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Procedia - Social and Behavioral Sciences 46 (2012) 926 – 930

Procedia
Social and Behavioral Sciences

WCES 2012

Comperative analysis of problem posing ability between the Anatolian high school students and the public high school students located in Bagcilar district of Istanbul

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Abstract

The purpose of this case study was to investigate the problem posing abilities of the “Anatolian High School” students and the “Public High School” students who had been studying in the Bagcilar district of the city of Istanbul. The methodology employed in the study was qualitative in nature. Document analysis method was applied. The participants, who had been successful for an exam carried out by a private course located in the district of Bagcilar of Istanbul, were including four “Anatolian High School” 11 th grade students and the other four “Public High School” 11 th grade students. In the research, students were provided with five different types of worksheets for problem posing. Types of worksheets were including story editing, information translating, problem posing according to the previously defined equation, figure and result or conclusion. As a result of the study, two “Public High School” students could not accomplish the study concerning the problem posing according to the previously defined equation. On the other hand, the “Anatolian High School” students were much more successful than the “Public High School” students.

KeyWords: *Problem posing, Anatolian High School Students, Public High School Students.*

1. Introduction

One of the most important components of mathematical thinking is problem posing. Problem posing includes the reformulation of the problem and discovering a new problem for problem solving process (Fidan, 2008; Argun&Others,2006). For this reason, there is a strong relationship between problem posing and problem solving (Cankoy, 2010). Problem posing, which effects the problem solving process, becomes significantly understandable and different strategies are used in the problem solving process (Brown & Walter,1993;Yaman &Dede, 2005).

Students cannot succeed in problem posing without problem solving skills as they can not succeed in problem solving without computation ability. In recent years, problem posing activities considered as case have been carried out by means of making changes to the existing problem in order to develop the students’ problem posing skills. Because of the fact that it does not depend on the students’ problem solving strategies stereotypes. When the students meet open ended and original questions, they should not falter and try to find different problem solving strategies (Celik, 2010; English, 1998;Yaman&Dede, 2005). Problem posing is a bridge between abstract concepts and concrete situation (Yaman&Dede,2005; Brown&Walter, 1993). Similarly, problem posing reduces to mathematics anxiety and student exhibit positive attitudes towards mathematics(Brown& Walter, 1993). Problem posing skills support mathematical thinking and creativity as well (NCTM 2000, Korkmaz&Gur, 2006).

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In the curriculum which was conducted by The Ministry Of National Education in Turkey, the importance of problem posing skills have been emphasised. But some teachers think that students are not interested in problem posing because of the fact that they are getting used to solve stereotype question as a test. As a result of this situation, teachers do not prefer to deal with problem posing activity (Yaman&Dede, 2005).

2. Methodology

In this study, it was aimed to identify students' problem posing skills and finding answers for why some students fail to create the required problems. Which type of high school students were much more successful accordingly?

In the study, students were provided with five different types of worksheets and each worksheets has three problem posing questions. If problem included inconsistent numbers for problem solving, was not suitable for requested information or situation and was misunderstandable during the problem posing activity, so the problems have accepted as an unsuccessful.

This study is a case study which is a qualitative research and the study has been intended to demonstrates the results of the specific cases Case studies are qualitative or quantitative research motives which are conducted in an effort to demonstrate the results of the specific cases like an individual, an organization, a group, or an environment. (Yin, 1984).

The study was modelled by Christou and Others' article which is "An Empirical Taxonomy of Problem Posing Processes" and was published by ZDM The International Journal on Mathematics Education in 2005. Questions of this study was determined parallel to questions of Christou and others' article and to be appropriate to level of readiness of 11th grade students.

3. Literature Review

Akay (2006), the study has been made in Elmadag district of Afyon among 48 fifth grade students who have studied in different classes. The aim of this study was the fact that whether the problem posing activity effects the problem solving ability. Finally, problem posing activity significantly effects the positive aspect of problem solving ability.

Akkan, Cakiroglu and Guven (2009), problem posing activity has been prepared according to 6 and 7 grade students' curriculum. Firstly, students have been wanted to create the appropriate equation for arithmetic and algebraic problems. Secondly, students have been wanted to create problem according to equation which had previously been given to them. Comparative analysis has been made not only by class but also the gender. As a result, male students have been much more successful than female students. Differences were not found between the classes.

Christou and others(2005), they focused on constructional description and testing of a theoretical model of problem posing in their study. Problem posing and problem solving processes have been modelled. Name of these processes are editing, selecting, comprehending and translating. 143 sixth grade students have been joined in the study in Cyprus. As a result of the analysis of this study, three categories have been recognized. Category 1; students only have responded to comprehension tasks, Category 2; students have responded to only comprehension tasks but also translation tasks, Category 3; students have responded to all types of tasks. As a result of the study, students have been much more successful than the activities carried out during th first problem posing activity.

Yaman and Dede (2005), they have made their studies on prospective teachers . They have been asked five open ended questions and wanted to create similar problem. Although they were able to solve the questions , they could not succeed to create problem similarly.

Cankoy and Darbaz(2010), the aim of the study is to compare the problem solving abilities between the traditional teaching of mathematics and the problem posing activities. In the study, 53 third grade students have joined into the work itself as an experimental and control group of students. As a result, experimental group students have been much better than the control group of students.

Korkmaz and Gur (2006), the aim of the study examined mathematics and elementary prospective teachers in order to define that whether they are able to create problem or not. In the study, there are two categories which are experimental and control. As a result, experimental group prospective teachers have been much more successful.

4. Findings

Students were provided with five different types of worksheets for problem posing activities. Types of worksheets were including story editing, information translating, problem posing according to the previously defined equation, figure and result or conclusion.

Table 1. Editing

Problem Posing based on questions	Case on	Anatolian High School				Public High School			
		A1	A2	A3	A4	P1	P2	P3	P4
1	imperfect knowledge		✓	✓	✓	Incomplete knowledge ✓	✓	Not suitable for question ✓	✓
			✓	✓	✓		✓		✓
2	Inconsistent number	✓	✓	✓	✓		✓		✓
3						Not suitable for question		Not suitable for question	

Table 2. Translating

Problem Posing based on questions	Case on	Anatolian High School				Public High School			
		A1	A2	A3	A4	P1	P2	P3	P4
1	Inconsistent number		✓	✓	✓	✓	✓	✓	✓
		✓	✓	✓	✓		✓		✓
2						Not suitable for question ✓		Not suitable for question ✓	
3		✓	✓	✓	✓		Not suitable for question		Not suitable for question

Table 3. According to Conclusion

Problem Posing Case based on questions	Anatolian High School				Public High School			
	A1	A2	A3	A4	P1	P2	P3	P4
1	✓	✓	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	misstatement	✓	misstatement
3	✓	✓	✓	✓	✓	✓	✓	✓

Table 4. According to Equation

Problem Posing Case based on questions	Anatolian High School				Public High School			
	A1	A2	A3	A4	P1	P2	P3	P4
1	✓	✓	✓	✓	misstatement	✓	misstatement	✓
2	✓	✓	✓	✓	Not suitable to question	✓	Not suitable to question	✓
3	✓	-	✓	✓	Not suitable to question	-	Not suitable to question	✓

Table 5. According to Figure

Problem Posing Case based on questions	Anatolian High School				Public High School			
	A1	A2	A3	A4	P1	P2	P3	P4
1	✓	Logic error	Question is not understood	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	Inconsistent number	✓	Inconsistent number
3	✓	✓	Inperfect knowledge	✓	✓	✓	✓	✓

5. Conclusion

Some students could not succeed in problem posing. Some problems were not suitable according to the requested information or situation. Some problems have inconsistent number for problem solving. Some problems were not understandable. Also students who were not able to successful in problem posing have not recognized their mistakes because of not solving their problems.

Some students were able to create problem which are stereotype questions. Therefore, researchers thought that the more students solve too much test questions, the more they memorize stereotype questions.

Anatolian high school students were more successful about problem posing. They were less successful in problem posing according to the those which were figure based.

Public High School students were not successful about categories including the success and they were less successful in problem posing according to the those which were equation based.

Although the participants who had been successful an exam carried out by a private organization, Anatolian High School students were much more successful on problem posing activity. The reason for this may be due to the conceptual knowledge.

All students expressed satisfaction with problem posing activity. A student was able to create all related problems for each of the questions, and this student was from Anatolian High School.

During the activity of problem posing, it is observed that the students view the issue only as a matter of writing down a question. Thus, we strongly believe that if the problem posing sessions take more place during the lectures, it will help the students to conceive the importance of the ability of constructing a problem, in the sense that it will keep them away from the bad habit of (mot à mot) memorizing, and improve their critical thinking skills.

The problem posing activity can also be utilized by teachers as an alternative method of evaluation. The inability of constructing problems of a student helps the lecturer to diagnose easily one of the following complications: student lacks the relevant conceptual knowledge, student lacks the ability of processing the knowledge, student needs to be convinced to leave off the habit of (mot à mot) memorizing, student has not mastered the subject well enough, student cannot draw the right connection between the notions, etc...

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