P – 55

Students' Achievement In Developing Instructional Material Of Junior High School Mathematics In English Through Implementation Of Peer Assesment In Cooperative Setting

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Abstract

This research proposes that to study students' achievement in developing the instructional material of Junior High School Mathematics in English through implementation of peer assessment in cooperative setting.

The subject of this study are fifth semester students of Study Program of Mathematics Education, Malang State University, offering AY 2010/2011. Descriptive study is implemented in this study. The researcher analizes syllaby, lesson plan, worksheet, media, assessment, and scenario that developing by students for teaching mathematics in English.

This research concludes that students' achievement in developing instructional material of junior high school mathematics in English through implementation of peer assessment in cooperative setting is good.This research also found that students work cooperatively and appreciate each other during the teaching learning process in coooperative setting.

Key words: *instructional material, teaching mathematics in English, peer assesment, cooperative*

I. INTRODUCTION

The Study Program of Mathematics Education, State University of Malang (UM) has provided a course of *Teaching Junior High School Mathematics in English* (TJSME) since 2004. This study program also offers a bilingual class every academic year. In the implementation of the TJSME, students develop instructional material, presentations and discussions, as well as practice of mathematics instruction in English. In the practice of mathematics instruction in English, we use audio visual camera (s) for the reflection of the instruction. The reflections of instruction by using audio-visual recordings have been tested on the mathematics instruction at *RSBI* in Balikpapan (Cholis Sa'dijah, 2009a, 2009b), which the result can enhance the teachers' performance in teaching mathematics in English.

The study program of mathematics education has responsible for improving the academic atmosphere with the innovations in mathematics instruction so that the graduated students readier work as professional mathematics educator in national or international standard school. Cholis Sa'dijah (2009c) in a previous research concluded that the performance of students who taking the course *"Teaching Junior High School*

Mathematics in English" assisting by information and communication technology (ICT) is very good. Likewise, the responses of usage the ICT in the instruction is very good. The usage of ICT could help the students to optimize their performance in teaching mathematics in English. This research continues that previous research, this research focus on the achievement of students in developing instructional material of Junior High School mathematics in English through implementation of peer assessment at elaboration phase before the confirmation phase by the lecturer altogether with students. Model of the learning that applied in this research is cooperative. Cooperative learning model is one of the models that use a constructivism approach. Cholis Sa'dijah (2006) in her research concluded that mathematics instruction based on constructivism can enhance the achievement of problem solving and mathematical communication. Likewise, many researchers have concluded that cooperative learning indicates learning outcomes higher than conventional learning (Cholis Sa'dijah, 2004). In this research, the researcher focus to study the achievement of the students who participating in the courses *"Teaching Junior High School Mathematics in English"* in developing the instructional material of Junior High School mathematics in English through implementation of peer assessment in cooperative setting.

According to Tadao (2000) and modified by Cholis Sa'dijah (2002, 2006), there are four phases in a main activity of mathematics instruction based on constructivist (Indonesian: Pembelajaran Matematika Beracuan Konstruktivis/*PMBK*), namely the awareness phase, operational phase, the reflective phase and approval arrangements phase. In the awareness phase and operational phase, students learn individually, while in the reflective phase and approval arrangements phase, students learn cooperatively. This matter is implemented in the instruction process in this research. Although the cooperative learning model applied dominantly in the research, students firstly learns through individual work, then the tasks that have been done is elaborated and confirmed cooperatively.

Zane (2009) states that in the constructivist instruction should be implemented the performance's task. In this research, performance's task and the assessment rubric developed by the researcher. The performance's task developed with consider this following matter as stated by Lorraine Valdez Pierce (Carpini, 2009), namely: the task should be meaningful, that workable by learners through hands-on or collaborative

activities. Through the performance's tasks can be shown what is the learners known and what can learners do. The performance's task support cognitive and language skills, giving feedback to learners about their benefits and weakness..

This research implemented the instruction which the students discuss cooperatively and conduct peer assessment. This matter is harmony with statistical data that the learners will learn 95% through the teaching practice and assessing among their friends. Further, the results decline as follows. 90% through peer teaching practice, 75% through the practice, 50% through discussions, 30% through something was demonstrated, 20% through something that they hear, 10% through something what they read, and only 5% through a lecture (Roy, 2008).

The characteristics of cooperative learning in mathematics instruction (Foster, 1993:2-3), that are: the group members understand that they are part of a team and all team members work for the same purpose, and the group members understand that the success or failure of the team is a success or failure of each group member in the team. Timotheus (2009) defined three steps in using of ICT for teaching mathematics. One of the step is "The teacher identifies significant aspects in the mathematical situation that they want the students to actively notice".

II.METHOD

This research is a descriptive research. This research was conducted on college students' semester V of Study Program of Mathematics Education, Faculty of Mathematics and Science, The State University of Malang in a bilingual class participant of *Teaching Junior Secondary Mathematics in English* (TJSME) offering AY, Academic Year 2010/2011. The objective of the course of TJSME is that the students are expected to be able to teach junior secondary mathematics in English. (Cholis Sa'dijah, 2009c). The subject of this study were 23 students who are actively present during the implementation of this research for first 14 meeting in the first semester 2010/2011. The 23 students which is the subject of this research were grouped into six groups of 3-5 students. Each group, respectively, I; II; III; IV; V; and VI developing mathematics' syllabus for the 1st semester of grade VII, the 2nd semester of grade VII, the 1st semester of grade VIII, the 2nd semester of grade VIII, the 1st semester of grade IX, the 2nd semester of grade IX. The results of cooperative work in each group in the form the first draft are assessed by another group, then the initial group considers

the input (suggestion or critique) from other groups continued by revising so that each group has a second draft. The first and second drafts were displayed and exhibited in the classroom. The representative of each group alternately become sources of group work's result and ready to give an answer if anyone asks, while other members move around look details cooperative work in other groups to study, asks if there is something that is not clear, give input (suggestion or critique) or revise cooperative work's result in other groups by write down in the available space. After the stage, students discuss and confirm the input and used it to revise the second draft, so that each group has a third draft.

Members of each group choose one of basic competencies from the syllabus that arranged by the group and then write Lesson Plan, Student Worksheet, Assessment, and Media individually. After that, each member reviews the instructional materials and gives input to another member in small group. Each individual look details the input from other members in that group and discuss in indicated group as a material of first draft revision, thus producing a second draft. The next, peer assessment is done in the second draft by the members from the other group and returned to the initial author. The input from the member in the other group on this step is done the discussion and confirmation in the classroom and be a material to fix the second draft so that produce the third draft of lesson plan, students' worksheet, assessment, and instructional media.

The instruments rubric of students' achievement in developing instructional material developed by Cholis Sa'dijah (2009c) has five indicators as follows: (A) The conformity with the competence standards, basic competences, indicators, and the objectives, and the truth of the content (concepts of mathematics), (B) The conformity of the implementation of instructional models (including the correctness and completeness of the steps introduction activities, the main: exploration, elaboration, and confirmation, and the closing), (C) The ability of multimedia ICT development including the selection of media / mathematics manipulative materials that support the instruction; (D) The ability in developing assessment material, including the conformity assessment to the indicators, objectives, and instructional model, and (E) The ability in using written language.

Data that collected in this research are instructional materials of Junior High School in English, i.e. syllabus, lesson plan, students' worksheet, media, and

mathematics' instructional assessment. In accordance with the data that collected as described above, data collection techniques that used in this research is the students' performance in developing mathematics' instructional.

The researcher analyzes the instructional material toward five indicators as described above. Researcher gives comments on each of indicators in the students' results of work in developing instructional material. Researcher gives a scoring of each indicator scales 0-100 that represents the percentage of students' level of achievement. Scoring on each indicator with a scale of 0-100 has a conversion to the *A - E* as implemented in The State University of Malang. Researcher gives criteria of students' achievement as shown in Table 1 below.

Table 1 The criteria of students' achievement, The percentage of achievement, and the conversion with the A - E.

The criteria of students' achievement	The percentage of achievement (%)	
Very good	85-100	A
Good	80 to 84.9	A-
	75 to 79.9	B +
	70 to 74.9	B
Fair	65 to 69.9	B-
	60 to 64.9	C +
	55 to 59.9	C
Poor	40 to 54.9	D
	0 to 39.9	E

III.RESULTS AND DISCUSSION

The researcher analizes syllaby, lesson plan, worksheet, media, assessment, and scenario that developing by students for teaching mathematics in junior high school students in English**.** The example of comments for the Individual's Assignment of one student can be seen in Table 2.

Table 2. Comments for Individual's Assignment

INDICATOR (S)	COMMENTS
A	The conformity with the competence standards, basic competences, indicators, and the objectives, and the truth of the content (concepts of mathematics) is good. It can be seen on her scenario and her worksheet.
B	The conformity of the implementation of instructional models (including

	the correctness and completeness of the steps introduction activities, the main: exploration, elaboration, and confirmation, and the closing) is good. She has chosen a specific model of teaching and learning, namely Partner but she does not emphasize where is the step that is partner model differ from other models of cooperative learning. Overall, she divides the steps into introduction including apperception, motivation, main activities including exploration, elaboration, and confirmation, and closing but there are some missing steps in exploration step.
C	The ability in developing media including the selection of media / mathematics manipulative materials that support the instruction is good. The media may help her for the teaching and learning activities.
D	The ability in developing assessment material, including the conformity assessment to the indicators, objectives, and instructional model is good. The assessment rubric is appropriate with her learning objectives.
E	The ability in using written language is fair. There are some mistakes on her mathematics terms and her grammar.

The members in each group I to VI are shown as follows.

Five members of the group I are 11 (AFJ), 12 (ASP), 13 (FA1), 14 (MN1), 15 (YEE). Four members of the group II are 21 (A11), 22 (FA1), 23 (SA1), and 24 (LR1). Three members of the group III are 31 (OI1), 32 (YEE), and 33 (ERW). Four members of the group IV are 41 (YT1), 42 (NKS), 43 (NRP), and 44 (MKJ). Three members of the group V are 51 (LL1), 52 (ADP), and 53 (LER). Four members of the group VI are 61 (MAH), 62 (AF1), 63 (MM1), and 64 (DB1). The achievement (%) of each student of Group I-VI in each indicator A, B, C, D, and E can be seen in Table 3 – 8.

Table 3 The achievement (%) of each student of Group I in each indicator of A, B, C, D, and E.

Group 1	Indicator					Average	
	A	B	C	D	E		
11	85	80	80	80	85	82	A-
12	85	85	78	75	85	81.6	A-
13	85	70	85	80	85	81	A-
14	85	85	80	80	85	83	A-
15	85	83	75	80	85	81.6	A-

We can see in Table 3, the achievement of each student of Group I in developing of instructional material is good.

Table 4 The achievement (%) of each student of Group II in each indicator of A, B, C, D, and E.

Group 2	Indicator					Average	
	A	B	C	D	E		
21	70	80	85	83	85	80.6	A-
22	85	80	82	85	83	83	A-

| 23 | 85 | 80 | 70 | 85 | 82 | 80.4 | A- |
| 24 | 85 | 80 | 85 | 79 | 81 | 82 | A- |

We can see in Table 4, the achievement of each student of Group II in developing of instructional material is good.

Table 5 The achievement (%) of each student of Group III in each indicator of A, B, C, D, and E.

Group 3	Indicator					Average	
	A	B	C	D	E		
31	85	74	80	80	84	80.6	A-
32	85	80	85	84	84	83.6	A-
33	85	79	74	78	85	80.2	A-

We can see in Table 5, the achievement of each student of Group III in developing of instructional material is good.

Table 6 The achievement (%) of each student of Group IV in each indicator of A, B, C, D, and E.

Group 4	Indicator					Average	
	A	B	C	D	E		
41	78	76	83	77	85	79.8	B +
42	86	85	82	80	80	82.6	A-
43	78	77	75	81.4	79	78.08	B +
44	88	79	74	81.6	85	81.52	A-

We can see in Table 6, the achievement of each student of Group IV in developing of instructional material is good.

Table 7 The achievement (%) of each student of Group V in each indicator of A, B, C, D, and E.

Group 5	Indicator					Average	
	A	B	C	D	E		
51	78	82	80	75	76	78.2	B +
52	82	78	70	85	78	78.6	B +
53	80	78	85	85	78	81.2	A-

We can see in Table 7, the achievement of each student of Group V in developing of instructional material is good.

Table 8 The achievement (%) of each student of Group VI in each indicator of A, B, C, D, and E.

Group 6	Indicator					Average	
	A	B	C	D	E		
61	80	78	80	84	83	81	A-
62	79	78	80	83	83	80.6	A-
63	79	78	80	83	83	80.6	A-
64	80	78	80	84	83	81	A-

We can see in Table 8, the achievement of each student of Group VI in developing of instructional material is good.

We also can see in Table 9 and Diagram 1, the achievement (%) of each group in each indicator of A, B, C, D, and E.

Table 9 The achievement of each group in developing of instructional material in each indicator of A, B, C, D, and E.

Group	Indicator					Average	
	A	B	C	D	E		
I	85	80.6	79.6	79	85	81.84	A-
	A	A-	B +	B +	A		
II	81.25	80	80.5	83	82.75	81.5	A-
	A-	A-	A-	A-	A-		
III	85	75.75	79.67	80.67	84.33	81.47	A-
	A	B +	B +	A-	A-		
IV	82.5	79.25	78.5	80	82.25	80.5	A-
	A-	B +	B +	A-	A-		
V	80	79.33	78.33	81.67	77.33	79.33	B +
	A-	B +	B +	A-	B +		
VI	79.5	78	80	83.5	83	80.8	A-
	B +	B +	A-	A-	A-		

We can see in Table 9, the achievement of each group in developing of instructional material in each indicator of A, B, C, D, and E is good.
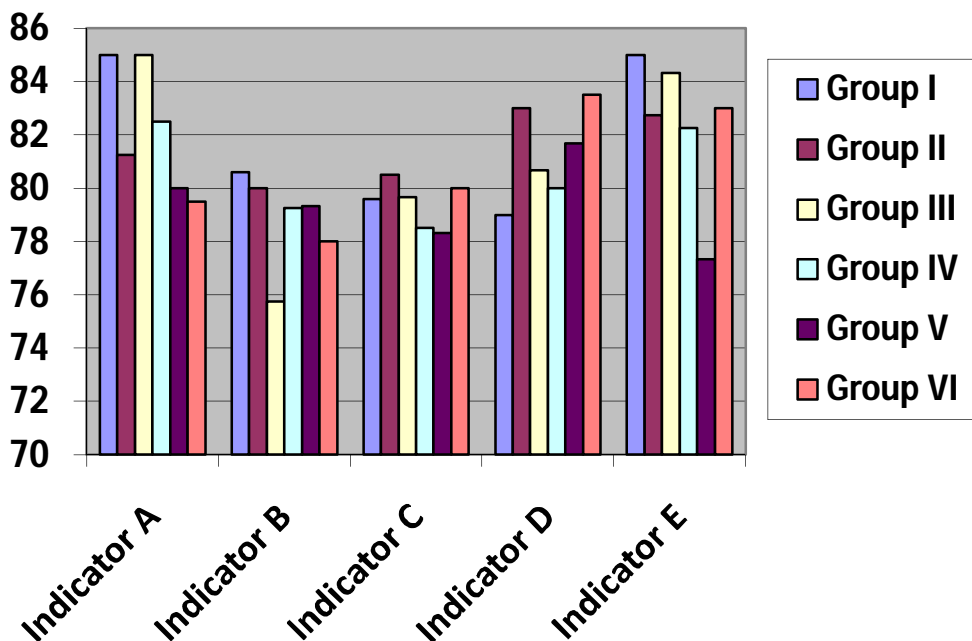

Diagram 1. The achievement of each group in developing of instructional material in

each indicator of A, B, C, D, and E.

Finally, we can see at Diagram 2 that the average of achievement of each group in developing of instructional material is also good.
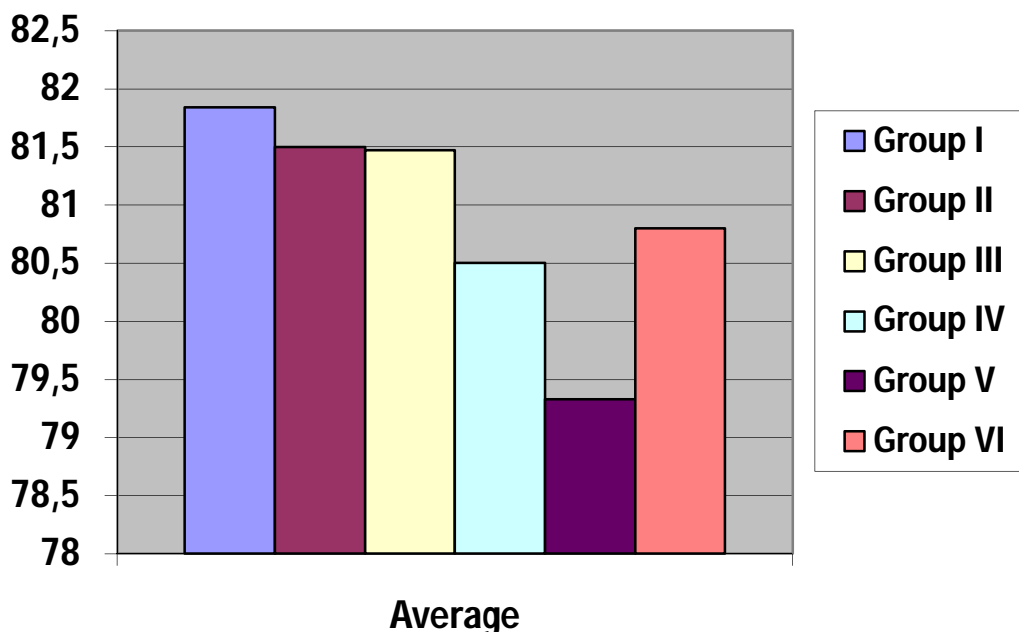

Diagram 2. The average of achievement of each group in developing of instructional material

IV. CLOSING

This research concluded that students' achievement in developing instructional material of Junior High School Mathematics in English through implementation of peer assessment in cooperative setting is good, whether viewed from each individual student as well as seen from each group (Group I, II, III, IV, V, and VI). From the results of this research, the researcher suggested that the application of peer assessment in cooperative setting can be used as an alternative of mathematics' instructional, especially in this course, at Study Program of Mathematics Education, Faculty of Mathematics and Science, The State University of Malang. This research also found that students work cooperatively and appreciate each other during the teaching learning process in coooperative setting.

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