The Effectiveness of Metacognition Strategy by Snowball Throwing on Student's Metacognition Ability and Learning Outcomes on Reproduction System Material

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Article Info	Abstract
	The purpose of this study is to analyze the effectiveness of the application of metacognition strategy by snowball throwing-assisted toward students' metacognitive ability and learning outcomes in reproductive system material. The study design uses Pre-experimental design with a one-shot case study pattern applied to class XI MIPA 4 and XI MIPA 7 of Academic Year 2017/2018. The sampling technique is purposive sampling. Student learning outcomes data are analyzed using classical completeness test. Data on the ability of metacognition is analyzed using a scaled category of metacognition abilities. This study is effective if it is able to reach indicators of effectiveness, namely the average final grade of metacognition ability reaches ≥ 68 with the ok-super scale, and classical completeness of learning outcomes reaches ≥ 85%. Data on metacognition ability is obtained from the value of the monitoring sheet and the value of student learning journals. The metacognitive abilities of the two classes can reach an average final score of 82.45, indicating that students already have awareness in carrying out thinking processes which include the optimal input-elaboration-output stage. Student learning outcomes data obtained from the LDS value, the value of the snowball throwing paper and the posttest value. The learning outcomes of both classes were able to achieve classical completeness on average by 92.5%. The conclusion of this study is the effective snowball throwing-assisted metacognition strategy applied to reproductive system material in SMA N 1 Jakenan.

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INTRODUCTION

The principle of learning in the standard educational process requires students to find out and the teacher is not the only source of learning so students participate actively. Sudarma & Sakdiyah (2007) states that the low participation of students in learning is one of the causes of learning outcomes that are not maximal. Based on the results of interviews with Biology teachers at SMA N 1 Jakenan. The Biology learning system that is carried out is still teacher center learning. This is not in accordance with the provisions in the 2013 curriculum that has been applied in learning in high school that requires that learning should be student-centered (student center learning) and teachers as facilitators.

Student learning outcomes on reproductive system material at 1 Jakenan Public High School indicate that most are still low. This can be seen from the results of Daily Evaluation of class XI MIPA 4 to XI MIPA 7 in the even semester of the 2016/2017 academic year. The percentage of students who scored according to the Minimum Completion Criteria (KKM) value of 70, was only 9.5%. While as much as 80% are less than KKM and 10.5% exceed KKM.

Reproduction system material is one material that is considered difficult to be delivered to students. The results of the interview with one of the class XI Biology teachers showed that too much material coupled with the existence of an abstract working mechanism caused students not understand the contents of the material. In addition, the absence of practical activities that can be done in learning activities makes it difficult for students to understand the processes that occur in the body related to the material. Material that is difficult to understand will affect the ability of students to solve problems related to everyday life.

Less optimal achievement of students' problem-solving ability by students is due to the lack of processes that involve student awareness in learning. For this reason, an alternative learning method is needed that involves consciously thinking students in understanding new knowledge in their own way, style and ability to solve problems. One alternative learning that involves conscious student thinking can be done by developing students' metacognition skills (Nurasyiyah, 2014). Saptono (2009) states that metacognitive learning strategies relate to how students think about the knowledge learned.

The stages in the metacognition strategy include the planning (planning), monitoring (monitoring) and evaluation (evaluating) stages (Sumampouw, 2011). In applying this strategy, students are trained to be able to plan, monitor, and evaluate the way they learn so that students have awareness in thinking about what information is already known and which is not yet known. During the learning process, students will understand how to learn, know the abilities and modalities of learning possessed and know the best strategies for effective learning.

The learning process in the education unit contained in Government Regulation No. 32 of 2013 is held in an interactive, inspirational, fun, challenging, motivating student to actively participate, and provides sufficient space for students' initiatives and creativity. Learning is done by involving students actively can make the learning environment more enjoyable, so students will more easily understand the material. Active learning can be done with cooperative learning models, namely, snowball throwing.

The snowball throwing model is a modification of the questioning technique which focuses on students' ability to form questions that are packaged in an interesting game, namely throwing snowballs from each other (Hakim & Pramukantoro, 2013), students who get paper balls are in charge of answering questions in it (Djahir et al., 2014). Snowball throwing is applied because this learning model is able to create a pleasant atmosphere, can arouse student motivation in learning, and only requires very simple abilities so students can raise questions according to the material being studied (Adhiatmika et al., 2017). Based on the background described above, a study is conducted on the application of snowball throwing-assisted metacognition strategies to metacognitive abilities and student learning outcomes in reproduction system material.

RESEARCH METHOD

This study used a pre-experimental design with a One-shot Case Study design. The sample in this study were students of class XI MIPA 4 and XI MIPA 7 SMA N 1 Jakenan which was determined using a purposive sampling technique. The research data includes the ability of metacognition which is the accumulation of the value of the learning journal and the value of the metacognition monitoring sheet and cognitive learning outcome data which are a combination of the posttest value, snowball throwing paper, and LDS. Learning outcomes are analyzed by classical completeness test, while the ability of metacognition is analyzed using the scale of the category of metacognition abilities. This study is effective if it is able to reach indicators of effectiveness, namely the average final grade of students' metacognition ability reaches ≥ 68 in the ok-super scale, and classical completeness of learning outcomes reaches ≥ 85%.

The procedures compiled in this study consist of the preparation, implementation and final stages of the research. Preparation stage: (1) Conduct initial observations at SMA N 1 Jakenan; (2) Making a problem statement; (3) Establish solutions to overcome problems; (4) Determine research methods and designs; (5) Preparing learning devices in the form of syllabus, lesson plans, worksheets, learning media, and teaching materials; (6) Prepare research instruments that include test instruments, metacognition monitoring sheets and observation journal observation sheets; (7) Conducting trials about instruments outside the research sample; (8) Analyze the results of the test questions which include validity, reliability, power difference and the level of difficulty of the question using ANATES version 4.0.9. Implementation stage: (1) Application of snowball throwing-assisted metacognition strategies; (2) Perform posttest. The final stage of the study: (1) Analyzing data on students' metacognitive abilities and student learning outcomes; (2) Writing the results and discussion; (3) Making research conclusions.

RESEARCH AND DISCUSSION

Students' Metacognition Ability

The analysis of the value of metacognitive abilities obtained the final data on metacognitive abilities consisting of the highest scores, the lowest scores, the average value and the category of the average value of students' metacognitive abilities. The final value data on the ability of metacognition are presented in Table 4.1.

Table 4.1 Final Score of Metacognition Ability

Information	XI MIPA 4	XI MIPA 7
Maximum score	95,65	96,9
Minimum score	47,5	69,7
Average of each class	79,49	85,4
Total Average	82,45	
Category	*Ok*	

The results of the analysis show that the metacognition abilities of the two classes are able to achieve an average final score of 82.45 in the Ok category. This means that students already have awareness in carrying out the thinking process which includes the input-elaboration-output stage optimally. This shows that learning by applying metacognition strategy snowball throwing is effectively applied to reproductive system material because it reaches an indicator of effectiveness, namely the average final value of metacognition ≥ 68 on an ok scale - super.

The ability of metacognition is management awareness of the cognitive processes and products of students who can be trained by applying metacognition strategies. The ability of metacognition includes aspects of planning, monitoring and evaluating learning outcomes. The ability to plan allows students to determine their goals in studying reproduction system material independently without having to be told by the teacher. Knowledge of learning objectives in reproduction system material can make students know what should be learned. Students learn more effectively and become motivated to learn. Santrock (2002) states the

application of goals can strengthen student motivation in learning. This opinion is in line with Silalahi (2008) which states that motivation is a driving force in students to generate learning activities and provide direction on learning activities so that the goals desired by students can be achieved.

The monitoring aspect allows students to monitor their learning activities in the context of understanding, memory, attention, and communication in problem-solving. Hidayat (2016) states that monitoring in learning allows students to distinguish behavior and remind them of the effects that arise after the behavior is applied. Self-monitoring while studying reproductive system material provides effective ways to maximize participation and improve student learning outcomes. This opinion is reinforced by Zimmerman (2002) that self-monitoring is a strategy that can help students to improve learning achievement. The results of observations on metacognition monitoring sheets and learning journals show the existence of student learning efforts that are still carried out or changed during the learning of the reproductive system so that learning is optimal.

The aspect of evaluation in this study makes students more independent to determine the learning goals that have been and have not been achieved, know their weaknesses in learning the reproductive system and determine the efforts that will be done as a follow-up. This is in accordance with the opinion of Putri et al. (2012) that evaluation activities on metacognitive learning train students to assess their own abilities so that it is easier to solve problems and understand the concepts of material received can last long. Based on the observations of metacognition monitoring sheets and learning journals made by students, it can be seen that students are more confident in writing down their weaknesses in learning than expressing them verbally directly. Students are more confident in expressing their difficulties in writing because some students are not used to expressing their ideas in class verbally.

Students' Learning Outcome

Analysis of learning outcomes obtained the maximum, minimum, and the average value, the number of students who completed and did not complete learning, and classical completeness. The Minimum Completion Criteria (KKM) set by the school for biology subjects is 70. The percentage of classical completeness and students who get grades reaching KKM is presented in Table 4.2.

Table 4.2 Student learning outcomes after learning by applying a snowball throwing metacognition strategy on reproduction system material.

Information	XI MIPA 4	XI MIPA 7
Maximum score	83,4	86,3
Minimum score	64,5	58
Average score	77,5	75,9
Completed students	38	36
Incompleted students	2	4
Class Classical Completed	95%	90%
Overall Classical Completeness	92,5%	

Based on the results of the analysis of student learning outcomes in Table 4.2, it can be seen that the average value of class XI MIPA 4 is 77.5 with the number of students completed as many as 38 students. Meanwhile, the average value of class XI MIPA 7 is 75.9 with the number of students completing as many as 36 students. The classical completeness of the two classes reached an average of 92.5% of students reaching KKM. This means that the application of metacognition strategy with snowball throwing to reproduction system material is effectively applied to student learning outcomes because it reaches indicators of effectiveness, namely classical completeness reaching ≥85%.

Overall, the analysis of student learning outcomes in this study shows that the snowball throwing metacognition strategy makes students' cognitive learning outcomes in the reproduction system material more optimal. This can be seen in the learning outcomes value data in Table 4.2 which shows that the number of students who complete KKM in the two sample classes is more than half of the number of students in each

class. Students are able to complete the task of learning well through the ability to plan, monitor and evaluate the learning process. Metacognition monitoring sheets and learning journals as a strategy for thinking metacognition helps students analyze and find solutions to problems related to learning. This is because it can help find out what has been learned, which parts need to be improved and what is to be achieved in studying the reproduction system. Sudiarta (2006) asserts that metacognitive activities have the potential to produce students with high-level thinking competencies because they encourage students' motivation to learn and improve learning outcomes. Sulistiyo (2008) added that high mental processes such as thinking power, memory and reasoning are parts of metacognitive that can optimize student learning outcomes.

This study shows the percentage of classical completeness is high, but in reality, there are still some students who have not reached the KKM score. Keep in mind that learning is a process in which there are various factors that are interrelated so that it can produce behavioral changes (learning outcomes). Factors that influence the level of learning completeness include the responses and responses of students in learning. Learning activities will not be able to achieve learning goals if students do not provide good responses. Based on data analysis, the results showed that not all students gave good responses. This can be seen from the score of every aspect of the statement that is not maximal. Students who have not completed KKM have lower response scores and responses compared to students who complete KKM. These results indicate that there are still some students who are not interested in learning reproductive system material by applying snowball throwing-assisted metacognition strategies.

Students' motivation in learning will affect students' interest in learning. Learning by applying metacognition strategy by snowball throwing to reproductive system material is still not in demand by some students, so students' desire to find out information about the material is low. Low student curiosity causes less optimal learning outcomes. Aritonang (2008) states that interest can influence the quality of achievement of student learning outcomes in the field of material and affect the desire of students to study harder so as to achieve the desired results. The statement is in line with Nurdayanti et al. (2012) states that students 'interest in learning influences students' motivation and activeness.

Students whose learning outcomes have not yet reached KKM can be made an improvement effort by holding remedial activities, giving special assignments or by providing additional study hours outside of lesson hours so that students are able to achieve mastery learning. In addition, it can also be added by providing motivation for the students concerned. Putri et al. (2012), states high motivation can make students excited to be actively involved physically, emotionally and mentally so that learning outcomes are optimal.

CONCLUSION

Based on research result and discussion, it can be concluded that metacognition strategy by snowball throwing is effective to be applied toward students' metacognition ability and learning outcome in the reproduction system material.

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