

Determining the Problem Solving Skills of Primary School Mathematics Teachers

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Abstract: The aim of the present study is to determine the problem solving skills of freshmen students studying in the department of primary school mathematics education. The research sample of the study is composed of 182 freshmen students from the Department of Elementary Mathematics Teaching in Erzurum Atatürk University. The “Problem Solving Inventory” (PSI) prepared by Heppner and Petersen (1982) was used as a means of collecting data. Findings obtained as a result of the present research determined an intermediate problem solving capacity among freshmen education majors.

Keywords: Prospective Teachers, Mathematics Education, Problem Solving.

Introduction

People encounter many problems during their lives and they have to solve these problems in order to persevere. A problem can be defined as an obstacle that makes it difficult to achieve a desired goal, objective or purpose (Bingham, 1998). It also refers to a conflict situation, condition, or issue that is yet unresolved (Morgan, 1999). According to Heppner and Krouskopf (1987), problem solving is a cognitive and effective behavioural process that harmonizes the individual’s complex internal and external desires and wishes.

Problem solving is an important skill for teachers in training and constitutes a process itself. The skills and knowledge acquired in this process should be cooperatively developed. There are many different definitions for problem solving. For example, problem solving is a process which requires a series of efforts to eliminate the challenges encountered while pursuing a particular objective (Bingham, 1998); is finding the best way to overcome a challenge encountered (Morgan, 1999); is a process starting from the point when one feels a problem and ending until he finds a solution for it; is the process of exerting previously existing relationships against new situations or events, setting up new relationships and obtaining a particular result depending on the target adopted (Pesen, 2006). Problem solving requires time, effort, energy and practice (Karatas and Guven, 2003). Briefly, problem solving includes a series of efforts to eliminate the challenges encountered while pursuing a particular objective (Keskin and Yıldırım, 2008). This complex process requires cognitive, affective and psychomotor skills (Guclu, 2003; Soylu and Soylu, 2006). Problem solving itself can be considered as a way of developing effective learning and personal skills. According to Sirin and Güzel (2006), overcoming life’s problems is a process that requires knowledge and skills beyond a question of ability. However difficult and complex a problem may be, if an individual has adequate knowledge and skills he can chart the best solution. The most important point here is carefully selecting and planning the steps that take us to the problem’s solution. From this point of view, it can be said that teachers and prospective teachers should be able to solve their own problems and share their experiences with students. The present research examines the social problem solving skills of the freshmen students studying in the department of primary school mathematics.

Method

The descriptive survey, a quantitative research method, was determined as the pattern of the present research. The research sample of the study is composed of 182 freshmen students from the Department of Elementary Mathematics Teaching in Erzurum Atatürk University. The “*Problem Solving Inventory*” (PSI) prepared by Heppner and Petersen in 1982 and adopted to Turkish culture by Taylan (1990) and Sahin, Sahin

and Heppner (1993) were used in order to measure the students' problem solving skills. The Turkish validity and reliability analysis of the inventory was conducted by Savasir and Sahin (1997). The Cronbach Alpha reliability coefficient of the inventory was found to be 0.88. In the reliability calculation of the inventory for this study group, the Cronbach Alpha was found to be 0.78.

In the evaluation of the Problem Solving Inventory, while high scores indicate low problem solving skills, low scores indicate high problem solving skills (Heppner and Petersen, 1982). The possible score range in the problem solving inventory is between 32 and 192. The answers of the students in the problem solving inventory are scored between 1 and 6 from positive to negative. In the planning of the data received from the scale, the items 9, 22 and 29 were excluded from the scores as suggested by Savasir and Sahin (1997). In addition, 14 items (items 1, 2, 3, 4, 11, 13, 14, 15, 17, 21, 25, 26, 30 and 34) were reversely scored. As the total score that the students earn from the problem solving inventory approximates to the numerical value of 32, the problem solving capability increases as well; as this value approximates to the numerical value of 192, problem solving capability decreases. The rating of the problem solving skill in the present research is given in Table 1.

Quite good	Good	Intermediate	Low	Fairly Low
32-63	64-95	96-127	128-159	160-192

Table 1. The Score Intervals Received from the Problem Solving Inventory

Findings

In this section, the scores that the freshmen students studying in the department of primary school mathematics education received from the Problem Solving Inventory are given in the table.

	Quite good	Good	Intermediate	Low	Fairly Low
f (%)	16 (8.7)	40 (21.9)	125 (68.6)	1 (0.5)	none

Table 2: The Score Levels that the Freshmen Students studying in the Department of Primary School Mathematics Education received from the Problem Solving Inventory

Observation of Table 2 reveals that approximately 69% of the freshmen students studying in the department of primary school mathematics education have an "intermediate" problem solving skill level. It can be said that approximately 9% of the students have a "quite good" level of problem solving skill, while 22% of them have a "good" level of problem solving skill. Furthermore, while the results show that none of the students have a "fairly low" level of problem solving skill, only one student has a "low" level of problem solving skill.

Conclusions

These research findings seem to indicate that the perceptions of the students participating in the study regarding problem solving are at an intermediate level as the low scores indicate effectiveness in problem solving and high scores indicate an inability to find effective solutions. In addition, when Table 2 is analyzed, it is seen that the scores focus on the groups with intermediate and higher problem solving skills.

Problem solving means generating and obtaining various alternative, potentially effective ways to cope with problems, and increasing the possibility of selecting the most effective solution among these alternatives (Anliak and Dincer, 2005). It was found that individuals who cannot effectively solve their problems are more anxious and less self-confident, they prefer being abstention when encounter problems, they remain incapable of understanding the expectations of others and they have more emotional problems when compared to individuals possessed of effective problem solving skills (Heppner and Krauskopf, 1987). Moreover, it was detected that ineffective problem solving may cause stressful situations and psychological dissonances (Heppner and Baker, 1997). In the present study, the fact that the freshmen mathematics students' problem solving skills are at an

intermediate level (approximately 69% of them) may indicate that a section of the society that aspires to the teaching profession is on the fringe of stress and psychological dissonance.

Suggestions

Given that the students participating in the research are the teachers of the future, it is hard to regard as positive the fact that their problem solving skills are at an “intermediate level”. Teachers who are important models for students should have quite a good level of problem solving skills, and they should educate their students in this skill. Therefore, teacher training programs should aim to prepare the prospective teachers as self-confident individuals who believe that they can solve the problems they encounter, who do not give up and step back when they encounter a problem. To this end, young teachers should be trained to understand and identify the problem they encounter correctly, and find and apply solutions through the courses and seminars they attend for professional discipline.

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