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**ENGLISH LEARNING OUTCOMES THROUGH LEARNING
MODEL AND INTRAPERSONAL INTELLIGENCE IN
VOCATIONAL HIGH SCHOOLS**

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Abstract: Globalization and modernization have made English proficiency a key factor in student success. However, Indonesia's performance remains low, ranking 79th out of 113 countries in the EF English Proficiency Index, with only 46% of students in Bekasi Regency

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meeting the minimum standard in 2021. This study investigates the impact of intrapersonal intelligence and learning models. Project-Based Learning (PjBL) and Discovery Learning (DL)—on English achievement among vocational high school students. Using a 2x2 factorial experimental design, 70 students were assigned to PjBL (experimental) and DL (control) groups, categorized by high (B1) and low (B2) intrapersonal intelligence. Data were analyzed using Two-Way ANOVA and Tukey tests. Results revealed: (1) PjBL led to significantly better outcomes than DL; (2) a significant interaction existed between learning models and intrapersonal intelligence; (3) students with high intrapersonal intelligence in the PjBL group outperformed their DL counterparts by 13.20 points; (4) students with low intrapersonal intelligence performed better with DL, with a score difference of -3.90. These findings suggest vocational English teachers should apply PjBL for students with strong intrapersonal skills and DL for those with lower levels. Policymakers are urged to incorporate emotional intelligence components into national curriculum development.

Keywords: *English learning outcomes, discovery learning, intrapersonal intelligences, learning model, project-based learning*

INTRODUCTION

In today's globalized world, English proficiency is essential for accessing global knowledge, technology, and cross-cultural communication (Zurrahmi & Triastuti, 2022). As the dominant language in academia, business, and international affairs, English is no longer optional but a core skill. Therefore, students' ability and willingness to use English actively is crucial. This global demand

drives countries like Indonesia to integrate English education into their formal school systems.

Despite English being integrated into Indonesia's national curriculum for middle and vocational high schools (Lena et al., 2022), significant challenges hinder meaningful language acquisition. The urgency to master English stems from its global role in professional settings, where limited proficiency often hampers workplace performance (Huang, 2023). As English dominates due to transnational economic expansion and cultural influence (Giang et al., 2023), the core issue remains the effectiveness of classroom instruction. Many Indonesian students struggle with confidence and communicative competence (Omar et al., 2020), a situation worsened by the lingering demotivation from prolonged online learning (Iftanti et al., 2023). Contributing factors include a shortage of qualified teachers, low motivation, poor peer interaction, irrelevant content, and negative attitudes toward English (Evans & Tragant, 2020; Pathan et al., 2020). Addressing these barriers requires a holistic approach that fosters student confidence, motivation, teacher quality, and collaborative learning.

Based on the Education First (EF) English Proficiency Index, Indonesia ranks 79th out of 113 countries, reflecting persistent challenges in English language learning. Student learning outcomes are influenced by a range of internal factors, such as physical health, motivation, and emotional maturity and external factors like curriculum quality, teacher competence, instructional models, and classroom environments (Suratno et al., 2023). Asim et al. (2021) highlight five critical elements for effective English instruction: appropriate assessment, clear learning objectives, learner-preferred methods, baseline proficiency, and alignment with competency standards. These complexities demand a comprehensive pedagogical approach that integrates learner characteristics (Sani et al., 2020) with well-structured learning model (Weng et al., 2022). Effective classroom environments must be intentionally designed using appropriate models, as they provide a structured yet adaptable framework

grounded in educational theory, supporting student engagement and creativity.

Among various models, Project-Based Learning (PjBL) emphasizes collaboration and real-world application, encouraging students to work in groups, communicate effectively, and produce tangible outputs that reflect professional scenarios (Crespí et al., 2022; Sari & Prasetyo, 2021). This model enhances time management, teamwork, and problem-solving skills, making the learning process more relevant and motivating. In contrast, Discovery Learning (DL) promotes independent inquiry and problem-solving, where students construct knowledge through exploration rather than teacher-led instruction (Mukherjee, 2015; Mukti et al., 2020). Both models aim to foster deeper learning, but their effectiveness depends on students' individual traits and the context in which they're implemented.

A key noncognitive trait influencing student success is intrapersonal intelligence, defined as the ability to understand, reflect on, and manage one's thoughts and emotions (Gardner, 2000; Mulbar et al., 2019). Students with strong intrapersonal intelligence are better equipped to regulate behavior, make informed decisions, and identify personal strengths and weaknesses (Barman & Roy, 2021; Boo & Kim, 2020). Research consistently shows that intelligence, particularly intrapersonal and cognitive abilities (Kustyarini, 2020), enhances learning (Chen et al., 2022) when paired with curiosity-driven strategies (Wade & Kidd, 2019) and prior knowledge (Zambrano R. et al., 2019). Therefore, incorporating emotional intelligence into instructional planning and selecting responsive models like PjBL or DL can significantly improve educational outcomes.

To assess the current classroom situation, researchers conducted pre-observations and interviews with English teachers at several schools in Bekasi Regency. Findings revealed that most teachers still rely on discovery learning, which appears to be less effective. This is supported by declining student performance: in the first semester of the 2021/2022 academic year, 72% of grade XI students met the minimum passing score (*KKM*) for English, but this dropped

to just 46% in the second semester. As a result, 54% of students failed to reach the school’s *KKM* target of 76, highlighting the need for improved instructional strategies to enhance English learning outcomes.

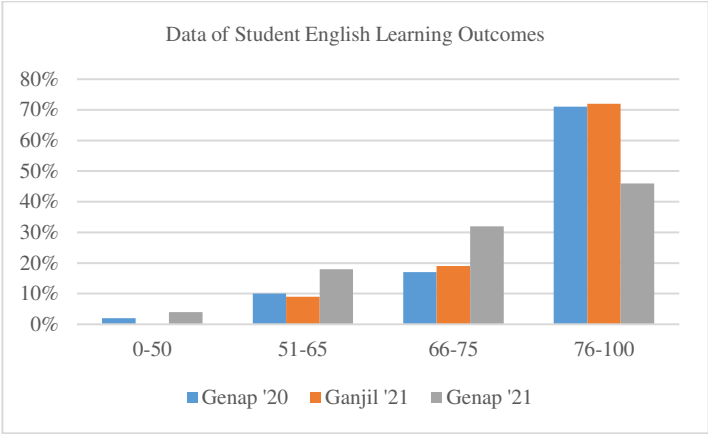


Figure 1. English Learning Results Odd Semester 2020-2021

The pre-observation findings indicate that both teachers and students face challenges in English learning, largely due to ineffective instructional models. While discovery learning has been shown in prior studies to enhance outcomes (Brata et al., 2021; Lyu & Wang, 2018), its application in Bekasi schools has correlated with a decline in student performance. In contrast, studies like Mustikaningrum et al. (2017) highlight the superiority of PjBL in improving learning outcomes. This suggests that while discovery learning may be effective in some contexts, PjBL could offer a more suitable alternative for English instruction in vocational high schools within Bekasi Regency, Indonesia.

Building on these findings and research gaps, this study investigates the comparative effectiveness of PjBL and discovery learning, moderated by students’ intrapersonal intelligence, on English learning outcomes. While previous studies have explored these models independently or in other subject areas (Ertikanto et al., 2018; Syakur et al., 2020), this research is unique in examining both learning models simultaneously in the context of vocational English education. The

study tests four hypotheses: (1) learning outcomes differ between the two models; (2) learning models interact with intrapersonal intelligence; (3) for students with high intrapersonal intelligence, PjBL yields better outcomes; and (4) for students with low intrapersonal intelligence, DL produces more favorable results.

METHOD

Research Design

This research relied on a quantitative approach with a 2x2 design experimental method. The experimental method used was treatment with two sample groups: one experimental group and one control group. In the series of experimental methods in this research, the attribute variable is treated as intrapersonal intelligence, so in its application, this research uses a Treatment by Level design. The treatment plan by level 2 x 2 is presented as follows:

Table 1.
Design Treatment By Level 2 X 2

Intrapersonal Intelligences (B)	Learning Models (A)	
	Project Based Learning	Discovery Learning
High (B1)	A1B1	A1B2
Low (B2)	A1B2	A2B2

Explanations:

- A = Learning Model
- A1 = Project-Based Learning
- A2 = Discovery Learning
- B = Intrapersonal Intelligence
- B1 = High Intrapersonal Intelligence
- B2 = Low Intrapersonal Intelligence
- A1B1 = A group of students with a high level of intrapersonal Intelligence who received instruction through a project-based learning
- A2B1 = A group of students with a high level of intrapersonal Intelligence who received instruction through a discovery learning
- A1B2 = A group of students with a low level of intrapersonal

Intelligence who received instruction through a project-based learning model
A2B2 = A group of students with a low level of intrapersonal Intelligence who received instruction through a discovery learning model

Population and Sample

The study's population was all class XI students at Vocational School “X” in Bekasi Regency, Indonesia, totalling 535 students from 15 classes, with 35 or 36 students in each class. The sample selection in this research applied a purposive sampling technique. Some considerations and sample criteria include: (1) students are in good health and able to support research activities, and (2) students who are taking odd semester learning in class XI.

From the considerations and criteria mentioned above, the total sample collected was 70 students divided into two classes, with 35 students in each class. The determination of high and low intrapersonal Intelligence was based on 27% of students who got the highest and 27% who got the lowest scores. By referring to this percentage, a sample of 10 students with a high limit (high intrapersonal Intelligence) and 10 students with a low limit (low intrapersonal Intelligence) was obtained. Each level (high and low) is divided into two groups according to their level. The sample grouping applying the sampling technique above can be viewed in the table below:

Table 2.
Research Sample

Intrapersonal Intelligences (B)	Learning Models (A)	
	Project Based Learning	Discovery Learning
High	10	10
Low	10	10

Instrument
English Learning Outcomes Test

The English learning outcomes test consists of 40 multiple-choice items developed based on the eleventh-grade odd-semester syllabus, covering topics such as Imperative Sentence, Simple Past Tense, Simple Present Tense, and Present Continuous Tense. The researcher initially drafted the test items following a blueprint that maps core competencies and cognitive indicators. Content validity was established through expert reviews by four specialists: two senior high school English teachers, one curriculum expert, and one learning evaluation expert. These experts assessed the relevance of the material, clarity of wording, and cognitive level appropriateness.

Subsequently, the instrument was pilot-tested on 37 students, and point-biserial correlation analysis was used. The validity criteria of one research instrument item is if $r_{\text{count}} \geq r_{\text{table}}$ is determined by the level of significance and degrees of freedom (df). The significance level is set at $\alpha = 0.05$ with 37 student respondents, $n-2 = 35$, then $r_{\text{table}} = 0.325$. The results of the calculation of the validity test of the English learning outcome variable instrument with 50 multiple-choice questions that were carried out on 37 students, the results obtained are 40 valid questions and 10 dropped questions. Then, the results of calculating the reliability test of the English learning outcome instrument using Alpha Cronbach, obtained a result of $r_{\text{count}} = 0.961$. The reliability value is in the very high category. Thus, it can be concluded that the English learning outcome instrument is reliable. This means that the instrument's reliability is very high/outstanding for use in research.

Intrapersonal Intelligence Questionnaire

The intrapersonal intelligence questionnaire was designed to measure four main dimensions: self-awareness, self-regulation, self-motivation, and metacognition, using a 5-point Likert scale. The questionnaire items were developed based on Gardner and Goleman's theoretical frameworks and then reviewed by two learning technology experts and two educational psychology experts to ensure construct validity and item clarity.

The instrument was pilot-tested on 37 students using Pearson

product-moment correlation analysis. The validity criteria of one research instrument item is if $r_{\text{count}} \geq r_{\text{table}}$ is determined by the level of significance and degrees of freedom (df). The significance level is set at $\alpha = 0.05$ with 37 student respondents, $n-2 = 35$, then $r_{\text{table}} = 0.325$. The results of the calculation of the validity test of the intrapersonal intelligence variable instrument with a total of 40 statement items that have been tested on 37 students, the results obtained are 31 valid items and nine dropped items. Based on the results of calculating the reliability test of the intrapersonal intelligence variable instrument, the result obtained was $r_{\text{count}} = 0.958$. This value is in the very high category. Thus, it can be concluded that the intrapersonal intelligence instrument is reliable. This means the instrument is in the very high/outstanding category for use in research.

Data Collection

This study collected data over eight structured sessions following the teaching module, from July to December 2023, in the odd semester of the 2023/2024 academic year. At the outset, students completed a written pre-test to measure their mastery of English concepts and, simultaneously, filled out a validated questionnaire to assess their level of intrapersonal intelligence. Over the subsequent six face-to-face sessions, the researchers and co-teacher implemented and documented the learning process according to the instructional model. In the final session, students completed a written post-test, identical in format to the pre-test, to quantitatively measure their improvement in material mastery, thereby making learning gains visible.

Table 3.
Data Collection Procedure

Session	Topic	Experimental Class	Control Class
1 (2x40)	Pre-Test	Students form groups and brainstorm the concept for their “Daily English Commands” comic—deciding on a	Students complete the pre-test individually, then gather in small groups to share their challenges and discuss

		title, main character, and overall storyline – before taking a pre-test to assess their initial writing and dialogue-drawing skills.	what they hope to learn in the upcoming lessons.
2 (2x40)	Imperative Sentences	Each group drafts the storyboard for Chapter 1, including at least eight speech balloons filled with imperative sentences (e.g., everyday instructions), then sketches rough panels to visualize their ideas.	The teacher presents several examples of imperative sentences from texts and videos; students work in teams to categorize them by function (commands, requests, advice) and articulate the patterns they observe.
3 (2x40)	Imperative Sentences	Groups refine their Chapter 1 storyboard based on peer feedback, finalize the panel illustrations, and enhance their dialogue with more varied imperatives before sharing a digital draft of their comic for class review.	Students watch two to three short instructional videos, note down recurring imperative structures, and present their findings on sentence formation to the class for discussion.
4 (2x40)	Simple Past Tense	For Chapter 2, each group writes a script about their protagonist's experience using the simple past tense, draws the corresponding panels, and exchanges drafts with another group for peer editing.	Students receive annotated narrative snippets, rearrange the events chronologically, highlight all simple past verbs, and then compare and discuss their classifications in small groups.
5 (2x40)	Simple Present Tense	In Chapter 3, groups design a comic page depicting their characters' daily routine using the simple present tense, complete with illustrative scenes, and	Students observe a classmate's morning routine, record at least five simple present sentences, analyze their grammatical structure, and then collaborate to

		post their finished page on the classroom bulletin board.	deduce the general rule under teacher guidance.
6 (2x40)	Simple Present Tense	Each group creates and sketches a “visual podcast” comic page—an illustrated dialogue recounting their morning activities in simple present tense—and uploads it to the class channel for peer feedback and discussion.	Students play a “sentence scramble” game with mixed-up simple present sentences, reconstruct them correctly, and engage in group discussions to reinforce sentence structure and usage rules.
7 (2x40)	Present Continuous Tense	In Chapter 5, students compile a collage of comic panels showing their character in various ongoing actions, write captions in the present continuous tense for each scene, and showcase their pages in a mini-exhibition as a sneak peek of the final comic.	The teacher acts out different activities while students write descriptive sentences in the present continuous tense for each action; they then switch roles, allowing peers to practice both acting and sentence writing.
8 (2x40)	Post-Test	During the final session, groups assemble and submit the complete comic (Chapters 1–5), present their finished work highlighting all four tenses, and then complete a post-test to measure their progress.	Students take the post-test independently, write a brief reflection on what they discovered about using the four tenses, and engage in a whole-class discussion to solidify their understanding of the uncovered grammar rules.

Data Analysis

The data analysis approach employed is inferential analysis. Inferential analysis aims to draw test conclusions and generalizations from the results of this research. The inferential analysis used includes the normality test, homogeneity of population variation test, two-way

analysis of variance (ANOVA) test (2 x 2) with the F-test at a significance level of 0.05, and further tests applying the Tukey test at a significance level of 0.05. Before inferential analysis, pre-requisite analysis tests must be carried out, including normality and homogeneity tests.

FINDINGS

Analysis Pre-Requirements Test

A normality test was done applying the Shapiro-Wilk test in SPSS version 26. The experiment was carried out on eight distinct sets of data labelled explicitly as A1, A2, B1, B2, A1B1, A1B2, A2B1, and A2B2. The findings of the data normality test are as follows:

Table 4.
Normality Test with the Shapiro-Wilk Test

Data	N	Normality Test Sig. Result	Condition	Inf
AI	20	0.303	Sig. > 0.05	Normal
A2	20	0.773		
B1	20	0.488		
B2	20	0.259		
A1B1	10	0.487		
A1B2	10	0.368		
A2B1	10	0.652		
A2B2	10	0.692		

The homogeneity check was performed using the Levene test in SPSS version 26. The test was done on four data groups: A1 & A2, B1 & B2, A1B1 & A1B2, and A2B1 & A2B2. The findings of the data homogeneity test are as follows:

Table 5.
Homogeneity Test with Levene's Test

Data	N	Homogeneity Test		
		Sig. Result	Condition	Inf.
A1 & A2	40	0.139	Sig. > 0.05	Homogeneous
B1 & B2	40	0.064		Homogeneous
A1B1 & A1B2	20	0.068		Homogeneous

A1B2 & A2B2	20	0.714	Homogeneous
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Hypothesis test

Research hypothesis testing has been carried out by testing the independent variables' main and interaction effects, namely learning models and intrapersonal Intelligence on English learning outcome variables. Hypothesis testing in this study used analysis of variance (ANOVA) with 2 x 2 interactions, then continued with the Tukey test. A summary of the calculation results of the 2 x 2 ANOVA test data analysis can be observed in Table 6.

Table 6.
Two-Way ANOVA Test Results with SPSS ver. 26

Test of Between – Subjects Effects					
Dependent Variable: Hasil Belajar Bahasa Inggris					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1040.275	3	346.758	16.696	.000
Intercept	27615.025	1	27615.025	1329.599	.000
A	216.225	1	216.225	10.411	.003
B	93.025	1	93.025	4.479	.041
A * B	731.025	1	731.025	35.197	.000
Error	747.700	36	20.769		
Total	29403.00	40			
Corrected Total	1787.975	39			
a. R Squared= .582 (Adjusted R Squared= .547)					

Hypothesis 1: Students who receive instruction through the Project-Based Learning (PjBL) model achieve higher English learning outcomes compared to those taught using the Discovery Learning model.

The outputs of the two-way ANOVA assessment specify that students who received the project-based learning model treatment (group A1) had an average score of 28.6. In contrast, students who received the discovery learning model treatment (group A2) had an

average score of 23.95. The calculation results show that the sig. The result is $0.003 < 0.05$. According to these findings, students who utilized the project-based learning model had significantly superior learning outcomes than those who employed the discovery learning approach.

Hypothesis 2: There is an interaction effect between the learning model and intrapersonal intelligence on students' English learning outcomes.

The results of the ANOVA calculation obtained a sig value of $0.000 < 0.05$. The study of English learning outcomes indicates a noteworthy interplay across the project-based learning model, the discovery learning model, and student groups with varying levels of intrapersonal Intelligence.

After testing the hypothesis with ANOVA, a follow-up test was conducted, using the Tukey test to answer the simple effect across A and B.

Table 7.

Summary of Advanced Tests with Tukey's Test

Multiple Comparisons						
Dependent Variable: Hasil Belajar Bahasa Inggris						
Tukey HSD						
(I)Interaksi	(J) Interaksi	Mean Difference (I-J)	Std. Error	Sig.	95% Confident Interval	
					Lower Bound	Upper Bound
A1B1	A2B1	13.20*	2.038	.000	7.71	18.69
A1B2	A2B2	-3.90	2.038	.240	-9.39	1.59
Based on observed means.						
The error term is Mean Square (Error) = 20.769.						
*. The mean difference is significant at the 0.05 level.						

Hypothesis 3: Students with high intrapersonal intelligence who receive instruction through the project-based learning model demonstrate higher English learning outcomes than those who receive instruction through the discovery learning model.

Further testing applying the Tukey test was conducted to determine which is better with the project-based learning and discovery learning models, which possess high intrapersonal

Intelligence. Based on the table above, there is an average difference across A1B1 and A2B1 of 13.20. Furthermore, the significance value for A1B1 and A2B1 is $0.000 < 0.05$ (α). This means that students who received project-based learning model treatment with high intrapersonal Intelligence had more remarkable learning outcomes than students who received discovery learning model treatment with high Intelligence.

Hypothesis 4: Students with low intrapersonal intelligence who receive instruction through the project-based learning model demonstrate lower English learning outcomes than those who receive instruction through the discovery learning model.

Further testing applying the Tukey test was conducted to determine which was much better with the project-based learning and discovery learning models, which had low intrapersonal Intelligence. The table above shows the average difference between A1B1 and A2B1 is -3.90. Furthermore, the significance value for A1B1 and A2B1 is $0.240 > 0.05$ (α). This means students who received the discovery learning model treatment with low intrapersonal Intelligence had better outcomes than those who received the project-based learning model treatment with high Intelligence.

DISCUSSION

Project-Based Learning model (A1) and Discovery Learning Model (A2)

This research found differences in English learning outcomes across the group that used the project-based learning model and the group of students who applied the discovery learning model. The two-way ANOVA test, which obtained a sig value, proves this. The result is $0.003 < 0.05$.

Implementing the project-based learning model is considered to have a more significant influence than the discovery learning model (Mustikaningrum et al., 2017). Project-based learning is authentic learning that answers problems by building a genuine product.

Meanwhile, students must have high cognitive abilities in discovery learning because they must uncover material in an abstract process. However, most students are limited to rational thinking. Project-based learning directly addresses acquiring 21st-century abilities, specifically higher-order thinking abilities, focusing on solving authentic problems, providing motivation for exploration, and encouraging the advancement of higher-order thinking (Zhang & Ma, 2023). The PjBL approach has also been proven to help inexperienced educators' professional and personal growth by providing them various learning opportunities (Moje, 2015).

According to the results of hypothesis testing, it was found that students who received their project-based learning model received more remarkable learning outcomes than students who received their discovery learning model. This is encouraged by research by Hidayati et al. (2023), who stated that technologically enhanced PjBL impacted ESP learning scores and could elevate speaking abilities. Research by Costa-Silva et al. (2018) conducted on dental education students in a project-based course on cell biology showed positive learning outcomes. Furthermore, Rodríguez et al. (2015) research shows the class that received the project-based learning model. Apart from improving technical skills, this model increases student motivation and satisfaction.

Based on the above, PjBL has been shown to produce superior outcomes compared to DL in English language education, primarily because its collaborative framework enhances student engagement (Angraini & Abrar, 2024) and language acquisition (Tumewu et al., 2017); its grounding in social constructivist principles fosters peer scaffolding and shared knowledge construction (Arochman et al., 2024). Its use of authentic, real-world tasks aligns with situated cognition theory to deepen contextual understanding and retention, and its emphasis on learner autonomy and meaningful products boosts intrinsic motivation in line with Self-Determination Theory (Cooper & Kotys-Schwartz, 2022) – all of which translate into measurable gains in English proficiency as evidenced by multiple EFL studies (Zohirovna,

2025).

Based on the findings of this research and supporting evidence from previous studies, it can be concluded that, PjBL consistently outperforms DL in English instruction by engaging students in authentic, collaborative projects that foster higher-order thinking, real-world language use, and sustained motivation, while also enhancing contextual understanding and learner autonomy – all contributing to measurable improvements across all language skills.”

Interaction of Learning Models and Intelligence (AXB)

Based on the sig value, the analysis results show an interaction effect across the learning model and Intelligence with English learning outcomes. The result is $0.000 < 0.05$. Thus, implementing a learning model by looking at student intelligence can elevate learning outcomes.

The outcomes of hypothesis testing align with the conclusions drawn from other investigations conducted by Gunawan et al. (2022), which show that learning models and intelligence influence student learning outcomes, as proved by the sig value. $0.003 < 0.05$. This supports a study by Lastari et al. (2023), where students' learning outcomes when taught utilizing a learning model are positively correlated with Intelligence, as shown by the correlation test results of 0.951.

Improving students' English learning outcomes is always influenced by other variables, either simultaneously or partially. The students' intelligence level always influences the learning outcomes, especially in learning English (Sudjimat et al., 2019). Many things influence student learning outcomes. In this research, two factors can influence them, namely learning models and intrapersonal Intelligence. Research conducted by Gasong and Toding (2020) explained that choosing a suitable learning model can increase students' Intelligence; it was also explained that someone with intrapersonal Intelligence has a severe desire to complete the task.

The findings reveal a clear interaction between instructional

model and students' intrapersonal intelligence, indicating that aligning the learning approach with learners' intelligence profiles significantly enhances English achievement. This concurs with Gunawan et al. (2022) and Lastari et al. (2023), who reported that the effectiveness of a teaching model is moderated by student intelligence. Moreover, as Sudjimat et al. (2019) and Gasong & Toding (2020) emphasize, intrapersonal intelligence drives motivation and persistence and shapes how well students engage with and benefit from different pedagogical strategies. Consequently, educators should tailor their instructional models to optimize English learning outcomes, favoring approaches that resonate with students' self-awareness and reflective capacities.

Project-Based Learning Model (A1) with High Intrapersonal Intelligence (B1) and Discovery Learning Model (A2) with High Intrapersonal Intelligence (B1)

Students with high levels of intrapersonal intelligence who utilize the project-based learning model demonstrate superior English learning outcomes compared to those instructed with the discovery learning approach. This is based on the Tukey test results, showing an average difference between A1B1 and A2B1 of 13.20. Furthermore, the significance value for A1B1 and A2B1 is $0.000 < 0.05 (\alpha)$.

Optimal achievement in English language education necessitates the integrated development of cognitive, psychomotor, and affective domains across the four core competencies of reading, writing, speaking, and listening. Central to this holistic paradigm is learner self-awareness: Abdi & Desfandi (2020) report that metacognitive awareness significantly predicts task performance, while Mulbar et al. (2019) demonstrate that reflective learning strategies substantially enhance overall proficiency. This evidence converges with conceptualizations of intrapersonal intelligence, defined as the capacity to accurately perceive and regulate one's internal states—emotions, motivations, and cognitive processes—which Ingram et al. (2019) associate with strategic study planning and

Ula (2019) links to sustained learner autonomy. Moreover, Wardani et al. (2019) underscore the critical role of instructors in fostering students' self-regulatory skills to identify personal limitations and thereby optimize individual learning trajectories.

In this usage, the project-based learning model is considered to have a more significant influence than the discovery learning model (Mustikaningrum et al., 2017). Project-based learning is authentic learning that answers problems by building a natural product. This aligns with research by Baş & Beyhan (2010), where students educated with project-based learning methods, encouraged by multiple intelligences, are more successful than those educated with traditional language teaching methods.

Students with high intrapersonal intelligence benefit more from PjBL model than DL in English language instruction. PjBL supports self-awareness, motivation, and independent learning—key traits of intrapersonal intelligence—by engaging students in meaningful, authentic tasks. This approach enhances cognitive aspects of language learning and encourages personal reflection and responsibility, aligning with the broader goals of affective and psychomotor development. As such, PjBL is more suitable for optimizing the potential of learners with strong intrapersonal intelligence.

Project-Based Learning Model (A1) with Low Intrapersonal Intelligence (B2) and Discovery Learning Model (A2) with Low Intrapersonal Intelligence (B2)

Based on the results of the Tukey test, students possessing low intrapersonal intelligence who were instructed utilizing the project-based learning model exhibited inferior English learning outcomes compared to the group of students instructed using the discovery learning approach. The Tukey test showed an average difference across A1B1 and A2B1 of -3.90. Furthermore, the significance value for A1B1 and A2B1 is $0.240 > 0.05 (\alpha)$.

A study conducted by Sholikhati et al. (2018) explains that students with low intrapersonal Intelligence can reach two levels in

Bloom's Taxonomy: reading and understanding. Fitriyani (2018) explains in his research that students with low intrapersonal Intelligence can understand, plan, observe, and evaluate problems. However, when preparing problem solutions, they only carry out planning and observation without carrying out evaluations.

In connection with this, teachers who select an inappropriate learning model often cause problems for students with low emotional Intelligence in terms of receiving quality instruction. In this study, the discovery learning model, as opposed to the project-based learning model, produced higher student learning outcomes for students with poor intrapersonal Intelligence. This is so because the DL model is a type of learning focused on developing ideas and information from the experiences that students have had studying (Syawaludin et al., 2022). Through discovery learning, students investigate and manipulate objects at random or maybe through methodical experiments to get information on their own (Ormrod et al., 2017). Someone with a high intrapersonal level will show good metacognitive abilities. Based on research conducted by Junina. Et.al. (2020), it was explained that the discovery learning model improved students' metacognitive abilities. Someone with high intrapersonal Intelligence will show independence in learning and have self-knowledge. This is in line with research conducted by Nusantara. Et.al. (2019), DL helps students construct their knowledge. Furthermore, it is supported by Chase and Abrahamson's (2018) research, which indicates that the discovery learning model facilitates students' comprehension of procedural knowledge and enables them to develop new knowledge under varying circumstances.

DL model is more effective for students with low intrapersonal intelligence than the PjBL model in improving English learning outcomes. This is likely because DL emphasizes exploration and independent discovery, which can help learners build understanding even when self-awareness and reflective abilities are limited. While students with low intrapersonal intelligence may struggle with self-directed tasks in PjBL, the structured yet investigative nature of DL

supports their learning through direct engagement with materials and guided discovery. Therefore, tailoring instructional models to align with students' cognitive and emotional profiles is essential for maximizing their academic potential.

CONCLUSION

Based on the research objectives, the objective of comparing the effectiveness of the PjBL and discovery learning models in English instruction was achieved. Students who experienced PjBL demonstrated higher English proficiency than those who received discovery learning. This finding aligns with the constructivist framework, which emphasizes project-based activities to develop competencies through hands-on experience. Second, in accordance with Gardner's multiple intelligences theory, the interaction between instructional models and intrapersonal intelligence was found to significantly impact learning outcomes. In other words, the effectiveness of a teaching model depends on students' intelligence profiles. Third, the specific objective of examining intrapersonal intelligence revealed that students with high intrapersonal intelligence achieved better learning outcomes under the PjBL model than under discovery learning. This result supports the self-regulated learning concept, as intrapersonal intelligence facilitates planning and self-reflection in project-based contexts. Fourth, the finding that students with low intrapersonal intelligence performed worse under PjBL than under discovery learning suggests the need to adjust scaffolding strategies within PjBL to accommodate varied levels of intrapersonal intelligence. Overall, this study confirms the initial research objectives and provides empirical support for the constructivist framework and multiple intelligences theory in the context of English instruction at vocational schools.

The implication is that PjBL model is recommended for English language learning. It is suitable for maintaining student groups with high intrapersonal Intelligence. In maintaining student groups with low intrapersonal intelligence, the discovery learning model is suitable

for implementation, in addition, The Ministry of Education and the curriculum development team must consider intrapersonal and interpersonal emotional intelligence aspects in learning policies. Researchers in this study are aware of the many limitations and shortcomings in this research. This research must significantly elevate how each learning model's significance level can be calculated. This research uses intrapersonal intelligence as a control variable so that future researchers are projected to be capable of discussing linguistic intelligence attached to language or other factors that influence learning outcomes.

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DECLARATION OF AI AND AI-ASSISTED TECHNOLOGIES

We confirm that this article was not created with the help of GEN AI. The applications used to make the article were only SPSS for data analysis and Grammarly Premium for independently proofreading English.

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