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The Effect of PBL Assisted with Crosswords on Increasing Learning Outcomes and Motivation

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Received 5 June 2024, Revised 19 June 2024, Accepted 3 July 2024, Available online 5 July 2024

To link to this article: https://doi.org/10.53797/ujssh.v3i1.20.2024

Abstract: The purpose of this study was to determine the effect of the problem-based learning model assisted by crosswords on student learning outcomes in science material for grade VI elementary school students, to determine the effect of the problem-based learning model assisted by crosswords on student learning motivation in class student science material. VI Elementary School, to find out how much influence problem-based learning assisted by crossword puzzles has on student learning outcomes in science material for grade VI elementary school students and to find out how much influence problem-based learning assisted by crosswords has on student learning motivation in science material Elementary School grade VI students. This study uses quantitative research with a quasi-experimental design method. The design of the Quasi Experimental Design used is the Non-equivalent Control Group Design, in this type of design the experimental and control groups are not randomly selected. This study used data collection techniques in the form of questionnaires and tests. The final analysis is used as data to conclude from the research results. The results of this research are: There is an influence of the problem-based learning model assisted by crossword puzzles on student learning motivation in science material for grade VI elementary school students on student learning outcomes in science material for grade VI elementary school students.

Keywords: Problem-based learning, crossword puzzles, learning outcomes, and learning motivation

1. Introduction

Efforts to improve the quality of education are an important factor in advancing a nation. Education aims to explore students' potential so that it can be developed according to their respective abilities. Through education, students can develop mental and emotional intelligence, skills, and knowledge to contribute to social, national, and national life (Azzahra, 2023). To improve the quality of education, the government will continuously make changes to the curriculum. Currently, the curriculum implemented in Indonesia is the Merdeka curriculum and the 2013 curriculum (Firdaus et al., 2022; Angga et al., 2022; Pohan & Dafit, 2021).

In this curriculum, the objectives are regulated by the Ministry of Education and Culture No. 37 of 2018 concerning Core Competencies and Basic Competencies for Lessons in the 2013 Curriculum in Basic Education and Secondary Education, includes four main competencies, namely: 1) spiritual attitudes, 2) social attitudes, 3) knowledge, and 4) skills. These four competencies can be achieved through various learning processes, including intra-curricular, cocurricular and extracurricular (Nurhasanah et al., 2021; Suryana et al., 2022). Learning in educational units must be carried out in an interactive, inspiring, fun, challenging and motivating way for students to actively participate and provide space for creativity and independence in accordance with the students' interests, talents, physical and psychological development (Rasmani et al., 2023; Sulistiani et al., 2021; Harsiwi & Arini, 2020). As an educator, teachers must master the material, approaches, strategies, learning models that are appropriate to what is being taught and students' needs so that meaningful learning can be created (Lukman et al., 2022), apart from that, teachers can also develop competence and look for lots of information so that it is up to date, teachers can integrate the use of technology in learning activities (Rahayu et al., 2022; Rahayuningsih & Muhtar, 2022).

Science is one of the main subjects of the education curriculum in Indonesia, including at the basic level. Science is a subject that is considered difficult by most students (Utami & Sabri, 2020). Science education is very useful for our

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daily lives. Science education in elementary schools (SD) is expected to be able to increase students' curiosity, recognize concepts, and be able to have behavior to maintain and protect nature in terms of science, technology and society (Aris et al., 2022). Science learning is very important in elementary schools, because science is closely related to students' daily lives (Utaminingsih et al., 2023; Hadi et al., 2019). For this reason, the aim of science subjects in elementary school is for students to appreciate the nature around their environment by preserving and utilizing it. In relation to the entire curriculum, the learning process in students is the main factor that is most important and must be considered in science learning (Azizah et al., 2022).

Referring to learning objectives, motivation is needed to achieve a change. Motivation is able to encourage students to carry out all activities including learning activities. The existence of learning motivation greatly influences students' success in the teaching and learning process, as long as there is a willingness and desire to learn, the goal of learning will be successful. Learning motivation is divided into two, namely intrinsic motivation from students which can encourage them to take learning actions) and extrinsic motivation, an external condition that encourages students to participate in learning activities (Miftahussaadah & Subiyantoro, 2021).

However, in reality, the implementation of learning in the classroom, especially science learning, still faces many obstacles, one of which is low student learning motivation (Samroni et al., 2021). During the learning process, most teachers give lectures using the lecture method, students only listen and pay attention to the teacher's explanation, so students do not actively participate in learning. Lastly, the learning process takes place in one direction and is monotonous, without using interesting learning methods, which affects students' interest and motivation to learn. The success of the learning process is mainly influenced by factors originating from the students and teachers themselves. The learning process will be effective and can achieve learning goals if students have high motivation in learning. Therefore, it is important that teachers are able to foster students' learning motivation. To obtain optimal learning results, teachers must be able to create good leadership so that they can generate student learning motivation (Fahri & Lubis, 2022).

Based on the results of interviews conducted on April 10 2023 with class VI teachers at SDN 8 Suwawal in Mlonggo District, Jepara Regency, it was stated that the learning methods commonly used during the science learning process were using lecture and group discussion methods with the use of textbook media in teaching where the use of This method is actually quite good. Likewise, the assignments given by teachers to students are mostly in the form of essay questions or objectives, but these are commonly used during the learning process at school.

Scientific learning can be carried out in various ways, including using certain methods, models and strategies to improve students' skills, affective and psychomotor skills in order to achieve academic goals. Thus, the problem-based learning model assisted by the crossword puzzle software Proprofs is a manifestation of teacher competence and creativity in managing the learning tasks and exercises given to students (Lestari & Salsabila, 2023). As a teacher educator, you must know the learning model that will be applied, one of the learning models that can be applied is problem based learning, the problem based learning model is a student-centered learning model (Tanjung et al., 2022), and the problem-based learning model changes the assumption of students as subjects who do not have anything into objects that can be used as partners, contributors and provide inspiration for the continuation of learning (Devirita et al., 2021). Therefore, problem-based learning is a learning innovation from conventional to modern, democratic learning (Vianis et al., 2022). The problem based learning model is a model whose implementation starts from explaining the learning objectives and encouraging students to be involved in problem solving activities (Kurniawan et al., 2022). The problem will later be discussed by students, then presented and at the end of the activity, the teacher helps students to reflect on the learning material (Yuristia et al., 2022).

Hermilia et al. (2021) stated, ProProfs provides many features, such as Quiz Maker, Training Maker, Knowledge Base, Collaborate, Project, Brain Games, Flashcards, Polls, etc. One of the interesting features of ProProfs is the crossword puzzle where is a form of teacher skill and creativity in managing learning and training assignments given to students. ProProfs Brain Games as a tool to measure understanding of the material that has been studied. Apart from that, ProProfs Brain Games can also give a different impression to students when working on questions because what is presented is not just questions in text form but can be in the form of games that are interesting and not boring (Nurjanah et al., 2022). In this case, researchers want to know the impact of crossword puzzle games (TTS) supported by Profofs Quiz Maker software on students' learning motivation, especially in science subjects. Therefore, researchers conducted research with the title "The Effect of Problem Based Learning Models Assisted by Crossword Puzzles on Learning Outcomes and Learning Motivation".

The results of observations carried out at SD 8 Suwawal show that the low motivation of students in learning is due to the lack of variety in the learning models and media used by teachers and students acting as objects in learning. This is due to students' lack of attention in participating in learning which requires a lot of memorizing the concepts presented so that students feel bored, easily forget the material that has been taught, students' abilities are underutilized so they become passive and have low abilities. The solution is expected to be able to overcome these problems by increasing the activeness of the appropriate learning process by subject teachers. One learning model that can activate students is the Problem Based Learning learning model assisted by crossword puzzles using crossword puzzle media. Problem-based learning (Problem-Based Learning) is an innovative learning model that can provide active learning conditions for students (Devirita et al., 2021).

The aim of this research is to determine the effect of the problem-based learning model assisted by crossword puzzles on student learning outcomes and student learning motivation in science material for grade VI elementary school students.

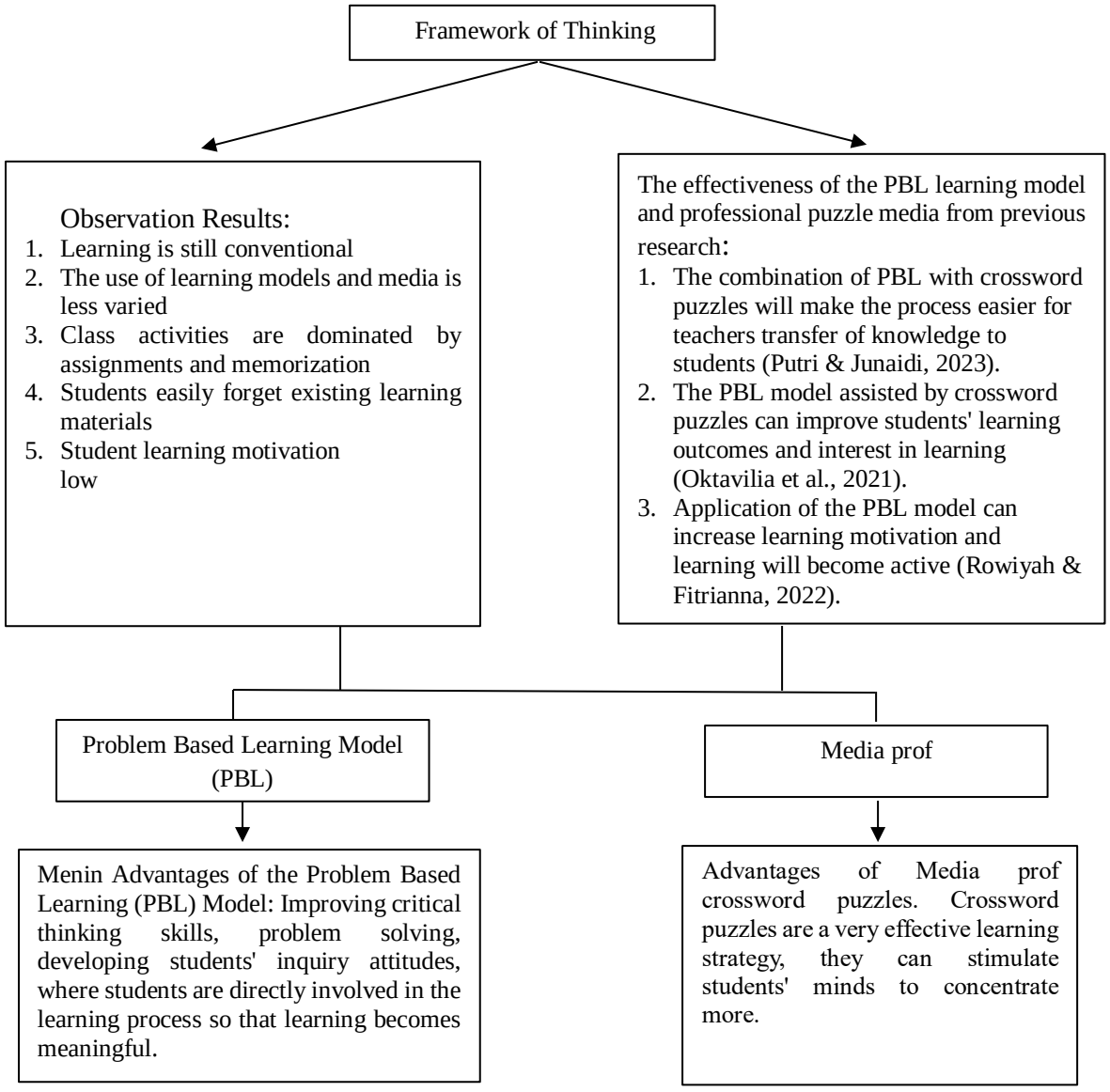

Figure 1. Research framework

2. Methodology

This research is a quantitative type of research it is explained that quantitative research is a research method based on the philosophy of positivism, used to research certain populations or samples, sampling techniques are generally carried out randomly, data collection uses research instruments, data analysis is quantitative/statistical to test the established hypothesis. The design of the Quasi Experimental Design used is Nonequivalent Control Group Design. In this type of design the experimental group and control group are not selected randomly (Sugiyono, 2013).

The population taken in this research were all sixth-grade students from elementary schools in Mlonggo sub-district. The samples in this research were two elementary schools, namely class VI of SD Negeri 8 Suwawal and SDN 1 Karanggondang. In this case, 15 class VI students from SDN 8 Suwawal became the experimental class and 16 class VI students from SDN 1 Karanggondang became the control class. Purposive sampling was used with certain considerations. These considerations include: Elementary school in 1 sub-district. Have implemented the 2013 Curriculum. The number of students is almost the same, learning facilities are relatively the same, students' abilities are relatively the same, and relatively the same problems.

The data obtained in this research includes learning outcomes data and student learning motivation questionnaires in the control class and experimental class. Learning outcome data includes results before and after tests in the control

class and experimental class. In the experimental class, post-test scores were obtained after being processed using a problem-based learning model and post-test scores in the control class were obtained using a conventional learning model.

3. Findings and Discussion

Based on Table 1, it shows that the average score for the experimental class was 66.53 in the pre-test, 88.53 in the post-test. Meanwhile, the control class obtained a pre-test average of 66.33, post-test 75.13. In the post test scores for the control class and the experimental class, there was a significant difference in the average score with a KKM of 75. The experimental class had a higher average than the control class. The pre-test and post-test results can be explained using a bar chart of the pre-test and post-test results for each class. The following are the results of the pre-test and post-test diagrams for the experimental and control classes.

Table 1. Analysis of pre-test and post test data for control and experiment classes

Statistical Description				
	Experiment Classes		Classes Control	
	Pre-test	Post-test	Pre-test	Post-test
N Valid	15	15	15	15
Mean	66.53	88.53	66.33	75.13
Minimum	56	76	52	60
Maximum	76	100	76	90
Std. Deviation	5.579	8.667	7.058	8.798

Based on Fig. 2, it can be seen that there has been an increase in the average pre-test and post-test scores in the control class and experimental class. However, the highest average increase was in the experimental class.

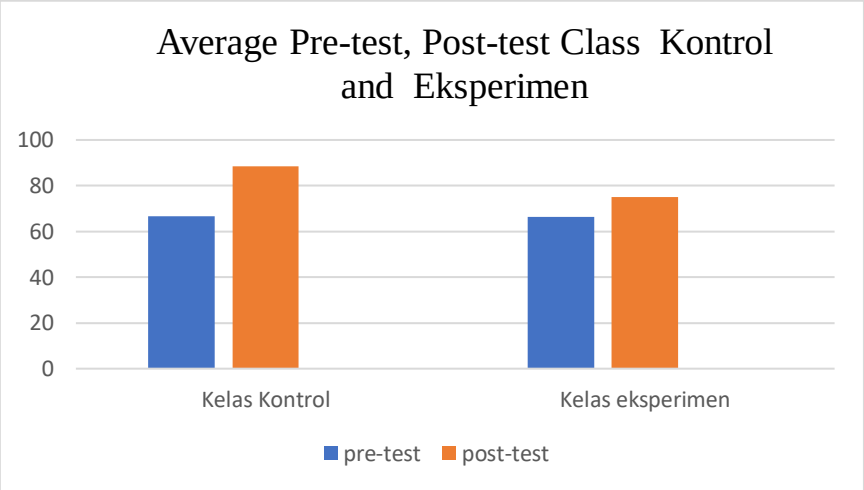

Figure 2. Description of the pre-test and post-test for the experimental and control classes

Based on Table 2, it shows that the average motivation of the experimental class was 82.73. Meanwhile, the control class obtained an average motivation of 76.93. The experimental class has a higher average motivation than the control class. Motivational results can be clarified using bar charts of pre-test and post-test results for each class. The following are the results of the motivation diagram for the experimental and control classes.

Table 2. Analysis of pre-test and post test data for control and experiment classes

Statistical Description		
	Experimental class motivation	Motivation Control class
N Valid	15	15
Mean	82.73	76.93
Minimum	70	62
Maximum	91	90
Std. Deviation	6.954	7.086

Source: SPSS 2023 Data Analysis

Based on Table 3, it shows that the average motivation of the experimental class was 82.73. Meanwhile, the control class obtained an average motivation of 76.93. Motivational results can be clarified using bar charts of pre-test and post-test results for each class. The following are the results of the motivation diagram for the experimental and control classes.

Table 3. Description of the pre-test and post-test for the experimental and control classes

Descriptive Statistic		
	Motivation experiment class	**Motivation control class**
N Valid	15	15
Mean	82.73	76.93
Minimum	70	62
Maximum	91	90
Std. Deviation	6.954	7.086

Based on Fig. 3, it can be seen that there was an increase in the average motivation in the control class and experimental class. However, the highest average increase was in the experimental class. There is an increase in the influence of problem-based learning assisted by crossword puzzles on student learning outcomes in science material for class VI elementary school students. After going through the prerequisite tests in the form of normality tests and homogeneity tests, hypothesis testing is then carried out.

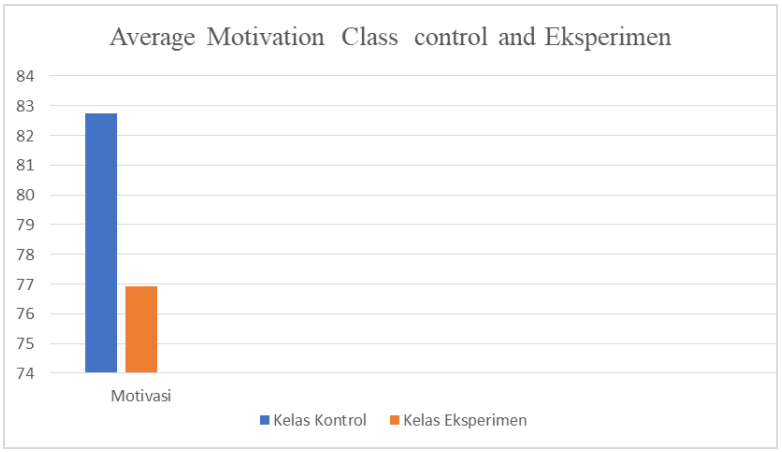

Figure 3. Data motivation of experiment and control class

The following are the results of the hypothesis calculation. It can be seen from Table 4, that there are differences in the increase in student learning outcomes which can be seen in the pretest scores and posttest scores in the experimental class and control class.

Table 4. Paired test results

		Mean	**N**	**Std. Deviation**	**Std. Error Mean**
Pair 1	Pre-test experiment	66.53	15	5.579	1.440
	Post-test experiment	88.53	15	8.667	2.238
Pair 2	Pre-test control	66.33	15	7.058	1.822
	Post-test control	75.13	15	8.798	2.272

4. Conclusion

Based on the results it can be concluded that there is an influence of the problem based learning model assisted by crossword puzzles on student learning motivation in science material for class VI elementary school students on student learning outcomes in science material for class VI elementary school students, there is an influence of the problem based learning model assisted by crossword puzzles on student learning motivation in science material for class VI elementary school students, there are differences in the increase in student learning outcomes which can be seen in the pretest scores

and posttest scores in the experimental class and experimental class, and there are differences in the increase in student learning motivation that can be seen, in the experimental class and the control class.

Acknowledgement

The authors would like to express their gratitude to the Universitas Muria Kudus for their support in providing both facilities and financial assistance for this research.

Conflict of Interest

The authors declare no conflicts of interest

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