

Original Research Article

Implementing Problem Based Learning Dalihan Na Tolu to Promote Senior High School Students' Social Attitudes in Biology Class

Widya Arwita^{1,2}, Mohamad Amin³, Herawati Susilo³, Siti Zubaidah³

¹Doctoral Program of Biology Education, Universitas Negeri Malang, 65145, Indonesia

²Faculty of Mathematics and Science, Universitas Negeri Medan, 20221, Indonesia

³Faculty of Mathematics and Science, Universitas Negeri Malang, 65145, Indonesia

Corresponding Author: Widya Arwita

ABSTRACT

This study aimed to promote senior high school students' social attitudes in biology class using Problem based learning dalihan na tolu (PBL DNT). The participants of this research were the students who came from MIA 4 class at SMA Negeri 1 Tebing Tinggi. Data on students' social attitudes was collected using an observation sheet. Students' social attitudes that were observed comprised responsibility, cooperation, tolerance, and politeness. Data was then described qualitatively. The results showed that PBL DNT managed to improve students' social attitudes as follows. The average student scores "Very Good" for an attitude of responsibility, tolerance, and politeness, while a cooperation attitude generates a "Good" score.

Key Words: Problem based learning, *dalihan na tolu*, social attitudes.

INTRODUCTION

Education in Indonesia has been focused on students' social attitudes since the establishment of the School-Based Curriculum (KTSP) until now (Curriculum 2013). One of the competencies that should be achieved by the students in those curriculum is the affective or attitude competency. As a compulsory subject in senior high school, biology is required to provide the students with an integrated learning of social attitudes, knowledge, and skills. Social attitudes promoted in Curriculum 2013 reflect the goals of education that have been set by National Regulation No. 20/2003 on National Education System which is to create not only intelligent but also noble students who have a good personality.

However, learning to achieve the goals has not yet been well developed. This can be seen from the results of the survey in

November-December 2013 of eight biology teachers in four state high schools across Tebing Tinggi City, North Sumatra. The results of the survey confirmed that 88% of the teachers agreed that it is important to promote social attitudes in their biology classroom, but only 50% of the teachers admitted that they measured their students' social attitudes in the classroom. This fact indicates that there are only few teachers concerned with their students' social attitudes. There might be some reasons of why the teachers pay more attention on the students' cognitive achievement only; one of which is the execution of national examination. This problem, therefore, leads to students' low emotional (affective) competency. Information obtained from informal interviews with some biology teachers also revealed that many students were less respectful to the teachers and their peers and less responsible for their tasks.

Those obstacles to the development of education can hinder national growth. Anshoriy (2013) argues that one of the challenges to improving the quality of a country is lack of attention to character education. Therefore, it is necessary to improve learning which can promote students' social attitudes.

Attitudes can be defined as knowledge accompanied by willingness and tendency to react based on the knowledge, while social attitudes are factors which drive someone to do something (Gerungan, 2004 and Azwar, 2009). Social attitudes can also refer to a state of mind and feelings towards a particular object or social interaction (Stankov, 2007). Attitudes can be created easily in a situation which involves emotional factors and someone's personal experiences (Azwar, 2009). Thus, students' learning experiences should be designed to shape their positive attitudes. The guidance of other students' attitudes and abilities must be explicitly taught, meaning there is integration between the competencies in learning (Zubaidah, 2016; Zubaidah, 2017)

In addition, Azwar (2009) argues that culture in which someone is raised also influences his/her character building. Batak is a popular ethnic found in North Sumatera. Its social system which is known as *Dalihan Na Tolu* divides the society into three sub groups namely dongan tubu, boru, and hula-hula (Harianja and Harianja, 2013). These three sub groups play the same important role and are inseparable. The values of this social system are then embedded into a local culture-based learning.

Problem based learning dalihan na tolu (PBL DNT) is a learning model which was developed by Arwita, et al. (2017) by integrating Batak social system into problem based learning to learn biology. Problem based learning (PBL) is a learning that is done through the discovery of problems, namely learning about the content of the problem such as facts, concepts, and skills; And learn about finding problem solving (Zubaidah, 2013), while *dalihan na*

tolu (DNT) is the philosophy of life as well as the social system of the Batak culture.

Biology is a science of which characteristics are close to students' life. Besides studying living creatures and environment, biology also teaches students how to understand living creatures and their way of life as well as to conduct further investigation (Paid, 2012). Materials in biology are mostly authentic since they encourage students to engage in problem solving and inquiry. PBL DNT gives students a space to be more active in learning. This PBL DNT learning model consists of six learning stages: (1) dividing students into groups or subgroups; (2) providing guidance to actual and authentic problem solving; (3) offering solution using DNT pattern; (4) scaffolding; (5) presenting the solution, and (6) making decision, analyzing and evaluating the solution. These stages show that students can work in a group and subgroup to find a scientific solution to the problems.

Purpose

This study aimed to investigate the effectiveness of implementing PBL-DNT to promote students' social attitudes.

METHODS

Research Design

This study partially belonged to the development of problem based learning dalihan na tolu (PBL-DNT) model introduced by Arwita, et al. (2017). Data was collected through observation using an observation sheet and a questionnaire. Students' social attitudes were observed in four meetings from 2 to 23 May 2015 with "environmental" subject matter, and questionnaires distributed to students at the final meeting.

Participants

There were 38 students participating in this study. They were tenth graders who came from MIA 4, SMA Negeri 1 Tebing Tinggi and were enrolled in a biology class which implemented Curriculum 2013.

Instrumentation and Data Collection

Observation

Observation was conducted using a social attitudes observation sheet which had a purpose to measure four attitudes that were responsibility, cooperation, tolerance, and politeness. There were two observers assigned to observe 38 students in the classroom.

Questionnaire

A questionnaire was used to collect data on students' social attitudes. It contained 40 items of questions; 20 of which were for positive statements and the other 20 showed negative statements. The questionnaire employed four Likert scales namely strongly disagree, disagree, agree, and strongly agree (Azwar, 2009).

Data Analysis

Data was analyzed descriptively. Data analysis on students' social attitudes was conducted by 1) summarizing the questionnaire data and the results of observation on students' social attitudes, 2) scoring every aspect/indicator of students' social attitudes using a social attitude assessment rubric, 3) counting the average score of every aspect/indicator of students' social attitudes obtained from the observation sheet and the questionnaire, 4) summing the results of the observation and questionnaire, 5) the average scores of the students' social attitudes have been set by the criteria of Permendikbud (Regulation of Ministry of Education) No. 104/2014 and are displayed in Table 1. Model PBL DNT would be determined effective if the

students' scores on social attitudes were categorized good.

Table 1. Criteria of social attitudes assessment

Score Interval	Criteria
2,00 - 2,49	Less
2,50 - 2,99	Fair
3,00 - 3,49	Good
3,50 - 4,00	Very Good

RESULTS

Students' social attitudes were observed during the learning process using PBM DNT model which lasted for four meetings. The questionnaire was distributed at the fourth meeting when all materials had been delivered. The average scores of the students' social attitudes are presented in Table 2.

Table 2. Average acquisition of every aspect of students' social attitudes

No	Social Attitudes Aspect	x_o	x_q	X	SD
1	Responsibility	3.73	3.30	3.52	0.30
2	Cooperation	3.53	3.19	3.36	0.24
3	Tolerance	3.68	3.44	3.56	0.17
4	Politeness	3.53	3.62	3.58	0.06

Explanation: x_o = Average from the observation

x_q = Average of the questionnaire

X = Average overall social attitudes

SD = Standard deviation

The social attitudes of the students described in Table 2 indicate that responsibility aspect achieved the highest average score at 3.52. It was followed by cooperation score at 3.36, tolerance score at 3.56 and politeness score at 3.58. Based on the assessment criteria, it can be concluded that students who were enrolled in biology class where learning was done with PBL DNT model were very responsible, tolerant, and polite, while their cooperation skill was categorized good.

Table 3. Percentage of students' social attitudes

Score	Responsibility		Cooperation		Tolerance		Politeness	
	F	%	F	%	F	%	F	%
Less	0	0	3	8	2	5	1	3
Fair	3	8	4	11	1	3	1	3
Good	11	29	8	21	9	24	12	32
Very Good	24	63	23	61	26	68	24	63

Explanation: F = Frequency

% = Relative (percentage)

Table 3 presents the number of students who achieved scores which are categorized very good, good, fairly good,

not good. There were 35 students achieved good scores on responsibility (92%), 31 students got good scores on cooperation

(82%), 35 students achieved good scores on tolerance (92%), and 36 students (95%) got good scores on politeness.

DISCUSSION

Most of the students who learned with PBL DNT model have fulfilled the very good criteria of social attitudes. PBL DNT is a cooperative learning approach, involving students' activities to collaborate with their peers. Social competence is determined by basic skills and ability, such as students' collaborative skills that can be developed through PBL (Yew & Goh, 2016 and Skrzypek, et al., 2011). Lavasani et al. (2011) states that the cooperative approach (in PBL) provides an opportunity to: 1) teachers in encouraging social interaction between students in class, and 2) students to discuss and exchange ideas.

They achieved very good scores on responsibility which means that PBL DNT can make the students more responsible. The indicators to be observed using the observation sheet and the questionnaire are a) students perform individual tasks properly, b) students want to be responsible for what they have done, c) students do not judge others without strong evidence, d) students return things they borrow, e) students apologize if they make mistakes. Based on the characteristic of PBL DNT, learning activities should be done in groups and subgroups. The students were divided into three subgroups (Arwita, et al., 2017) which are subgroups *dongan tubu* who propose problems and are actively engaged in the discussion; sub groups *boru* who access information or collect necessary data, and subgroups *hula-hula* who make decisions and determine focus of the problems.

The division of subgroups aims to delegate specific roles to the students. Therefore, learning should make the students used to completing the tasks according to their own responsibility. Each member of the group has a learning responsibility for himself and helps friends learn to improve his performance

(Panlumlers & wannapiroon, 2015) In addition, Erdem (2009) also suggests that group work enable the distribution of tasks in a group, promote cooperation and negotiation in solving problems so that every student has an opportunity to speak, interact, and make use of time.

Students' cooperation is categorized good. Even though students achieved the lowest score on this aspect, it still can be concluded that their scores fulfilled the effectiveness criteria of PBL DNT model. The indicators of cooperation are a) students are active in cooperative work; b) students clean up the classroom or school environment; c) students are willing to do tasks based on an agreement; d) students want to help others without expecting anything in return; and e) students are active in group work. PBL DNT can promote cooperation among students since this model facilitate the students to solve problems together in their group. Zubaidah, et al. (2013) also stated that teaching students to work together on teams can be done through PBL. Group work helps students to develop their social skills because students who do not possess good social skills can learn from other students who have good social behaviors (Muijs & Reynolds, 2008).

Based on the results of this research, the students' scores on tolerance aspect is categorized very good. The indicators assessed are: a) students respect other students' point of view; b) students appreciate difference in ethnic, religion, races, culture, and gender; c) students accept the decision even though it is not the same as theirs; d) students are welcome to other students' weaknesses, and e) students are willing to forgive. Learning biology with PBL DNT can promote tolerance because its learning activities encourage students to interact with peers and the teacher. The students started to interact with peers in groups. They discovered authentic problems, solved them, and made a decision, analyzed and evaluated the process. The students-teacher interaction

occurred when the teacher gave guidance on how to find a solution to a problem and provided a scaffolding. Kemple (1992) argues that teacher is responsible to give scaffolding if there is a conflict happening in the classroom. The scaffolding helps students to accept different opinions and decisions which are made together with other students.

Students' politeness is categorized very good. The assessment criteria of this aspect are a) students respect older people; b) students do not mention bad and harsh words; c) students do not interrupt; d) students thank someone for help; e) students greet other people and smile at them; f) students ask for permission if they want to enter someone's room or use someone's properties. Similar to the tolerance aspect, PBL DNT model has facilitated the students to interact with their teacher, friends in the same group, and friends from different groups. Students who work in a subgroup learn not to interrupt each other (one of the politeness indicators) because every group has its own roles or tasks to do sequentially. At the scaffolding stage, teacher gives the students a chance to be more polite when they talk with older people. The existence of harmony between attitude and values according to Harasym, et al (2013) can occur through learning experiences, role playing, and small group discussion.

CONCLUSION

Based on the findings, it can be concluded that the implementation of PBL DNT model in biology learning was effective to improve students' social attitudes. Students' social attitudes measured were 1) responsibility of which scores are categorized very good; 2) cooperation of which scores are categorized good; 3) tolerance of which scores are categorized very good; and 4) politeness of which scores are categorized very good.

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