THE IMPACT OF PROJECT-BASED LEARNING AND PROBLEM-BASED LEARNING ON WRITING SKILLS: A COMPARATIVE STUDY ON EXTROVERTED AND INTROVERTED INDONESIA EFL STUDENTS

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Abstract: This study aimed to investigate the effectiveness of Project-Based Learning (PjBL) and Problem-Based Learning (PBL) on enhancing the writing skills of students, considering their extroverted or introverted personality traits. The objective was to explore how different teaching strategies might yield varying results depending on the students' personalities. Employing a quasi-experimental design with a time-series approach, the research methodology included pre-and-post assessments, classroom observations, self-assessment tools for evaluating students' writing competencies, and questionnaires to determine their preferences. The research utilized three distinct forms of tests, revealing that the significance (Sig.) value stood at 0.005, which is below the 0.05 threshold for significance. This indicates a differential impact of PjBL and PBL on the writing abilities of introverted students. Conversely, for extroverted students, the significance value derived from the data was 0.300, exceeding the 0.05 level. This outcome suggests acceptance of the null hypothesis (Ho) and rejection of the alternative hypothesis (Ha), meaning there was no discernible difference in the effectiveness of the two strategies for extroverted students. Participants in the study were fourth-semester English Department students at the University of Sultan Ageng Tirtayasa (Untirta). The findings revealed that introverted students experienced variations in their writing skills when exposed to both PjBL and PBL, with these methods significantly influencing their writing abilities. In contrast, extroverted students did not show notable differences in their writing skills under the same teaching

INTRODUCTION

Proficiency in writing is a prerequisite for efficient communication, idea expression, and navigating the complexities of the modern world. It plays a vital role in both academic settings and real-life scenarios (Baharudin et al., 2023; Lestari et al., 2022; Oflaz, 2021). Writing is more than just conveying messages; it involves a series of processes including initial drafting, brainstorming, revising, and editing (Batubara et al., 2022; Rahardjo et al., 2021; Rizki et al., 2022; Salama et al., 2022), all enhanced by reflection and discussion. Through writing, complex ideas can be articulated clearly, compelling narratives crafted, and nuanced viewpoints presented, making it a means for shaping and sharing one's perspective beyond mere information dissemination.

As noted by Muliani et al. (2022), individuals with communicative competence can use language effectively, appropriately, and flexibly in different contexts. Suanyot et al. (2022) further

describe this competence as the ability to use language across four key communication domains: grammatical competence, which includes exploring phrase types, clauses, sentences, and texts (Berezenko et al., 2022); sociolinguistic competence; discourse competence; and strategic competence. These domains are crucial for curriculum development and instructional approaches. Additionally, according to Sauvignon and Brown as cited in D'andrea (2010), communicative competence in writing involves understanding the linguistic features of written discourse, recognizing the social roles of the intended audience, constructing sentences into a coherent whole, and choosing the appropriate genre for the text's purpose to engage readers effectively. By integrating these elements into writing instruction, learners are expected to achieve effective writing outcomes.

In addition to teaching language mechanics, our responsibility as educators is to assist students improve their creativity, critical thinking abilities, and clarity of ideas (Al-Halim, 2019; 2020). By integrating creativity, critical thinking, and clarity into language mechanics instruction, educators can equip students with not only the technical skills of effective communication but also the ability to express themselves thoughtfully and creatively in a variety of contexts by employing proper methodologies and strategies (Kwon et al., 2020).

Writing is essential to improving our comprehension of and appreciation for the function of language in the development of ideas and interpersonal communication. Writing is essentially a sophisticated activity that enables people to investigate and bring their ideas to life (Rahmanita, 2023). It serves as a medium for expressing thoughts, feelings, intentions, and experiences (Meisani, 2022), highlighting its importance as a fundamental skill in language learning.

However, many students face challenges in effective written communication, which is understandable given the extensive cognitive process involved in writing (Bulqiyah, et al., 2021). A major hurdle in the writing process for students includes various aspects such as developing content and ideas, organizing thoughts, choosing appropriate vocabulary, using language effectively, and adhering to formalities and referencing standards (Astrini, 2020; Elfa, 2020; Riadil et al., 2023; Phuong, 2021; Tambunan et al., 2022).

Students often struggle with grammar, punctuation, sentence structure, and generating ideas, particularly ESL college students who face challenges in brainstorming and originality in their writing tasks. Teachers can assist by offering guidance, encouraging free writing, and teaching idea-generation techniques, while fostering an environment conducive to open exploration and sharing of ideas.

Furthermore, understanding students' personality traits is crucial as it influences teaching methods, shaping the educational experience and the teacher-student relationship (Toker, 2021). This understanding is vital in creating an effective learning environment.

Personality also plays a role in shaping a student's writing skills. Research by Sahid et al. (2022) suggests that while both introverted and extroverted EFL learners have the potential to be proficient writers, extroverted learners may need to concentrate more on the context and content of their writing.

Understanding students' personalities is key for educators to customize their teaching methods to align with individual learning preferences. For instance, while some students may excel in group activities, others might prefer solitary learning. Recognizing these personality differences enables teachers to create more effective and engaging learning experiences. In essence, appreciating how introverted and extroverted students learn differently is crucial in designing effective writing instruction. Involving students in this process ensures the educational approach is tailored to their needs, developmental stage, and experience (Dirsa et al., 2022).

Recognizing the distinct characteristics of students is beneficial for English teachers in achieving educational goals. A teacher's grasp of these personality differences, combined with their teaching strategy, can help create learning environments that capitalize on each student's unique strengths (Nggawu & Thao, 2023). This aligns with Kafryawan's (2020) findings, which indicate a moderate correlation between introverted and extroverted personalities and writing skills.

Özbay et al. (2017) note that among the most researched personality traits influencing language learning are introversion and extroversion. These traits play a significant role in how individuals interact with their environment and gain energy. Introversion and extraversion are often considered crucial factors in the success of learning a foreign

language (Nabila & Wibowo, 2022; Sahid et al., 2023; Sirrajuddin et al., 2023).

Introverts typically favor internal reflection and thought before expressing their ideas in writing, often requiring more time to contemplate and organize their thoughts (Nabila & Wibowo, 2022). Extroverts, conversely, may thrive in social settings and prefer discussing ideas verbally over writing (Zaswita, 2022). Activities like group discussions and collaborative tasks can be particularly beneficial for them.

The use of Project-Based Learning (PjBL) is beneficial for nurturing writing skills in students of varying personality types. PjBL, a student-centered approach, promotes collaboration, critical thinking, and creativity through engaging in practical projects. It is appropriate for improving creative writing skills since it provides possibilities for students to discover new things, comprehend ideas, and acquire new skills via hands-on activities (Parker, 2020; Zubaidi et al., 2023; Pentury et al., 2020; Setiawan & Herlambang, 2022).

Problem-Based Learning (PBL) is another essential approach for fostering students' idea development. According to Sari et al. (2021), PBL encourages students to solve real-world problems, construct their own understanding through learning activities, focus on studied material, engage in group-based scientific communication, and utilize resources from libraries, the

environment, and the internet. Thus, PBL is crucial for stimulating critical thinking and aiding in the development of students' ideas and creativity.

METHOD

In order to evaluate the effect of a particular intervention or independent variable on a dependent variable, scientific investigations often use quasi-experimental time-series designs, like the one employed in this study.

The one-group time-series design, a type of quasi-experimental approach, focuses on examining the influence of a treatment or intervention on a single group over a prolonged duration. This design involves routinely measuring a single group, where the sequence of these measurements is enhanced by an experimental treatment, as explained by Ary and colleagues (2010, p. 320).

According to Ary et al. (2010), essential elements of this design include many evaluations of the intervention-designated dependent variable ('X') both before and after it was introduced. The way in which 'X' affects the group's performance in 'Y' then evaluated by comparing the pre- and post-intervention measurements. In this framework, the experimental treatment is incorporated at the 'X' point, and the effects are observed through the 'Y1 to Y8' measurements.

Table 1. *The time-series design with PjBL for class A*

Y1	Y2	Y3	Y4	X	Y5	Y6	Y7	Y8

Note:
Y1 – Y4= Measurements before giving treatment
X   = Giving treatment by applying PjBL
Y5 – Y8= Measurements after giving treatment
                (Adopted from Ary, Donald, et al. 2010, p. 320)

The population was drawn from Untirta's English Department's fourth-semester students. There were forty pupils in each of the three classes that made up the fourth semester. Purposive sampling was used to obtain the sample. By taking into account specific features that were appropriate for the research's objectives, this sampling technique was employed to determine which samples to take. As such, It may be used to solve the problems with the research. The researcher used this technique to take class A and B of the University of Sultan Ageng Tirtayasa's fourth-semester English Department students in the 2019–2020 academic year.

Three distinct types of variables were used in this investigation. The independent variable was composed of one variable at first. It was referred to as project-based learning for teaching writing. Second, the dependent variable was the compositions made by the students. Students wrote about particular topics that were supplied by the researcher. The last variable was the moderator. It contained two variables. They were both introverts and extroverts. To determine whether the students were introverts or extroverts, the researcher gave them a personality test.

The hypothesis are: (1) There is no difference in the writing ability of introverted students' writing ability in the PjBL and PBL methods. (2) There is no difference in the writing ability of extroverted students in the PjBL and PBL methods.

It is evident from examining the variety of data types employed in this investigation that quantitative data served as the main source.

Results were obtained using a pre-test and a post-test. On the other hand, these study areas have different goals. To determine the differences in introverted students' writing abilities taught by PjBL and PBL methods, data from the first research question was analyzed. These results were examined to determine how teaching extrovert students with PjBL and PBL approaches differed in terms of their writing skills.

For this study, data were gathered using a total of four different types of devices. Field note observations, questionnaires, post-tests, and pre-tests were all used. The purpose of these resources is to provide information about the study's subject.

First, there was a questionnaire. It included two different kinds of questionnaires that were administered both before and after the students completed the pre-tests and post-tests. Personality traits were the subject of these questionnaires. Two distinct sources served as the inspiration for them. These were taken from the Introvert-Extrovert Test (https://www.thecalculator.co/personality/Introvert-Extrovert-Test-545.html#here) and the Eysenck-Personality-Questionnaire (https://www.scribd.com/document/248421357/Eysenck-Personality-Questionnaire).

The second instrument was the pre-test. The pre-test was designed to gather preliminary information about students' writing skills. It was applied to four different text formats. These were texts that were argumentative, recount, descriptive, and narrative. Students were given sixty minutes to put down their ideas.

Observations made in a field or other real-world setting are recorded as field notes in the third method. It is clear from observing the interactions and activities of the students that the researcher paid close attention to what each person was doing and how they were interacting with the materials. In this instance, every action that took place in the classroom during the teaching and learning process was documented by the researcher or observer.

The fourth instrument is the post-test. It kept to the same rules as the preliminary exam. The purpose of the post-test, which was given to the students after the treatment, was to learn more about their writing skills. Additionally, it was used to collect information that may guide decision-making, efforts to improve, and the evaluation of learning or change, as well as to measure the success of an intervention or educational experience.

To guarantee that the information gathered is accurate, dependable, and able to fulfill the study goals, gathering data for a study involves careful preparation, close attention to detail, and observance of best practices.

In the first, the researcher selected students and administered questionnaires to classify their personality types. The questionnaires were distributed before the students got a pre-test and after they got treatments. The goal was to help students consistently deal with their personality types. Following data collection, the researcher began categorizing the questionnaire responses into two groups. They were introverts and extroverts.

Two classes were given the pre-test by the researcher in the second occasion. Pre-tests were administered four times for each class. Next, the investigator assessed every student's paper.

Observing was the third phase. The observation was done as long as the students got care. After that, the assistants watched and noted what the students were doing while the lesson was being taught.

A post-test was the fourth step. Once the students got treatment utilizing a specific approach, the researcher gave them instructions to complete a post-test. Four post-tests were administered to each class. The student's writing was then graded.

This study used three different kinds of tests. The homogeneity test is conducted using the Levene Test. The percentage of responses from two or more populations are compared using this test. The normalcy test employs the Kolmogorv-Smirnov. It is employed to determine whether a set of data's distribution is consistent with a normal distribution or not.

A two-way ANOVA covers two types of tests. These are pairwise comparisons, which are required when there are multiple groups or conditions and need to ascertain the precise differences between those groups, and tests of between-subjects effects, which are used to understand which independent variables or factors in the study have a substantial impact on the dependent variable.

RESULTS AND DISCUSSION

Answering the research questions is based on the data showed in the following tables. The first table deal with Tests of Normality. The second table covers the result of Homogeneity Test. The third table is about Tests of Between-Subjects

Effects. The last table contains the result of Pairwise Comparisons

In this study, three categories of variables were used. The independent variable, which incorporates project-based and problem-based learning, comes first. Two distinct classes used those variables. Second, the student compositions served as the dependent variable. The researcher assigned specified subjects to the students to write on. The moderator was the final variable. It included two variables. They were extroverts as well as introverts. The researcher administered a personality test to the students to determine if they were extroverts or introverts.

Before the data can be used to answer the research questions, it must pass the assumption test. The normality and homogeneity tests are used. The normality test employs the Kolmogorv-Smirnov statistic. This test is used to assess whether a dataset follows a normal distribution. It helps researchers make informed decisions about the appropriateness of certain statistical methods and the validity of their results. The Levene Test is used to determine if the variances of two or more groups or samples are equal. This statistical test determines if the variances of two or more groups are identical.

The following are the tables of the normality and homogeneity tests.

Table 1. *Tests of normality*

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Standardized Residual for Post-test	.062	92	.200[*]	.990	92	.701
*. This is a lower bound of the true significance.						
a. Lilliefors Significance Correction						

Ho: The group of Normal Distribution of Data
Ha: The group of Abnormal Distribution of Data

Based on the data above, it can be reported that for the normality test, Kolmogorov-Smirnov was used. Based on the results of the test, the value of Sig is claimed to be 0.200. It is greater than 0.05 (0.200 > 0.50). As a result, Ho is considered acceptable. As a result of this discovery, it is possible to conclude that the data set is from the Normal Distribution of Data.

Table 2. *Homogeneity test (Levene's test of equality of error variances[a])*

Dependent Variable: Posttest

F	df1	df2	Sig.
1.571	5	86	.177
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			

a. Design: Intercept + Method + Personality + Method * Personality

Ho: Variance data is homogenous
Ha: Variance data is not homogenous

The Levene Test is used in the homogeneity test. It is a statistical test used for assessing the variances of two or more groups. The test results show that Sig. is greater than 0.05 (0,177 > 0.05). As a result, this outcome demonstrated Ho's respectability. In other words, data variance can be inferred to be homogeneous.

Because the data passed the normality and homogeneity tests, the following data was evaluated using a parametric technique, namely two-way ANOVA with an advanced test. The findings of the analysis are as follows:

Table 3. *Tests of between-subjects effects*

Dependent Variable: Post-test

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	154.651[a]	5	30.930	4.746	.001	.216
Intercept	395003.325	1	395003.325	60605.771	.000	.999
Method	64.070	2	32.035	4.915	.010	.103
Personality	78.614	1	78.614	12.062	.001	.123
Method * Personality	44.170	2	22.085	3.389	.038	.073
Error	560.512	86	6.518			
Total	513071.011	92				
Corrected Total	715.163	91				
a. R Squared = .216 (Adjusted R Squared = .171)						

In terms of the differences in students' writing skills, according to the analysis shown in the table above, the value of sig. is 0,010. With 0,010 < 0,05, it is less than 0.05. This finding indicates that there are differences in students' writing abilities when viewed from various methods (PjBL and PBL).

Regarding the personality and writing skills, based on the results of the analysis in the table above, the value of sig. is 0,001. It's less than 0.05 (0,001 0.05). Given this finding, it seems plausible to conclude that personality types—introvert and extrovert—affect students' writing abilities differently.

In relation to the interaction, the Sig. value in the table above is 0,038. It is below the significance threshold (0,038 < 0,05). It may be concluded from this outcome that Ho is rejected and Ha is accepted. As a result, it can be concluded that there is a substantial interplay between the approaches and personality factors when it comes to students' writing talents.

Answering two research questions is based on the result showed in Table 4.

Table 4. *Pairwise comparisons*

Dependent Variable: Posttest

Personality	(I) Method	(J) Method	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
Introvert	PjBL	PBL	-2.596[*]	.897	.005	-4.378	-.814
Extrovert	PjBL	PBL	-1.347	1.291	.300	-3.912	1.219

Based on estimated marginal means

*. The mean difference is significant at the .050 level.

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

The following discussion is based on the result of test showed in Table 4. This first point discusses how introverted students' writing skills differ across PBL and PjBL methods.

The results of the test indicate that Ho is rejected and Ha is accepted. The outcome of the data calculation serves as proof. It indicates that Sig. has a value of 0,005. It is below the significance level (0,005 < 0,05). This data suggests that introverted students' writing talents are affected differentially by PjBL and PBL techniques.

When it comes to developing their writing abilities, introverts usually have unique traits and tendencies. For introverts, quiet, isolated places are frequently the best. When they are first learning to write, they might want to work alone and without distractions. In this environment, they may focus and pay attention to their writing. Reflective people are thought to be introverted. They often take their time to carefully consider their ideas before putting them down on paper. This kind of reflective thinking can lead to well-considered and perceptive writing.

As with other individuals, introverted students have distinct personality traits and preferences that impact their learning and socializing capacities. According to evidence added by Sirrajuddin et al. (2023), introverts prefer to concentrate their energies on their inner world of thoughts and experiences. Through introspection, they extract their vitality from their inner world. Their preferred method of self-expression is writing, which they further develop through introspection. This is also how they prefer to study. For introverts, privacy is really important. They will take the lead on matters that are highly important to them.

There is another researcher who supports this. Because they are more interested in their own ideas and feelings than in things outside of themselves, introverted people often hesitate and are reluctant to speak to others or take part in group activities. To put it another way, introverts have enough internal stimulation; hence, their energy is directed toward their inner world (Sirrajuddin, 2023).

To sum up, students who identify as introverts differ from extroverts in several ways, including their personality traits and preferences. They prefer small-group or solitary activities to large social gatherings and tend to find their sources of

energy. They can become exhausted from too much social interaction and frequently need some alone time to refuel. Introverts frequently have introspective thoughts. They tend to think a lot about many topics and ideas and are self-conscious all the time.

However, when introverted students participate in two unique methods, project-based learning (PjBL) and problem-based learning (PBL), their writing outputs change. This is because PjBL and PBL adopt different approaches to treating students. Therefore, it can be concluded that the two teaching strategies have different effects on the writing skills of introverted students. Even though these methods are comparable, they also have unique qualities that can affect introverted students and other types of learners. PjBL, according to Pentury et al. (2020), is a teaching strategy based on authentic tasks and learning activities that present problems for students to overcome. It is consistent with what Zubaidi et al. (2023) According to them, PBL facilitates the development of students' critical and creative thinking as well as their problem-solving abilities, communication, teamwork, flexibility, and self-evaluation abilities in addition to imparting knowledge.

Additionally, PjBL can improve how students study. Furthermore, PjBL teaches students how to communicate, think critically, and collaborate with others. Therefore, when it comes to honing their writing abilities, they can be imaginative students (Bulqiyah et al., 2021). They claimed that including PjBL into writing sessions offers significant benefits. According to some, PjBL can enable students to work relatively freely for protracted periods and generate realistic products or presentations. In addition, it promotes individual learning, deepens learning, and helps students acquire more sophisticated critical thinking skills.

Conversely, Sari et al. (2021) noted that in relation to PBL, problem-based learning can assist students in learning with complexity and in realizing that there are no simple answers to problem scenarios, but rather that learning and life occur in contexts, which influence the kinds of solutions that are feasible and accessible. Other researchers agree with this. According to them, PBL facilitates the development of students' critical and creative thinking as well as their problem-solving abilities, communication, teamwork, lifetime learning, adaptation to change, and self-evaluation skills in addition to imparting knowledge.

It is in accordance with what Assegaff & Sontani (2020) and Hotimah (2020) said. According to them, problem-based learning can assist students in grasping complexity, seeing that life and learning occur in contexts and that there are no simple answers to problems. Introverts can choose projects that correspond with their interests in PjBL. Introverts can choose projects that correspond with their interests in PjBL. Introverts frequently survive when they can work on issues that they are enthusiastic about. It also allows for individual work within group projects. Introverts may feel more at ease if they can work separately on certain areas of the project.

Additionally, PjBL offers students a variety of issue scenarios to pick from. This affords introverts a degree of autonomy over the course of their education. It also enables introverts to tackle problem-solving activities alone or in smaller groups. They might submit written contributions of their solutions. Educators can create a more inclusive and successful learning environment by customizing PBL and PjBL to meet introverted learning and communication preferences. These approaches can assist introverts in excelling at writing by allowing them to capitalize on their skills in research, reflection, and written expression.

Dealing with flexible scheduling, PjBL provides flexibility in project deadlines, so introverts can manage their time and energy effectively. Some introverts may need more time for writing and revising. It can be inferred that introverts often function best in settings that encourage careful consideration and introspection. In reality, a lot of introverts would want to dedicate more time to their writing preparation and editing phases. As a result, introverts are often more introspective and thoughtful. They may want to do a comprehensive analysis of their ideas and arguments before putting them down on paper.

PBL, on the other hand, allows for more prolonged problem-solving times, understanding that introverts may need extra time for meaningful, written responses. Introverts benefit from extended problem-solving sessions because they do not feel rushed to contribute or make decisions. This can result in an improved educational experience and a greater readiness to participate in writing chores. Introverts often write more effectively than they speak. Because of the shorter time constraints of PBL, they can create written responses that accurately portray their thoughts and ideas.

The last point discusses how extroverted students in the PjBL and PBL methods differ in their writing skills. The significance value, as determined by the data, is 0.300. The degree of significance is greater than 0.05 (0,300 > 0.05). This suggests that Ho is accepted and Ha is rejected in light of this discovery. Put differently, there is not a significant distinction between the writing abilities of PjBL participants and extrovert PBL participants. Put alternatively, there is no discernible difference in the writing skills of extroverted students participating in Problem-Based Learning (PBL) and Project-Based Learning (PjBL). It is foreseeable because extroverted students exhibit a range of learning outcomes in their writing, and these outcomes depend on several factors. This result could be influenced by these several factors.

Adaptability comes first. Strong adaptation skills enable extrovert students to excel in a variety of learning environments. They can modify their teaching strategy to satisfy PBL and PjBL criteria while still producing writing outcomes that are comparable. Extroverts can benefit greatly from having the ability to adapt in a variety of educational settings and circumstances. Furthermore, extroverted people usually feel more at ease and enjoy communicating with others in social situations. Their social comfort enables them to interact with classmates, teachers, and other group members in a variety of learning environments, including cooperative project-based learning environments and traditional classrooms. It is consistent with the findings of Zafar as stated in Ozbay et al. (2017). He stated that an extrovert is described as a gregarious person who takes full advantage of language use chances. This saying implies that extroverts are better communicators. They are frequently good in verbally expressing themselves, including the use of words to convey their thoughts, ideas, and emotions.

The second point to mention is common teaching approaches. PjBL and PBL may employ similar teaching practices, such as collaborative group work and independent research and writing assignments. For extroverted students, these instructional strategies can produce similar effects.

The third factor is the quality of instruction. Extroverted students may gain equally from the advice and resources in both settings if both PjBL and PBL teachers use good teaching approaches and give support.

The fourth factor is peer pressure. Extroverted students may flourish in group discussions and peer relationships in both PjBL and PBL. This can increase their comprehension of the topic matter as well as their writing skills in general.

Kafryawan (2020) presents an additional definition of extroversion. According to him, extroverts connect with people and their surroundings, providing and receiving energy. They prefer talking to exchanging ideas and working on projects together. They would much rather learn by doing and discussing it with others. They typically take the initiative in relationships and at work, and they have a diverse set of interests. They are usually outgoing and have good communication abilities.

As a result, in general, those remarks can be utilized to supplement information about the characteristics of extroverted pupils. Knowing the characteristics of extroverted students allows educators to modify their teaching approaches to create a more engaging and successful learning environment. This can include adding collaborative activities, group discussions, and opportunities for social engagement, which extroverted kids generally enjoy.

CONCLUSION

In general, it may be said that the test's findings imply that the alternative hypothesis (Ha) is accepted and the null hypothesis (Ho) is rejected based on the data presented. The significance level (Sig.) of 0.005, which is less than the generally accepted significance level of 0.05, is the basis for this conclusion. In real words, this suggests that there is statistically significant evidence to support the hypothesis that the PjBL (Project-based Learning) and PBL (Problem-based Learning) approaches have differing effects on the writing abilities of introverted students. The alternative hypothesis— that there is a substantial influence on introverted students' writing abilities when utilizing these distinct teaching methods—is supported by the low p-value (0.005), which suggests that the observed findings are unlikely to have happened by chance alone.

Based on the information given, it seems that the significant value (p-value) connected with the analysis is 0.300, which is higher than the generally accepted significance threshold of 0.05 when dealing with extroverted children in the PjBL and PBL. When the p-value in a hypothesis test exceeds the significance threshold, it implies that there is insufficient data to rule out the null

hypothesis (Ho). Thus, when comparing the writing abilities of extrovert students participating in PBL (Problem-based Learning) and PjBL (Project-based Learning) in this study, it can be concluded that there is no statistically significant difference in their writing abilities. Put another way, the null hypothesis (Ho) is accepted while the alternative hypothesis (Ha) is not sufficiently supported by the facts.

In order to examine the different effects that Problem-based Learning (PBL) and Project-based Learning (PjBL) have on the writing abilities of introverted students (p-value: 0.005), teaching methods should be adapted to their specific needs, combining PjBL and PBL elements and offering varied assessments. For extroverted students, where no significant difference was noted, deeper subgroup analysis and feedback from teachers and students can enhance understanding and guide future educational approaches.

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