



USING COOPERATIVE LERNING MODEL- SNOWBALL THROW TO IMPROVE STUDENTS ENGLISH LEARNING OUTCOMES

Lanlan Muhria^{a*}, Iman Solahudin^b

^a STKIP Yasika, Indonesia

^b STKIP Yasika, Indonesia

*Corresponding author: Cirebon, Indonesia, muhrialanlan@gmail.com

article info

Article history

Received: 01 September 2021

Received in revised form:

30 December 2021

Accepted: 30 December 2021

Available online:

31 December 2021

Keywords:

Cooperative learning

Snowball throwing

Learning outcomes

abstract

The goal of this study was to see if a snowball throwing cooperative learning strategy could improve students' English learning outcomes in from of writing an advertisement. Classroom Action Research is the research method used in this study. The actions are divided into two cycles, each with four stages: preparation, implementation, observation, and reflection. The study was carried out at SMPIT Al Muhsinin with 24 students, 10 males and 14 females. Data gathering procedures are observations, interviews, assessments, and documentation. the findings of the research shows that snowball throwing cooperative learning strategy has a good influence on enhancing student learning outcomes, as seen by an increase in student learning completion in each cycle, which is 56.25 percent in cycle I and 81.25 percent in cycle II. As a result, the classical completion of pupil learning has been attained. The Snowball Throwing methodology, when used collaboratively, can boost students' learning motivation and cooperation when learning English.

INTRODUCTION

Education is critical to the survival of human life. The rapid advancement of science and technology encourages the expanding range of problems people encounter. As a result, humans are obliged to create, develop, and adapt. According to Susanto (2013), the difficulty of the world of education today, and potentially a problem, is the poor execution of the learning process used by instructors in school. It should be predicted that the learning method has not fostered and improved students' thinking skills.

In junior high school, learning English acts as a vehicle for self-development regarding access to science and technology. English language learners are required to master four language skills: listening, speaking, reading, and writing. Because learners must think critically and constructively while learning, the cooperative learning model is one of the most successful, efficient, and innovative learning strategies. This strategy is ideal for students who have inadequate understanding and poor thinking skills and students who are intelligent but unable to communicate their thoughts. The researchers hypothesized that repeating a material will improve pupils' knowledge of the described material.

Students can be excited about learning if they use a strong learning model. A snowball-throwing collaboration model is one of the needed learning models and types. A learning paradigm emphasizes student cooperation for pupils to attain their expected learning goals.

The use of collaborative learning in education places a larger emphasis on coordinating among students within a group. This is founded on the assumption that when students debate difficulties, the concept of facts becomes easier to grasp. Students behave well in co-op learning because they are driven to learn and actively participate in various activities. In learning activities, teacher creativity is required to ensure that students make appropriate use of their time and focus their energy on productive activities. Through active cooperation among students, this learning allows pupils to grasp deeper concepts and enhance learning outcomes (Silalahi, 2020).

Prasetya et al. (2014) showed that most students had not reached the minimum completed criteria set at 70, with an average of 57.26. After acting on Cycle I increased to 75.7. Then, the researcher continued the action on cycle II so that it got the highest value of 100, and the average value became 88.7. Another study, Astrini et al. (2013), showed increased student response in applying the method with audiovisual media during learning activities. Cycle I shows a percentage of 72% and increases to 82% in cycle II. In cycle III, the percentage reached was 89.5%. The data indicate that the application of this model can be used as a way out to solve problems that exist in students.

From the results of interviews with class IX teachers conducted at SMPIT Al Muhsinin, it is known that the learning process still uses conventional learning methods dominated by lectures and translates the subject into Indonesian in the learning. In the implementation of learning, teachers are more likely to use a direct approach to impact the learning process that eventually becomes boring. Teachers are less applying alternative learning models that vary to teaching and learning in the classroom. Learning methods are less appealing to learners, making them less passionate about learning English and contributing to students' poor learning outcomes.

Low learning outcomes are caused by teacher-centered learning and less attractive content, which causes learners to be passive in the learning process. In addition to these issues, a lack of infrastructure and facilities positively influence the learning process, resulting in a less effective and efficient learning process. Learners must grasp the significance of what they are learning, the advantages, their current position in the learning process, and how to obtain it to be continuously motivated to study (Widyaningsih & Yusuf, 2015).

Permana and Sulistyowati (2015) point out that the learning model is a plan or model used as a guideline for planning classroom learning or tutorial learning. In another opinion, Rusman (2015) states a learning model is a plan or template that can be used to shape a curriculum, layout getting to know materials, and manual getting to know in magnificence or others. According to Permana and Sulistyowati (2015), some things that must be considered in choosing a learning model are the subject, lesson hours, the level of cognitive development of students, the learning environment, and supporting facilities available learning goals can be achieved.

Based on the experts' understanding above, it can be concluded that the learning model is a pattern used by teachers to design materials that will be delivered in the learning process. So that the learning process presented is more interesting and motivates learners during the learning process can be used cooperative learning type snowball throwing. Snowball throwing is one type of cooperative learning model.

Snowball throwing learning is a learning method that, in its implementation with the supervision of teachers, learners learn in groups and work together to master the subject (Oviyanti, 2013). According to Rashid & Side (2011), the learning process by utilizing the snowball throwing model makes learners a learning center; learners actively discuss and solve problems from questions expressed during the learning process and do tasks together. The

snowball throwing model uses questions as a tool for learning activities of learners in the classroom. Snowball throwing encourages pupils to participate in more exciting activities, increasing their enthusiasm for teaching and learning. Furthermore, rather than simply social skills, students can now strengthen their conversation skills through hobbies. This activity can also help college students enhance their language mastery. It has also been shown that throwing snowballs helps college students express their thoughts and beliefs (Apsari, 2018).

According to Shoiman (2014), the snowball throwing learning model is a development of the discussion model and is part of the cooperative learning paradigm. Snowball throwing cooperative learning can teach students difficult material grasping ideas and assess students' knowledge and abilities in the content. According to Handayani (2017), the snowball throwing learning model is a learning model in which each group forms a group represented by the group leader to receive a task from the teacher. Each group writes a question in a worksheet formed like a ball and then throws it to another group, and each group answers questions from the acquired ball. The Snowball Throwing Learning Model, which is based on the classification of living things, has been shown to increase students' interest in learning and enhance their learning results (Fitriani, 2018).

This learning model seeks to explore the leadership potential of learners in groups and the skills of creating and answering questions combined with imaginative play forming and throwing paper balls. The model encourages students to be more receptive to messages from others and communicate the message to their friends in one group. The snowball throwing learning model has developed a group in which each student creates a question in the shape of a ball (question paper) and then throws it to another student, who answers the question from the ball obtained.

From this, it is possible to conclude that the snowball-throwing learning model is a learning model in which students have an active role in the learning process. Students can increase their ability to think in the learning process by asking and answering questions.

The snowball throwing model has several characteristics: (a) learners work in cooperative groups to master academic material. (b) Students are given questions to train the student's understanding of the material. (c) the assessment given in cooperative learning is based on group work results. Nevertheless, teachers need to realize that the expected achievement is the achievement of each student. (d) Students learn to cooperate; including must also learn how to build confidence. (e) a group-oriented reward system rather than individuals

The snowball throwing learning model's steps can be concluded as follows: (1) The material to be studied is communicated by the teacher; (2) Teacher forms a group and calls the group leader to explain the material; (3) the chairman of the group conveys the material that has been explained to the members of his group; (4) The teacher provides a worksheet to each student to write a question about the material already described by the group leader; (5) the student forms the worksheet into a round ball then thrown at another student for ± 15 minutes; (6) after each student gets one ball, then answers the questions contained in the ball alternately; (7) The teacher provides an evaluation and closes the learning.

According to Shoiman (2014), the snowball throwing learning model has several advantages, including the following: (1) the learning environment becomes fun because students enjoy playing by throwing paper balls to other students; (2) students get the chance to develop thinking skills because they are provided the chance to create problems and give them to other students; (3) students are prepared with various possibilities because they do not know what their partner made; (4) Students actively participate in their learning; (5) Educators do not waste time creating media because students jump right into practice; (6)

learning is becoming more effective; and (7) all three cognitive, emotional, and psychomotor elements can be attained.

The flaws of the snowball throwing learning approach are as follows: a) it is dependent on the student's capacity to understand the information, therefore what students master is limited. This can be seen in the issues created by students, which are usually limited to the subject that has been discussed or examples of problems that have been supplied. b) Group leaders who cannot communicate the information adequately are undoubtedly an impediment to other members' understanding of the material, causing students to spend a significant amount of time discussing the issue. c). There are no individual examinations or group awards, so pupils are less motivated to collaborate when they are together. However, it does not rule out the potential of teachers adding individual quiz honors and group awards. d) It is time-consuming. e) Misbehaving students are prone to causing problems. f) Classes are frequently noisy because students form groups.

Teacher evaluation in the learning process can result in learning outcomes. According to Handayani (2017), learning outcomes are students' abilities after completing their learning experience. According to Sudjana (2014), outcomes (products) are acquired due to the performance of an activity or process that results in changes in functional inputs. In Handayani (2017), Kingsley distinguishes three types of learning outcomes: a) skills and habits, b) knowledge and comprehension, and c) attitude and values. Each sort of learning outcome can be filled with curriculum-aligned materials. In contrast to Gagne's viewpoint, which separates learning outcomes into five categories: a) linguistic knowledge; b) intellectual skills; c) cognitive methods; d) attitude; and e) motoric skills.

The implementation of a cooperative learning method - snowball throwing is believed to draw learners' attention to improve their learning outcomes, resulting in learners being more active in learning, creating a more conducive environment, and reducing saturation in the learning process. In this study, the researchers focused more on students' outcome in writing skill namely, writing an advertisement.

METHOD

The research method carried out in this study is called Classroom Action Research (CAR). It is a controlled investigative process to find and solve learning problems in the classroom. It is carried out gradually through several cycles to improve learning processes and outcomes in a particular classroom. The study used saturated sampling. Handayani (2017) states that saturated sampling is sampling that all members of the population use as samples. So, the sample of subjects in this study is all students of class IX SMPIT Al Muhsinin Cirebon, consisting of 24 students (10 male and 14 female). The data taken in this study includes qualitative data and quantitative data.

According to Purwanto (2009), data collection techniques are taken to gather data. This study will use several ways to collect data during the research process: observation, interview, assessment, and documentation. In comparison, the data analysis in this study was conducted by analyzing students' learning outcomes based on minimum completion criteria. This data analysis technique is in the form of learning outcome tests. The data collected above will be analyzed quantitatively in numbers and then condensed into qualitative information that forms sentences. The correct number of answers determines each student's score. In doing CAR, four stages must be passed by a researcher. Four stages are commonly passed: planning, action, observation, and reflection.

The data for this study are acquired in the form of observation data from both cooperative learning implementation utilizing the snowball throwing model and class activities during the learning process and formative exam data from students for each cycle. The project item's test result data is used to obtain the test that properly represents the practice learning outcome. The data were then analyzed further to seek validity, reliability, difficulty, and categorization.

FINDINGS AND DISCUSSION

Research data was obtained in the form of test results of exercise items, observation data of cooperative learning management in the form of snowball throwing model, observation data of student and teacher activities at the end of learning, and students' formative test data for each cycle. The test result data of the project item is used to obtain the test that truly represents what you want. The data has been further analyzed in terms of validity, reliability, difficulty, discrimination, etc.

Observation table data is taken from two observations, namely Observational Data on Collaborative Learning Management, a snowball throwing model used to measure student learning outcomes using a cooperative learning model such as snowball throwing and observation data from student and teacher activities. Formative test data for identifying improvement in student learning outcomes after applying the Snowball Throwing Collaborative Learning Model.

Cycle I

Planning

At this step, researchers create a learning device that includes a lesson plan, a formative test problem, and supporting teaching materials.

Action

The implementation of educational and methodological activities in the I cycle was carried out with 24 students from the SMPIT Al-9th Muhsinina's grade. In this case, the researcher takes on the role of a teacher. A lesson plan is referred to as the teaching and learning process. Observation occurs together with teaching and learning. After completing the training and receiving the knowledge of the teaching method, students are given a Formative Test I to determine the student's development in coaching and gaining knowledge of the method being used. The data about the study's results in cycle I, is as follows:

Table 1. Formative Test Scores in Cycle I

No	Amount	Description	
		Complete	Not Complete
1	60		√
2	50		√
3	80	√	
4	70	√	
5	60		√
6	80	√	
7	50		√
8	70	√	
9	80	√	

10	50		√
11	60		√
12	60		√
13	80	√	
14	70	√	
15	60		√
16	70	√	
17	70	√	
18	80	√	
19	70	√	
20	50		√
21	70	√	
22	70	√	
23	60		√
24	80	√	
Amount	1600	14	10

Maximum Score	2400
Number of Scores Reached	1600
Average Score Achieved	66,67
% Not Complete	41,67
% Complete	58,33

Table 2. Recapitulation of Students' Formative Test Results in Cycle I

No	Description	Cycle I Results
1	Formative test average score	66,67
2	Number of students who have completed their studies	14
3	Percentage of learning completion	58,33

The following data shows that the average student learning outcome produced by using the cooperative learning model Snowball Throwing is 66.67. The learning completion rate is 58.33 percent, indicating that 14 of the 24 students have completed their studies. According to the results, some students did not finish their studies in the first cycle because they achieved 65 points or more, only 58.33 percent of the total. It falls short of the planned completion rate of 80%. The problems occur because students are still unfamiliar with the new instruction techniques.

Observation

The following are taken from field notes that were used to gather information for the teaching and learning activities:

- a. Teachers are less effective at inspiring students and communicating learning objectives;
- b. Teachers are ineffective at managing time; and
- c. Students become less motivated while learning.

Reflection

Some activities did not fit properly during the cycle I implementation. As a result, the following cycle must be modified:

- a. Teachers should encourage pupils better and create clear learning objectives. When students are encouraged to be concerned about each lesson with a purpose;
- b. Teachers should manage their time effectively, adding information as needed and taking notes; and
- c. Teachers must be more professional and passionate about encouraging students to be more motivated.

Cycle II

Planning

At this point, the researcher creates a learning device that includes Lesson Plan 2, Formative Test Question II, and additional instructional resources.

Action

The second cycle's teaching and learning activities were carried out in the ninth grade, with 24 pupils. In this situation, the researcher takes on the role of a teacher. Refer to the teaching plan for the teaching and learning process, paying special attention to the modification of cycle I, so that the faults or shortcomings in cycle I do not reoccur in cycle II. Observation occurs together with the execution of teaching and learning.

Students will take a formative exam II at the end of the teaching and mastering methods to determine their level of achievement in the finished teaching and mastering techniques. Formative test II is the instrument utilized. The following are the findings of research in cycle II:

Table 3. Formative Test Scores in Cycle II

No	Amount	Description	
		Complete	Not Complete
1	70	√	
2	60		√
3	80	√	
4	70	√	
5	70	√	
6	80	√	
7	60		√
8	70	√	
9	80	√	
10	60		√
11	70	√	
12	70	√	
13	80	√	
14	70	√	
15	80	√	
16	70	√	
17	70	√	
18	80	√	
19	70	√	
20	80	√	
21	70	√	
22	70	√	
23	80	√	

24	80	√	
Amount	1740	21	3

Maximum Score	2400
Number of Scores Reached	1740
Average Score Achieved	72,50
% Not Complete	12,50
% Complete	87,50

Table 4. Recapitulation of Students' Formative Test Results in Cycle II

No	Description	Cycle II Results
1	Formative test average score	72,50
2	Number of students who have completed their studies	21
3	Percentage of learning completion	87,50

According to the table above, an average score of 72.50 formative assessments was acquired, and of the 24 students that completed them, 21 students and three students did not complete their learning. Traditionally, 87.50 percent completion of learning (including the complete category). Cycle II's results outperform Cycle I's. Enhanced learning results in Cycle II are affected by students' increased capacity to study the subjects studied thus far, allowing them to understand the subject better.

Observation

At this step, the cooperative learning approach snowball throwing is utilized to investigate the teaching process's strengths and faults. The information received can be summarized as follows:

- a. The teacher did all of the learning during the teaching process. Even though some aspects are flawed, the proportion of each aspect is relatively large.
- b. Based on the observation data, pupils are engaged in the learning process.
- c. The previous cycle's flaws have been improved and upgraded to become better.
- d. All of the student's learning outcomes for the second cycle have been completed.

Reflection

Teachers in Cycle II have effectively implemented a collaborative learning snowball throwing approach, and the teaching and learning process is progressing smoothly, based on student activities and student learning results. You don't need to do much to fix it. However, the next step is to maximize and preserve the current one. It intends to facilitate the collaborative learning snowball tossing approach to improve the teaching and learning process and learning results, allowing learning objectives to be met.

The findings of this study indicate that the Snowball Throwing collaborative learning paradigm has a beneficial impact on student learning outcomes. According to the data analysis, the achieved activity of students in the process of collaborative training of the model "Throwing a snowball" grew in each cycle. The strategy improves student learning outcomes and subject acquisition, as seen by an increase in average student value in each cycle, which continues to grow.

The cooperative learning snowball model's dominance of student actions in the English learning process is to listen to/pay attention to the teacher's explanation and the conversation

between students/students and teachers. As a result, student activities can be categorized as beneficial. In terms of teacher actions in the learning process, the phases of cooperative learning are implemented, and the snowball model is excellent. It can be seen in teachers' activities such as instructing and watching students' activities, explaining items that students do not comprehend, providing feedback/evaluation/question-and-answer, etc. The activities mentioned above account for a sizable fraction of the total.

This results are confirmed by some researches conducted by Gani, Yusuf, and Erwina (2017), Susanty, (2016), Isnawan and Zahroni (2016), Zaqiyaturrahmah (2018), Manurung, Samosir, Hia, Mariani, Togi & Tambunan (2019), Mufida (2021), Wirawan, Rita, and Waris (2013), Sipayung, Gusar, Siahaan, Purba, Haloho (2021). Regarding student math achievement, the leadership strategy (snowball-throwing collaborative learning and traditional) is effective, and the snowball-throwing kind of collaborative learning is more effective than the traditional approach. A snowball-throwing learning strategy for biomaterial classification has been successfully implemented to boost learning interests and student learning results. There is a significant difference between scientific students who use the snowball throwing learning paradigm and traditional learning students.

The use of collaborative learning in education places a larger emphasis on coordinating among students within a group. The belief is founded on the assumption that when students debate difficulties, the concept of facts becomes easier to grasp. Students behave well in co-op learning because they are driven to learn and actively participate in various activities. In learning activities, teacher creativity is required to ensure that students make appropriate use of their time and focus their energy on productive activities. This learning allows pupils to grasp deeper concepts and enhance learning outcomes through active cooperation among students.

CONCLUSION

The snowball co-teaching methodology significantly affects student learning outcomes in form of writing an advertisement, as seen by a rise in student completion rates in each cycle, which is 56.25 percent in cycle I and 81.25 percent in cycle II. As a result, the teaching and learning processes are completed. Using the snowball throwing model in tandem can help boost student motivation and teamwork in English learning.

ACKNOWLEDGEMENTS

The authors would like to thank to 1) the Directorate General of Higher Education, Ministry of Education and Culture of the Republic of Indonesia, which has provided funding for this study and 2) students who contributed to the completion of this study.

REFERENCES

- Akbar, Sa'dun. (2008). *Penelitian Tindakan Kelas (Filosofi, Metodologi dan Implementasinya)*. Malang: Surya Pena Gemilang.
- Algiyan Eko Prasetya, dkk,. (2014) *Penerapan Model Kooperatif Tipe Snowball Throwing Untuk Meningkatkan Pemahaman Konsep Jasa Dan Peranan Tokoh-Tokoh Kemerdekaan*. Universitas Sebelas Maret
- Apsari, Y. (2018). Snowball throwing in teaching grammar. *Lingual: Journal of Language & Culture*, 10,(1). <http://ojs.unud.ac.id/index.php/languange/index>

- Apsari, Y., Saputra, I.A., & Leriandini, G. Students' perception of snowball throwing in teaching grammar. 2 (2) e-ISSN 2614-6258.
- Femilla Astrini, dkk., (2013), *Penerapan Model Kooperatif Tipe Snowball Throwing dengan Media Audio Visual dalam Peningkatan Hasil Belajar IPS pada Siswa Kelas V SD Negeri Dondong 02 Tahun Ajaran 2013/2014*. Universitas Sebelas Maret
- Fitriani, K., Martuti, N. K. T., Utami, N. R. (2018). The effectiveness of snowball throwing model on the living things classification material to students' learning interest and outcomes. *Journal of Biology Education*. 7(1). 91-98. <http://journal.unnes.ac.id/sju/index.php/ujbe>.
- Gani, S.A., Yusuf, Y.Q., & Erwina, R. (2017). The effectiveness of snowball throwing technique in teaching reading comprehension. *Proceedings of The 1st National Conference on Teachers' Professional Development*. 2581-2742
- Handayani, T., dkk., (2017), *Penerapan Model Pembelajaran Kooperatif Tipe Snowball Throwing Terhadap Hasil Belajar Peserta Didik*, Jurnal Curricula, (1): 47-58.
- Isnawan, M.G., & Zahroni, T.R. (2016). Effectiveness of cooperative learning approach (snowball throwing) in logics instruction at AMIKOM Mataram. *Proceeding of 3rd International Conference on Research, Implementation and Education of Mathematics and Science*. ISBN 978-602-74529-0-9.
- Manurung, N., Samosir, K., Hia, Y., Mariani, Togi & Tambunan, H. (2019). Implementation of snowball throwing type of cooperative learning in calculus course. *International Education Studies*. 12,(3). doi:10.5539/ies.v12n3p124
- Margono, S. (2010). *Metodologi Penelitian Pendidikan*. Jakarta: PT Rineka Cipta
- Mufida, N. M. (2021). Improving student reading comprehension through cooperative learning (snowball throwing) at senior high school. *Jurnal Pendidikan Indonesia (Japendi)* 2(9)
- Oviyanti. (2013). Keefektifan Pembelajaran Kooperatif Tipe Snowball Throwing Bervisi Sets Terhadap Hasil Belajar Koloid. *Jurnal chemistry in education*, 3 (1), 96-101.
- Permana, Yudi dan Dwi Sulistyowarni. (2015). *Model-Model Pembelajaran IPS di Sekolah Dasar Mengembangkan Profesionalisme Guru*. Cetakan ke-1. Bandung: UPI Press.
- Purwanto, (2009), *Evaluasi Hasil Belajar*, Yogyakarta: Pustaka Pelajar
- Rasyid, M., & Side, S. (2011). Pengaruh Penerapan Pembelajaran Snowball Throwing terhadap Hasil Belajar Peserta didik Kelas X SMAN I Bajeng Kab. Gowa (Studi pada Materi Pokok Senyawa Hidrokarbon). *Jurnal Chemica*, 12 (2), 69-76.
- Rosma Hartiny Sam's, (2010), *Model PTK Teknik Bermain Konstruktif untuk Peningkatan Hasil Belajar Matematika*, Yogyakarta: Teras
- Rusman. (2014). *Model-Model Pembelajaran Mengembangkan Profesionalisme Guru*. Edisi Kedua. Cetakan Ke-5. Jakarta: PT.Raja Grafindo Persada.
- Shoiman, Arif. (2014). *68 Model Pembelajaran INOVATIF dalam Kurikulum 2013*. Cetakan Ke-1. Yogyakarta: Ar-Ruzz.
- Silalahi, T.F., & Hutauruk, A.F., (2020). The application of cooperative learning model during online learning in the pandemic period. doi: <https://doi.org/10.33258/birci.v3i3.1100>
- Sipayung, E. F. S., Gusar, M. R. S., Siahaan, K. W. A., Purba, T. A. D., & Haloho, U. N. (2021). The influence of the snowball throwing learning model on the science learning outcomes of grade 5 students. *IJECA (International Journal of Education and Curriculum Application)*. 4(2). 47-57. <https://doi.org/10.31764/ijeca.v4i2.4594>
- Sudjana, Nana. (2014). *Penelitian Hasil Proses Belajar Mengajar*. Bandung: Remaja Rosdakarya.

- Sugiyono. (2014). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif dan R&D*. Bandung: Alfabeta.
- Susanto, Ahmad. (2013). *Teori Belajar dan Pembelajaran di Sekolah Dasar*. Jakarta: Kencana Prenada Media Grup.
- Susanty, H. (2016). Use of the snowball throwing technique for teaching better ESL speaking. *English Education Journal (EEJ)*, 7(1), 117-129
- Tanzeh, Ahmad. (2011). *Metodologi Penelitian Praktis*. Yogyakarta: Teras.
- Wirawan, R., Rita, F., & Waris, A. (2013). Increasing vocabulary mastery of the seventh grade students through snowball throwing. *e-Journal of English Language Teaching Society (ELTS)*. 1(2)
- Yusuf, I., Widyaningsih, S. W., & Purwati, D. (2015). Pengembangan Perangkat Pembelajaran Fisika Modern Berbasis Media Laboratorium Virtual Berdasarkan Paradigma Pembelajaran Abad 21 dan Kurikulum 2013. *Pancaran Pendidikan*, 4 (2), 189-200
- Zaqiyaturrahmah, E. (2018) Implementation of cooperative learning model snowball throwing to increase activity and learning outcomes. *Classroom Action Research Journal* 2(2). 87-94. doi: 10.17977/um013v2i22018p87.