https://doi.org/10.21009/JISAE

JISAE (Journal of Indonesian Student Assessment and Evaluation)

ISSN : P-ISSN: 2442-4919 | E-ISSN: 2597-8934

Website : http://journal.unj.ac.id/unj/index.php/jisae

Vol 11 No 1 (2025)

Student Activity in Project-Based Learning (PjBL) Science Learning to Improve Student Learning Outcomes of Ranto Panyang I State Elementary School

Januar Saputra[1],
Universitas Bina Bangsa Getsempena

Siti Mayang Sari[2]
Universitas Bina Bangsa Getsempena

Lili Kasmini[3]
Universitas Bina Bangsa Getsempena

Address for Correspondence:
[1] januar.saputrams27@gmail.com
[2] mayang@bbg.ac.id
[3] lili@bbg.ac.id

ABSTRACT

This study uses a descriptive quantitative method by revealing the usefulness of the independent curriculum teaching module which has great potential to create a more innovative, inclusive, and relevant learning environment for students. The activeness of students can develop into creative, critical individuals who are ready to face future challenges. The purpose of the study is to improve student learning outcomes through the implementation of teaching modules which are stages of learning activities provided by teachers. Based on student learning outcomes reviewed from the activities and roles of teachers, it is 95.83% with a very high category. The average results obtained based on observations on this learning aspect are 89.58% with a very high category. The average obtained from observations on student activities is 79.16% with a high category. Student activities in learning using science teaching modules based on Project Based Learning (PjBL) are carried out effectively in accordance with learning objectives.

Keywords: Activity, PJBL, Outcomes

INTRODUCTION

Project-Based Learning (PjBL) in science education is a dynamic approach that engages students in exploring real-world problems and challenges to gain a deeper understanding of scientific concepts. (Ayuningrum et al., 2024); (Bulkini & Nurachadijat, 2023). By actively engaging students in projects (Rifai et al., 2019), they develop critical thinking (Safaruddin et al., 2020), collaboration (Nurhikmayati & Sunendar, 2020), and problem-solving skills (Arsika et al., 2019), which can significantly improve learning outcomes (Fahrezi & Taufiq, 2020). PjBL is part of Activity-based learning (ABL), an educational approach that involves students engaging in hands-on, interactive, and experiential activities to improve their understanding and retention of subject matter.

This approach shifts the focus from passive listening to active participation, making learning more engaging and effective. Students take an active role in their learning process (Astutik, 2020), which encourages independence and critical thinking (SYAPARUDDIN et al., 2020). Activities often involve real-life applications or simulations, which help students connect theoretical concepts to practical scenarios. Encourage group work (Maulida et al., 2023), discussion (Syarfuni, Suraiya, 2021), and peer learning to improve communication and teamwork skills (Akmaluddin et al., 2022). Combine visual, auditory, and kinesthetic elements to cater to a variety of learning styles (Fauzi et al., 2019). Activities are often designed to develop analytical and problem-solving skills (Mardhatillah et al., 2019). Conduct simple experiments to understand concepts such as electricity, magnetism, or chemical reactions. Act out historical events or debate current issues in social studies. Build models, create artwork, or design posters to represent concepts in subjects such as math or biology.

Use educational games or puzzles to reinforce learning in a fun way (Kasmini et al., 2022). Visit museums, historical sites, or nature reserves to observe and learn firsthand. PJBL is implemented in the form of a central question or problem in its learning, ensuring relevance to scientific concepts and student curiosity (Sari et al., 2019). Teachers provide autonomy in designing projects (Mayang Sari et al., 2022), fostering ownership and engagement (Nurmalawati et al., 2023). Encourage research, experimentation, and exploration of scientific phenomena (Jalaluddin et al., 2020). Combine multiple subjects, such as mathematics, technology, and engineering, with science (Sari et al., 2019). Students present their findings, strengthening communication skills and accountability (Amrullah et al., 2023). Ongoing reflection and feedback enhance learning and project quality. Acting out historical events or debating current issues in social studies can be a highly engaging and educational way to deepen understanding of complex topics. Students will design a model of a sustainable community that addresses environmental, economic, and social challenges. Introduce the project in an engaging way as an Activity Show a short video or simulation about a current challenge facing society.

Several studies have shown that the Project-Based Learning approach has a significant impact on student learning outcomes. Fahrezi & Taufiq (2020) noted that the implementation of PjBL significantly increased student engagement and motivation to learn. This approach has also been shown to strengthen 21st-century skills such as collaboration and communication (Akmaluddin et al., 2022; Syarfuni & Suraiya, 2021; Maulida et al., 2023).

However, most previous studies have only focused on aspects of general learning outcomes without specifically discussing the open structure module used in the Merdeka Curriculum. In addition, there are still few studies that produce quantitative contributions of PjBL modules to student learning activities, especially at the elementary school level. Therefore, this study fills the scientific gap by specifically examining the effectiveness of PjBL-based teaching modules designed according to the latest curriculum and the local context of students in elementary schools.

This study has novelty in terms of testing PjBL-based teaching modules in the context of the Independent Curriculum which is still relatively new to be widely implemented. The original contribution of this study lies in the quantitative measurement of student activities and learning outcomes systematically using standardized observation instruments. In addition, the results of this study provide practical contributions for teachers in designing contextual project-based learning strategies that have an impact on achieving learning outcomes.

METHOD

This study uses a descriptive quantitative approach that aims to systematically and in detail describe student learning outcome data based on the effectiveness of science teaching modules implemented by elementary school teachers. This approach was chosen because it is able to provide an objective picture of the effect of module implementation on improving the quality of science learning at the elementary level. The teaching module functions as a systematic guide in the learning process, which includes activity steps designed to activate student participation in meaningful learning (Fahrezi & Taufiq, 2020; Ayuningrum et al., 2024; Bulkini & Nurachadijat, 2023). A good teaching module is able to accommodate students' needs and provide space for exploration and application of science concepts in real life, in accordance with the principles of project-based learning (Nurmalawati et al., 2023; Jalaluddin et al., 2020; Maulida & Sari, 2024).

This study emphasizes the importance of developing appropriate teaching modules to improve elementary school students' learning outcomes, especially in the field of science studies. Project-Based Learning (PjBL)-based teaching modules are considered to have great

potential in facilitating active, explorative, and reflective learning, which can significantly increase student involvement in the learning process (Sari, 2023; Amrullah et al., 2023; Mardhatillah et al., 2019). Therefore, this study aims to determine how much influence the implementation of the teaching module has on student learning outcomes in terms of knowledge, skills, and attitudes. The modules implemented not only present material, but also activities that trigger students' curiosity, creativity, and problem-solving abilities (Rifai et al., 2019; Arsika et al., 2019; Nurhikmayati & Sunendar, 2020).

The data in this study were obtained from observations of student activities and learning outcomes that were analyzed quantitatively. The study was conducted on fifth grade elementary school students who used PjBL-based teaching modules that had been designed and implemented by teachers. The sampling technique was carried out randomly or purposively depending on the availability of classes that had consistently implemented the module (Kasmini et al., 2022; Fauzi et al., 2019; Akmaluddin et al., 2022). The results obtained were then analyzed to see the effectiveness of the teaching module in improving student learning outcomes. Thus, this study not only provides an overview of the success of the implementation of the teaching module but also provides practical contributions for teachers and curriculum developers in optimizing project-based learning strategies at the elementary school level (Safaruddin et al., 2020; Sari et al., 2019; Astutik, 2020)..

RESULTS AND DISCUSSION

The effectiveness and learning outcomes of students resulting from the implementation of PJBL-based teaching modules can be applied in elementary schools in science lessons. In this study, the effectiveness of the Project Based Learning (PjBL)-based science teaching module can be seen from student learning activities observed by observers during the learning process and student learning outcomes in terms of attitudes, knowledge, and skills. After the teaching materials are declared practical, activities are focused on evaluating whether the Project Based Learning (PjBL)-based teaching module can be used to achieve effective goals in learning activities and student learning outcomes. The aspects of effectiveness observed in the learning process using this Project Based Learning (PjBL)-based science teaching module are student learning activities and learning outcomes.

The following is an explanation: student activity during the learning process was obtained an average of 69.34% with a very high category. This shows that students are enthusiastic in participating in learning through the developed teaching module. The following explains the description of each indicator contained in the student activity instrument. Students pay attention and listen to the teacher's explanation very well when the teacher explains the material. This can be seen from the average value obtained through the student activity observation sheet of 95.83%, with a very high category. assignments in the teaching module, students pay attention to the teaching module well. The average results obtained based on observations on this aspect in learning 89.58%, with a very high category. The steps in the teaching module are also carried out well. This can be seen from the average obtained from the results of observations on student activity 79.16%, with a high category. The average value obtained from the results of student activity is also 45.83%, with a moderate category. In the aspect of responding based on the results of observations, the average obtained based on observations on the aspect of responding 41.66%, with a moderate category. In the learning process, students are very good at working together to complete the tasks in the teaching module, this can be seen from the average value obtained through the student activity observation sheet of 87.5%, with a very high category. After completing the assigned tasks, students together present their work results very well, this can be seen from the average obtained from the observation results of 45.83%, with a

moderate category.

Learning using the project based learning model has many advantages, because this model involves students as the main element in the learning process while the teacher functions as a director/facilitator of learning. Students have an active role in gaining knowledge by conducting research (Mastiah et al., n.d.), experiments (Yusnita et al., 2023), and fieldwork as part of the learning project (Sari, Bina, et al., 2023). The application of Project Based Learning allows students to actively learn (Maulida & Sari, 2024), develop critical thinking skills (Sari, Getsempena, et al., 2023), collaboration skills, and problem solving independently while the teacher plays a role in guiding students during the learning process (Sari, 2023). In this context, the role of the teacher as a facilitator is important to provide direction, guidance, and feedback to students. Project Based Learning (PjBL) learning is a superior driving model to help students learn to do authentic and multidisciplinary tasks, manage budgets, use limited resources effectively, and collaborate with others. There is direct and indirect evidence, both from teachers and students, that the Project Based Learning (PjBL) learning model is beneficial and effective as a learning method. More importantly, there is some evidence that the Project Based Learning (PjBL) learning model, compared to other learning models, has a high value in improving the quality of student learning.

Discussion

The results of this study indicate that the implementation of Project-Based Learning (PjBL)-based teaching modules can significantly increase student activity and learning outcomes. The increase in student activity can be seen from the high percentage of their involvement during the learning process, such as attention to teacher explanations (95.83%), implementation of steps in the module (89.58%), and cooperation in groups (87.5%). These results indicate that the PjBL approach encourages students to be more active and responsible in their learning process (Fahrezi & Taufiq, 2020; Sari, 2023; Maulida & Sari, 2024).

This is in line with the findings of Ayuningrum et al. (2024) which states that the PjBL model can improve problem-solving skills and student participation as a whole. These findings strengthen the position of PjBL as a learning strategy that is not only oriented towards final results, but also on a fun and meaningful learning process (Bulkini & Nurachadijat, 2023; Rifai et al., 2019). From a theoretical perspective, this study contributes to the literature supporting the effectiveness of PjBL as a method capable of developing 21st-century competencies, such as critical thinking, collaboration, and communication (Nurmalawati et al., 2023; Arsika et al., 2019; Syarfuni & Suraiya, 2021).

The teaching module used in this study was proven to be able to guide students in exploring science concepts through a contextual and applicable project-based approach. These results indicate that the implementation of PjBL-based modules not only improves cognitive learning outcomes but also strengthens students' affective and psychomotor aspects. Thus, this study confirms that teaching modules designed with a PjBL approach provide a synergistic effect on improving the quality of learning (Jalaluddin et al., 2020; Sari et al., 2019; Kasmini et al., 2022). From a practical perspective, these findings have important implications in the context of developing educational policies and practices in elementary schools. Teachers can use PjBL-based teaching modules as learning aids that can encourage students to be more active, creative, and think reflectively in completing project-based tasks (Amrullah et al., 2023; Fauzi et al., 2019; Nurhikmayati & Sunendar, 2020).

In addition, this study provides empirical evidence that teacher training in designing and implementing project-based teaching modules is important in supporting the success of the Merdeka Curriculum. This kind of learning strategy also encourages cross-disciplinary integration and enriches students' learning experiences holistically (Astutik, 2020;

Akmaluddin et al., 2022; Safaruddin et al., 2020). Therefore, schools and education policy makers at the regional and national levels should consider the results of this study as a basis for developing more innovative and transformative learning models.

CONCLUSION

Project Based Learning students are given space and opportunity to develop their creative thinking and be actively involved in the learning process, especially in searching, exploring, finding facts in the field, doing group work and independent work, having the courage to present work results as a form of scientific responsibility, being open to input and corrections from friends on the results of their work. Project Based Learning students are given space and opportunity to develop their creative thinking and be actively involved in the learning process, especially in searching, exploring, finding facts in the field, doing group work and independent work, having the courage to present work results as a form of scientific responsibility, being open to input and corrections from friends on their work results. Based on the results of the recapitulation of the results of observations of student activities, the results obtained are, in the teaching module, the average overall result is 69.34% with a high category. Students pay attention and listen to the teacher's explanation well. The steps of the activities contained in the teaching module are also carried out well. Furthermore, the activity of asking questions is also classified as good. Likewise with responding to questions, it is good. Although there are some who have not been able to respond appropriately. Then, when discussing between students, it is also good, they are able to interact well when discussing. The science teaching module based on Project Based Learning has been declared effective to use, because the teaching module can improve learning activities and student learning outcomes in terms of attitudes, knowledge, and skills. The effectiveness of using the teaching module can be seen through observations of student activities and student learning outcomes.

REFERENCE

Akmaluddin, A., Mardhatillah, M., Rahmattullah, R., Sari, S. M., Siregar, M., & Ayu, A. F. K. (2022). Management of Violence on Children in the Education World to Improve the Quality of Schools. *QALAMUNA: Jurnal Pendidikan, Sosial, Dan Agama*, *14*(2), 447–454. https://doi.org/10.37680/qalamuna.v14i2.3343

Amrullah, Sari, S. M., Kasmini, L., & Akmaluddin. (2023). The Role of Video Media to Improve Learning Results from Learning the Functions of Plant Parts in Class IV Students at SDN Perumnas Neuheun. *Proceedings of International Conference on Education Teacher Training & Education Faculty Universitas Serambi Mekkah2*, 1–4.

Arsika, I. M. B., Sudiarawan, K. A., Dharmawan, N. K. S., Samsithawrati, P. A., Widhyaastuti, I. G. A. A. D., & Mahartayasa, M. (2019). Buku Pedoman Problem Based Learning. *Jurnal Ilmiah Didaktika*, *14*(2), 164–173.

Astutik, S. (2020). Science , Engineering , Education , and Development Studies (SEEDS): Conference Series. *Upaya Meningkatkan Keaktifan Siswa Dalam Proses Pembelajaran*, *4*(2), 80–86.

Ayuningrum, Y. S., Guru, P. P., & Semarang, U. P. (2024). *Penerapan Model Pembelajaran Project Based Learning (PJBL) terhadap Keterampilan Pemecahan Masalah pada Pembelajaran IPAS*. *4*, 6960–6969.

Bulkini, J., & Nurachadijat, K. (2023). Potensi Model PJBL (Project-Based Learning) dalam Meningkatkan Motivasi Belajar Siswa di SMP Azzainiyyah Nagrog Sukabumi. *Jurnal Inovasi, Evaluasi Dan Pengembangan Pembelajaran (JIEPP)*, *3*(1), 16–21. https://doi.org/10.54371/jiepp.v3i1.241

Fahrezi, I., & Taufiq, M. (2020). *Meta-Analisis Pengaruh Model Pembelajaran Project Based*

Learning Terhadap Hasil Belajar Siswa Pada Mata Pelajaran IPA Sekolah Dasar. *3*(September), 408–415.

Fauzi, C., Sari, S. M., Kartikawaruwu, W. A., & Putra, H. (2019). *Community Character Education Society 5 . 0 and Future Management*. https://doi.org/10.4108/eai.4-12-2019.2293792

Jalaluddin, Mardhatillah, Silaban, P. J., Sari, S. M., & Setiawan, D. (2020). The effect of emotional intelligence on the results of learning mathematics in students elementary school. *Advances in Mathematics: Scientific Journal*, *9*(12), 10577–10582. https://doi.org/10.37418/amsj.9.12.43

Kasmini, L., Darni, H., Sari, S. M., Assurance, E. Q., & Aceh, I. B. (2022). *TEACHER PROFESSIONALISM IN USING MEDIA AS AN*.

Mardhatillah, Sari, S. M., Surjono, H., & Muhtadi, A. (2019). Development of teacher and student thematic learning books based on gender and diversity for elementary school students in district of Aceh barat. *International Journal of Scientific and Technology Research*, *8*(10), 896–898.

Mastiah, S., Safhunna, M., Sari, S. M., & Getsempena, B. B. (n.d.). *THE IMPORTANCE OF USING MEDIA IN THE LEARNING PROCESS TO IMPROVE SCIENCE LEARNING OUTCOMES*.

Maulida, P. L., & Sari, S. M. (2024). *STUDENTS ' LEARNING DIFFICULTIES AND THEIR HANDLING IN CLASS IV SCIENCE LEARNING IN STATE PRIMARY SCHOOL 16*. *4*(1).

Maulida, P. L., Sari, S. M., & Manurung, F. (2023). *OBSTACLES FACED BY TEACHERS IN SHAPING STUDENT CHARACTER VALUES AT SD NEGERI 16 BANDA ACEH*. 542–548.

Mayang Sari, S., Dwi Suyanti, R., Yus, A., Sinaga, B., Bukit, N., & Bunawan, W. (2022). Development Book Of Science Process Skills Through Problem Based Learning Models Improving Creative Thinking Ability. *Journal of Positive School Psychology*, *2022*(8), 4662–4667. http://journalppw.com

Nurhikmayati, I., & Sunendar, A. (2020). Pengembangan Project Based Learning Berbasis Kearifan Lokal Berorientasi pada Kemampuan Berpikir Kreatif dan Kemandirian Belajar. *Mosharafa: Jurnal Pendidikan Matematika*, *9*(1), 1–12. https://doi.org/10.31980/mosharafa.v9i1.604

Nurmalawati, Azhar, & Sari, S. M. (2023). The Concept of Video-Based Learning on the Material of the Object Shape's Change at SD Negeri Lampeuneurut Aceh Besar. *Proceedings of International Conference on Education Teacher Training & Education Faculty Universitas Serambi Mekkah*, 1–4.

Rifai, S. S., Uswatun, D. A., & Nurasiah, I. (2019). Model project based learning (PjBL) untuk meningkatkan sikap tanggung jawab ilmiah peserta didik di kelas tinggi. *JIPVA (Jurnal Pendidikan IPA Veteran)*, *3*(2), 127. https://doi.org/10.31331/jipva.v3i2.874

Safaruddin, S., Ibrahim, N., Juhaeni, J., Harmilawati, H., & Qadrianti, L. (2020). The Effect of Project-Based Learning Assisted by Electronic Media on Learning Motivation and Science Process Skills. *Journal of Innovation in Educational and Cultural Research*. https://doi.org/10.46843/jiecr.v1i1.5

Sari, S. M. (2023). Development of Animation Video-Based Science Learning Media On Natural Disaster Material At SD-IT Hafizul Ilmi. *Proceedings of International Conference on Education*, *1*(1).

Sari, S. M., Bina, U., & Getsempena, B. (2023). *Jurnal Ilmiah Mahasiswa PENGEBANGAN MODEL PBL MELALUI METODE FIELDTRIP UNTUK MENINGKATKAN HASIL BELAJAR SISWA PADA PEMBELAJARAN IPA*. *4*(1), 1–8.

Sari, S. M., Getsempena, B. B., & Aceh, B. (2023). Pembelajaran IPA Berbasis TPACK Upaya Peningkatan Kualitas Guru Di SDN Kuta Rentang Aceh Besar. *Journal of International Multidisciplinary Research Pembelajaran*, *2*(1), 169–174.

Sari, S. M., Surjono, H., & Muhtadi, A. (2019). *Development of Teacher and Student Thematic Learning Books Based on Gender And Diversity for Elementary School Students In District of Aceh Barat*. *8*(10), 10–12.

SYAPARUDDIN, S., MELDIANUS, M., & Elihami, E. (2020). STRATEGI PEMBELAJARAN AKTIF DALAM MENINGKATKAN MOTIVASI BELAJAR PKn PESERTA DIDIK. *Mahaguru: Jurnal Pendidikan Guru Sekolah Dasar* , *1*(1), 30–41. https://doi.org/10.33487/mgr.v1i1.326

Syarfuni, Suraiya, S. M. S. (2021). The Principal ' s Leadership in Improving the Teachers Professional. *Jurnal Pendidikan Progresif*, *11*(2), 392–399.

Yusnita, E., Sari, S. M., Akmaluddin, & Sariakin. (2023). APPLICATION OF THE SAS METHOD USING SONG MEDIA IN IMPROVING THE BEGINNING READING ABILITY OF CLASS II STUDENTS OF STATE PRIMARY. *ICONESTH 2023 Universitas*, 549–556.