Improve Students' Generic Science Skill and Self-Regulated Learning Using Cooperative Learning Model Based on Malay Culture

Faury Hidayati, Sahyar[1], Derlina, Bornok Sinaga[2], Eva Marlina Ginting[3]
{*fauryhidayati@gmail.com*}

Post Graduate Program, Universitas Negeri Medan Jl. Willem Iskandar Pasar V Medan Estate, Indonesia[1,2,3]

Abstract. The purpose of the study were to improve students' generic science skill and self-regulated learning using cooperative learning model based on Malay culture on physics learning. This research is an action research consisting of planning, action, observation and reflection stages. The instrument used in this study is lesson plan and student worksheet were based on Malay Culture, instrument generic science skills and questionnaire self-regulated learning. Subjects in this study were students of class XII MIA II MAN 2 Tanjung Pura. The result of the research shows that the skills of physics generic science and self-regulated learning by applying the cooperative learning model based on Malay culture had increased..

Keywords: Generic Science Skill, Self-Regulated Learning, Cooperative Learning Model, Malay Culture.

1 Introduction

Physics learning must be confronted with a new paradigm, which gives students direct experience to understand and guide them to use scientific knowledge. The ability to think and act on the scientific knowledge possessed by the scientific framework is called generic science skills (Liliasari, 2007). Generic science skills is known as core skills, essential skills and basic skills, and is something that is needed in the work (Yeung et al., 2007). Generic science skills help students to learn science and show how well the learning. But in reality on the ground, students' conceptual understanding is still low so students have not mastered generic science skills.

Science generic skills In physics course that can be develop are: direct observation, indirect observation, sense of scale, symbolic language, logical consistency, causality, modeling, logical inference and abstraction (Viajayani et al., 2013). Through generic science skills, students will be accustomed to scientific thinking that supports understanding of concepts (Siswantoet al, 2016). Generic science skills need to be trained for students to build personality and "high-level thinking". Generic science skills as the basis for high-level thinking processes that include creative thinking skills, critical thinking skills, decision making and problem solving everyday life (Liliasari, 2007; Sutopo, 2013).

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The learning process that does not involve students actively also results in low student self-regulated learning. Self-regulated learning is defined as thoughts, feelings, and behaviors that are self-generated and planned that are adjusted to performance feedback to achieve their own set goals (Zimmerman, 2000; Alexiou & Paraskeva, 2010). Self-regulated learning needs to be improved especially in physics learning so that students have the responsibility to regulate and discipline themselves in learning and students can determine their learning goals and develop learning plans to achieve these goals. Students who have Self-regulated learning to work on learning tasks in an attentive and confident manner, proactively set goals, and develop a plan to achieve these goals (Alexiou&Paraskeva, 2010). Self-regulated learning helps prepare students for lifelong learning and the important ability for students to transfer skills, knowledge, and abilities from one domain or setting to another (Shuy, 2010). In addition to training skills, a good learning process must also be able to train student' self-regulated learning. Students are said to have been able to learn independently if they have been able to do the task of learning without dependence on others.

Cooperative learning is a learning model where students learn and work in small groups collaboratively with heterogeneous group structures (Slavin, 2005). This learning model is a form of learning based on constructivism. Cooperative learning is a collaborative learning strategy in which groups of small students with different levels of ability work together to achieve common goals or complete group assignments and goals and tasks that they cannot solve themselves (Hossain &Tamizi, 2013; Tiantong & Teemuangsai, 2013; Gillies , 2016)

Cooperative learning models train students to talk and think and solve problems together, which has been shown to contribute to the development of individual reasoning and problem solving (Gillies, 2016), which can train students in building conceptual knowledge. A series of activities in constructing concepts are indicators of generic science skills, so that learning devices developed with cooperative learning models can enhance students' generic science skills (Harahap et al., 2017). In line with the results of Mohamed & Jaafar (2009) research that cooperative learning can be used as a learning strategy to enhance the generic science skills.

Culture is knowledge that is owned by a group of people, which is related to their behavior. Physics is closely related to culture, especially in Indonesia with cultural wealth, so that this integration not only creates meaningful and interesting physics learning but also preserves national culture and instills good character for students. Indonesia with a rich culture has the opportunity to be explored, not only to engage students in culture, but also to maintain students' cultural identity in the face of globalization (Rahmawati, 2017).

The results of observations at MAN 2 TanjungPura also showed that physics learning not links the material that can be used as a culture-oriented science learning to explain natural phenomena around students, it is necessary to hold the learning models which is expected to help the teacher in linking the material which is so broad with real-world situations. The cooperative learning models based on culture is carried out in order to foster students' appreciation of culture and develop understanding of students' physics concepts that are integrated in character. The application of based learning models based on Malay culture can also improve students' physical problem solving skills and self-regulated learning (Ummi et al., 2017).

The cooperative learning models in etnophysic was designed by incorporating local cultural facts in the physics material taught. Integrating these cultural facts into learning is expected to make it easier for students to understand problems because they are close and related to students. Especially for North Sumatra, one of the cultures that can be integrated into physics learning is Malay culture. Based on their identity and identity, the so-called Malay is Malay resam, uses Malay language and is Muslim, which is not bound to

genealogical factors (blood relations) but united by the same culture (Arifin, 2010). The value system that has been built in Malay has been proven to be able to make Malay dominate civilization in the archipelago, the concrete evidence is the use of Malay as an Indonesian language that is used today (Mahayana, 2009). the integration of Malay culture in learning physics can be an effort to preserve Malay culture.

2 Literature

2.1 Cooperative Learning Model Based on Malay Culture

The cooperative learning model based on Malay culture is a learning process that applies the steps of the cooperative learning model by incorporating aspects of Malay culture into learning, the facts of the Malay culture environment in the problems solved in learning and incorporating patterns of social interaction between Malay culture in the learning process. Integrated learning with culture is needed to enrich students 'knowledge, improve students' communication skills and social skills, which enable students to face global challenges and also students closer to their cultural environment (Aufa et al., 2016).

2.2 Generic Science Skill

Generic skills are basic skills that students can have when experiencing the learning process in school. Generic science skills are basic (generic) skills needed to train students' scientific work so as to produce students who are able to understandconcepts, solve problems, and other scientific activities, and are able to learn by themselves effective and efficient (Rosidah et al., 2017). Sudarmin (2012) stated that generic science skills consist of 10 basic skills, including: (1) direct observation, (2) indirect observation, (3) sense of scale, (4) symbolic language, (5) logical frame, (6) logical consistency, (7) causality, (8) modeling, (9) logic inference and (10) abstraction.

2.3 Self-Regulated Learning

Self-regulated learning is regulates a person's ability to understand and control one's learning environment. The ability to self-regulate includes goal setting, self-monitoring, self-instruction, and self-reinforcement (Shuy, 2010). Zimmerman (2000) defines it as a learning process that occurs because of the influence of thoughts, feelings, strategies, and behaviors that are oriented towards achieving goals.

Tanriseven (2014) asserts that the learning process that is realized through student self-regulated earning includes; opportunities provided to individuals in managing their learning process; exercises used to activate knowledge; elaboration provides new learning relationships with early learning; linking past knowledge with new ones; time and environment control where students can manage their own environment and strategies in learning. Zimmerman (2000) states Self-regulated learning consists of three stages, namely:

(1) Preliminary thinking; (2) Performance and (3) Self-reflection.

3 Research Methodology

This research is an action research consisting of planning, action, observation and reflection stages.

3.1 Subject and Object

Subjects in this study were students of class XII IA II MAN 2 Tanjung Pura academic year 2018/2019, where as the object of this research is application of cooperative learning model based on Malay culture, generic science skills and self-regulated learning.

3.2 Instrument

The instruments of data collection in the research are observation sheet, and questionnaire. Observation sheets are used to determine the implementation of learning, assessing the competence of attitudes, and skills. Filling the questionnaire to obtain data needs analysis and performance analysis. The improvement of generic science skills and self-regulated learning using the N-Gain by Hake (1999).

4 Result

The result of the research is the students' generic science skill and self-regulated learning using the cooperative learning model based on Malay culture on physics material. The results of research and discussion as follows:

Planning Stage aims to plan and develop physics learning devices using the cooperative learning model based on Malay culture on physics material. The learning devices used in this study is lesson plan and student worksheet were based on Malay Culture, instrument generic science skills and questionnaire self-regulated learning. This learning device is ready to be tested on action and observation stage.

The action and observation stage was carried out to determine the improvement of students' generic science skills and self-regulated learning at each meeting during four meetings. The action stage, the implementation cooperative learning model based on Malay culture applied using lesson plan and student worksheet which has been designed at the planning stage. The observation stage, the overall cooperative learning model based on Malay culture implementation is 4,34, which, if referenced to the predefined instruction learning device criteria, then the average value of 4.34 is in good category ($4 < P \leq 5$).

Table 1. Score of Implementation of Physics Learning

Average every meet				Total Average	Category
1	2	3	4		
4,11	4,32	4,36	4,57	4,34	Good

Data generic science skill of student was analyzed to know improvement of generic science skill of student by comparing mean score of student obtained result of generic science skill of student each meeting.

Table 2. Improvement Generic Science Skills

Average every meet		N-Gain	Category
1	46,34		
2	60,65	0,27	Low
3	69,53	0,23	Low
4	79,64	0,33	Medim

Based on Table 2, the generic science skill of students at each meeting has increased so that it can be concluded that the application of physics learning devices using cooperative learning model based on Malay culture can improve students' physics generic science skill.

Generic science skill data was obtained based on the increase of students' generic science skill value in at each meeting, has increased which was assessed based on indicators of generic science skill.

Table 3. Improvement Generic Science Skill EveryIndicators

No.	Indicators	Meeting			
		1	2	3	4
1	Direct Observation	46	59	72	76
2	Indirect Observation	48	66	72	4
3	Sense Of Scale	49	56	68	76
4	Symbolic Language	47	60	67	75
5	Logical Frame	49	60	67	79
6	Logical Consistency	47	61	69	80
7	Causality	45	60	69	82
8	Modeling	43	62	71	4
9	Logic Inference	45	62	70	86
10	Abstraction	44	62	74	83

Data self-regulated learning of student was analyzed by comparing mean score of student self-regulated learning of result before and after applying cooperative learning model based on Malay culture.

Table 4. Improvement Self-regulated Learning

Pretest' Avarege	Postest' Avarage	N-Gain	Category
59,72	75,02	0,38	Medium

Student self-regulated data was obtained based on the increase of students' self-regulated learning value in pretest and posstest which was assessed based on indicators of self-regulated learning

Table 5. Improvement Self-regulated Learning Every Indicators

No.	Indicators	Postest	Pretest
1	Preliminary Thinking: Setting learning goalsand self-confidence skills	3,78	2,97
2	Self Performance: self-control skills in learning	3,71	2,88
3	Self-Reflection: Self-evaluation skills afterlearning	3,77	3,17

Based on Table 4 and Table 5 above, it can be concluded that the average of questionnaire results of student cooperation increased from pretest to posttest result. Increasing students' self-regulated learning in every aspect of indicators after the treatment of physicslearning devices using cooperative learning model based on Malay culture.

5 Conclusion

Based on the result of analysis and discussion in this research, it can be concluded that: There is improvement of students' generic science skill and self-regulated learning after applying cooperative learning model based on Malay culture.

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