



Improving Student Learning Outcomes in Light and Optical Instruments Using Team Teaching Methods with Crossword Puzzle Media

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Article Info

Article history:

Received Jan 15, 2024

Revised Feb 23, 2024

Accepted Mar 6, 2024

OnlineFirst Mar 20, 2024

Keywords:

Crossword Puzzle
Learning Outcomes
Light and Optical
Student
Team Teaching

ABSTRACT

Purpose of the study: This research aims to determine the improvement in student learning outcomes regarding light and optical devices in class VIII junior high school through the team teaching method and crossword puzzle learning media.

Methodology: This research is a type of classroom action research. The subjects in this research were 30 students in class VIII A of Junior High School 2 Tuntang. Data collection techniques in this research used tests, observation, documentation. Data analysis in this research was carried out descriptively qualitatively and quantitatively.

Main Findings: The research results showed that cycle I produced 8 students with a percentage of 26.7% who completed the minimum completion criteria and there were 22 students who had not completed it with a percentage of 73.3%. Meanwhile, cycle II produced 26 students who completed the minimum completion criteria with a percentage of 86.7%, while there were 4 students who had not completed it with a percentage of 13.3%. This was marked by an increase in the results of classical completion criteria in cycle I which was only 26.7% to 86.7% in cycle II. The team teaching method used in combination with crossword media makes students interested in new ways of learning.

Novelty/Originality of this study: This study explores improving student learning outcomes in light and optical instruments using innovative methods, including team teaching and interactive crossword puzzles. The integration of crossword puzzles into teaching materials provides a unique and engaging learning experience, enhancing students' understanding of the subject.

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1. INTRODUCTION

The teaching and learning process is a form of interaction between teachers who transfer knowledge and students who receive that knowledge [1], [2]. One of these activities is teaching, where teachers are required to stand in front of providing new information and knowledge to students and provide motivation so that students can accept this knowledge happily [3], [4]. Conventionally, many teachers convey this knowledge by means of lectures, which for students is boring and can reduce students' interest in learning [5], [6]. Many students need a pleasant classroom atmosphere to study so that they can receive this knowledge well [7], [8]. Nowadays, there are many students whose learning achievements are still below the minimum completeness criteria standard.

This is because many students find it difficult to learn. Lack of encouragement from the environment to develop their potential becomes an obstacle in the teaching and learning process [9], [10]. Many teachers still use monotonous teaching methods and media that do not attract students' interest in learning [11], [12]. Therefore, motivation is a very important thing that must be done by teachers together with parental support in improving student learning outcomes.

As a teacher in this millennial era, using innovative methods and media is really needed to improve the quality of education, especially in teaching and learning in the classroom [13], [14]. Taking part every day in the classroom makes teachers understand the appropriate methods and media to use in learning in each class. Like teachers who teach science subjects. [15] There are some children who really like the lesson so it is easy for them to understand the concept of the material, but it is not possible for all of them to like the lesson [16]. This is what encourages action, taking real action to find ways for all students to understand the concept of the material and love the lesson. One way is by using the Team Teaching method.

The Team Teaching teaching method is carried out by several people or more than one person, each teacher has their own task with the same learning objectives [17]. Apart from that, when using this method, what is done is not just teaching together but starting to plan, implement and evaluate learning together [18]. This Team Teaching method will be better if it is collaborated with interactive learning media, such as Crossword Puzzles. The learning media resulting from the development of the Crossword Puzzle is in the form of a rectangular board on which there are several words ready to be paired with each other according to the material so that they become a harmonious whole.

Junior High School 2 Tuntang is one of the schools where most of the old methods of learning are still used, such as the lecture method, where the teacher delivers the material and the students just listen to what the teacher says [19]. Students who feel bored with learning prefer to talk to themselves and are busy with their own activities rather than listening to the lessons delivered by the teacher [20]. Not only that, the large number of students in one class is also a factor in less effective learning because teachers cannot focus on all students [21]. Based on several things above, the students' learning outcomes scores are still below the minimum completeness criteria, especially in science subjects, light and optical instruments, which only reach a percentage of 10% out of 30 students, which means there are only 3 students who get a score above the minimum completeness criteria, namely 70.

This research is in line with research conducted by Joneska et al, [22], although research on improving student learning outcomes on light and optical musical instruments using team teaching methods with crossword puzzles shows promising progress in enriching learning approaches, there are still several gaps that need attention. One of them is the need for more research related to the effectiveness of applying this method in various learning contexts and educational levels [23]. Apart from that, further research also needs to pay attention to factors such as differences in student needs and learning styles, as well as adapting more specific learning strategies in order to provide more optimal and sustainable results. Based on the problem formulation above, it can be seen that the aim of this research is to determine the improvement in student learning outcomes regarding light and optical instruments in class VIII A at Junior High School 2 Tuntang through the Team Teaching method and Crossword Puzzle learning media.

2. RESEARCH METHOD

2.1 Type of Research

This research is a type of classroom action research. Classroom action research is an observation that implements actions in the classroom using rules in accordance with research methodology carried out over several periods or cycles [24]. Teachers carry out Classroom Action Research to improve the quality of learning, increase learning achievement, develop teaching skills and so on based on real problems in the classroom so that the essence of learning can be realized.

2.2 Population and Sample

The subjects in this research were 30 students in class VIII A of Junior High School 2 Tuntang, with 18 male students and 12 female students along with the science teacher in that class. In this action research, the researcher will use the Team Teaching method with Crossword Puzzle media in two cycles where each cycle consists of one meeting.

2.3 Data Collection Techniques

Data collection techniques in this research used tests, observation, documentation. The use of tests provides a clear picture of students' understanding of the subject matter being taught [25]. Observation allows researchers to see directly the interactions between teachers and students during the learning process, as well as observe students' responses to the teaching methods applied [26]. Meanwhile, documentation produces data that

can be analyzed in more depth, such as class notes, exam results, or student work that can provide additional insight into their learning progress.

2.4 Data Analysis Technique

Data analysis in this research was carried out descriptively qualitatively and quantitatively. Data analysis here aims to determine the motivation and learning outcomes that students have achieved, as well as the responses given during learning. The motivation results in this research cover the psychomotor domain and learning outcomes include the cognitive domain. The psychomotor domain can be identified through observation sheets.

2.5 Research Procedures

Classroom action research procedures are steps taken by teachers to improve learning in their classes [27]. First, the teacher will identify problems or areas that need to be improved in learning. Then, the teacher will plan specific actions to overcome the problem. The next step is to apply these actions in daily learning in the classroom [28]. During implementation, the teacher will collect data about the effectiveness of the action using methods such as observation or tests. After that, the teacher will analyze the collected data to evaluate whether the action was successful or needs to be adjusted. This process can be repeated several times until learning problems are resolved and student learning outcomes improve [29]. Overall, this procedure helps teachers to continue to improve the quality of learning in their classes.

3. RESULTS AND DISCUSSION

3.1. Implementation of learning uses the Team Teaching method with Crossword Puzzle media

Implementation of science learning on light and optical instruments in class VIII A of Junior High School 2 Tuntang pre-cycle using the classic lecture method. Meanwhile, learning in cycles I and II which used the Team Teaching method and Crossword Puzzle media showed an increase in each cycle, which means that after these actions were carried out, the students' learning outcomes were better than before [30]. Even though in cycle I it still needs improvement, this can be resolved in cycle II. At the pre-cycle stage, it was seen that the class was still not conducive because many students did not pay attention to the lesson but instead liked to play alone. However, entering cycle I, the class conditions began to become somewhat more conducive, where when students were given bait, they took the bait well, such as when they were asked a question, they reflexively answered the question.

Cycle I is the first cycle using the Team Teaching method with Crossword Puzzle media, although 85% of the learning has been carried out well according to the learning implementation plan that has been made. Why is it still said to be 85%, because in cycle I the time spent during learning was not as planned, and the media was still too monotonous. Therefore, all deficiencies in cycle I were corrected in cycle II.

This second cycle of learning can be said to be successful because almost all aspects that had been planned went well from start to finish, because students were getting used to the methods and media applied in the previous cycle so that students looked more enthusiastic in this second cycle. This is proven by the increase in learning outcomes from cycle I to cycle II.

3.2. Improving student learning outcomes using the Team Teaching method with Crossword Puzzle media

Based on the learning process carried out by researchers, a recapitulation or distribution of test results and student observation results during cycles I and II was obtained. The recapitulation and distribution can be seen in the table below:

Table 1. Recapitulation of Improvement in Learning Outcomes Per Cycle

No.	Cycle	Cycle	Cycle
1.	Pre-Cycle	49	-
2.	Cycle I	53,7	8,3
3.	Cycle II	85	27,7

The results of the average student score have increased in each cycle, as evidenced by the increase in the average score from cycle I to cycle II by 27.7. Based on the results, it can be seen that the learning outcomes of students in class VIII A of Junior High School 2 Tuntang, Semarang Regency have increased in each cycle. Cycle II succeeded in increasing learning outcomes from initially completing learning in cycle I for only 8 (26.7%) people to 26 (86.7%) people. When depicted in a graph it will show a graph as follows:

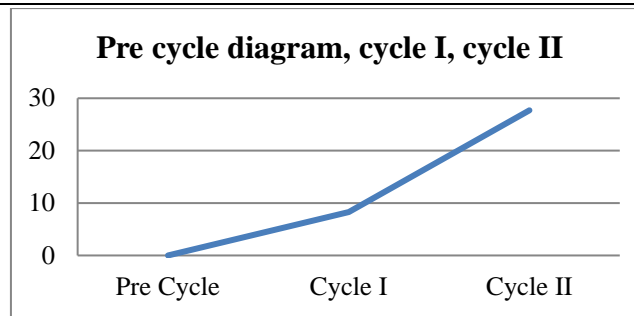


Figure 1. Histogram Diagrams Comparison of Pre-Cycle, Cycle I and Cycle II Learning Outcome Values

The picture above shows that the results of learning science are light material and optical instruments for class VIII A students at Junior High School 2 Tuntang increased through the Team Teaching method and Crossword media Puzzles. The team teaching method involves several teachers working together to provide learning, allowing for the connection of different memberships and experiences [31]. In the context of learning light and optical musical instruments, this approach can improve student understanding by providing a variety of perspectives and teaching approaches. In addition, the use of crossword puzzles as a learning aid can increase students' interest, motivate them to be actively involved in the learning process, and strengthen their problem-solving skills.

The application of team teaching methods using crossword puzzles not only brings a fun game aspect to learning but also creates a collaborative and interactive learning environment [32]. Through crossword puzzles, students are invited to work together to solve complex problems, build work teams, and share knowledge and strategies [33]. The process of finding answers that involves discussion between team members promotes active communication and joint problem solving, thereby strengthening student involvement in learning and increasing their understanding of the lesson material.

Applying the team teaching method using crossword puzzles can also create a collaborative and interactive learning environment [34]. Collaboration between teachers in teams allows the distribution of responsibilities and division of roles, so that each teacher can focus on certain aspects of the subject matter. This can create a more dynamic learning atmosphere and allow students to experience variations in presenting information [35]. Thus, this research has the potential to make a positive contribution to improving student learning outcomes, creating more effective learning experiences, and providing alternative teaching methods that can be applied in various educational contexts.

Research on improving student learning outcomes on light and optical musical instruments using team teaching methods with crossword puzzles offers interesting innovations in the world of education [36]. A collaborative approach through team teaching provides a varied and in-depth learning experience for students, while the use of crossword puzzles provides a game dimension and challenge in the learning process [37]. The novelty of this research lies in the effective integration of teaching methods, learning materials for light and optical musical instruments, as well as the use of crossword puzzles as an interesting and interactive learning medium [34]. Thus, this research has the potential to make a positive contribution to increasing student understanding and learning outcomes in a creative and fun context.

A research gap is the lack of focus on the psychological aspects and effectiveness of teaching involving interactions between teachers and students [38]. This study may not have explored in depth how the team teaching method using crossword puzzles can optimize the learning process by paying attention to individual student needs and considering students' motivation and interest factors in learning. Apart from that, the possibility of measuring learning outcomes that is too focused on cognitive understanding of the material without taking into account the practical and applicable aspects of learning light and optical musical instruments can also be an issue that needs to be addressed [39]. This research combines team teaching methods and crossword media, this research offers an interesting approach to increasing students' understanding of the concept of light and optical musical instruments. This approach not only strengthens collaboration between teachers, but also enriches students' learning experiences by presenting material in an engaging and interactive format.

The implication of this research is that a learning approach that involves teamwork and the use of interactive media can be an effective alternative in increasing students' understanding and involvement in studying complex material [40]. In addition, the use of crossword puzzles as a learning medium can also stimulate students' creativity and help them combine the concepts taught with relevant contexts, which in turn can improve their information retention and problem-solving abilities.

The limitations of research on improving student learning outcomes on light and optical musical instruments using the team teaching method with crossword puzzles include several things. First, the success of learning may depend on the teacher's ability to apply the method effectively, so adequate training and mentoring is needed [41]. Second, other variables outside of teaching methods such as student motivation, learning

environment, and parental support can also influence student learning outcomes but were not fully addressed in this research. In addition, the generalization of research results may be limited to certain contexts and research subjects, so further research is needed to confirm these findings in various learning situations.

4. CONCLUSION

Based on the classroom action research that has been carried out and the discussion above, it can be concluded that the use of the Team Teaching method and Crossword Puzzle media can improve learning outcomes in science subjects regarding light and optical instruments in class VIII A students of Junior High School 2 Tuntang, Semarang Regency. The researcher's recommendation for further research is to develop a more in-depth measuring tool to measure students' conceptual understanding in the use of optical instruments.

ACKNOWLEDGEMENTS

The author would like to thank all parties who have contributed, both directly and indirectly, to the completion of this journal

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