posits that introverted learners perform better when it comes to acquiring cognitive academic language proficiency as they tend to enjoy the subject more than their counterparts.

Extroverts are better language learners, particularly in spoken communication, than their introverted counterparts, while introverts tend to slightly outperform their extroverted counterparts in language learning that involves reading and writing activities (Dewaele, 2013). Thus, extroversion is a strong predictor of success in second language learning (Cao & Meng, 2020) wherein the skills to use the language actively play an essential role. In fact, there is no single personality trait that pre-determines success in second language acquisition (SLA) (Dewaele, 2013) though it is one of the factors that contribute to the accomplishment of L2 acquisition. Learning achievement is also determined by

motivational constructs in addition to students' personality types (Cao & Meng, 2020; Liang & Kelsen, 2018), even though extroverts outperform their counterparts in oral communication (Liang & Kelsen, 2018). Thus, extroverts and introverts are not superior to one another, and it is necessary to note that most people are a combination of both with tendencies toward one more than the other (Liang & Kelsen, 2018; Cain, 2012; Dow, 2013).

Studies that investigated the effects of personality types on students' learning yielded various results, and research found that the writing performance between extroverts and introverts is not significantly different (Nejad et al., 2012; Alavinia & Hassanlou, 2014; Hemmatnezhad et al., 2014; Shorkpour & Moslehi, 2015). The performance between extroverts and introverts was also not significantly different in virtual reality writing online (Khodabandeh, 2022), and the use of self-correction did not affect the quality of writing between the extroverts and introverts (Hajimohammadi & Mukundan, 2011). However, other studies showed that personality types affect students' learning strategies where extroverts use cognitive strategies, metacognitive strategies, and social strategies during writing exercises (Liyana & Bartlett, 2013) which improves their writing. On the contrary, research by Boroujeni et al. (2015) discovered that the introverts' descriptive writings were better than those of the extroverts particularly in terms of content, language, mechanics, and vocabulary. In line with this, Sanjaya et al. (2015) discovered that introverts outperformed extroverts in writing essays concerning content, syntax, and mechanics, but not in organization, discourse, and vocabulary. Meanwhile, studies by Qanwal and Ghani (2019) and Zaswita and Ihsan (2020) revealed that introverted students have better writing scores compared to the writing scores of extroverted students.

Referring to the gap, this study tries to investigate the roles of personality types, particularly the roles of extraversion and introversion within problem-based learning and the learning of argumentative essay writing. The roles of individual differences, particularly extrovert and introvert personality types, and EFL writing proficiency, remain unsolved since studies on PBL have not investigated the possible roles of these individual differences. In fact, individual differences, particularly in students' personality types, are evident in any PBL group (Johnson & Finucane, 2000). This implies the need to investigate the potential roles of personality types in PBL classrooms.

III. METHODOLOGY

This study employed a quasi-experimental design in order to reveal the effects of PBL on students' writing quality between extroverted and introverted students. The research questions are formulated as follows:

1. Is there any significant difference in the mean scores of the argumentative essays between students taught using PBL and those taught using guided writing?
2. Is there any significant difference in the mean score of the argumentative essays between the extroverted students taught using PBL and those taught using guided writing?
3. Is there any significant difference in the mean score of the argumentative essays between the introverted students taught using PBL and those taught using guided writing?

The study involved English Department students from the Faculty of Teachers Training and Education of the University of Lambung Mangkurat (ULM), Banjarmasin, Indonesia, who were enrolled in Academic Writing courses as intact classes. The classes were equal in terms of the number of students and the level of writing ability. The homogeneity test found that the significance level was $.302$ ($p = .302 > \alpha = .05$). It indicated that the subjects' skills in writing argumentative essays were homogeneous. These classes were then randomly selected as the experimental and comparison classes.

The instruments of the study were a personality-types inventory, a writing test, and a scoring rubric. The design of the inventory was based on the dimensions of the extrovert and introvert personality types proposed by Lieberman and Rosenthal (2001), Dörnyei and Skehan (2003), Swanberg and Martinsen (2010), and Dewaele (2013) which were basically rooted in the notions of extraversion and introversion introduced by Carl Jung. The personality-types inventory consisted of 38 items with 19 items revealing the introverted type and another 19 items revealing the extroverted type. A five-scale response was selected with the scales including "Strongly Agree", "Agree", "Neutral", "Disagree", and "Strongly Disagree" to represent the subject's preference on the tendency of thinking, behaving, or acting toward the thought, actions, or behaviors in various situations. Each scale was scored 5, 4, 3, 2, and 1, respectively. When a student obtained a higher score on the extrovert items than the introvert items, s/he was categorized as an extrovert and vice versa. The inventory was validated by two experts and then tested before actual use. After revision, the inventory was administered to the subjects of the study. The results showed that there were nine extroverted students and 19 introverted students in the comparison group while there were 11 extroverted students and 17 introverted students in the experimental group.

The writing test consisted of the prompts which were evaluated in terms of the relevancy of the topics with the students' needs and interests and the appropriateness of the prompt with the genre and rhetoric task. Furthermore, the wording of the instructions was evaluated in terms of the clarity and accuracy of the language used which meant that the instructions were clear and understandable. Meanwhile, the scoring rubric focused on the quality of the content, and its organization, vocabulary, grammar, and mechanics. Specifically, the content aspect of the essay is measured based on the clarity of the claim, the relevancy of the evidence, the acknowledgment of the opponent's views, and the relevancy of the refutation. The four-point scale ranged from 1 (Poor), 2 (Average), 3 (Good), and 4 (Very Good) with specific

weight for each component based on the level of importance: 6 for content and organization, 5 for vocabulary and grammar, and 3 for mechanics. The writing prompt and scoring rubric were validated by involving three experts to measure the suitability of the components evaluated in the students' essays.

The test was then tried out by involving 27 students having similar characteristics to the subjects of the study and involving two raters. Before its usage, however, a training session was given to ensure that the raters had a consensus on how to use the scoring rubric in evaluating the essays. After trying out the writing test, the scores from two raters were analyzed. The result showed that the obtained *r* value for the content aspect was .709, the organization aspect was .826, the vocabulary aspect was .624, the grammar aspect was .596, and the mechanics aspect was .458. Interestingly, these *r* values were greater than the *r* table for 50 samples (.235). Further, the obtained significance value was .000 for the content, organization, vocabulary, and grammar while the obtained significance value for the mechanics was .001. These values were less than the .05 significance level. Accordingly, the raters' scores were valid concerning the students' argumentative writing skills. To measure the consistency of scores among raters, the inter-rater reliability was employed by utilizing the Intra-Class Correlation (ICC) coefficient. The analysis revealed that the obtained reliability coefficient *r* was .942. This value indicated a high inter-rater consistency, which showed a high reliability.

The treatment was conducted by implementing PBL in the experimental group and guided writing instruction in the comparison group. The procedure of PBL was developed by adapting the procedure proposed by Burch (2000) which originally consisted of problem presentation, problem analysis, research (collecting information), and reporting. A minor modification was made by adding the application stage after the reporting stage to allow students to write argumentative essays. The application stage was designed by following the principles of process writing, namely planning, drafting, revising, and editing to increase cognitive activities in each stage which gradually improves the quality of students' writing (Graham & Sandmel, 2011).

In the present study, solving a problem through PBL groups and writing an argumentative essay individually were accomplished in two meetings taking into consideration that the process of problem-solving and writing an essay was complex and that the students needed sufficient time before they finally produced a composition. After practicing writing for four weeks, a test was administered to obtain data on students' abilities in writing argumentative essays. This study involved two raters to evaluate the students' argumentative writing from the test.

IV. FINDINGS

The students' writings were evaluated by two raters using the scoring rubric. The scores were then tabulated and calculated by using SPSS version 16.

A. The Result of the Writing Test of the Experimental and Comparison Groups

The experimental group gained a higher mean score than the comparison group, as depicted in Table 1.

TABLE 1
DESCRIPTIVE STATISTICS OF WRITING TEST OF THE EXPERIMENTAL AND COMPARISON GROUPS

Group	N	Range	Minimum	Maximum	Mean	Std. Deviation
Experimental	28	32.50	59.50	92.00	74.2500	8.21527
Comparison	28	33.50	51.50	85.00	68.1250	10.53992

Table 1 shows that the scores in the PBL group were between a minimum of 59.50 and a maximum of 92.00. The range was 32.50, and the standard deviation was 8.21. Meanwhile, in the comparison group, the scores were from 51.50 to 85.00. The range was 33.50, and the standard deviation was 10.54. Finally, the mean score of the experimental group was 74.25 while the mean score of the comparison group was 68.12.

Next, a statistical analysis was employed by using an independent sample t-test with a .05 significance level to find the effect of PBL on students' skills in writing argumentative essays. The results are displayed in Table 2.

TABLE 2
RESULTS OF THE INDEPENDENT SAMPLE T-TEST ON THE SCORES OF STUDENTS IN THE EXPERIMENTAL AND COMPARISON GROUPS

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Essay scores	Equal variances assumed	-2.580	54	.013	-6.12500	2.37396	-10.88449	-1.36551

Table 2 displays the *p*-value as .013 ($p = .013 < sig. = .05$). Concerning the result, it was concluded that the students taught using the PBL approach performed better in writing argumentative essays compared to students taught using guided-writing techniques.

After that, the scores on the writing test were then classified based on the students' personality types. The analysis was made by comparing the mean scores of extroverted students taught using problem-based learning and those taught

using guided writing. A comparison was also made concerning the mean scores of the introverted students in both groups.

B. The Results of the Writing Test Based on Personality Types in Both Groups

The data from the writing test in both groups were analyzed using an independent sample t-test. Table 3 summarizes the data on the writing test for both extrovert and introvert students in both the experimental and comparison groups.

TABLE 3
DATA OF THE WRITING TEST BASED ON PERSONALITY TYPES IN BOTH GROUPS

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Scores	Extroverts of Experimental Group	17	73.7647	8.12042	1.96949
	Introverts of Experimental Group	11	75.0000	8.70057	2.62332
	Extroverts of Comparison Group	19	66.9737	10.73866	2.46362
	Introverts of Comparison Group	9	70.6111	10.26456	3.42152

Based on Table 3, the mean score of the extroverts in the PBL group was 73.76 while the mean score of the extroverts in the comparison group was 66.97. Likewise, the mean score of the introverted students in the experimental group was 75.00 whereas that of the comparison group was 70.61. Therefore, the mean score of the introverted students was better than their counterparts in both the PBL and guided writing groups.

C. The Results of Homogeneity Testing

In order to find out whether the data across personality types in both the experimental and comparison groups were equal and consistent, homogeneity testing was carried out. Hence, Levene’s test of the SPSS 16.0 version was employed with .05 as the significance level. The results of the homogeneity testing are displayed in Table 4.

TABLE 4
RESULTS OF HOMOGENEITY TESTING

Homogeneity Group	Levene’s Statistic	Sig.	Interpretation
Experimental and Comparison Groups	11.598	.001	Heterogeneous
Introverts in Both Groups	1.791	.197	Homogeneous
Extroverts in Both Groups	3.728	.062	Homogeneous

Based on the homogeneity tests, the data on the writing test in both groups were not homogeneous since the *p*-value was .001 ($p = .027 < sig. = .05$). Meanwhile, the data of the extroverts in both groups and the data of the introverts in both groups were homogeneous since the *p* values were greater than a significance level of .05 at .197 for the introverted students and .062 for the extroverted students.

D. The Results of Normality Testing

The normality testing was carried out using the Kolmogorov-Smirnov test utilizing the SPSS 16.0 version of the computer program. The results of normality testing are presented in Table 5.

TABLE 5
RESULTS OF NORMALITY TESTING

Group	Kolmogorov-Smirnov Test			
	Statistic	Std. Deviation	Sig.	Normality
Writing Scores-Experimental Group	.507	8.24	.960	Normal
Writing Scores-Comparison Group	.904	10.54	.387	Normal
Introverts’ Writing Scores- both	.806	9.45	.534	Normal
Extroverts’ Writing Scores - both	.937	10.06	.343	Normal

Based on data shown in Table 5, the *p*-value in each group was greater than the significance level of .05. The *p*-value for the writing scores in the experimental group was .960, whereas in the comparison group, the *p*-value was .387. Then, the *p*-value for the writing scores of the introverts in both groups was .534 and the *p*-value for the writing scores of the extroverts in both groups was .343.

To find the answer to the second research question, an independent sample t-test was carried out resulting in an alpha value of .05. The result is displayed in Table 6.

TABLE 6
RESULT OF INDEPENDENT SAMPLES T-TEST ON THE SCORES OF THE EXTROVERTED STUDENTS IN BOTH GROUPS

		t-test for Equality of Means						
		T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper	
Scores_Extro_Exp	Equal variances assumed	1.036	18	.314	4.38889	4.23746	-4.51369	13.29147
Extro_Comp								

The result displayed in Table 6 showed that the *p*-value was .314. Since the *p*-value was greater than a .05 level of significance ($p = .314 > sig. = .05$), there was no significant difference in the mean scores of the extroverted students' argumentative writing skills who were taught using PBL and those who were taught using guided writing.

The next analysis was based on the result of the independent sample *t*-test with a .05 significance level to answer the third research question. Table 7 shows the summary of the result of the analysis.

TABLE 7
RESULT OF INDEPENDENT SAMPLES T-TEST ON THE SCORES OF THE INTROVERTED STUDENTS IN BOTH GROUPS

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper	
Scores	Equal variances assumed							
Intro_Exp		2.120	34	.041	6.79102	3.20360	.28053	1.330151
Intro_Com								

As depicted in Table 7, the *p*-value was .041, which was less than the .05 significance level ($p = .041 < sig. = .05$). This indicated that the introverted students taught using PBL had better argumentative essay writing skills than those taught using guided-writing.

V. DISCUSSION

This study attempted to discover the potential roles of students' personality types on their performance in writing argumentative essays within PBL instruction. The first analysis was carried out on the writing scores of the students from both the experimental and comparison groups. An analysis of the findings revealed that the students in the PBL group achieved better scores than those in the guided-writing group. The hypothesis testing shows that the obtained *p*-value was .013 which was smaller than the .05 level of significance. This means that there was a significant difference in the mean scores between the students in the PBL group and those in the guided-writing group. This finding is in line with previous research showing that PBL contributes to increasing students' scores in argumentative writing (Li, 2013; Othman & Shah, 2013). The stages of PBL allow for exploration of the issue, analysis of the cause-effect, and proposing a viable solution, each of which facilitates students in making a good claim, providing arguments and evidence, and refuting opponents' points of view – all of which are essential in writing argumentative essays (Johnston, 2000).

Next, the writing scores between the extroverts and introverts in both the experimental and comparison groups were analyzed and revealed that the extroverted students in the experimental group achieved higher mean scores than the extroverts in the comparison group. However, the analysis using the *t*-test showed that the difference was insignificant as the *p*-value was greater than the .05 significance level ($p = .314 > \alpha = .05$). On the contrary, the statistical analysis on the writing scores of the introverted students showed that the introverted students in the experimental group outperformed those in the comparison group. Furthermore, an independent sample *t*-test showed that the difference in the mean scores of the argumentative writing skills of the introverted students in both groups was significant ($p = .041 < \alpha = .05$). This is to say that the introverts taught using PBL had better skills in writing argumentative essays compared to the introverts taught using guided-writing.

The possible reason for introverts scoring higher than their counterparts is that the structure of the brain of introverts is longer and consists of more complex blood pathways than the brains of extroverts which causes the information to line up before being processed, gradually slowing down the brain's processing (Lieberman & Rosenthal, 2001; Dewaele, 2012; Dow, 2013). Consequently, introverts tend to be more thoughtful before they make decisions. From the observations in the experimental group, the researchers found that during PBL group discussions, introverts tended to listen more and think before talking. In contrast, extroverts tend to think by talking. While writing their drafts, the introverts checked their drafts more often than the extroverts which might be due to the slow information process in their brain making them focus more on the quality of the content, organization, vocabulary, grammar, and mechanics than their counterparts. As previous theories postulate, this might indicate that introverts are more thoughtful (Lieberman & Rosenthal, 2001; Dewaele, 2012; Dow, 2013). For that reason, the introverted students taught using problem-based writing instruction were facilitated through the stages of problem-solving and the stages of writing an essay; thus, they performed better than those taught using guided writing instruction who were not provided with collaborative activities such as the opportunities to comprehend an issue, find a solution, and write an essay.

The finding of the present study also confirms the findings of the studies conducted by Layeghi (2011), Boroujeni et al. (2015), and Sanjaya et al. (2015) which revealed that the introverted students' skills in writing argumentative and descriptive essays were better than the extroverts' skills. Similar to the present study, a study by Layeghi (2011) involving high-intermediate students and two raters who evaluated the students' essays using an analytical scoring rubric discovered that introverts had better content and form when it came to their writing skills than their extroverted counterparts. Meanwhile, a study by Boroujeni et al. (2015) utilizing a test that involved writing descriptive paragraphs

found that introverts outperformed extroverts in all of the writing components studied including content, organization, vocabulary, language, and mechanics. Finally, the result of the current study is also in line with the findings of research conducted by Sanjaya et al. (2015) that compared extroverts and introverts in an argumentative writing test using an independent samples t-test. In their research, Sanjaya et al. (2015) found a significant difference between extroverts and introverts when it came to the argumentative essay scores with regard to the content, syntax, and mechanics. However, no significant difference was found concerning organization and vocabulary.

Nonetheless, the findings of the current study are in contrast with the findings of the studies by Marefat (2006), Hajimohammadi and Mukundan (2011), Alavinia and Hassanlou (2014), Hemmatnezhad et al. (2014) which revealed that there is no significant difference in the writing performance of extroverts and introverts. The contrastive findings may be due to the different methods applied in the studies including different instruments to measure personality types, different instruments to measure writing skills, and different variables involved. In studies by Hajimohammadi and Mukundan (2011), Alavinia and Hassanlou (2014), and Hemmatnezhad et al. (2014), two different measurements were utilized including Eysenck inventory. Meanwhile, the study by Marefat (2006) utilized the MBTI questionnaire. The current study utilizes researcher-made questionnaires by adapting available questionnaires for extroverts and introverts and integrating theories of the dimensions of personality. Although all the measurements have been validated, they might yield different results due to dissimilar psychological types that are included in the questionnaire. Furthermore, the studies utilize different writing tasks, which include descriptive, narrative, expository, and argumentative essays, each of which requires a different approach to thinking and different patterns of organization and word choice. Consequently, the task type might explain the reason why the writing performance between the extroverts and the introverts is dissimilar.

VI. IMPLICATIONS

The findings of this study provide evidence of the need to use suitable teaching strategies that facilitate both extroverts and introverts in developing their writing skills. While problem-based writing instruction benefits introverted students, teachers need to select the appropriate strategy that can facilitate extroverted students' writing development to respond to the majority of research findings on the low writing performance of extroverts.

VII. CONCLUSION

The findings suggest that PBL affects students' writing quality, especially students with introverted personality types. The introverts who were taught argumentative writing using PBL achieved better scores than the introverts who were taught guided writing. Meanwhile, the difference in the writing scores was not significant between the extroverts in the PBL group and the extroverts in the guided writing group.

APPENDIX A WRITING PROMPT (TEST)

Directions:

- Write an argumentative essay consisting of **5 paragraphs** (410-460 words) by **choosing one** of the two topics below.
- Your essay should consist of an introductory paragraph, three body paragraphs, and a concluding paragraph.
- You have 100 minutes. Spend the time effectively drafting, rereading, and revising your essay.
- Using any gadget or dictionary is **not** allowed.

-
1. The Ministry of *Pemberdayaan Perempuan dan Perlindungan Anak* is now working on the draft of the regulation that forbids students at any level of education to bring cellular phones to schools. However, some people believe children should be allowed to bring cellular phones to schools. Which position do you agree with? Provide reasons to support your position.
 2. English in elementary schools in Indonesia is no longer a compulsory subject but a local one. People react differently to the change in the status of English. Some people believe that English should be taught in elementary schools, while others think the opposite. Which position do you agree with? Provide reasons to support your position.

Your work will be evaluated on: (1) content (claim, reasons, evidence, recognition of opponent's view, and refutation), (2) organization, (3) vocabulary, (4) grammar, and (5) mechanics.

Please use clear handwriting because poor handwriting can affect the readability of your essay.

Do your best!

APPENDIX B SCORING RUBRIC

Elements	Weight	Score	Category	Criteria
Content	6	4	Very Good	The essay is consistently focused on the central idea that clearly shows the writer’s argument; the writer’s reasons are supported with accurate, relevant, and detailed evidence while the opponent’s view is fully explained and refuted using accurate, relevant, and detailed evidence. It summarizes the main points, demands action, and warns of some consequences.
		3	Good	The essay is focused on the central idea. It contains the writer’s reasons; however, a piece of evidence is inaccurate, irrelevant, or not detailed. The opponent’s view is addressed where only some points are explained and refuted with some evidence. It contains the summary of the main point or the demand of an action.
		2	Average	The essay is focused on the central idea, but the writer’s argument is rather weak as it contains some irrelevant reasons and/or inaccurate, irrelevant, and limited evidence; the opponent’s view is addressed but not fully refuted as the evidence is not provided. It summarizes the main points.
		1	Poor	The essay fails to show the writer’s argument since it discusses the issue in general without stating the writer’s argument. It provides very little or illogical evidence and mostly contains fallacies. The opponent’s view is not explained nor refuted.
Organization	6	4	Very Good	The essay is well-organized using accurate and varied cohesive devices that make the relationships among the claim, counterclaim, reasons, and evidence very clear. The length of the essay is proper.
		3	Good	The essay is adequately organized in that the relationships among the claim, counterclaim, reasons, and evidence are quite clear, although one or two cohesive devices are missing. It has an appropriate length.
		2	Average	The essay is rather disorganized because of a few incorrect or limited cohesive devices while the length is fairly appropriate. Some sentences are irrelevant, which makes the essay rather loose, though the essay has an appropriate length.
		1	Poor	The essay is disorganized because many irrelevant ideas are discussed, and some cohesive devices are used incorrectly. It does not have an appropriate length.
Vocabulary	5	4	Very Good	The essay shows exceptional vocabulary and hedging usage with almost no errors or less than 3 total errors in dictions appropriate for formal writing, wordiness, and unclear expressions.
		3	Good	The essay shows good vocabulary and hedging usage with 3-6 total errors in dictions appropriate for formal writing, wordiness, and unclear expressions.
		2	Average	The essay shows moderate vocabulary and hedging usage with 7-10 total errors in dictions appropriate for formal writing, wordiness, and unclear expressions.
		1	Poor	The essay shows limited vocabulary and hedging usage, containing more than 10 total errors in dictions appropriate for formal writing, wordiness, and unclear expressions.
Grammar	5	4	Very Good	The essay demonstrates excellent grammar usage with complex sentences; it contains almost no errors or less than 5 total errors in singular-plural, subject-verb agreement, tense, cohesive devices, pronouns, prepositions, and articles.
		3	Good	The essay shows good grammar usage with good simple sentences and some incorrect complex sentences; it contains 5-10 total errors in singular-plural, subject-verb agreement, tense, cohesive devices, pronouns, prepositions, and articles which do not distract the readers.
		2	Average	The essay shows moderate grammar usage, containing problems with simple and complex sentences; it contains 11-16 total errors in singular-plural, subject-verb agreement, tense, cohesive devices, pronouns, prepositions, and articles that distract the reader.
		1	Poor	The essay shows poor grammar usage with no mastery of sentence constructions; it contains severe and persistent errors (more than 16 total errors) in singular-plural, subject-verb agreement, tense, cohesive devices, pronouns, prepositions, and articles that distract the reader.
Mechanics	3	4	Very Good	The essay shows excellent mechanics usage with almost no errors or less than 3 total errors in spelling, punctuation, capitalization, and paragraphing, while the handwriting is neat and legible.
		3	Good	The essay shows good mechanics usage, containing 3- 5 total errors in spelling, punctuation, capitalization, and paragraphing, while the handwriting is somewhat neat and legible.
		2	Average	The essay shows moderate mechanics usage, containing 6-8 total errors in spelling, punctuation, capitalization, and paragraphing, while the handwriting is not neat but still legible.
		1	Poor	The essay shows poor mechanics usage, containing severe errors (more than 8 total errors) in spelling, punctuation, capitalization, and paragraphing, while the handwriting is neither neat nor legible.

APPENDIX C PERSONALITY-TYPES INVENTORY

No.	Items	Responses				
		5	4	3	2	1
1.	I like working in groups better than working alone.					
2.	I concentrate best in a silent room.					
3.	When confronted with a sudden question, I am usually the first to respond.					
4.	In conversations, I usually listen to others.					
5.	I like trying challenging sports.					
6.	To express my ideas, I'd rather write than talk.					
7.	I tend to make decisions quickly without thinking too much.					
8.	In discussions, I tend to think silently.					
9.	I usually learn by observing how others do the task.					
10.	I check my assignments many times before submitting them.					
11.	I prefer spending my leisure time reading books rather than hanging out with my friends.					
12.	I find it easy to start conversations even with people whom I don't know.					
13.	I feel like I am full of energy when I am interacting with people.					
14.	People say that I am a silent person.					
15.	In discussions, I usually let others talk first.					
16.	I usually need a lot of time to prepare before I speak in front of the public.					
17.	I tend to make decisions quickly and think about the consequences later.					
18.	I find it uneasy to act as a leader in a situation.					
19.	I have emotional relationships with only a few friends.					
20.	I usually write what I want to say especially before I speak in front of the public.					
21.	I'd rather spend holidays at a popular beach than in a small, quiet one.					
22.	I rarely show my emotions (happy, sad, worried, or angry) to others.					
23.	I dislike small talk but I enjoy talking in depth about topics that matter to me.					
24.	I enjoy multitasking (doing more than one thing at a time).					
25.	In classroom situations, I prefer group discussions to lectures.					
26.	When solving a problem, I consider a rational approach to be the best.					
27.	I prefer to discuss my work when I have finished doing it.					
28.	I usually try new things for the sake of fulfilling my curiosity.					
29.	I usually finish my work/assignments quickly.					
30.	I prefer doing assignments alone or with only one classmate to working with groups.					
31.	I enjoy being a part of the crowd at sporting, music, or amusing events.					
32.	I am not as quick and lively (energetic) as other people.					
33.	Working in groups usually energizes me.					
34.	I usually do school assignments by learning from the examples of others' works.					
35.	I usually practice in front of a mirror before I speak, especially in front of the public.					
36.	When I study in the library, I prefer to sit in solitary.					
37.	I prefer oral tests to written tests.					
38.	I usually do the school assignments with my classmates.					

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