Application of the Project Based Learning Model in Elementary Schools: Obstacles and Solutions of Science and Environment Content

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Abstract: The Project Based Learning (PjBL) model has been widely applied in elementary schools. However, in practice, not a few teachers and students encounter obstacles when implementing the PjBL model. This research was conducted with the aim of identifying, compiling and describing studies regarding the obstacles in implementing the PjBL model in elementary schools and their solutions. This research is a library research. Researchers collected data from books and 40 articles related to the implementation of the PjBL model in elementary schools. Data analysis was performed using content analysis techniques. The results of the research show the fact that there are obstacles in implementing the PjBL model in elementary schools. These obstacles are: (1) poor time management; (2) teachers and students do not understand the essence of PjBL; (3) lack of motivation of teachers and students; (4) teachers and students have not been able to understand the relationship between PjBL and real life; (5) the inequality in the ability of students in groups makes the project implementation not run smoothly; (6) teachers are confused about adapting learning to the PjBL model, in other words the teacher is not able to understand when PjBL should be implemented; (7) lack of training for elementary school teachers on the PjBL model; and (8) inadequate facilities. At the end of the article, the researcher presents alternative solutions that can be further considered by teachers, schools and curriculum designers to overcome problems that occur during the implementation of PjBL in elementary schools.

Keywords: Elementary School; Project Based Learning; Science; Social Environment

Introduction

Education plays a role in shaping the civilization of a nation. Advanced education can only be realized through quality learning. Learning is the product of the continuous interaction between development and life experiences. Trianto (2009) revealed that learning is a conscious effort of a teacher to teach his students (directing students' interactions with other learning resources) with the intention that the goal can be achieved. The learning process is marked by the existence of educative interactions that occur, namely interactions that are aware of the purpose. This interaction is rooted in the educator (teacher) and pedagogical learning activities on the students themselves, proceeds systematically through the stages of design, implementation, and evaluation. Learning does not happen instantly, but proceeds through certain stages. In learning, educators facilitate students so that they can learn well. With this interaction, it will produce an effective learning process as expected (Hanafy, 2014).

Learning must be carried out well at all levels of education, especially the basic education level which is the key to the success of the next level of education. Learning should keep up with the times. According to Widayat (2018), 21st century learning integrates knowledge, skills, attitudes, and mastery of Information and Communication Technology (ICT). 21st Century skills that are integrated into knowledge, skills and attitudes as well as ICT mastery can be developed

through: (1) critical thinking and problem solving skills; (2) communication skills (communication skills); (3) creativity and innovation skills; and (4) collaboration skills (collaboration). These four skills are the focus of development in the 2013 curriculum learning.

One important component in the continuity of learning activities is the learning model. The learning model is a conceptual framework that describes a systematic procedure for organizing learning experiences to achieve certain learning goals, and serves as a guide for learning designers and teachers in planning and implementing learning activities (Winataputra, 2021). The learning model should keep up with the times. The recommended learning model to be implemented in class includes the project-based learning model or PjBL. PjBL uses projects/activities as media. Students explore, assess, interpret, synthesize, and explore information to produce various forms of learning outcomes (Tohir, 2019). Through PjBL, the inquiry process begins by raising a guiding question and guiding students in a collaborative project that integrates various subjects (matter) in the curriculum.

PjBL trains students' critical thinking skills and problem solving. PjBL helps students to develop basic skills that students must have including thinking skills (Fitri et al., 2018), decision-making skills, creative abilities (Natty et al., 2019), problem-solving abilities, and at the same time are seen as effective for developing trust student self-management and self-management. The PjBL learning model is applied by linking learning materials with real conditions that exist in the student environment (Wahyuni & Rahayu, 2021). The PjBL model can be applied to all lesson content in the 2013 curriculum (Wahyu, 2018). The application of the PjBL model in elementary schools can improve integrated thematic learning outcomes (Cahyadi et al., 2019), writing poetry (Marlani & Prawiyogi, 2019), speaking skills (Sari et al., 2015), music arts (Desyandry, 2019), Science (Fahrezi et al., 2020; Nisah et al., 2021; Taupik & Fitria, 2021), Mathematics (Andini et al., 2022) and Social Studies (Darmayoga & Suparya, 2021; Munisah et al., 2018).

The implementation of the PjBL model in elementary schools continues to progress. This is evidenced by the many research articles that examine the application of the PjBL model. However, the implementation of the PjBL model in elementary schools did not run without problems. Several factors make PjBL difficult to implement and a solution must be found immediately. This study aims to compile and describe a study of the obstacles in implementing the PjBL model in elementary schools and their solutions. Researchers hope that this article can be a reference for readers (especially teachers, curriculum designers, and future researchers) regarding the implementation of PjBL in elementary schools.

Method

This research is a library research. Khatibah (2011) suggests library research as an activity that is carried out systematically to collect, process, and conclude data using certain methods/techniques to find answers to problems faced through library research. Library research is the basis for developing knowledge, creating policy and practice guidelines, as well as the beginning of new ideas for further research (Snyder, 2019).

In this study, researchers collected data from books and 40 articles related to the implementation of the Project Based Learning (PjBL) model in elementary schools along with the obstacles and solutions. The data is processed, then attached to the results and discussion of the research so as to produce a conclusion. The data analysis technique used in this research is content analysis. Content analysis is a technique for drawing conclusions by identifying various characteristics of a message in an objective, systematic, and generalist manner. The stages in content analysis, namely text selection, determining the unit of analysis, developing content categories, marking units, and analysis (Masyhuri & Zainuddin, 2009).

Result and Discussion

Application of the Project Based Learning Model in Elementary Schools

Project Based Learning (PjBL) is a learning model that involves students in a project based on a problem and in the end students can produce real work (Colley, 2008). Through PjBL, the inquiry process begins by raising a guiding question and guiding students in a collaborative project that integrates various subjects (matter) in the curriculum. Audet (Sumarmi, 2012) argues that the objectives of implementing PjBL are: (1) integrating the real world with learning; (2) make students work in a directed manner; (3) make students learn to work together or cooperatively; (4) encourage students to investigate and solve problems. Not only building students' knowledge through the real world or the environment around students, but also sharpening students to solve problems in their environment so that learning is more focused.

According to Buck Isntitue For Education Slameto (2017), the end result of PjBL is a product that is not necessarily in the form of material, but can be in the form of presentations, plays and other things that are presented in public and evaluated for quality. PjBL requires students to learn and produce work, therefore this model can increase students' motivation to learn, improve students' skills in problem solving and increase student cooperation in group work. The PjBL syntax according to The George Lucas Foundation (2007) is: (1) start with the essential question; (2) design a plan for the

project; (3) create a schedule; (4) monitor the students and the progress of the project; (5) assess the outcomes; and (6) evaluate the experience.

The PjBL model has been widely applied in elementary schools. Arisanti et al. (2017), conducted an analysis of students' mastery of concepts and creative thinking skills through the application of the PjBL model. As a result, the PjBL model succeeded in developing students' mastery of concepts and creative thinking skills towards learning science. Surya et al. (2018) and Nugraha et al. (2018)conducted Classroom Action Research by applying the PjBL model. The results of the study show that the application of the PjBL model can improve student learning outcomes and creativity. Saputro & Rayahu (2020) conducted experimental research to find out the difference in the effect of the PjBL model compared to the Problem Based Learning (PBL) model assisted by monopoly media on critical thinking skills. The results showed that the average critical thinking ability of the experimental group students (Project Based Learning class) was higher than the average critical thinking ability of the control group students (Problem Based Learning class). Based on the studies above, it can be concluded that the PjBL model can be applied in elementary schools.

Barriers to the Implementation of the Project Based Learning Model in Elementary Schools

Successfully implementing PjBL does not mean not encountering obstacles. The implementation of the PjBL model in elementary schools is inseparable from the accompanying obstacles. Habók & Nagy (2016) conducted an analysis of teachers' perceptions of methods, the teacher's role, success and evaluation in the implementation of PjBL. Based on the data obtained from filling out the questionnaire, there are 36% of teachers from various levels of education implementing PjBL. This is in line with what was stated by Aldabbus (2018), who found data that only 7 out of 24 teachers were able to implement PjBL in one semester for the reasons: (1) teachers could not decide on topics or sub-themes to be taught using PjBL; (2) PjBL implementation requires more time. Time management constraints were also found in Anggreni et al. (2020) which considered that during PjBL implementation, students were not able to manage time properly.

Nurfitriyanti (2016), applies the PjBL model to learning mathematics. Some of the obstacles that must be faced when implementing the PjBL model include: (1) it takes a lot of time to solve problems and produce products; (2) requires a lot of money; (3) requires teachers who are skilled and willing to learn; (4) requires adequate facilities, equipment and materials; (5) not suitable for students who give up easily and do not have the required knowledge and skills; (6) difficulty involving all students in group work. The same thing

was stated by Fithriani & Roysa (2022) that the implementation of PjBL is often constrained by facilities, and the lack of motivation to learn makes students lazy. Likewise with the results of Fransiska & Ain (2022), it was found that the teacher had difficulty choosing the right time to use the PjBL model. According to the teacher, the use of this model takes quite a lot of time. Teachers also experience difficulties in determining the model to be used in accordance with the learning material.

Aliyah (2017), conducted research on the development of project-based thematic learning models to improve students' creative thinking skills. Students need a lot of guidance from the teacher to be able to understand the problems presented. This happened because in previous learning, students were not used to carrying out project-based learning. Another obstacle, teachers are still experiencing problems in conducting assessments. Friani et al. (2017) and Tanjung et al. (2021) state that teachers experience problems in providing the tools and materials needed to develop projects.

Mislinawati & Nurmasyitah (2018) conducted research related to teacher constraints while implementing learning models in the 2013 curriculum in elementary schools. It was found that the teacher was less able to deal with the time available, class management and supervision could not run optimally and students were less active during learning. Teachers also experience problems when directing students to link the objectives of the project implementation with the material being discussed. Some students do not understand the purpose of implementing the project and its relation to the lesson. Students assume that the implementation of the project is separate from the subject matter. This obstacle was also found in Anggreni et al. (2020) where the teacher had not succeeded in relating the material to situations in students' daily lives.

In addition to constraints in time management, Cintang et al. (2018) stated that another obstacle was that the product that was the final result of project activities was not done optimally due to undisciplined students. Students have not been able to follow established procedures. Inequality in student abilities also influences the course of the project. Another obstacle is influenced by the teacher's own understanding of the PjBL model. Epifania et al. (2020) conducted an analysis related to teachers' understanding of implementing PjBL in elementary schools. As a result, the implementation of the PjBL model has not been maximized and has not been in accordance with the RPP. Teachers do not fully understand PjBL due to a lack of training.

Mufidah et al. (2020) in their research stated that the obstacles faced by teachers in implementing the PjBL model were: (1) limited facilities and infrastructure; (2) difficulties in applying the PjBL model with different characteristics; (3) difficulties in adjusting the theme; (4)

some parents do not support or participate less, even though collaboration with people around students is needed, because many students need assistance. Similar to these findings, Wibowo et al. (2022), stated that when implementing PjBL, the teacher had a little difficulty conditioning students, students must continue to be guided while carrying out the project. In addition, in the group there are some students who dominate.

Lapase (2021) experienced more complex obstacles. Teachers and students are not used to carrying out project-based learning. In addition to difficulties managing time, the teacher did not provide guidance to students, including when writing the results of problem solving discussions on presentation sheets. At the time of learning, only a small number of students were able to answer questions or provide feedback. There are still students who do not participate in group work. When other groups appeared, many students did not pay attention, and even tended to play and talk to themselves. At the end of the learning activity, conclusions are drawn by the teacher, even though it is the students who should draw conclusions. The same thing was confirmed by Niswara et al. (2019) who conducted research on the effect of the PjBL model on High Order Thinking Skills (HOTS). Besides requiring a lot of time and money, another obstacle is that it is difficult to involve all students to work in groups. PjBL is considered not suitable for students who give up easily and lack knowledge and skills.

Khasanah & Darsinah (2022) stated that cost and time limitations were a consideration for PjBL implementation. Another obstacle is that teachers find it difficult to adapt to the PjBL model because it requires careful preparation. Teachers prefer conventional methods because they are considered simpler and less complicated. In addition, the implementation of PjBL requires more time and large funds to find tools and materials. From the student side, during the PjBL implementation, there were some students who were less active in group work or only relied on their friends. Some students could not understand the topic and had difficulty understanding the steps for carrying out the project, so the teacher had to give repeated explanations. Sutrio et al. (2021) found the fact that many elementary teachers had difficulties implementing PjBL because they did not have sufficient knowledge regarding the PjBL model. Some teachers also rarely participate in training or workshops related to learning innovations and curricula to improve the quality of their learning.

The studies above are in line with what was stated earlier by Majid et al. (2014) which stated that the obstacles that must be faced when implementing PjBL include: (1) the tools and materials that must be provided are relatively large; (2) teachers feel comfortable with the conventional model, which is guided by the teacher center; (3) students who have weaknesses in gathering information will experience significant obstacles when implementing PjBL; (4) it is possible that some students will be less active in working in groups that have been formed; (5) when the topics given to each group are different, it is feared that students cannot understand the topic as a whole.

The PjBL model is the model recommended by the Ministry of Education and Culture to be applied to the 2013 curriculum learning. However, from the studies that have been discussed previously, there are many obstacles that must be faced by teachers and students during the implementation of PjBL. Therefore, it is necessary to find solutions to overcome these obstacles so that PjBL can be implemented optimally and more broadly at the basic education level. Researchers have cited several solutions from selected articles related to obstacles to implementing PjBL in elementary schools. At the end of the discussion, the researcher also recommended solutions to be used as alternatives in overcoming obstacles when teachers apply the PjBL model.

Solutions for Overcoming Barriers to the Implementation of the Project Based Learning Model in Elementary Schools

Based on the results of the research above, the researcher has summarized the obstacles faced by teachers and students when implementing the PjBL model. These obstacles are: (1) poor time management; (2) teachers and students do not understand the essence of PjBL; (3) lack of motivation of teachers and students; (4) teachers and students have not been able to understand the relationship between PjBL and real life; (5) the inequality in the ability of students in groups makes the project implementation not run smoothly; (6) teachers are confused about adapting learning to the PjBL model, in other words the teacher has not been able to understand when PjBL should be implemented; (7) lack of training for elementary school teachers on the PjBL model; and (8) inadequate facilities. Alternative solutions that can be used to overcome obstacles in the implementation of PjBL are presented in the following description.

Mislinawati & Nurmasyitah (2018) argue that in order to be able to overcome the obstacles or obstacles encountered, the teacher needs to take several actions, namely, the teacher must set a time in each phase so that the teacher can adjust the time available to complete the project the student is working on. The teacher needs to supervise the learning activities and discussions carried out by students, so that they can ensure that all students work well. According to Cintang et al. (2018), constraints in terms of limited time can be solved by combining two lessons into one if you want to implement a project at the end of the theme. Alternatively, the teacher can include projects during learning activities because the project does not have to be implemented at the end of the theme.

Obstacles related to the lack of student discipline can be overcome by the way the teacher acts as a supervisor. As a supervisor, the teacher's job is to monitor the progress and readiness of students in completing projects. As for the problem of inequality in student abilities, it can be overcome by forming heterogeneous groups. The division of groups must be in accordance with the type of project to be made.

Epifania et al. (2020), recommends a solution to overcome the problem of lack of time, namely by conditioning the time according to the duration of the project. Another way is to assign students to work on their projects at home. Setyowati & Mawardi (2018) added that teachers must try to manage time well from the start of the scheduling phase. The teacher must also monitor the progress of the project and always remind students of the time spent working on the project. Obstacles in the form of inadequate facilities should be prepared in advance according to school conditions and student conditions. Regarding the problem of lack of student involvement, teachers need to supervise, remind students and also motivate students during project implementation (Epifania et al., 2020). Next, with regard to the problem of the inability of teachers and students to relate projects to learning materials and everyday life, Fithriani & Roysa (2022) offers a solution, namely by means of the teacher from the start having to provide basic questions to students to be able to associate the project with the material being studied. will be studied. This will help students so that they have the provision of knowledge before implementing PjBL.

In the implementation of PjBL, one of the obstacles found was the lack of students' understanding of PjBL itself. Students are often confused in identifying and understanding the problem. In this case the role of the teacher is very important, Aliyah (2017)argues that the teacher must get around this obstacle by providing instructions or questions that can direct students to be able to understand the problem. At this stage, the project guidebook will assist the teacher in understanding students of the issues being discussed.

According to Sakilah et al. (2020), the obstacles encountered during PjBL implementation can be minimized through careful preparation before learning activities are carried out such as: limiting students' time in completing projects; provide simple equipment that is affordable and can be obtained from a local environment diary; and create a pleasant learning atmosphere so that students feel comfortable in the learning process. Meanwhile, according to Mufidah et al. (2020), various problems faced by elementary teachers in implementing the PjBL model can be overcome by providing special PjBL training.

Aldabbus (2018), in more detail provides suggestions for teachers, schools and curriculum designers regarding the PjBL model. These suggestions include: (1) the culture of applying the PjBL model must be disseminated in schools through workshops, seminars and training; (2) teachers must receive training on how to implement PjBL; (3) parents must be introduced and given an understanding of the importance of PjBL; (4) PjBL must be taught together with problem-based learning, inquiry-based learning and task-based learning; (5) if you want to implement PjBL, the curriculum must be specifically designed to be taught through PjBL; (6) a special budget for the project must be provided by the school; (7) schools should have a display room for project results. All products which are the end result of project implementation need to be displayed so that other students can see and be motivated; (8) schools should provide the best rewards for students who successfully carry out projects; (9) schools must encourage good and solid collaboration between teachers in schools; (10) PjBL must be used throughout the curriculum; and (11) curriculum designers, teachers and schools must create an effective assessment tool to assess the PjBL implementation process from start to finish, until the final product is produced.

Next, the researcher provided a solution idea as a response to the obstacles to implementing PjBL in elementary schools. This solution can be used as an alternative for further consideration by teachers, schools and curriculum designers to overcome problems that occur during PjBL implementation. These solutions are: (1) before implementing the PjBL model, schools must provide training to teachers about the PjBL model, this is intended so that teachers properly understand the theory and practice of PjBL; (2) in order to overcome technical obstacles in the implementation of the PjBL model, a PjBL module is needed that can be used by teachers and students as a guide in project implementation; (3) the lack of facilities which is an obstacle to implementing the PjBL model can be circumvented through the use of technology and the surrounding environment.

Conclusion

The recommended learning model to be implemented in class includes the project-based learning model or PjBL. PjBL uses projects/activities as media. Students explore, assess, interpret, synthesize, and explore information to produce various forms of learning outcomes. The PjBL model has been widely applied in elementary schools. However, successful implementation of PjBL does not mean that there are no obstacles. The obstacles found during the PjBL implementation included: (1) poor time management; (2) teachers and students do not understand the essence of PjBL; (3) lack of motivation of teachers and students; (4) teachers and students have not been able to

understand the relationship between PjBL and real life; (5) the inequality in the ability of students in groups makes the project implementation not run smoothly; (6) teachers are confused about adapting learning to the PjBL model, in other words the teacher has not been able to understand when PjBL should be implemented; (7) lack of training for elementary school teachers on the PjBL model; and (8) inadequate facilities. According to the researchers, alternative solutions that can be further considered by teachers, schools and curriculum designers to overcome problems that occur during the implementation of PjBL include: (1) before implementing the PjBL model, schools must provide training to teachers on the PjBL model, this aims so that the teacher correctly understands PjBL theory and practice; (2) in order to overcome technical obstacles in the implementation of the PjBL model, a PjBL module is needed that can be used by teachers and students as a guide in project implementation; (3) the lack of facilities which is an obstacle to implementing the PjBL model can be circumvented through the use of technology and the surrounding environment.

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