The relationship between mathematics anxiety and mathematical problem solving skills among primary school students

Nedime Karasel\textsuperscript{a}, Or\textcurrenyun\textsuperscript{b}, Murat Tezer\textsuperscript{c}*

\textsuperscript{a} Near East University, Department of Education and Teaching, 98010, North, Cyprus
\textsuperscript{b} TRNC Primary School Department, Güvercinlik Primary School, 98010, North Cyprus
\textsuperscript{c} Near East University, Department of Computer and Teaching Technologies 98010, North Cyprus

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Abstract

In this study students studying in 9 different primary schools that are joint to the Ministry of Education and Culture (MEC) in North Cyprus were taken into hand to study the relationship between “mathematics anxiety” and “mathematical problem solving skills”. The study group consists of 134 students studying in 9 different primary schools in the Turkish Republic of North Cyprus (TRNC) between 2009-2010 academic year. In this study, two different data collective measuring scales were administered. The first measuring scale was used to measure the “mathematical problem solving skills” which was formed of two sections. The first section consisted of 9 questions for demographic information and the other section consisted of 28 statements in a form of a 4-point likert scale to measure the problem solving skills. In order to collect data for the student mathematics anxiety 45 statements in a form of a 4-point likert scale was only used. As a result of the study, there is a minor significant difference ($r=0.28; p=0.01$) between the relationship of students anxiety and problem solving skills.

Keywords: Mathematics anxiety; mathematical problem-solving skills; the relationship between mathematical problem-solving and anxiety.

1. Introduction

Individuals always face problems in their daily lives. It’s compulsory to solve the problems we face for the continuity of life. Problem can be defined as an unknown result of an uncertain situation and difficulty which needs to be overcome (Van De Walle, 1980; Aksu, 1985). Adair (2000) defined problem as “a situation thrown infront of you that causes obstruction”. Basically, a situation that has a problem is connected to cause difficulty and discomfort of humans. A person who has not been faced with such a situation before must overcome this difficulty by showing hard efforts and try to solve the problem.

Problem solving is important for intellectual development, gain ability and mathematic teaching point of view (Brown, 2003; Giganti, 2004; Jonassen, 2004; Lester, 1980; Manuel, 1998; Martinez, 1998; Polya, 1953; Willoughby, 1985). Due to these reasons it’s pointed out that today in mathematic teaching, problem-solving for every course level and the integration of math is a necessity and countries such as Brazil, Italy, and America problem solving continued up to pre-school undergraduate education (Lester, 1994; NCTM, 2000).
Anxiety is a state of fright that’s expected to approach you from danger. Mathematic anxiety covers fright and withdrawn behaviour against anxiety towards mathematics. The reason for mathematic anxiety is that it’s an abstract science (Tepedelenlioğlu, 1995). Studies have shown that as fright for math and anxiety increases from students their attitudes towards math decreases and while students are solving mathematical problems the anxiety they will feel will lead them in not being able to find a solution (Altun, 2004; Uysal, 2007). According to Pajares and Kranzler (1995), a study which consists of 329 students found a clear sign that problem solving sufficiently and mathematic anxiety is a strong signal.

In this study the relationship between mathematical problem solving skills and anxiety are of importance. The findings of this study states 5th grade primary school students' anxiety towards mathematics and finding the relationship between mathematical problem solving skills concern further interests of researchers.

1.1 Problem

Is there a relationship between “mathematical anxiety” and “mathematical problem solving skills” of 5th grade primary school students towards mathematic course?

1.2 Aim of the Study

This study has aimed to determine the relationship between mathematic anxiety and mathematical problem solving skills of 5th grade primary schools students.

2. Method

2.1 Research Model

In this study, two different questionnaires have been administered to the students in order to determine the relationship between “mathematic anxiety” and “mathematical problem-solving skills”. The questionnaires were administered between 2009-2010 academic year in North Cyprus.

2.2 Data Collection and Participants

In the process of collecting data, firstly a literature review was formed and the data in hand created the study’s theoretical section. Later, aiming to state the anxiety situation a 4-point likert scale made up of 45 statements a “mathematic anxiety scale” was administered (Uysal, 2007). In order to state the mathematical problem solving skills 9 questions for demographic information and a 4-point likert scale made up of 28 statements a “mathematical problem-solving skills scale” was administered (Uysal, 2007). The study group was administered between 2009-2010 academic year of 9 different primary schools joint to the MEC which consists of 134 students.

2.3 Data Analysis

The measuring scales used to evaluate the values in this study are correlation together with SPSS17 Windows program.

2.4 Assumptions

The students were expected to answer the questionnaire honestly, the measuring tools used were required to be measured accurately and the work group is a successful representative stated as the researches assumption.

2.5 Limitations

The study was administered between 2009-2010 academic year in North Cyprus of 9 different primary schools which consists of 134 students, the prepared measuring scale for mathematical problem-solving skills were made up of 9 for demographic information and 28 statements on a 4-point likert scale, in order to measure the students mathematic anxiety it was restricted to 45 statements on a 4-point likert scale.
3. Findings and discussion

The discussions related to the findings will be stated in this section. The findings are stated as below:

Table: The relationship between students mathematic anxiety and mathematical problem solving skills points

|                | Attitude points | Anxiety points |
|----------------|-----------------|----------------|
| **r**          | 1.000           | -0.282         |
| **p**          |                | 0.001          |
| **N**          | 134             | 134            |

The data in table shows the points between mathematic anxiety and mathematical problem solving skills points of correlation coefficient r=-.28 and significant level as p<.001. Here students mathematic anxiety points and mathematical problem solving skill points indicate significance and are negative, though it shows a low level of relationship.

4. Conclusion and Recommendation

As a result of the study, the test made to measure the relationship between students mathematical problem solving skills and mathematic anxiety resulted a coefficient correlation as r=-.28. The low level of relationship between these two variables is transparent. Again viewing the significance between the two variables the p value has been found as 0.001 and this indicates a low but significant relationship. A similar result had been discovered by Uysal (2007) where 2nd level (6 to 8 grades) primary education students’ anxiety and problem solving skills were measured in the study.

In the past years different studies were administered by researchers (Çakmak & Hevedanlı, 2005) where family behaviours effect students anxiety levels.

Also, a study undertaken by Tağ (2000) was in class where students’ anxiety points and teacher attitudes, on the other hand Newstead (1998), Weber (2005), Bland (2004) and Ku & Sullivan (2002) pledged studies on students anxiety points are effected through the methods teachers use for teaching results were found.

It is considered that if the research consists of more student than studied work group then more effective results can be obtained.

Reference

Adair, J.(çev: Nurdan Kalaycı). (2000). Karar verme ve problem çözme. Ankara: Gazi Kitapevi.
Aksu, M. (1985). Matematik öğretiminde bilgisayar kullanım. Eğitim ve Bilim, 59, 4.
Altun, M. (2004). Matematik Öğretimi.3.Baskı,Alfa Yayıncılık, Bursa.
Bland, I. C. (2004). The Effect Of Teaching Mathematics Strategies and Keeping Mathematics Journal to Reduce Mathematics Anxiety. Walden University.
Brown, N.M. (2003). A Study of elementary teachers’ abilities, attitudes, and beliefs about problem solving. Dissertation Abstracts International, 64(10), 3620. (UMI No. 3108818).
Çakmak, Ö. & Hevedanlı, M. (2005). Eğitim ve fen-èdebiyat fakülteleri biyoloji bölümü öğrencilerinin kaygı düzeylerinin çeşitli değişkenler açısından incelenmesi. Elektronik Sosyal Bilimler Dergisi www.e-sosder.com Güz, 2005, C.4 S.14(115-127)
Giganti, P. (2004). Mathematical Problem Solving. Book Links, 14, 15-17.
Jonassen, D. H. (2004). Learning to solve problems: An instructional design guide. San Francisco, CA: Jossey-Bass.
Ku, H., Sullivan, H. (2002). Student Performance and Attitudes Using Personalized Mathematics Instruction. ETR&D, Vol.50, No.1, pp:21-34
Lester, F. K. (1980). Problem solving: Is it a problem?. In m. M. Lindsquist (ed.), Selected Issues in Mathematics (pp. 29-45). NCTM, Reston VA.
Lester, F. K. (1994). Musings about mathematical problem solving research: 1970- 1994. Journal for Research in Mathematics Education, 25(6), 660-675.
Manuel, S. T. (1998). Instructional qualities of a successful mathematical problem solving class. *International Journal of Mathematics Education in Science & Technology*, 29(5), 631-645.

Martinez, M. E. (1998). What is problem solving?. *Phi Delta Kappan*, 79 (8), 605-609.

Newstead, K. (1998). Educational studies in mathematics 36: 53–71. kluwer academic publishers, Netherlands. http://www.springerlink.com/divit.library.itu.edu.tr/content/n80m375j04241 235/fulltext.pdf

National Council of Teachers of Mathematics (2000). *Principles and standards for school mathematics*. Reston, VA: NCTM.

Polya, G. (1953). On Teaching Problem Solving. In H. F. Fehr (Ed.), *The learning of mathematics: Its theory and practice* (pp. 228-270). 21st yearbook of the NCTM. Reston, VA: NCTM.

Pajares, F., & Kranzler, J. (1995). *Self-efficacy beliefs and general mental ability in mathematical problem-solving*. Contemporary Educational Psychology, 20,426-443.

Tag, S. (2000). *Matematiğe yönelik tutum ile matematik başarısı arasındaki karşılıkli ilişki*.Yayılmamams Yüksek Lisans Tezi, Orta Doğu Teknik Üniversitesi, Orta Öğretim Fen ve Matematik Alanları Eğitimi Bölümü, Ankara.

Tepedelenlioğlu, N.(1995). *Kim Korkar Matematikten*. İstanbul:Sarmal Yaynevi.

Uysal, O. (2007). *İlköğretim II. kademe öğrencilerinin matematik dersine yönelik problem çözme becerileri, kaygıları ve tutumları arasındaki ilişkilerin değerlendirilmesi*. Yayınlanmams Yüksek Lisans Tezi. İzmir: Dokuz Eylül Üniversitesi.

Van De Walle, J. A. (1980). *Elementary school mathematics*. New York & London: Longman.

Weber, J. L. (2005). *Students’ beliefs and anxiety about teaching mathematics: a study of a constructivist elementary mathematics methods course*. The University of South Dakota.

Willoughby, S. S. (1985, April). How to Teach Problem Solving. *Educational Leadership*, 42, 90-92.