

Promoting of Thematic-based Integrated Science Learning on the Junior High School

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Abstract

This study was conducted to explain the effect of thematic based integrated science learning to the student's critical thinking skills and character. One group pretest-posttest design is involving thirty students in one of the junior high school in the Palu city. A sample was taken using purposive sampling. Data of critical thinking skills obtained from pretest and posttest, whereas the characters students are collected with observation and questionnaire. The results showed critical thinking skills of students are better after following thematic-based integrated science learning with N-gain as 0.52. Ten characters of students showed good category with the lowest scores on the aspects of environmental concern. The study revealed that thematic based integrated science learning can increase of critical thinking skills and character of the seventh grade junior high school students with good category

Keywords: thematic, integrated science, character, critical thinking

1. Introduction

Central Sulawesi has a wide range of Natural Resources with the potential to be used for life. Utilization of natural resources requires human resources are quality and character. The quality and character of a person can be known from the ability, skills and behavior. Ability often measured in learning more emphasis on cognitive abilities. Learning is not training students for higher order thinking. One type of higher order thinking skills is the critical thinking.

Critical thinking skills of the individual are very useful for the management and utilization of natural resources. Individuals should be able to criticize and resolve the problems. However, critical thinking skills individuals need to be balanced with good character. Individuals with good critical thinking skills, but has a bad character can be detrimental to society. Therefore, it is necessary to increase human resources to be individuals who have critical thinking skills and character. They expected to be able to manage natural resources wisely and sustainably.

The importance of thinking skills and character accommodated in curriculum. The curriculum has four core competencies, namely competency of spiritual attitudes, social attitudes, knowledge, and skills. Competency skills are not only in psychomotor skills, but also thinking skills. This means the habit of critical thinking and building character values need to be done in learning since primary and secondary education. By this way, students were expected have to the critical thinking skills and good character.

Development of critical thinking skills and character of students with systematic and sustained can help students to solve problems. Critical thinking is one of the high order thinking skills. Critical thinking is often associated with the ability students to connect a case, compare/ differentiate, classify, analyze, and evaluate (Zohler and Pushkin, 2007). A person's character can be built from the environment and habituation. Thinking skills and positive character can be trained and familiarized with the learning of science in schools.

Natural Sciences examine the universe and life. Learning of natural science had oriented of applicative, development of thinking skills, curiosity, and responsible towards the natural and social environment (Department of Education and Culture, 2012). Science education have a vital role in the lives of individuals and the development of a nation scientifically and technologically (Alebiosu and Ifamuyiwa, 2008). It studied in junior high school. Science learning in junior high school implemented as the integrated science. Development

of the integrated science curriculum is determined by a large number of factors; the most important being the learner, the changing nature of schools, changes in society and changes in the nature of disciplines (Oludipe and Idowu, 2011)

However, science learning on the junior high school that took place in the Palu city was carried out separately (Pursitasari et al., 2013). Teachers were not sure if they should explain subject matter which is not in accordance with their competence. Some schools do not provide the opportunity for students to do practical work. Whereas, lab is one of the vehicle for developing thinking skills and character of students.

Based on the existing problems, it has done thematic-based integrated science learning (TISL) model that is equipped with an thematic textbook (Pursitasari et al., 2013). Models of TISL has been arranged to get the assessment and input from two lecturers as reviewer and two teachers as users. The results showed assessment of lesson plan, critical thinking skills instruments, character instrument, and textbooks are valid and practical (Pursitasari et al., 2014). After improvements based on feedback from the reviewer, then TISL model used in one of the Junior High School in the Palu city. It aims to describe the influence of implementation TISL model to critical thinking skills and character of the seventh grade junior high school students in the Palu city.

2. Material and Methods

This study was conducted in one of the Junior High School in the Palu city by using One Group Pretest-Posttest Design. Samples were obtained by purposive sampling. The study begins by providing a pretest. Learning is done taking the theme of natural diversity. It consists of three sub-themes, namely natural diversity characteristic, classification of the physical diversity, and the classification of the biological diversity. Syntax of the TISL model is Observation, Questioning, Exploration, Analysis, Confirmation and Evaluation (OQEACE). Learning does not only take place in the classroom, but also carried out in the laboratory and outdoors. Learning also using media such as images/video and textbooks. Observation has been done to observe activities of students and teachers. Posttest conducted at the end of the study. Collecting data is using critical thinking skills tests, observation sheet and questionnaire form with a scale of 1-4 to assess character. Data were collected then analyzed by descriptive and inferential statistic.

3. Results

3.1 Critical thinking skills

Critical thinking skill is one kind of the higher order thinking skills. It is necessary to build early in the learning process. Table 1 showed the result of critical thinking skill in the junior high school at the Palu city after the implementation of TISL model.

Table 1. Critical Thinking Skills of Students on the Thematic-based Integrated Science Learning

	Critical Thinking Skills		N-gain
	Pre-test	Post-test	
Minimum	24	59	0.08
Maximum	76	95	0.92
Mean	49	77	0.52
Std. Deviation	4.2	3.1	0.23

Table 1 shows TISL model can increase critical thinking skills of junior high school students. Test of significance (see Table 1) refers the data is normally distributed but no homogenous. The results of paired t-test (1-tailed) concluded that critical thinking skills student's in the post-test was better than pre-test significantly (Table 2). It was caused during learning with TISL model, students were involved actively and built meaningful learning.

Table 2. Summary of Statistics Test Results of Critical Thinking Skills

	Normality Test	Homogeneity Test	t-test
Pre-test	p = 0.121	p = 0.000	p = 0.000*
Post-test	p = 0.200		t' = 7.954

• Significant at p < 0,05

3.2 Character

TISL model also can build character of students beside increase the critical thinking skills. The result of the student's character assessment is presented Table 3.

Table 3. Score of the Students Character on the Thematic of the Integrated Science Learning

	Score of character	Category
Minimum	2.56	Enough
Maximum	3.78	Very good
Mean	3.10	Good
Std. deviation	0.3	

Table 3 showed that the average character of students is 3.10 with good category. A ten of characters aspect that viewed in the integrated science learning is presented Table 4.

Table 4. Aspects of the Character on the Thematic of the Integrated Science Learning

No.	Aspect of character	Average of score by			Mean	Category
		Teacher	Parents	Self-assessment		
1.	Piety	3.34	3.34	2.88	3.19	Good
2.	Honestly	3.33	3.40	3.33	3.35	Good
3.	Hard work	3.10	3.19	3.63	3.31	Good
4.	Discipline	3.59	3.17	3.12	3.29	Good
5.	Responsibilities	3.00	2.97	3.30	3.09	Good
6.	Self-directed	3.03	3.06	2.97	3.02	Good
7.	Curiosity	3.42	2.92	3.42	3.25	Good
8.	Communication	3.05	3.07	3.32	3.15	Good
9.	Cooperation	3.49	3.47	3.52	3.49	Good
10.	Save of environment	3.03	3.04	2.72	2.93	Good

Table 4 showed that ten characters can be constructed in the implementation TISL model with good category.

4. Discussion

Thematic-based integrated science learning model have been done to students of the junior high school at the Palu city. Syntax of the TISL model is Observation, Questioning, Exploration, Analysis, Confirmation and Evaluation. When the students make observations, students observe object carefully. Furthermore, the students ask questions to actualize their curiosity. The students can also determine similarity and dissimilarity. After the teacher suggested learning objectives and formed group, students in groups to explore through the completion of the tasks. At this stage, students applying the principles, concepts, and analyzes the results of the exploration. After that, students do presentation in the class to confirm their explore result. Students are trained to answer question from friends and teachers. At the end of the discussion, the teacher asks student to make inferences. In evaluation phase, students apply their ability to obtain optimal results. Based on the syntax of the TISL model, implementation of TISL model encourages students to critical thinking such as: (1) formulates or asking a question, (2) find their similarity and dissimilarity, (3) applying the principles and concepts, (4) explain a question, (5) analysis, and (6) make inference.

Although N-gain critical thinking of student in this study categorized moderate, however critical thinking skills must be developed through science learning and other subjects. This is due to the critical thinking skills is

urgently needed by Human Resources in Central Sulawesi in order to manage and exploit natural resources wisely. Critical thinking skills also need to be trained and familiarized from elementary school. Lambertas (2009) suggests that critical thinking skills can be trained on elementary students through math. Students are given questions that are non algorithmic or contextual tasks.

Development of the thinking skills through thematic learning also presented by Min et al. (2014). They stated that the thematic learning can encourage students to critical thinking, creative, and innovative. Dilek (2012) also stated that the thematic learning can improve psychomotor skills, affective, and cognitive of students.

Characters students formed through science lessons with natural diversity theme is piety, honesty, hard work, discipline, responsibility, independence, curiosity, communication, collaboration, and caring environment. Ten aspect of the characters have good category with the lowest mean is concerned about save of environment (Table 4). It is caused awareness about good environment not become habits during the time of childhood.

Piety character formed through the integrated science learning with natural diversity theme. Students always be grateful for all the gifts given by God Almighty in the diverse natural wealth. Honesty character occurs when students make observations, exploration, and analyze during solving tasks. Students are required to report all the data of observations, findings, and results of data processing. Hard work, discipline, and responsibility characters are formed when students explore and analyze. Students should try to obtain relevance information from books or other sources. Students also must continue to strive to complete the task with good results. Discipline and responsibility of students is indispensable in solving the problem or task. Students are also trained their independence in completing the task, even though at first they need the guidance of a teacher. Gradually, teacher reduces aid to the student. TISL program also facilitate students to develop a sense of curiosity. At the beginning of learning displayed images or impressions that provides the opportunity for students to ask and argue about they observe.

Communication and cooperation characters established through group work in the exploration, analysis, and confirmation. Every student asks question and respond to questions in a group or the other group and teacher. This is the same as the opinion of Akinoğlu and Tandoğan (2007) that the collaborative learning provides a great role to be active learners rather than as passive recipients of information. Character of the environmental concerns formed through the interaction of students with the environment when making observations to living beings and inanimate objects as well as laboratory activities. Character of honesty, responsibility, discipline, cooperation, and curiosity can also be formed through learning in junior high school biology with guided inquiry (Jaya et al., 2014).

Integrated science learning with TISL model using images/video and textbook. Images/video in the TISL program can stimulate curiosity. When students are observe its, they ask various questions. Teacher encourages and motivates students to ask a question. Based on the questions were posed, students then create a hypothesis based on their knowledge. After that, students will do exploration to prove their hypothesis. In the exploration phase, student do a survey object of environment to finding similarities and differences, analyzes and classifies objects based on their findings. The next learning stage is confirmation. Students explain the findings and teacher write their findings on the white board. After that, students explain their conclusions. Teacher also asks questions to stimulate the students' thinking skills.

The textbook in TISL model also played a role in the development of critical thinking skills and character of students. Textbook gives students the chance to develop insights and ideas to understand the material and complete the tasks. Mahmood et al., (2009) stated that textbooks provide the questions and tasks that help students reflect or express understanding and explaining the reasoning and ideas.

Implementation of TISL model received a positive response from students. Students are also fun during the integrated science learning because students do an activity to observe and solve the task in the worksheet either in groups or individually. Students also ask many questions and express their opinions because the teacher continues to provide motivation.

5. Conclusion

Our study focused on the sains learning on the junior high school. Based on the finding, it can be concluded that implementation TISL model on the junior high school can improve critical thinking skills with moderate category. TISL model is also improve the students character such as piety, honesty, hard work, discipline, responsibility, independence, curiosity, communication, collaboration, and caring environment.

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