
Research Article**Empowering Metacognition Skill by RDSE (Reading, Discussing, Searching, and Experimenting) Learning Model***Rois Amrullah Akbar¹, Suratno², Dwi Wahyuni²*¹Postgraduate of Sains Education Program, University of Jember, Indonesia²Postgraduate of Sains Education Program, University of Jember, Indonesia

Abstract: Based on the needs analysis conducted in Banyuwangi district, metacognition skills are less empowered by students in learning. One of learning model combined and potentially empowering metacognition skills is the RDSE learning model (Reading, Discussing, Searching, and Experimenting). The purpose of this research is to know the effectiveness of RDSE learning model on metacognition skills. The RDSE learning model consists of four stages: 1) Reading, 2) Discussing, 3) Searching, and 4) Experimenting is expected to empower metacognition skills. The population of this study was the tenth grade students of State Senior High School Muncar Banyuwangi in the 2016/2017 academic year. The metacognition skill was measured through metacognitive awareness inventory (MAI). Data analysis was used quantitative descriptive. The data were analyzed by using Normalized gain (g). The results show that RDSE learning model can empowering metacognition skill. The effective RDSE learning model empowering metacognition skills value Normalized gain (g) 0,72 (high).

Keywords: *learning model, metacognition skill, RDSE (Reading, Discussing, Searching, and Experimenting).*

I. INTRODUCTION

Problems of learning in the classroom, ie passive students in the classroom, students can not answer the teacher's questions well, many students who do not pay attention to the teacher's explanation and play HP, students are less able to understand the concept due to lack of practical activities, and many students are not aware of knowledge it possesses or lacks of empower metacognition skills. The learning process is still dominated by discussion activities. These problems can be solved by using a teaching learning model based on reading technique to prepare students to understand the subject matter. The learning model, namely RQA (Reading, Questioning, and Answering) (Corebima, 2009, hal. 20).

RQA learning model is considered as a learning model based on constructivism learning theory. The RQA learning model is a newly developed model. This learning model is based on the fact that almost all students who are assigned to read the material for next meeting but they don't do it. As a result, the designed learning model is difficult or unavailable and ultimately the understanding of learning materials becomes low or even very low. RQA teaching learning model has several advantages, which can guide students to really read the subject matter assigned, so as to improve the understanding of learning materials and able to improve students' learning outcomes and able to inculcate skills and ability to think high level (Corebima, 2009, hal. 19). RQA teaching learning model also has weaknessess, such as during learning using RQA students are only forced to prepare individually before the learning takes place so that social skills and students' low ability to work together in group (Thalib, 2013, hal. 152), They one more inclined to social learning because of their lack

of sosial skill according to their's biological characteristics, ie the existence of experimental activities and the ability of students to solve the problem is still low.

Problem-Based learning model is a learning model that is able to assist students in solving problems encountered in the learning process. Problem-Based learning is a student-centred teaching approach that enables students to become active participants in solving problems, answering questions, cooperating in learning, working in teams on problems or projects, and taking on more of the responsibility for learning (Aziz, 2014, hal. 127). Problem-Based Learning is a methodological approach to teaching in which learners solve problems of varying degrees of complexity (frequently based on actual cases) using any resources they think may be of use (Gonzalez, 2016, hal. 15). The problem given has the authentic and ill-structured characteristics. According to (Zabit, 2016, hal. 32), specifically the problem and problem solving process are the main characteristics in Problem-Based learning. The activities of Problem-Based learning, (1) teacher orient students to the problems in diverse contexts to encourage all students actively involve in learning process; (2) teachers organize students to learn; (3) students identify the problems and analyze the data individually or in a heterogeneous group; (4) the students presented the results in different ways; (5) the teacher and the student are evaluate the problem solving process (Kartikasari, 2017, hal. 4).

Problem-Based Learning model also has advantages and disadvantages. The advantages of Problem-Based Learning model, which is realistic with student life, the concepts according to the students needs, build the nature of students'

inquiry, the concept retention becomes strong and fosters problem solving abilities, Problem-Based Learning is fun for students and tutors and the process requires all students to be engaged in the learning process. Disadvantages of the Problem-Based Learning model, which is complex learning preparation, the difficulty of finding relevant problems, misconception and often takes a long time, large numbers of students need to access the same library and computer resources simultaneously (Alrahlah, 2016, hal. 158).

Based on the disadvantages and advantages of both RQA and PBL learning models, these learning models can be developed in combination. The integration of the two models is a syntactic combination of RQA and PBL learning model which is known as Reading, Discussing, Searching, and Experimenting (RDSE) learning model. The RDSE learning model consists of four phases, namely Reading, Discussing, Searching, and Experimenting. RDSE learning model is expected to empower metacognition skills.

The first phase of Reading, which students individually read to understand the ecosystem material before the learning activities. Reading the greatest effect on learning, because most learning activities are reading. Students with reading will more easily obtain information from a reference that helps students in joining teaching and learning activities. Learning with biological materials has characteristics, that is text-shaped, so students are required to read to understand the content of the material. Reading is a process of catching and understanding or ideas compehending and appreciating reading (Gilakjani, 2016, hal. 230). Reading phase students' criteria, which are able to mark important concepts, create summaries, and questions.

Reading activities there are some obstacles such as there are some concepts that are difficult to understand students, students can not make questions and answer them. The constraint was overcome by a second phase, namely Discussing. Discussion is the presentation of lesson material by providing opportunities for students/student groups who hold scientific talks to gather opinions, draw conclusions or develop alternative solutions to a problem. Discussions are generally used to improve students' thinking and communication skills and to encourage student involvement in the lesson. Discussions are used by teachers for at least three important learning objectives: improving students' thinking by helping students generate understanding of the content of the lesson, cultivating engagement and student participation, learning communication skills and thought processes (Olukayode, 2012, hal. 55). Discussing phase criteria, ie students are able to provide solutions to questions that have been made in the phase of Reading.

The third phase is called the Searching phase. Students in groups learn to associate between ecosystem material with Qur'anic verses. Target students in this phase, which is able to produce products in the form of ecosystem material that has been associated with the verses that exist in the Qur'an. The linkage between the ecosystem material and

the verses in the Qur'an must be verified. Proof can train students psychomotor ability. In this connection, experimental activities are required.

Experimenting phase, students perform observation activities in the school environment and do the tasks LKS given by the teacher. Target students in the Experimenting phase, which is able to prove the linkage of ecosystem material with Qur'anic verses proved by the students are able to do the tasks LKS well. Experimental method is one of alternative solution of teacher to solve problem faced. Because the experimental method is able to open the students' mind or knowledge to argue as well as prove the hypothesis that has been studied, so that learning is more centered on students rather than on teachers (teacher centered). The experimental method is a way of delivering teaching by conducting experimental activities to find out for both their self or in groups, so that students are able to check the truth of a hypothesis or prove for themselves what is learned (Ross, 2013, hal. 1021).

II. METHOD

The research of RDSE learning model, take place at Jember University whereas test place at SMA Negeri 1 Muncar Banyuwangi. The time schedule of the RDSE learning model (Reading, Discussing, Searching, and Experimenting) was conducted in the second semester of the academic year 2016/2017. The subject of this development research is the students of class X in SMA Negeri 1 Muncar Banyuwangi second semester of academic year 2016/2017.

RDSE learning model has characteristics, namely syntax, social system, reaction principle, support system, instructional impact, and accompanist impact.

Syntax

The syntax of the REDE learning model consists of 4 stages, namely Reading, Discussing, Searching, and Experimenting. Explanation of each stage is presented in Table 1 below.

Table 1. Syntax Complementation of Learning Model of RQA and PBL

No	Steps of the RQA Learning Model	Steps of the PBL Learning Model	Steps for Developing the REDE Learning Model
1	Reading <ul style="list-style-type: none"> Students read, mark important concepts, and summarize the literature relating to the material being studied 		Students read, mark important concepts, and summarize the literature relating to the material being studied (Reading)
2		Student orientation to the problem <ul style="list-style-type: none"> The teacher explains the ecosystem material 	The teacher explains the ecosystem materials with lectures and frequently asked questions and presents a video

		with lectures and frequently asked questions	about the ecosystem material to the students
		<ul style="list-style-type: none"> Students presented a problem 	
3		Organize students to learn	Students are divided into groups of 4-5 students
		<ul style="list-style-type: none"> Students are divided into groups of 4-5 students 	(Discussing)
4	Questioning	Organize students to learn	Students make questions and then discuss the questions that have been made and look for alternative solutions to these questions
	<ul style="list-style-type: none"> Students make some questions based on reading results 	<ul style="list-style-type: none"> Students make inquiries and discuss issues in the PBL tutorial 	(Discussing)
	Answering		
	<ul style="list-style-type: none"> Students answer questions that have been compiled beforehand 		
5		Guiding for individual and group investigations	Students look for linkage between ecosystem material with verses in Al-Quran
		<ul style="list-style-type: none"> Students collect the appropriate information to get an explanation 	(Searching)
6		Develop and present the work	Students make observations about the ecosystem around the school environment
		<ul style="list-style-type: none"> Students carry out experiments or observations to get explanations and problem solving 	(Eksperimenting)
7		Analyze and evaluate the problem-solving process	Students make conclusions about the observation result
		<ul style="list-style-type: none"> Student can conclude observation result 	

The line that is not in the content of the learning model step means different from the step of the learning model beside it

Source: (Huda, 2015:272-273) and Sumamprouw (2012:426).

Social System

The social system in the REDE teaching learning model, ie students in groups to conduct a discussion process to solve a problem in learning. Teachers build students' knowledge of the experiences they discover either directly or from the results of the information provided. In addition, teachers manage the class well in order to create a conducive class atmosphere. Interaction is emphasized between students and teachers, students are free to express their opinions and ideas.

Principles of Reaction

The principle of the reaction of the RDSE learning model is that teachers provide knowledge about the ecosystem material to the students. As a facilitator, teachers guide students and rectify if there is a wrong material concept from students, helping students to be able to find the correct concept. Provide a point for students who are active in the learning process and the point will be accumulated with the final value.

Supporting System

Implementation of RDSE learning model in order to run smoothly then require a support system in the form of Powerpoint learning media, textbook, and student worksheet (LKS), and LCD. Requires also tools and materials to be used for experimental activities.

Instructional Impact and Companion Impact

The instructional impact of REDE learning model is that students can understand the ecosystem material because students directly observe it themselves. Students can link between ecosystem material concepts. Companion impact is an indirect impact of applying REDE learning model. The impact of accompaniment of the REDE learning model after being applied, ie students become the spirit to learn to understand their respective environment, more concerned about the environment, and have good communication skills.

Data analysis technique

The Effectiveness of Metacognition Skills

The effectiveness of metacognition skills was analyzed using the Normalized gain formula (g) to determine the effectiveness of metacognition skills. Here is the normalized gain (g) formula (Hakim, 2016, hal. 324).

$$Normalized\ gain\ (g) = \frac{\text{metacognition scores of late} - \text{scores of early metacognition}}{\text{metacognition score of maximally} - \text{early metacognition scores}}$$

The value scales used in the Normalized gain (g) metacognition skills are listed in Table 2 below.

Table 2. Criteria Normalized gain (g) Metacognition Skills

Normalized gain score	Criteria normalized gain
$0,70 \leq \text{normalized gain}$	High
$0,30 \leq \text{normalized gain} < 0,70$	Medium
$\text{normalized gain} < 0,30$	Low

Source: Huke (1998:3)

III. RESULTS and DISCUSSION

RESULTS

The research of RDSE learning model (Reading, Discussing, Searching, and Experimenting) was conducted in class X.2 of Senior High School Muncar Banyuwangi in the 2016/2017 academic year, it conducted in three meetings. This research results were obtained through 30 respondents. This research were conducted on May, 22, 23, and 24, 2017. Research obtained metacognition skills data on the application of RDSE learning model (Reading, Discussing, Searching, and Experimenting). The research data to the application of RDSE learning model are in the form of quantitative and qualitative data. Data of metacognition skills at beginning and final can be seen in Table 3.

Table 3. Data Metacognition Skills

N	Metacognition Skills	The number of students	Average \pm SD	Normalized gain (g)	Category
1	Initial Metacognition skills	30	72,37 \pm 12,84	0,72	High
2	Final Metacognition skills	30	91,79 \pm 6,86		

Table 3 shows that the mean of initial metacognition skills is lower than the mean of final metacognition skills. The mean of initial metacognition skills is 72,37 while mean of final metacognition skill is 91,79. Normalized gain (g) of metacognition skills, is 0,72 with high category.

DISCUSSION

The research stage was conducted with the researcher as the model teacher. This research was conducted in 3 meetings. The number of observers there are 4 teachers who observe the implementation of the learning that has been done by the model teacher appropriate with stages in lesson plan. Samples used for research were 30 students. Thus, each observer will observe 8 students. There is also a professional person as a cameraman whose job is to document learning activities on research. First, the researcher gives inventory of early metacognition skills.

The first in research performed, teachers explain apperception, motivation, and learning aim. Displays a learning video to encourage students to find problems. The Next ie directly into the syntax of the RDSE learning model with the teacher explaining the material. The first stage is the teacher asks students to read the subject matter, mark important concepts, make inquiries, and make summaries, all of which are included in the Reading phase. The second stage is Discussing, students discuss the questions that have been made before and find a solution to the question. The third stage is Searching, students after understanding the material of ecosystem will then link the material with the verses of the Qur'an. This activity helps students to be able to find out what students are learning with Quranic verses that students adhere

to. There is a relationship between the two. Hopefully from this stage students have a better belief in the religion of Islam. Students will be devoted to Allah SWT. For example, the relationship between the biotic component, ie the plant with the Qur'an surah Asy-syu'araa 'verse 7 regarding the plants that exist on earth consists of various kinds of good plants. The plant was created to support life on earth.

Lastly the Experimenting stage, students and teachers go outside the classroom to observe the ecosystems that are around the outside of the student class. Students will be more aware about the environmental conditions surrounding the school. Students will identify the biotic and abiotic components and connect between the two components. The Experimenting stage serves to prove what students have learned into the student's real life. According to Sutarto and Indrawati (2013:94), experimental activities will make students more confident in the truth or conclusions derived from their own experiments than simply accepting the teacher's or book, because the students do by themselves. The final activity of the student's research was given inventory of metacognition skills. Inventory Charging is done before and after learning. The mean of early metacognition skills was 72,37 while mean of final metacognition skill 91,79. Normalized gain (g) value of metacognition skills data of 0.72 with high category.

RDSE learning model consists of 4 phases, namely Reading, Discussing, Searching, and Experimenting. In the Reading Phase, students read material about the abiotic and biotic components and their relationships, mark important concepts, summarize, and create questions related to underlineng the topics given. Marking important concepts of material and creating a summary is an activity to help students understand the material given, so it will empower metacognition skills. Metacognition knowledge indicators, especially conditional knowledge and planning. Understanding the reading means being able to capture the contents of the passage. Reading comprehension means understanding the content of the passage and not just reading. Reading not only pronounces writing, but also involves other activities such as visual activity, thinking, psycholinguistics, and metacognitive. In addition, students control create questions and answers to test themselves. Students supervise and correct their own behavior in completing the tasks. Therefore, it will empower the metacognition skills of the comprehension monitoring aspect (Yusnaeni and Corebima, 2017, hal. 3477).

The second phase, is Discussing. Students communicate with each other to discuss questions that have been made in the previous stage and look for alternative solutions to the question. According to (Rickey, 2000), through small group settings, students can know their own knowledge so that cognition and metacognition can be empowered. One aspect of class discussion is the ability to develop cognitive growth. Another aspect is the ability to connect and incorporate cognitive aspects and social aspects. In fact, the discussion method is central to creating a positive learning environment.

Discussions help establish a pattern of participation and consequently have a major impact on classroom management. Talks between the teacher and his students make many social interaction, so the class comes alive (Olukayode, 2012, hal. 55). Some aspects of metacognition skills that can be empowered through Discussing activities, namely debugging strategies, procedural knowledge, and declarative knowledge.

The third phase is Searching, students will link the components of ecosystem materials with the verses that exist in the Qur'an. This stage can help the student's cognition to be better because students will think about the planning first before relating to the verses that exist in the Quran. Students will organize and make detail about the concepts that students had made. Therefore, the metacognition skills aspect of information management strategies can be empowered.

Similarly, the fourth phase, there is Experimenting activities. This phase contain communication and argumentation activity, when conducting observations in the outside of the class in the groups work. According to Suratno (2011:15), the process of functioning communication and arguing skills is inseparable from the principles contained in the metacognition skills component of planning, information management, monitoring, revising, and evaluating. Hence this activities will potentially increase metacognition skills.

RDSE learning model in which there are activities to make questions and conduct an inquiry will make students become independent and will empower metacognition skills. Metacognition skills can not come by themselves without being facilitated. This is in line with the opinion of (Sindhvani, 2013, hal. 70), which states that metacognition skills do not appear on their own in learning. Metacognitive skills enable students to master information and solve problems more easily. Therefore, the RDSE learning model is one of the learning models that can facilitate students to bring up metacognition skills.

Metacognition is very important to be empowered to students in learning for academic success. The ability of a well-empowered metacognition allows the individual to better manage the cognitive conditions and know their weaknesses, so that they can be improved by building new cognition conditions. Each student can be empowered metacognitive skills, so trained to be a habit of performing metacognition skills. Students will understand the situation under consideration, students become trained how they manage and perform cognitive abilities (Yusnaeni and Corebima, 2017, hal. 3476). The integration of the learning process with the local wisdom values can better build the concept of subject that is students have learnt by themselves. This research integrates between Islam and science so it is expected that metacognition skills can be empowered in high school students (Suratno and Dian, 2017, hal. 1016-1018).

CONCLUSION

From the results of research and discussion of metacognition skills as measured by inventory metacognitive awareness

(MAI) can be concluded that the effectiveness of RDSE learning model (Reading, Discussing, Searching, and Experimenting) on students metacognition skill, has Normalized gain (g) 0,72 with high category. So, RDSE learning model can empowering metacognition skill.

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