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The Influence of Project-Based Learning (PBL) and Motivation on Correspondence Learning Outcomes By Controlling Linguistic Intelligence

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Abstract

This research aims to ascertain (1) differences in correspondence learning outcomes for students taught with project-based learning (PBL) and those taught with the direct instruction (DI) model with controlling linguistic intelligence, (2) the influence of the interaction between the learning model and motivation study of students' correspondence learning outcomes by controlling linguistic intelligence, (3) differences in correspondence learning outcomes of students with high learning motivation taught with PBL and those taught with DI by controlling linguistic intelligence, and (4) differences in correspondence learning outcomes of students with low learning motivation who studied with PBL and those studied with DI by controlling linguistic intelligence. This research method employed a quasi-experiment with a 2 x 2 factorial design. The research sample for this study consisted of 68 students enrolled in the Department of Office Administration, specifically those taking Correspondence Subjects. The selection of participants was conducted through a random sampling method. The data analysis technique used two-way ANOVA at a significant level of $\alpha = 0.05$. The study's findings demonstrated that (1) students instructed using PBL achieved higher correspondence learning outcomes than students taught using the DI model while controlling linguistic intelligence. (2) An interaction effect was observed between learning models and learning motivation on correspondence learning outcomes by controlling linguistic intelligence. (3) The learning outcomes of students with high learning motivation who studied with PBL were higher than students who studied with DI by controlling linguistic intelligence. Also, (4) the learning outcomes of students with low learning motivation taught with DI were higher than those taught with PBL by controlling linguistic intelligence. The results of this research denote that it is essential to adjust the learning model in Correspondence Subjects by considering students' learning motivation.

Keywords
Project-based Learning;
Learning Motivation;
Direct Instruction;
Linguistic Intelligence

I. Introduction

Education in Indonesia is an ongoing endeavor to enhance students' competency. Through the learning process, students are anticipated to develop diverse abilities and information that would benefit their future lives [1]. However, the endeavors undertaken by the Indonesian state to enhance the quality of education have yet to be entirely successful in attaining the anticipated outcomes. Numerous attempts have been initiated, comprising enhancements to infrastructure, curriculum development, and the elevation of teacher professionalism via certification initiatives. Nevertheless, it is noteworthy that student learning outcomes have yet to reach their ideal level.

The United Nations Development Program (UNDP) in 2020 revealed that Indonesia's Human Development Index (HDI) data was 0.718; of 184 countries (on a scale of 0 to 1), Indonesia was ranked 105th. Furthermore, in 2021, its HDI was 0.75, ranking 111th compared to other countries in 2021. Indonesia's HDI ranking and value were still below the world average and the ranking of ASEAN countries (Singapore, Brunei, Malaysia, and Thailand) [2]. On the other hand, based on the results of field observations in 2020, 35% of students still need to reach the Minimum Completeness Criteria of 70. Teachers still dominated learning, where teachers explained, and students listened (teacher-centered) [3]. Teacher-centered learning was made worse by the results of the North Sumatra Teacher Competency Test (UKG), ranked 34th, with an average score of 48.96. This value was below the KKM set by the government of 55.5 [4].

The abovementioned facts highlight various Indonesian education system issues requiring prompt attention and resolution. Enhancements within the education sector might be targeted towards several facets, encompassing elements such as school infrastructure, instructor competence, student circumstances, and other variables that impact acquiring knowledge. In this research, one of the efforts to improve education is discussed, i.e., by implementing learning models.

Most existing research primarily focuses on investigating the impact of project-based learning (PBL) on factors such as learning motivation, creativity, and outcomes. The PBL paradigm offers students valuable opportunities to enhance their curiosity and creativity, ultimately improving their learning outcomes [5]. According to previous research, implementing the PBL model has positively impacted student motivation and learning outcomes [6]. The difference lies in that this research aims to investigate the impact of learning models on the correspondence learning outcomes of students with diverse learning motivations. In addition, this study included a control variable about linguistic intelligence.

Correspondence learning at the vocational high school level aims to impart the skills necessary for effective written communication through letter writing. The final goal is for students to proficiently compose letters of diverse genres, including personal, official, and commercial, with accuracy. A crucial element in letter writing is the aptitude to effectively organize words to convey ideas and thoughts to the intended recipient. This proficiency is significantly influenced by linguistic intelligence.

Linguistic intelligence facilitates students' comprehension of the contextual and purposive aspects inherent in their written correspondence. For instance, a personal letter is distinct from an official or business letter. Linguistic intelligence helps the ability of students to discern these distinctions and adapt their writing style correspondingly. Linguistic intelligence also allows students to understand better the meaning of words and their appropriate use in a particular context. Arranging words into coherent and impactful sentences is crucial to written communication. Students with solid linguistic intelligence are likelier to demonstrate proficiency in creating sentences characterized by clarity, conciseness, and comprehensibility, enhancing the recipient's ease of understanding the letter's content. One of the principal objectives of correspondence is to articulate and express thoughts and ideas effectively. Moreover, linguistic intelligence facilitates the ability of students to effectively organize and structure words in a manner that ensures clear comprehension of the intended message by the audience of the written communication.

Linguistic intelligence has been identified as a contributing factor to effectively arranging words into engaging sentences to convey a message to the reader of a letter [7]. In the present study, linguistic intelligence was used as a control variable. The researchers

want to ascertain that the correspondence learning outcomes of students are primarily attributable to the impact of the implemented learning model rather than being solely influenced by their high linguistic intelligence.

Based on the phenomena and research gaps discussed above, the following research problems can be formulated:

1. Is there a difference in the correspondence learning outcomes of the students taught with the PBL strategy compared to those acquainted with the DI strategy after controlling for linguistic intelligence?
2. After controlling linguistic intelligence, is there an interaction effect between learning strategy and motivation on students' correspondence learning outcomes?
3. Is there a difference in the correspondence learning outcomes of students with high learning motivation taught using the PBL strategy with those taught using the DI strategy after controlling linguistic intelligence?
4. Is there a difference in the correspondence learning outcomes of students with low learning motivation taught using the PBL strategy and those taught using the DI strategy after controlling linguistic intelligence?

II. Research Methods

This type of research is quasi-experimental, a research approach used when the researcher does not have complete control over the independent variables or cannot randomly assign subjects into a treatment group and a control group as in an actual experiment. This research carried out treatment in existing classes without changing the initial situation and conditions of the course [8]. By controlling students' linguistic intelligence, this study seeks to determine whether learning models and motivation affect correspondence learning outcomes.

This research method used a quasi-experiment with a 2 x 2 factorial design. The research sample in this study was 68 Department of Office Administration students at SMK Negeri 7 Medan who were taking Correspondence Subjects and were chosen randomly. While the experimental class applied PBL, the control class used direct instruction (DI). Correspondence learning outcomes data were collected using correspondence learning outcomes tests, learning motivation data were obtained using questionnaires, and linguistic intelligence data were gathered using linguistic intelligence tests. The data analysis technique then employed two-way ANAKOVA at a significant level of $\alpha = 0.05$. In addition, validity, reliability, normality, homogeneity, regression linearity, significance of regression influence, line parallelism tests, and inferential analyses were carried out.

III. Results and Discussion

The main effect of the independent variable was measured through hypothesis testing. The PBL and DI models were tested to determine whether there was an interaction between the learning model and learning motivation on correspondence learning outcomes. The two-way ANACOVA test was utilized in this study. The results of calculations with ANAKOVA can be seen as follows

Table 1. Summary of hypothesis testing with ANAKOVA

Sources of Variance	Jkyres	db	RJKyres	Fo	F-table
Between A	44.981	1	44.98	**5.817**	3.993
Between B	41.903	1	41.90	**5.419**	3.993
AxB interactions	329.101	1	329.10	**42.562**	3.993
A(X)	133.218	1	133.22	**17.229**	3.993
Within	487.130	63	7.73	-	-
Total	903.115	66	-	-	-

The covariate analysis calculations (Table 1) demonstrated that at the source of the AxB interaction variance, there was a significant interaction between the learning model and learning motivation, with F-count = 42.562, which was more critical than F-table = 3.993. As a result, Tukey's test could be performed, and the results are presented in Table 2.

Table 2. Summary of further tests using the Tukey test

Criteria	Hypothesis	Q_{count}	Q_{table}	Decision
H_0 is rejected if $Q_h > Q_t$.	$H_0: \mu_{11} = \mu_{21}$ $H_1: \mu_{11} > \mu_{21}$	9.04	3.701	H_0 is rejected.
H_0 is accepted if $Q_h < Q_t$.	$H_0: \mu_{12} = \mu_{22}$ $H_1: \mu_{12} < \mu_{22}$	4.15	3.701	H_0 is rejected.

Table 3. Average residue test calculation results

No.	Group	$\bar{Y}$	$\bar{Y}$ (corrected)
1	A_1	81.4	81.17
2	A_2	79.3	79.52
3	B_1	81.2	81.13
4	B_2	79.5	79.56
5	A_1B_1	84.7	84.18
6	A_1B_2	78.1	78.16
7	A_2B_1	77.7	78.08
8	A_2B_2	80.9	80.96

The findings derived from the ANAKOVA calculations revealed a statistically significant disparity in the correspondence learning outcomes of students exposed to the PBL model compared to those exposed to the DI model while accounting for the influence of linguistic intelligence. More specifically, the research results showed that students who engaged in learning using the PBL model had superior correspondence learning outcomes than those who utilized the DI model. This difference in learning outcomes persisted even after controlling characteristics related to linguistic intelligence.

The utilization of the PBL model in correspondence learning has promising prospects. PBL has been found to provide students with a more comprehensive and cooperative learning approach, focusing on problem-solving skills. Consequently, this instructional method has been associated with improved learning outcomes [9] [10] [11]. The findings of this study also denote that the inclusion of linguistic intelligence characteristics remains the same conclusion that the PBL model was more successful than the DI model in enhancing correspondence learning outcomes. The proposition posits that

the efficacy of PBL is contingent upon students' linguistic intelligence and the specific learning model employed.

From this research, it was observed that there were substantial differences in correspondence learning outcomes between the two groups of students after controlling linguistic intelligence. The study's findings revealed that students who engaged in learning activities utilizing the PBL model had superior learning outcomes to their counterparts exposed to the DI model. The results imply the effectiveness of the PBL model in improving student learning outcomes in correspondence learning [12].

In the analysis performed, it was uncovered that there was a significant interaction effect between two variables, namely learning model (A) and motivation (B), on correspondence learning outcomes by controlling the linguistic intelligence variable. This means that the influence of correspondence learning outcomes was influenced by one variable and the interaction between the learning model and student motivation

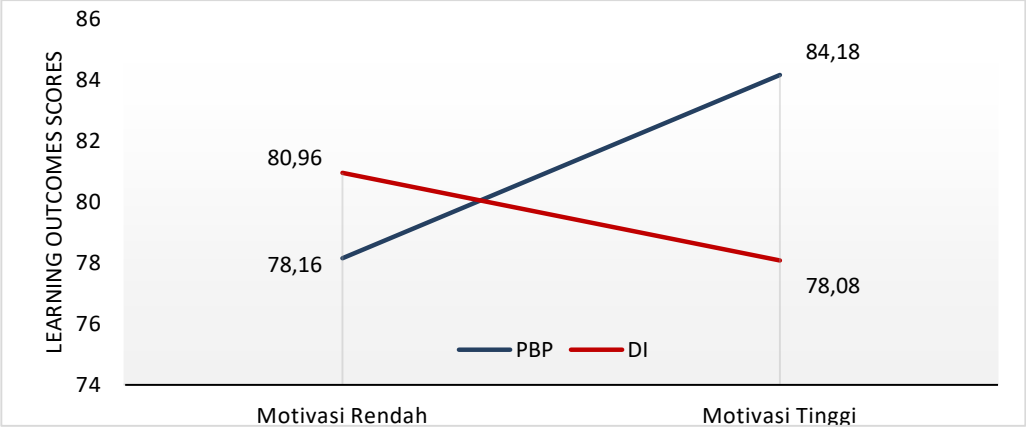

Figure 1. *The interaction of learning strategies and learning motivation on correspondence learning outcomes*

The figure above depicts the interaction between the learning model choice and motivation. To improve correspondence learning outcomes for students with high motivation, it is more appropriate if learning is carried out using the PBL learning model, and students with low motivation are more suitable when learning using DI.

The results of this analysis suggest that the influence on correspondence learning outcomes could not be reduced to a direct impact from the learning model or motivation alone. Instead, it is crucial to consider the interaction between these two variables. The learning model students use is essential in learning outcomes [13]. This may include teaching methods, learning approaches, or techniques teachers or educational institutions use.

The level of student motivation also plays a role in student learning outcomes [14]. More motivated students tend to achieve better learning outcomes [15]. This motivation can come from numerous factors, such as interest in the subject matter, encouragement to perform, or environmental support.

The results of this analysis also explain that linguistic intelligence is considered a control variable. This means that the effect of linguistic intelligence has been eliminated or controlled in this analysis to understand further the influence of the interaction between the learning model and motivation on correspondence learning outcomes.

The findings of this research have vital implications in the educational context. Teachers and educational institutions can use them to design more effective teaching models, increase student motivation, or even consider diverse learning methods to

accommodate students' differences. The interaction between learning models and inspiration in influencing correspondence learning outcomes is a significant step in improving education and helping students reach their maximum potential.

Interpretation of the Tukey test results revealed differences in correspondence learning outcomes between two groups of students, i.e., the group using the PBL model with high learning motivation (A1B1) and the group using the DI model with high learning motivation (A2B1) by controlling the linguistic intelligence variable.

The Tukey test results stated significant differences in correspondence learning outcomes between the two groups of students. This indicates that learning models and learning motivation had different impacts on student achievement of learning outcomes. The PBL model might be more effective in improving student learning outcomes than the DI model in specific contexts. This can be valuable information for teachers and educational institutions to choose the teaching method that best suits their learning goals.

This statement underlines the importance of high learning motivation in students. Increased motivation can influence students' learning behavior and encourage them to achieve better results [16]. Intrinsic motivation, namely motivation that comes from within the student, can be more sustainable than providing extrinsic motivation.

The cause of high motivation in students is their satisfaction when they complete a project [17]. This feeling of happiness can guarantee the trigger of stronger intrinsic motivation in the learning process [18]. The statement also notes that inherent reason can influence student learning outcomes [19]. When students feel satisfaction in learning, they tend to be more enthusiastic about achieving their academic goals and objectives.

The ramifications of these findings are significant for the field of instructional design. Educators and academic institutions have the potential to foster student motivation via the implementation of instructional frameworks that engender a feeling of fulfillment and allow students to engage in projects or assignments aligned with their interests. This can assist educators in selecting more efficacious instructional models and establishing a conducive learning milieu that fosters student motivation and facilitates the attainment of enhanced educational results.

Motivation to learn is essential in the learning process [20]. Understanding learning motivation is a critical factor in achieving good learning outcomes [21]. Each student has a different level of learning motivation. As educators, teachers must know that learning motivation varies from student to student [22]. Therefore, the appropriate approach must be tailored to each student's needs and level of learning motivation. Understanding the complexity of learning motivation and how it influences student learning outcomes is crucial in designing compelling learning experiences. It also helps ensure that every student has a fair opportunity to reach their potential in learning.

Tukey test results uncovered differences in correspondence learning outcomes between the two compared groups of students. In this case, differences could be observed between students with low motivation who were taught with the PBL model (A1B2) and students with low motivation who were prepared with the DI model (A2B2) by controlling the linguistic intelligence variable.

The DI model is usually used to deliver learning material related to declarative and procedural knowledge [23]. It includes factual information and skills that students must master. The material is provided in a structured, sequential activity pattern with clear steps. In this case, the teacher acts as an instructor who instructs students. This model also emphasizes understanding and mastery of concepts before students move to higher levels of problem-solving [24]. Students usually receive strict teacher guidance and are expected to follow instructions carefully.

Meanwhile, the PBL model is vastly different, emphasizing more active and exploratory learning. Teachers facilitate students to solve real project problems [25]. Students are given complex and challenging assignments in projects or challenges that involve problem-solving, investigation, collaboration, and decision-making. Students are also actively involved in designing their learning activities, research, and producing natural products due to their learning [26]. This PBL model also gives students the freedom to explore topics and explore them in more depth [27]. In this regard, the teacher is a facilitator who supports and directs the learning process [28].

This study found that students with low learning motivation experienced difficulties acquiring knowledge using the PBL model, particularly in correspondence learning. Selecting an appropriate instructional approach for students exhibiting low motivation levels is a prudent decision, and using the DI model is a viable solution to addressing this issue. This is because DI offers students explicit and organized guidelines. This approach can assist students who may experience uncertainty or disorientation while engaging in correspondence with a more inquiry-based instructional method, such as PBL.

DI is suitable for understanding the basic concepts needed in correspondence. Students with low motivation may need to understand the basic concepts before they feel comfortable creating words. For this reason, it can help students master essential skills in correspondence, such as correct grammar and proper vocabulary [29] [30]. These results can also be the basis for educators to evaluate the effectiveness of specific learning models in overcoming the challenges faced by students with low motivation. By understanding the relationship between learning models, inspiration, and learning outcomes, teachers can make better decisions in designing learning experiences following the needs and characteristics of their students.

Discussion

This discovery suggests that PBL might be a viable option for fostering student learning when students are strongly inclined toward education. It is important to remember that no learning approach can be universally applicable to all individuals. Hence, creating a successful educational encounter for students with diverse degrees of motivation is a considerable difficulty, necessitating the adoption of distinct strategies tailored to individual students.

This study's results have implications for creating more effective learning programs, particularly correspondence learning. Furthermore, additional research can be conducted to investigate other factors that may influence learning outcomes when using specific learning models.

This finding also shows complexity in understanding the factors that influence learning outcomes. Consequently, additional analysis or further research is required to know how the learning model and motivation interact and how these factors can be managed or improved to improve correspondence learning outcomes.

Further, it is vital to consider the interplay of learning models, learning motivation, and correspondence learning outcomes. It is crucial to assess individual needs while building learning experiences. One potentially efficacious strategy involves integrating components from both models, considering students' motivation levels and individualized needs. Consequently, the educator should possess the ability to provide an educational setting that fosters exceptional academic performance among all students, irrespective of their levels of motivation.

IV. Conclusion

Correspondence learning outcomes in groups of students taught with PBL were higher than those prepared with DI by controlling linguistic intelligence variables. Thus, applying the PBL model can significantly increase students' understanding and achievement in Correspondence Subjects, regardless of their linguistic intelligence level.

There was an influence of interaction between learning strategy and learning motivation on correspondence learning outcomes after controlling linguistic intelligence. In other words, the effectiveness of the PBL or DI models can be influenced by the level of student motivation.

Correspondence learning outcomes in groups of students with high learning motivation taught with PBL were higher than those acquainted with the DI model after controlling the linguistic intelligence variable.

Correspondence learning outcomes of students with low learning motivation taught with PBL models were lower compared to student learning outcomes introduced with the DI model after controlling linguistic intelligence.

References

[1] S. A. Octavia, Model-model pembelajaran. Deepublish, 2020.

[2] T. G. Economy.com, “Human Development_Country Ranking.” 2021.

[3] I. S. Nasution and E. S. Siregar, “Implementasi Pendekatan TPACK (Technological Pedagogical Content Knowledge) Bagi Guru SD Muhammadiyah 12 Medan,” Ihsan J. Pengabdi. Masy., vol. 3, no. 2, pp. 206–212, 2021.

[4] Kemdikbud, “Pengumuman Hasil UKG 2015.” Kemdikbud, 2015.

[5] J.-C. Tu, T.-Y. Lo, and X.-Y. Zhang, "Applying the ATDE-based model of teaching creativity to the improvement of students' learning in a design practice course," Think. Ski. Creat., vol. 48, p. 101293, 2023.

[6] E. Jääskä, J. Lehtinen, J. Kujala, and O. Kauppila, “Game-based learning and students’ motivation in project management education,” Proj. Leadersh. Soc., vol. 3, p. 100055, 2022.

[7] R. Matussolikhah and B. Rosy, “Pengaruh Disiplin Belajar dan Gaya Belajar terhadap Hasil Belajar Siswa dalam Pembelajaran Daring di Masa Pandemi Covid-19,” Prima Magistra J. Ilm. Kependidikan, vol. 2, no. 2, pp. 225–236, 2021.

[8] M. Gopalan, K. Rosinger, and J. Bin Ahn, “Use of quasi-experimental research designs in education research: Growth, promise, and challenges,” Rev. Res. Educ., vol. 44, no. 1, pp. 218–243, 2020.

[9] L. Zhang and Y. Ma, “A study of the impact of project-based learning on student learning effects: A meta-analysis study,” Front. Psychol., vol. 14, 2023.

[10] A. K. A. Faozi, M. Fatekurohman, K. Aini, and D. Yuniar, “Student’s problem-solving abilities in project-based learning (pjbl) based on learning community (lc),” in Journal of Physics: Conference Series, 2020, vol. 1538, no. 1, p. 12070.

[11] Y. Zhao and L. Wang, “A case study of student development across project-based learning units in middle school chemistry,” Discip. Interdiscip. Sci. Educ. Res., vol. 4, no. 1, pp. 1–20, 2022.

[12] N. O. Argawati and L. Suryani, “PROJECT-BASED LEARNING IN TEACHING WRITING: THE IMPLEMENTATION AND STUDENTS’ OPINION,” English Rev. J. English Educ., vol. 8, no. 2, pp. 219–226, 2020.

[13] A. M. Abidin, “Kreativitas Guru Menggunakan Model Pembelajaran Dalam Meningkatkan Hasil Belajar Siswa,” Didakt. J. Kependidikan, vol. 11, no. 2, pp. 225–238, 2019.
[14] R. Steinmayr, A. F. Weidinger, M. Schwinger, and B. Spinath, “The importance of students’ motivation for their academic achievement–replicating and extending previous findings,” Front. Psychol., vol. 10, p. 1730, 2019.
[15] M. K. Tokan and M. M. Imakulata, “The effect of motivation and learning behaviour on student achievement,” South African J. Educ., vol. 39, no. 1, 2019.
[16] M. Borah, “Motivation in learning,” J. Crit. Rev., vol. 8, no. 2, pp. 550–552, 2021.
[17] J. S. Bureau, J. L. Howard, J. X. Y. Chong, and F. Guay, “Pathways to student motivation: A meta-analysis of antecedents of autonomous and controlled motivations,” Rev. Educ. Res., vol. 92, no. 1, pp. 46–72, 2022.
[18] R. M. Ryan and E. L. Deci, “Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions,” Contemp. Educ. Psychol., vol. 61, p. 101860, 2020.
[19] E. Stark, “Examining the role of motivation and learning strategies in student success in online versus face-to-face courses.” Online Learn., vol. 23, no. 3, pp. 234–251, 2019.
[20] F. Ainurrohmah and R. Handayani, “The influence of motivation, learning discipline, teacher competence and parental support on academic achievement of students (study on gama English course Sukoharjo),” Int. J. Econ. Bus. Account. Res., vol. 4, no. 4, 2020.
[21] N. R. Irkinovich, “Ways To Increase Motivation To Study Foreign Language In A Non-Language University,” in E-Conference Globe, 2021, pp. 179–180.
[22] W. Chen, “Understanding students’ motivation in L2 collaborative writing,” ELT J., vol. 75, no. 4, pp. 442–450, 2021.
[23] E. Ria, A. Abbas, and M. Hasyim, “Efektivitas Model Direct Instruction dalam Meningkatkan Kemampuan Siswa SMA Negeri 1 Batauga Memahami Nilai dalam Folklore Wandiudiu,” J. Ilmu Budaya, vol. 8, no. 1, pp. 159–171, 2020.
[24] A. Arifin, “Implementasi Model Pembelajaran Pengajaran Langsung untuk Meningkatkan Hasil Belajar Siswa pada Pembelajaran PJOK Materi Gerak Spesifik Permainan Bola Basket di Kelas VII-G Semester 1 SMPN 1 Bolo Tahun Pelajaran 2022/2023,” J. Pendidik. dan Pembelajaran Indones., vol. 3, no. 1, pp. 69–82, 2023.
[25] R. Simbolon and H. D. Koeswanti, “Comparison of Pbl (Project Based Learning) models with Pbl (Problem-Based Learning) models to determine student learning outcomes and motivation,” Int. J. Elem. Educ., vol. 4, no. 4, pp. 519–529, 2020.
[26] T. T. Bui et al., “Application of Project-based Learning for Primary Teachers-A New Direction in Professional Training at Pedagogical Universities and Colleges in Vietnam,” Int. J. Psychosoc. Rehabil., vol. 24, no. 4, pp. 7169–7179, 2020.
[27] Y. N. Nafiah and W. Suyanto, “Penerapan model problem-based learning untuk meningkatkan keterampilan berpikir kritis dan hasil belajar siswa,” J. Pendidik. Vokasi, vol. 4, no. 1, 2014.
[28] P. D. Anggraini and S. S. Wulandari, “Analisis penggunaan model pembelajaran project based learning dalam peningkatan keaktifan siswa,” J. Pendidik. Adm. Perkantoran, vol. 9, no. 2, pp. 292–299, 2021.
[29] J. McQuillan, “Where do we get our academic vocabulary? Comparing the efficiency of direct instruction and free voluntary reading,” Read. Matrix An Int. Online J., vol. 19, no. 1, pp. 129–138, 2019.
[30] İ. İlter, “The efficacy of context clue strategy instruction on middle grades students’ vocabulary development,” Rmle Online, vol. 42, no. 1, pp. 1–15, 2019.