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Improving students' physics learning outcomes through the snowball throwing type of cooperative learning model

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ABSTRAK

Penelitian ini bertujuan untuk meningkatkan hasil belajar fisika melalui pembelajaran kooperatif tipe *snowball throwing*. Penelitian ini menggunakan model Penelitian Tindakan Kelas (PTK) dua siklus. Penelitian dilaksanakan pada siswa kelas XI yang mengambil kelas fisika. Siswa yang terlibat berjumlah 34 orang (24 perempuan dan 10 laki-laki). Hasil belajar siswa dinilai menggunakan instrumen tes pilihan ganda. Hasil belajar siswa dianalisis menggunakan teknik persentase. Penelitian dinyatakan berhasil apabila peningkatan rata-rata hasil belajar siswa mencapai 67 dan ketuntasan klasikal mencapai 80%. Hasil penelitian menunjukkan ada peningkatan hasil belajar siswa setelah diterapkan pembelajaran kooperatif tipe *snowball throwing*. Jadi, pembelajaran kooperatif tipe *snowball throwing* dapat meningkatkan hasil belajar fisika siswa kelas XI yang mengambil kelas fisika.

Keywords:
Snowball throwing
Physics learning outcomes
Cooperative model

ABSTRACT

Improving students' physics learning outcomes through the snowball throwing type of cooperative learning model. This study aims to improve physics learning outcomes through cooperative learning type snowball throwing. This study uses a two-cycle Class Action Research (CAR) model. The research was carried out on class XI students who took physics classes. There were 34 students involved (24 girls and 10 boys). Student learning outcomes were assessed using multiple choice test instruments. Student learning outcomes were analyzed using the percentage technique. The research is declared successful if the average increase in student learning outcomes reaches 67 and classical completeness reaches 80%. The results showed increased student learning outcomes after applying snowball throwing cooperative learning. So, cooperative learning with the type of snowball throwing can improve the physics learning outcomes of class XI students who take physics classes.

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Introduction

One of the goals of the educational process in schools is to improve student learning outcomes (Nasution, 2017). Learning outcomes refer to the level of mastery that students achieve when studying following the goals set (Syakur et al., 2020). Good learning outcomes cannot be obtained instantly but through a long process. Two factors influence learning outcomes, namely individual factors and social factors. Individual factors include maturity, intelligence, motivation, and personal factors. At the same time, social factors include teachers, families, and educational media. Learning outcomes must show improving conditions so that it is useful to increase knowledge, increase understanding, improve skills, have new perspectives, and appreciate things more (Syakur et al., 2020).

The results of student learning in Indonesia in physics have not yet achieved maximum results. A small number of students in class XII of SMAN 9 Pekanbaru still have report cards above the Minimum Completeness Criteria (KKM) (Ramlah, 2017). The average daily test of class X students of SMAN 1 Bandar two is still low (Azzahrah et al., 2017). In another area, at SMAN 16 Makassar, it was found that the average value of students' physics learning outcomes was still below the criteria of 65 (Helmiati, 2014a). Hakiki et al. (2015). also found a similar condition in the students of SMPN 30 Makassar. Physics learning outcomes incorporated in Integrated Science subjects are still very low compared to other subjects (Hakiki et al., 2015).

A preliminary study conducted in class XI of SMAN 2 Bantul revealed that student learning outcomes in physics subjects were still below the standard. Twelve out of 34 students showed learning outcomes less than the specified KKM (Minimum Completeness Criteria). Student learning outcomes in the good category are not more than half the number of students. Meanwhile, students who have good learning outcomes do not reach 20%. Various factors can cause low student learning outcomes. For example, the low interest and motivation of students in learning (Kinasih & Mariana, 2021; Sari et al., 2017), collaborative and cooperative learning that has not been entrenched among students, and the lack of variety of learning media used (Suseno et al., 2020), and can also comes from the monotonous way of teaching teachers (Bahtiar & Suryarini, 2019; Ismatullah & Fathoni, 2018). This is an urgent problem for teachers and schools to address. Students see the complexity of physics material as something difficult to learn.

Teachers should instruct students to utilize the learning models/methods needed for classroom learning to encourage high student achievement. According to Djamarah and Zain (2010), the technique serves as a teaching strategy, an extrinsic motivation, and a goal achievement tool. Therefore, a teacher should know various teaching techniques and have practiced using them. Appropriate learning models and methods are needed for learning in the classroom. Appropriate learning models and methods are expected to have implications for the effectiveness of improving student learning outcomes as expected.

The cooperative model of the snowball throwing type is one type of learning that can be used to improve learning outcomes (Nurbaiti, 2022). The snowball throwing model, known as snowball fighting (Handayani et al., 2017), makes students more active. This learning characterizes learning in a cheerful situation (Manurung et al., 2019). Students take more roles in learning activities than teachers. So that the learning experience carried out by students can optimize all the senses they have. Some advantages of snowball throwing type cooperative learning are more creative and efficient classroom management, encouraging students to be more active and creative, creating a friendly learning climate between teacher-students and students, and improving individual and group learning outcomes (Huda, 2011).

The cooperative learning model of the snowball throwing type, technically, is carried out by students by making question balls from crumpled paper resembling snowflakes and then throwing them to one of their friends. Students who get the paper ball can read the questions in front of the class and answer them (Manurung et al., 2019). This learning activity was adapted from the game of throwing snowballs to hit other people (Handayani et al., 2017).

The snowball throwing model has been empirically proven to improve student learning outcomes. Effendi and Sholikhah (2020) applied this model to class X students and obtained an increase in student physics learning outcomes reaching a class average of 82.0. Mardiana and Syazali (2020) applied the snowball throwing model to improve physics learning outcomes for junior high school students in NTB. Student learning outcomes increased from the initial condition of the class average of 69 to 78 at the end of the research cycle. Then Ariska et al. (2018) conducted experimental research on class XI science in Talamau. The snowball throwing model is effective in improving physics learning outcomes. According to Masyita et al. (2018), using the snowball throwing learning approach to improve the physics learning outcomes of junior high school students. Student learning outcomes in the last cycle that can be achieved are 80.4 with classical completeness of 86.36%. Based on the explanation presented previously, this research aims to improve students' physics learning outcomes through the application of the snowball throwing type of cooperative learning model.

Method

This study uses a 4-stage Class Action Research (CAR) adopted from Kemmis and McTaggart (1988). The four stages of research start from the planning stage, then the action stage, the observation, and the reflection stage. The preparation of learning tools and supporting evaluation tools is carried out at the planning stage. The implementation of learning snowball throwing is carried out at the Action stage. The observation stage is used to assess and observe learning activities. At the same time, the reflection stage is used to evaluate the level of achievement of student learning outcomes during learning activities at the Action stage. Reflection activities will determine whether the learning cycle needs to be developed and re-implemented or not. This PTK activity was carried out in 2 cycles, each consisting of 3 meetings.

The research subjects used in this study came from class XI MIA 4 SMA Negeri 2 Bantul. A total of 34 students (24 female and 10 male) were involved as the subjects of this study. The class of subjects used as respondents was selected based on the class taught by the researcher.

As previously stated, each research cycle consisted of 3 meetings, the student's prior knowledge was tested at the first meeting before the lesson was implemented. After the pre-test, learning activities using the snowball throwing model were carried out for three meetings. Before the end of the last meeting in each cycle, a post-test was conducted to assess student learning outcomes after the learning activities were carried out. The syntax for learning snowball throwing consists of: (1) delivering learning objectives and motivation, (2) conveying information, (3) grouping students, (4) guiding work and study groups, (5) evaluating, and (6) giving rewards.

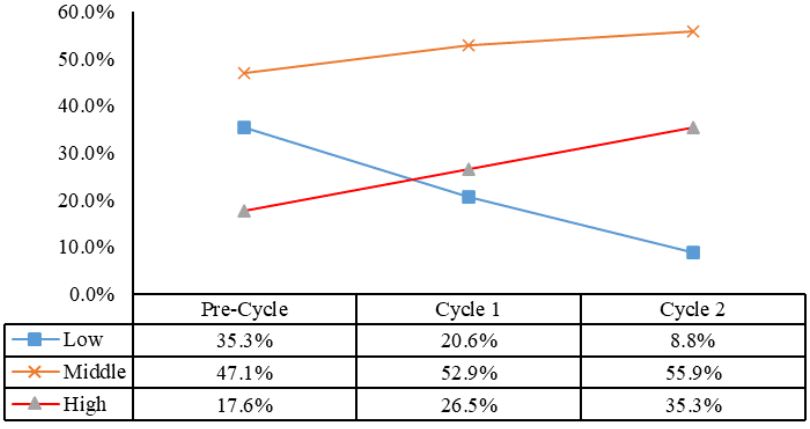
The instrument used to assess the learning outcomes of physics in this study was in the form of multiple-choice cognitive test questions. Data collection techniques in the form of a written test. Student learning outcomes were analyzed using the percentage technique. The success parameter of this research refers to the Minimum Completeness Criteria (KKM) on the learning outcomes achieved. The KKM used is 67. The study is successful if the average student learning outcome is ≥ 67 and classical completeness is at least ≥ 80%. Table 1 describes the minimum completeness criteria used.

Table 1. minimum completeness criteria

No	Score	Criteria
1	< 67	Low
2	67– 88	Middle
3	> 88	High

Results and Discussion

This study aims to improve student learning outcomes by implementing the snowball throwing type of cooperative learning model. This study carried out as many as three cycles. A summary of student learning outcomes during the research is shown in Figure 1.



	Pre-Cycle	Cycle 1	Cycle 2
Low	35.3%	20.6%	8.8%
Middle	47.1%	52.9%	55.9%
High	17.6%	26.5%	35.3%

Figure 1. Student learning outcomes during CAR

Pre-cycle

Before carrying out the learning activities in cycle 1, an initial test was carried out on 34 students. The lowest score obtained by students is 65, and the highest score is 95. The average grade obtained is 74.3. Based on Figure 1, the number of students with learning outcomes in the "low" category is 35.3%. The number of students learning outcomes in the "Middle" and "High" categories is 47.1% and 17.6%, respectively. After the accumulation, the number of students met the criteria was 64.7%. Starting from these findings, it is necessary to take Cycle 1 learning actions.

Cycle 1

After learning cycle 1 was carried out and the final test was carried out, the average class score was 77.4. The highest score achieved by students was 96, while the lowest score was 66. The categorization of student learning outcomes in Figure 1 obtained the percentage of students who met the criteria of 79.4%, with details in the "Middle" category of 52.9% and the "High" category of 26.5%. In the "Low" category, the number of students reached 20.6%. The reflection results on the success criteria in cycle 1 have not been met. The average value of the class has exceeded the specified criteria, while classical completeness has not yet reached 80%. Therefore, the reflection results in cycle 1 conclude that the action activities need to be continued to cycle 2.

Cycle 2

After learning cycle 2 and the final test were carried out, the average class score was 80.0. The highest score achieved by students was 97, while the lowest score was 66. The categorization of student learning outcomes in Figure 1 obtained the percentage of students who met the criteria in cycle 2 of 91.2%, with details in the "Middle" category of 55.9% and the "High" category of 35.3%. In the "Low" category, the number of students reached 8.8%. The reflection results on the success criteria in cycle 2 have been met. The average class score reached the specified criteria, and classical completeness exceeded 80%. Therefore, the reflection results in cycle 2 conclude that the action activities do not need to be continued to cycle 3.

Referring to Figure 1, it can be seen that the use of the snowball throwing type of cooperative learning model has a positive trend toward student learning outcomes. The learning carried out for 2 cycles had an impact that was in line with expectations. Judging from the average grade students can achieve, there is an increase of 3.1 from pre-cycle to cycle 1. Meanwhile, from cycle 1 to cycle 2, student learning outcomes have increased by 2.6. The number of students who achieved completeness increased by 11.8% from cycle 1 to cycle 2. This increase implies a pleasant learning atmosphere for students (Manurung et al., 2019). Students feel unburdened when learning because KBM has a game atmosphere. This is in line with the previous view that the cooperative learning model of the snowball

throwing type adopts a snowball throwing game model for the opponent (Firdaus, 2016; Handayani et al., 2017; Helmiati, 2014b).

The increase in the average value of the class during the 2 cycles of learning cannot be separated from the increase in student learning outcomes, both individually and in groups. The number of students in the "Middle" and "high" categories always increased from cycle 1 to cycle 2. While the number of students in the "Low" category consistently decreased significantly. The findings from this study provide further evidence that the application of the snowball throwing type of cooperative learning model can improve students' physics learning outcomes. The positive impact of implementing the snowball throwing type of cooperative learning model on student learning outcomes is in line with several previous studies (Ariska et al., 2018; Effendi & Sholikhah, 2020; Mardiana & Syazali, 2020; Masyita et al., 2018).

Conclusion

Based on the results of this research and discussion of classroom action research, it can be concluded that the application of the snowball throwing type of cooperative learning model can improve physics learning outcomes for students of class XI MIA 4 SMA Negeri 2 Bantul. The average student learning outcomes increased beyond the KKM, and the number of students met the criteria for completeness. The increase in student physics learning outcomes occurred consistently from the results of the Actions in cycle 1 and cycle 2. However, this research needs to be continued for future quasi-experimental research. Future researchers need to see the results of comparing the snowball throwing type of cooperative learning model with other types of cooperative learning and other learning models.

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