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## The Influence Of Socio-Science Issues Based On Intervention Model On Students Higher Order Thinking Skill At Topic Conservation In Biology Students At Medan State University Academic Year 2016/2017

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### ABSTRACT

The research aims to know the influence of socio-science issues based on intervention model on students' higher order thinking skill at topic conservation. This research was done at Medan State University on second semester of bilingual program students. The type of the research was quasi experiment, with pretest-posttest control group design. Sample of the research was 54 students consist of 23 students of experiment class and 31 students of control class. The data were taken by using instrument in form of essay test contain three indicator C4-C6 questions for Higher Order Thinking Skill, which have been tested for both validity and reliability. Two tailed t-test was used for data analyze which obtained that pretest data calculation for both classes were distributed normally and homogeny. During the treatment process, class experiment was thought by using socio-science issues based on intervention model, while class control was thought by conventional learning model. The result shows higher order thinking skill in experiment class significantly higher than control class. By the other words it can be concluded that socio-science issues based on intervention model has given an effect on students higher order thinking skill.

**Keywords:** Socio-science issues, intervention model, higher order thinking, conservation.

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### INTRODUCTION

Human resource quality of a nation is determined by the level of education of the nation itself. Increasing the quality of education starting from improving the quality of learning. This can be evidenced by the data from the Education for All (EFA) Global monitoring report issued by (UNESCO, 2011), that the quality of education in Indonesia has decreased from 2010, where previously the order of 65 to 69 of the 127 countries surveyed (Tureni, 2013). Many factors cause why the quality of education in Indonesia is still low. In addition to the material taught, if explored any further, students of Indonesia is very difficult to solve the problem when the students have to face questions that require in to high-level thinking skills. One of the reasons is that most learning in Indonesia being done with less chance to students to able to think critically.

Beside it, the education system in Indonesia is still focused on the exam. Therefore practice of teaching focuses on subject content and ignore the development of students' thinking skills (Soedjadi, 2000; Rohaeti, 2010). Most of the teaching and learning process that takes place in school is the lecture method, which is based on memorization of facts that leads



students to think less critical (Ziedler, 2002). Thus, negligence of the importance of thinking skills in teaching and learning affects students' ability to think (Zohar & Dori, 2003). This leads to students' thinking ability in Indonesia is in low level. Low ability among Indonesian students is shown by the study of TIMSS 2011 and PISA 2012. And the newest data from the PISA test result shown that in 2015, Indonesia was ranked 69 from 76 countries of participant.

Higher order thinking skill really important to students in order to face the real life problems. Because complex real-life problems often demand complex solutions, which are obtained through higher level thinking processes. Beside it, teaching higher order thinking, then, provides students with relevant life skills and offers them an added benefit of helping them improve their content knowledge, lower order thinking, and self-esteem. (R. De Vries, 1987)

According to Ratcliffe and (Grace, 2003) socio-scientific issues model are said to be vehicles, not only for raising students' interests in science, but also for strengthening generic skills as team-work, problem-solving and media literacy. At the same time, these skills are a presumption for successful work with socio-scientific issues (Jarman&McClune, 2007). Researches have showed that such issues challenge students' rational, social and emotional, and higher order thinking skills (Sadler, 2004). However, several problematic factors are identified, such as students easily can be distracted when they are working with complex issues, where the outcome often is not clear (Zeidler et al, 2005). For this case the using of intervention while student doing the discussion about socio-scientific issues in the class to lead the student for clearer outcome.

According to (Cobb et al, 1998), environmental science needs to be integrated with social science - e.g. biology in order to create new ideas of how environment works. Since environmental science for example in conservation becoming one of the most discussing topic now a day, Students really demanded to develop appropriate solutions to important environmental issues, think in critical ways, take suitable actions, and participate effectively in both local and global environmental problems that why this topic is suitable to increase student higher order thinking skill using socio-scientific issues learning model.

## MATERIALS AND METHOD

**Research design:**The study involved two classes which are experimental class and control class, where both these classes was given different treatment. Experimental class given socio-science issues-based on intervention model while the control class was given conventional learning model. To determine student learning outcomes obtained with the two treatments, the students was given the test twice. Those are a test that was given before treatment called pre-test and test after treatment called posttest.



**Data Sample:**Location: This research has been conducted at State University of Medan, located in Jl William IskandarPasar 5 Medan City. Research time began in Mei 2017 until June 2017 in the academic year 2016/2017.

**Sample:**The samples of this experiment required 54 students, 23 students for the experiment class and 31 students as control class.

**Instrument:**Instruments that was used to aggregate the data from students was test of ten questions essay with subject of conservation, Higher order thinking skill questions be composed of C4(Analysis), C5 (Evaluating) and C6 (Synthesis). Before the research was applied, test had been arranged first to determined validity. Validity had been determined by validators that were asked to specify each item in category valid or invalid.

## RESULT AND DISCUSSION

### Result

**Reliability:** Research instrument for higher order thinking skill and science process skill had been arranged of 10 questions of each. To validate the both instrument, the experts had been included. To know the reliability of the question, 24 students who were not the sample in this experiment had been tested. AndCronbach’s Alpha Formula was used to calculate the number of reliability . Number of higher order thinking skill instrumet was  $r_{11} = 1,042$

**Validity:** Validity of the test was tested to determine which question was really valid. Used to test the validity product moment correlation formula by Pearson.

**Table 1** Pre-test Validation

$r_{count}$	$r_{table}$	Explanation
0,17	0,40	Invalid
0,53	0,40	Valid
0,21	0,40	Invalid
0,42	0,40	Valid
0,54	0,40	Valid
0,42	0,40	Valid
0,67	0,40	Valid
0,58	0,40	Valid
0,67	0,40	Valid
0,44	0,40	Valid

The Table Result of the Pre-test questions of treatment model class and conventional model class

**Table 2** Post-test Validation

$r_{count}$	$r_{table}$	Explanation
-0,32	0,40	Invalid
0,55	0,40	Valid
0,33	0,40	Invalid
0,49	0,40	Valid
0,55	0,40	Valid



0,66	0,40	Valid
0,48	0,40	Valid
0,53	0,40	Valid
0,64	0,40	Valid
0,27	0,40	Invalid

The Table Result of the Post-test questions of treatment model class and conventional model class

**Pre-Test:** Before treatment, both of class socio-science issues based on intervention Model and conventional class were executed by giving pre-test in order to comprehend the initial ability of student's higher order thinking skills. Histogram (figure 3) below displays ConMod (Conventional Model), SSBI (Socio-Science Issues Based On Intervention Model), HOT (Higher Order Thinking Skill). Some tests had been required for the both ConMod class and SSBI class such as validity by Pearson formula, Normality was used by Liliofer Formula and homogeneity. The table beneath displays the result of the pre-test.

**Table 3** Result of the Pre-test

Description	Higher Order Thinking skill	
	ConMod	SSBI
Mean	44.77	44.04
Lt	0.04	0.05
Lv	0.20	0.18
Normality	Normal	
Fcount	1.39	1.89
Ftable	1.90	1.90
Homogen	Homogeneous	Homogenous
t count	0.41	1.19
t table	2.01	2.01
Difference	Not significant	

The table of normality, homogeneity and t test of the Pre-test of treatment model class and conventional model class.

From the table displays all the data was normal and homogeneous, and after tested by t-test showed that, both classes' higher order thinking skill and science process skill were not significantly difference

**Post Test:** After the experiment was applied, post-test for both of Socio-science issues based on intervention model class and conventional model class were given, the purpose was to know the last ability of students on both classes, that has been taught by socio-science issues based on intervention model. and class with conventional model

**Table 4** Result of Post-test

Description	Higher Order Thinking skill	
	ConMod	SSBI
Mean	58.30	77.13
Lt	0.06	0.08
Lv	0.18	0.20
Normality	Normal	
Fcount	1.89	
Ftable	1.90	



Description	Higher Order Thinking skill	
	ConMod	SSBI
Homogen	Homogeneous	
t count	8.86	
t table	2.01	
Difference	Significant	

The table of normality, homogeneity and t test of the Post-test of treatment model class and conventional model class.

## DISCUSSION

Base on the signifant test, this model influencing all type the higher order thinking skill of the student, which are analysizing, evaluating and creating. The stepping-up of students score level in higher order thinking skill and the big differences of score in Socio-science issues based on intervention model class if we compare to conventional class because, benefit of socio-science issues model is, encouraging the participation which is the students in action and solving problem in the scientific way and activity' rather than simply to learn to understand (Tytler, 2011). Those are what it takes to answering higher order thinking skill of the student, by using the model students get used to think more criticyly not only knowing.

Beside it, socio-science issues also using discussion and exchanging ideas method. According to (Salim, 2014), The group discussion and exchanging ideas are good means to allow the students exchangingtheir views in between and listen to others' opinions and and improving the level thinking of the student.According to (School of Education and Social Development, 2005), learning in such a 'real life' problem situation like socio-science issue model, students require the necessary skills to make professional decisions both cognitively affectiely .this is forcing student to think in higher level. This is in the line with thwresult of socio-science issue model , that improve students higher order thinking skills.

Socio-science issues model, on of some models wich demand student to use their creativity and to integrate materials across different subjects, inquiring of assumption and reflect viewpoints and possibilities. creativity in social sciences is more related to conceptual combination and idea generation. This is because the field of social science is based on loosely related theoretical model. (Diki, 2013). In biology, in order to improve higher thinking, the most important skills are concept selection, information gathering, and idea generation (Mumford et al, 2010).

## CONCLUSION

Base on the result of research, socio-science issues based on intervention model giving a significant effect on students's higher order thinking skill, because the class that was taught by the socio-science issues based on intervention model, shows great progress ahead in gaining higher order thinking skill.And the students that was taught by socio-science issues based on intervention model also showing significant effect than the students who taught by conventional learning model at conservation topic in Biology Student of Mathematic and Natural Science Faculty second semester.



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