International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

The Effect of Project Based Learning Model on Literacy and Numeracy Skills of Grade Five Students at Pineleng Public Elementary School

Elisabeth R. Lantang[1] , Deitje A. Katuuk[2] , Norma N. Monigir[3]

[1,2,3] Program Studi Pendidikan Guru Sekolah Dasar S2 – Universitas Negeri Manado
elisabethlantang11@gmail.com [1], deitjekatuuk@unima.ac.id [2], non_modigir@unima.ac.id [3]
DOI: https://doi.org/10.55248/gengpi.5.0524.1392

ABSTRACT

This research aims to analyse whether there is an effect of Project Based Learning (PjBL) model on Literacy and Numeracy skills of grade five students at Pineleng Public Elementary School. This type of research is quantitative with True Experimental Design in the form of Pretest-Posttest Control Group Design. The samples taken were 22 VA class students as the experimental class and 22 VB class students as the control class. Data collection techniques using tests and non-tests then the data obtained were analysed using hypothesis test I and hypothesis test II using the t test. The results of the research obtained the average posttest value of the experimental class is higher, namely in class VA of 88.18 for Literacy scores and 86.13 for Numeracy scores while the average posttest value of the control class is in class VB of 82.72 for Literacy scores and 82.04 for Numeracy scores. Based on the data analysis, the findings of this research indicate that the Project Based Learning (PjBL) model is effective on students' Literacy and Numeracy skills on the material of writing invitation letters in Indonesian language lessons and Building Space material in mathematics lessons in grade five Pineleng Elementary School. Based on the findings of this research, the Project Based Learning (PjBL) model should be applied and can create an active and innovative learning process.

Keywords: Project Based Learning (PjBL) Model, Literacy, Numeracy

INTRODUCTION

Education is a primary need for all people who want to change their lives. According to (Mangangantung et al., 2023) Good interaction between teachers, students, and learning resources is necessary. School components consist of principals, teachers, facilities, culture, and environment. Each component has a different role in implementing the curriculum (Katuuk, 2014). Therefore, every potential and existing resource must be managed thoroughly and integratedly to support curriculum implementation management. Quality learning is highly dependent on teacher creativity and student motivation. Therefore, the role of teachers is very important in planning and organizing learning. As a learning designer, teachers must be able to apply appropriate, interesting, and effective learning models to improve student learning outcomes (Arifin & Hakim, 2021). In fact, the problem identified in the education report card of Pineleng Public Elementary School is that literacy and numeracy skills are still not optimal. Therefore, strategies are needed to improve literacy and numeracy skills, such as the use of project-based learning.
The PjBL model is a Project Based Learning model that is student-centered and places the teacher as an effective facilitator in contextual learning related to real-life situations. Teachers can manage learning activities in the classroom through project work and emphasize students' efforts to produce products, which are the implementation of research skills, analyze, create, and present products from ideas that have been learned in real-world situations (Irman & Waskito, 2020). This is supported by Fitri et al. (2018), which states that the Project Based Learning (PjBL) model requires students to actively participate in solving problems and developing ideas that can be turned into products after project activities (Mayuni et al., 2019).

Project learning can encourage children to participate and have an impact on their environment (Nurhadiyati et al., 2021). The child must work alone to solve the problem, even if it is a task that he or she will complete alone. In addition, this model has the potential to improve children's cognitive abilities, their interest in learning, their skills of working together in groups, and their creativity (Ayuningsih et al., 2022). According to Abidin in (Cahyadi et al., 2019), one of the advantages of the Project Based Learning (PjBL) model is that it requires students to be more creative in various ways, such as thinking creatively, solving problems, making decisions, and making decisions. In addition, the Project Based Learning

(PjBL) model has the potential to increase students' self-confidence. According to Hartono & Asiyah (2019), the Project Based Learning (PjBL) model has several advantages: first, it makes students creative and able to solve learning problems; second, it encourages students to learn about project creation; third, it increases collaboration, because students have to work together to create a fun group atmosphere; and fourth, it fosters honest, conscientious behavior, this can certainly support the improvement of students' literacy and numeracy skills.
Literacy and numeracy are basic skills that are very important in everyday life. Literacy refers to a person's ability to read, write and comprehend written text or the ability that is expected to be achieved in Indonesian language learning. Indonesian language learning is very important to form habits (Monigir, 2022). Literacy is a person's ability to read, write, perceive, design and think critically so that they can communicate effectively and create meaning for their world (Kharizmi, 2015).

While numeracy refers to one's skill to understand, use and manipulate numbers. In addition, according to (Alberta Government, 2013), numeracy is the ability, confidence and desire to engage with quantitative or spatial information that is useful for making informed decisions in all aspects of daily life. These numeracy skills can help students understand and master more subjects.
Literacy numeracy is defined by the Ministry of Education and Culture (Kemeterian Pendidikan dan Kebudayaan, 2017) as the knowledge and skills to use various types of numbers and symbols related to basic mathematics to solve problems practically in various situations of daily life, and have the ability to analyze data presented in various graphical forms, tables, diagrams, and charts. The results of the analysis can also be used to make predictions, draw conclusions, and make decisions in certain situations.

Literacy and numeracy skills are needed by students to be able to solve problems that are unstructured, do not have a complete solution, irrelevant, and cannot be calculated mathematically. With literacy and numeracy skills, students can connect and interpret events using mathematical concepts (Prenzel et al., 2015). In modern life, literacy and numeracy are essential as almost all aspects of life require these skills. This includes understanding doctor's instructions, reading food labels, or managing personal finances.

The results of observations made on grade five students at Pineleng Public Elementary School show that the teacher has applied an inappropriate learning model, which causes students to lack in literacy and numeracy. The learning model used by teachers does not involve students actively in the learning process. Learning is focussed solely on the teacher and students only passively receive the material. Students are also easily bored with this learning model because the questions given by the teacher at the end of the lesson are not evaluated first according to their level of difficulty.

As shown by students' learning outcomes, students' literacy skills in Bahasa Indonesia Theme 7 Subtheme 3 Learning 1 about writing invitation letters and numeracy skills in Mathematics Building Space Materials are still lacking. Project Based Learning helps students improve their critical thinking skills and learn problem solving concepts. The Project Based Learning (PjBL) model teaches students to discover, analyse, creatively solve problems, and complete projects. The results of research related to the application of the Project Based Learning (PjBL) model were conducted by Pangkey et al. (2023) that the Project Based Learning (PjBL) model can improve IPAS learning outcomes in grade five of GMIM 4 Tomohon Elementary School.

METHOD

This research is considered to be quantitative research. This type of research is known as experimental research, and its purpose is to determine the causal effect between two phenomena (Jakni, 2016). The method used in this research is pre-experimental design or commonly referred to as pre-experiment. The design used in the pre-experiment method is One Group Pretest-Posttest Design.
The subjects in this research were all grade five students at Pineleng State Elementary School consisting of two classes, namely class V A with 22 students and class V B with 22 students, where class V A became the experimental class and class V B became the control class. The independent variable in this research is the Project Based Learning (PjBL) model (variable x), which affects or causes the dependent variable. The dependent variables in this research are literacy (variable Y1) and numeracy (variable Y2).

Tests and non-tests are the tools used in this research. The created grids became the basis for developing the instruments that the researcher would use. This research used descriptive statistical analysis to analyse the data. Normality, homogeneity, and hypothesis tests were used for data analysis. To test the research hypothesis, the researcher used the parametric statistical test t-test.

RESULTS AND DISCUSSION

Normality test to determine whether the data distribution of each variable is normal. The post-test scores of students in the experimental and control classes were used to conduct this test with the help of the SPSS computer programme using the Kolmogrov-Smirnov formula. The result of the normality test of students' literacy skills was 0.67 > 0.05. This indicates that the data is normally distributed. In addition, the results of the

normality test conducted on students' numeracy skills concept understanding show that the probability value of students' numeracy skills is 0.791 > 0.05, which indicates that the data on the mathematical numeracy skills variable is normally distributed.
Homogeneity test was conducted to ensure homogeneous research data. The post-test scores of students in the experimental and control classes were used to test homogeneity. This test was conducted using the SPSS version 29.0 programme. The homogeneity test for grade five students' literacy skills data showed a significance value (Sig.) of 0.064 > 0.05, it can be concluded that the variance of grade five students' literacy skills data is equal or homogeneous. Furthermore, based on the calculation results, the homogeneity test on the numeracy skills of grade five students found that the significance value (Sig.) was 0.058 > 0.05, it can be concluded that the data variance in the homogeneity test is the same or homogeneous.

After the prerequisite test was carried out, descriptive analysis was then carried out. Literacy pretest data has a sample that is 22 with a total number that is 1420, and has an average value that is 64.54, median 64.54, mode is 65, minimum value is 50, and for maximum value is 80. Furthermore, posttest literacy data has a total number 1940, average value 88.18, median 88.18, mode 95, minimum value 75, and maximum value is 100. While the numeracy pretest data from 22 samples has a total number 1160, an average value is 52.72, the median is 52.72, the mode is 50, the minimum value is 35, and for the maximum value is 70. While the numeracy posttest data has a total number 1895, an average value is 86.13, the median value is 86.13, the mode is 85, the minimum value is 75, and for the maximum value is 95.
After the descriptive analysis, then hypothesis testing was carried out which was built from two research questions, that is 1) Does the Project Based Learning (PjBL) model affect literacy skills in Bahasa Indonesia learning? 2) Does the Project Based Learning (PjBL) model affect numeracy skills in Mathematics learning?

To test the research hypothesis, researchers used the t-test, a parametric statistical test. This test uses post-test data from students in the experimental and control classes. Data analysis was carried out using the SPSS 29.0 programme. To determine how much the effect of the independent variable on the dependent variable, the t-test was conducted. The t-test was used in this research to determine how students in the experimental and control classes understood the concepts of literacy and numeracy. The researcher conducted this test using the SPSS programme. The t-test results of the post-test scores between the experimental and control classes are depicted here.

Table 1

The t Test of Literacy Skills

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	56.258	5.774		9.743	<.001
	pre test	.495	.088	.782	5.617	<.001

a. Dependent Variable: post test

According to the results of the t test shown in table 1, the t value of the experimental class is 5.617, while the t table value at the 5% significance level at df = N - 2 = 22 - 2 = 20 is 1.725. Furthermore, if reviewed from the significance value, a significance value of 0.001 is obtained. Because t count = 5.617 > t table = 1.725 and the significance value of 0.001 < 0.005, it can be concluded that H0 is rejected and Ha is accepted. This shows that there is a difference between the understanding of the concept of literacy skills of experimental group students who receive treatment using the Project Based Learning (PjBL) model and the control group that does not use the Project Based Learning (PjBL) model.

Table 2

The t Test of Numeracy Skills

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	67.159	5.300		12.671	<.001
	pre test	.360	.098	.634	3.665	.002

a. Dependent Variable: post test

The t test results in table 2 above show that the t value of the experimental class is 3.665. Meanwhile, the t table value at df = N - 2 = 22 - 2 =20 is 1.725. Furthermore, in terms of the significance value in table 2 = 0.002. Since t count= 3.665 > t table = 1.725 and significance value = 0.002 < 0.005, it is found that H0 is rejected and Ha is accepted. This explains that the numeracy skills of grade five students who received treatment with the Project Based Learning (PjBL) model are different from those of students who did not receive treatment.

The better literacy test results of grade five students after being treated with the Project Based Learning (PjBL) model is in accordance with the benefits offered by this learning model. Some of the benefits of the Project Based Learning (PjBL) model include improving students' skills in problem solving, improving their understanding of teaching materials, improving their skills in relevant topics, and improving their skills in other topics (Mayuni et al., 2019). The main purpose of the Project Based Learning (PjBL) model is to improve the understanding of the concept of literacy skills of grade five students after treatment with the Project Based Learning (PjBL) model. Students can use learning resources and learn independently with PjBL. The purpose of the Project Based Learning (PjBL) model then works together to improve students' mathematical understanding. The results of student numeracy tests in experimental and control classes showed better results for students trained with the Project Based Learning (PjBL) model compared to students who were not trained (Marwiah et al., 2024).

The Project Based Learning (PjBL) model is an excellent learning model to better understand the subject matter. It is assessed to help students transfer what they know to understand the problem. By implementing the Project Based Learning (PjBL) model in the classroom, students can gain new knowledge and become more responsible for what they learn. Problem solving can also encourage self-evaluation of the learning process and results. The Project Based Learning (PjBL) model improves students' skills to think critically and adapt, gives them the opportunity to apply what they know to the real world, and fosters students' interest in continuous learning even after formal education ends (Fahrezi et al., 2020). It is expected that the Project Based Learning (PjBL) model will encourage students to solve problems. Research Findings Hypothesis I shows that there is an effect of Project Based Learning (PjBL) model on the literacy skills of grade five students at Pineleng Public Elementary School. Based on the results of the analysis of post-test data between experimental and control class students, it is known that the scores of students who get treatment with the Project Based Learning (PjBL) model are better when compared to students who do not get treatment with this learning model. The findings of this research are in line with research by Aulia et al. (2022) which shows significant differences in the effect of the Project Based Learning (PjBL) model on Literacy Skills, namely the ability to read comprehension of grade IV elementary school students. This means that the Project Based Learning (PjBL) model for students can be an important alternative in the learning process for students to improve students' literacy skills.

In Hypothesis II research shows that there is an effect of Project Based Learning (PjBL) model on the numeracy skills of grade five students at Pineleng Public Elementary School. The second research finding is to reject H0 and accept Ha, which means that there is a difference between the numeracy skills of grade five students who receive treatment using the Project Based Learning (PjBL) model and classes that do not get treatment with the Project Based Learning (PjBL) model. The findings of this research are in line with research, (Rohim & Nugraha, 2023) which shows a significant difference in the effect of the Project Based Learning Model on Student Numeracy Skills at Jatiroto 01 Elementary School. This means that the p Project Based Learning (PjBL) model has the potential to be an effective learning model in improving student numeracy skills at the elementary school level.

CONCLUSION

Based on the results of research and discussion, it can be concluded that 1) there is a significant effect of Project Based Learning (PjBL) model on Literacy Skills of grade five students at Pineleng Public Elementary School. 2) there is a significant effect of the Project Based Learning (PjBL) model on the Numeracy Skills of grade five students at Pineleng Public Elementary School.

REFERENCES

1. Alberta Government. (2013). Literacy and Numeracy Progressions. In *Alberta Government*. https://education.alberta.ca/literacy-and-numeracy/about-literacy-and-numeracy/everyone/support-documents/
2. Arifin, M., & Hakim, A. R. (2021). Kajian karakter tokoh pandawa dalam kisah mahabharata diselaraskan dengan pendidikan karakter bangsa Indonesia. *Jurnal Syntax Transformation*, *2*(5), 613–623. https://doi.org/https://doi.org/10.46799/jst.v2i5.284
3. Aulia, D., Darmansyah, & Fitria, Y. (2022). PENGARUH MODEL PROJECT BASED LEARNING (PjBL) TERHADAP KEMAMPUAN MEMBACA PEMAHAMAN SISWA KELAS IV SD NEGERI 31 PAYAKUMBUH. *Elementary School Journal PGSD FIP Unimed*, *12*(3), 276–287. https://doi.org/https://doi.org/10.24114/esjpgsd.v12i3.40181
4. Ayuningsih, F., Malikah, S., Nugroho, M. R., Winarti, Murtiyasa, B., & Sumardi, S. (2022). Pembelajaran Matematika Polinomial Berbasis STEAM PjBL Menumbuhkan Kreativitas Peserta Didik. *Jurnal Basicedu*, *6*(5), 8175–8187. https://doi.org/https://doi.org/10.31004/basicedu.v6i5.3660

5. Cahyadi, E., Dwikurnaningsih, Y., & Hidayati, N. (2019). Peningkatan hasil belajar tematik terpadu melalui model project based learning pada siswa sekolah dasar. *Jurnal Riset Teknologi Dan Inovasi Pendidikan (Jartika)*, *2*(1), 205–218. https://media.neliti.com/media/publications/266995-peningkatan-hasil-belajar-tematik-terpad-0d451077.pdf
6. Fahrezi, I., Taufiq, M., Akhwani, & Nafia'ah. (2020). Meta-analisis pengaruh model pembelajaran project based learning terhadap hasil belajar siswa pada mata pelajaran IPA sekolah dasar. *Jurnal Ilmiah Pendidikan Profesi Guru*, *3*(3), 408–416. https://doi.org/https://doi.org/10.23887/jippg.v3i3.28081
7. Fitri, H., Dasna, I. W., & Suharjo, S. (2018). Pengaruh model project based learning (PjBL) terhadap kemampuan berpikir tingkat tinggi ditinjau dari motivasi berprestasi siswa kelas iv sekolah dasar. *Briliant: Jurnal Riset Dan Konseptual*, *3*(2), 201–212. https://doi.org/PDF (BAHASA INDONESIA)
8. Hartono, D. P., & Asiyah, S. (2019). PjBL untuk meningkatkan kreativitas mahasiswa: sebuah kajian deskriptif tentang peran model pembelajaran PjBL dalam meningkatkan kreativitas mahasiswa. *Jurnal Dosen Universitas PGRI Palembang*. https://jurnal.univpgri-palembang.ac.id/index.php/prosiding/article/view/2694
9. Irman, S., & Waskito. (2020). Validasi modul berbasis project based learning pada mata pelajaran simulasi dan komunikasi digital. *Jurnal Ilmiah Pendidikan Dan Pembelajaran*, *4*(2), 260–269. https://doi.org/https://doi.org/10.23887/jipp.v4i2.26156
10. Jakni. (2016). Metodologi penelitian eksperimen bidang pendidikan. In *Bandung: Alfabeta*. Alfabeta.
11. Katuuk, D. A. (2014). Manajemen implementasi kurikulum: strategi penguatanimplementasi kurikulum 2013. *Jurnal Cakrawala Pendidikan*, *33*(1), 13–26. https://doi.org/https://doi.org/10.21831/cp.v1i1.1858
12. Kemeterian Pendidikan dan Kebudayaan. (2017). *Pedoman Penilaian Dan Evaluasi : Gerakan Literasi Nasional*. https://repositori.kemdikbud.go.id/15987/1/Pedoman%20Penilaian%20dan%20Evaluasi%20Gerakan%20Literasi%20Nasional%202017.pdf
13. Kharizmi, M. (2015). Kesulitan siswa sekolah dasar dalam meningkatkan kemampuan literasi. *JUPENDAS (Jurnal Pendidikan Dasar)*, *2*(2), 11–21. http://jfkip.umuslim.ac.id/index.php/jupendas/article/view/233/132
14. Mangangantung, J. M., Penteno, M. I., & Komedien, B. E. J. (2023). Penerapan Model Pembelajaran Discovery Learning Untuk Meningkatkan Hasil Belajar Siswa Pada Mata Pelajaran IPA Dikelas IV SD GMIM V Tomohon. *Jurnal Ilmiah Wahana Pendidikan*, *9*(3), 727–735. https://doi.org/https://doi.org/10.5281/zenodo.7802176
15. Marwiah, S., Maharani, I., & Simamora, Y. (2024). Pengaruh Model Pembelajaran Project Based Learning Berbantuan Aplikasi Mathway Terhadap Kemampuan Literasi Numerasi Siswa MTs Darul Mukhlisin. *Journal on Education*, *6*(2), 15544–15561. https://doi.org/https://doi.org/10.31004/joe.v6i2.5442
16. Mayuni, K. R., Rati, N. W., & Mahadewi, L. P. P. (2019). Pengaruh model pembelajaran project based learning (PjBL) terhadap hasil belajar IPA. *Jurnal Ilmiah Pendidikan Profesi Guru*, *2*(2), 183–193. https://doi.org/https://doi.org/10.23887/jippg.v2i2.19186
17. Monigir, N. N. (2022). Penerapan Model Pembelajaran Explicit Instruction Untuk Meningkatkan Hasil Belajar Siswa Pada Mata Pelajaran Bahasa Indonesia Kelas IV SD GMIM Wailan. *Jurnal Ilmiah Wahana Pendidikan*, *8*(19), 620–625. https://doi.org/https://doi.org/10.5281/zenodo.8000541
18. Nurhadiyati, A., Rusdinal, R., & Fitria, Y. (2021). Pengaruh model project based learning (pjbl) terhadap hasil belajar siswa di sekolah dasar. *Jurnal Basicedu*, *5*(1), 327–333. https://doi.org/ttps://doi.org/10.31004/basicedu.v5i1.684
19. Pangkey, C., Lengkong, J., Legi, M., & Rorimpandey, W. H. F. (2023). Application Of The Project-Based Learning Model To Improve Indonesian Language Learning Outcomes For Class V Elemntary School Students. *Journal of Educational Learning and Innovation (ELIa)*, *3*(2), 303–317. https://doi.org/https://doi.org/10.46229/elia.v3i2.724
20. Prenzel, M., Blum, W., & Klieme, E. (2015). The impact of PISA on mathematics teaching and learning in Germany. In *Assessing mathematical literacy: The PISA experience*. Springer. https://doi.org/https://doi.org/10.1007/978-3-319-10121-7_12
21. Rohim, D. C., & Nugraha, Y. A. (2023). Pengaruh Model Project Based Learning Terhadap Kemampuan Numerasi Siswa di SD Jatiroto 01. *Jurnal Review Pendidikan Dasar: Jurnal Kajian Pendidikan Dan Hasil Penelitian*, *9*(3), 183–189. https://doi.org/https://doi.org/10.26740/jrpd.v9n3.p183-189