

Available online at www.sciencedirect.com

Procedia Social and Behavioral Sciences 1 (2009) 2197–2201

Procedia
Social and Behavioral Sciences

World Conference on Educational Sciences 2009

The analysis of preschool teacher candidates' attitudes about early mathematics education in the views of various variables

Fatma Alisinanoğlu^a, Gülhan Güven^a, Oğuz Serdar Kesicioğlu^{a*}^a*Gazi Üniversitesi, Gazi Eğitim Fakültesi, Ankara, Türkiye*

Received October 28, 2008; revised December 23, 2008; accepted January 05, 2009

Abstract

In this research, to reveal the attitudes of the preschool teacher candidates about early mathematics education, to get their suggestions and opinions about this issue is aimed. 150 third and fourth grade teacher candidates receiving education in the Department of Early Childhood Education of the universities in Ankara Province comprise teacher candidates in the study group of this research. The data of this research is gathered by applying 'Okulöncesi Öğretmenlerinin Erken Matematik Eğitimine İlişkin Tutumlarını Belirleme Aracı (The Identification Tool for the Preschool Teacher Candidates' Attitudes about Early Mathematics Education)' developed by Tokgoz(2006)with the aim of revealing the attitudes of the teacher candidates in the fall semester in 2008-2009 and for the demographical data by applying 'Kisisel Bilgi Formu(Personal Information Form)'. 'Okulöncesi Öğretmenlerinin Erken Matematik Eğitimine İlişkin Tutumlarını Belirleme Aracı (The Identification Tool for the Preschool Teacher Candidates' Attitudes about Early Mathematics Education)' developed by Tokgoz(2006)is a 22-point likert type of scale used for setting preschool teacher candidates' attitudes about early mathematics education. As a result of factor analysis carried out for this research, 18 points are used by eliminating 4 points. The data collected in'Okulöncesi Öğretmenlerinin Erken Matematik Eğitimine İlişkin Tutumlarını Belirleme Aracı (The Identification Tool for the Preschool Teacher Candidates' Attitudes about Early Mathematics Education)' developed by Tokgoz(2006)will be analyzed in Spss 15 packaged software. By converting the conversations which will be interviewed with the teachers into data texts, content analysis has been carried out on these texts. In consequence of the performed statistical processes, it is determined that the attitudes of the preschool teacher candidates about early mathematics education do not change according to their graduation field in high school, and meaningfully differentiated according to the grade in which they are undergoing education.

Keyword: preschool education; early mathematics education; teacher candidate.

1. Introduction

The foundations of the learning which will continue for lifelong are laid in early childhood period. The behaviours that are acquired at that times will continue for the child's whole life. Mathematics education which will be given to the children at the peroid of the early childhood, the foundation of the school life, will provide the first step for them to display pozitive attitudes to mathematics in their following school lives. Mathematics is accepted as

* Oğuz Serdar Kesicioğlu.

E-mail address: kesiciogluserdar@gmail.com

a universal language for all cultures and civilizations. It is an important tool and need which provides thinking in individuals and strengthens communication with others. It is almost an indispensable necessity of life (Güven, 2000).

Children, according to their mental development, can comprehend mathematics with their instincts in preschool period. In this period, the child's mathematical development starts with comprehending objects, the results s/he achieved bring experience to the child. It is necessary that teachers and teacher candidates who will give mathematics education have positive attitudes. Preschool children's being able to have as much as possible concrete experiences in terms of quality and quantity is associated with the mathematical learning experiences which the preschool teachers will present. Preschool teacher's being able to plan these kinds of experiences depends on their abilities and attitudes about early mathematics education (Tokgoz).

It is necessary that preschool teacher be competent and have positive attitudes in issues such as identifying mathematical goals and behaviours appropriate for children, planning active learning experiences, making mathematics a part of daily life, selecting and arranging appropriate material and education environments, making mathematical experiences permanent for children's cooperation with families), using appropriate strategies such as motivating, encouraging and urging to struggle children, following children's mathematical progression and appropriate counselling (Tokgoz, 2006).

It is needed that teachers, important in supporting and developing preschool children's mathematical perceptions and developments, have some qualities. These are:

- Teachers should have the ability to notice that the children understand mathematical concepts.
- Teacher should be able to counsel from showing to being able to express with their behaviours that the children understand mathematical concepts. Also, s/he should be able to use mathematical language, and encourage the children to use it.
- Teacher should be able to observe the children's learnings of mathematical concepts and plan learning experiences suitable to the children's developmental stages.
- The duty of the teacher is to strive for reconciling the children's experiences in a mathematics-centered environment by building up such an environment and for constructing, changing and combining mathematical concepts in children (Kirova, Bhargava, 2002).

The concerns and displaying positive attitudes of the teachers and the teacher candidates, who are giving and will give education in preschool stage, will also provide the increase of the children's concerns. Thus, the teachers and the teacher candidates should make an endeavour to be more competent on this issue. In the light of these information, these questions are asked for answers:

Do the attitudes of the teacher candidates about early mathematics education differentiate according to their graduation field in high school?

Do the attitudes of the teacher candidates about early mathematics education differentiate according to the grade level in which they are undergoing education?

2. Method

2.1. The Model of the research

The research is a study of survey model. Survey model is a research approach aiming to describe a situation, which was in past or is now, with the form of its being now. Individual or object that subjects to research is tried to be defined in the conditions of its or her/his and as it or s/he is. Any attempts to change or affect them are not shown (Karasar, 2002: 77).

2.2. The Aim of the research

In this research, to reveal the attitudes of the preschool teacher candidates about early mathematics education, to get their suggestions and opinions about this issue is aimed.

2.3. Study group

145 third and fourth grade teacher candidates receiving education in the Department of Early Childhood Education of the universities in Ankara Province comprise teacher candidates in the study group of this research.

2.4. Data collection

The data of this research is gathered by applying ‘Okulöncesi Öğretmenlerinin Erken Matematik Eğitime İlişkin Tutumlarını Belirleme Aracı (The Identification Tool for the Preschool Teacher Candidates’ Attitudes about Early Mathematics Education)’ developed by Tokgoz(2006) with the aim of revealing the attitudes of the teacher candidates in the fall semester in 2008-2009 and for the demographical data by applying ‘Kisisel Bilgi Formu(Personal Information Form)’. ‘Okulöncesi Öğretmenlerinin Erken Matematik Eğitime İlişkin Tutumlarını Belirleme Aracı (The Identification Tool for the Preschool Teacher Candidates’ Attitudes about Early Mathematics Education)’ developed by Tokgoz(2006)is a 22 point likert type of scale used for setting preschool teacher candidates’ attitudes about early mathematics education. As a result of factor analysis carried out for this research, 18 points are used by eliminating 4 points. In the analysis of the data, ‘I strongly agree’(5), ‘I agree’(4), ‘I am not sure’(3), ‘I do not agree’(2), ‘I strongly do not agree’(1) scores in the points of the scale with the aim of assessing the scores of the responses that the teacher candidates have given.

2.5. Analysis of data

The data collected in ‘Okulöncesi Öğretmenlerinin Erken Matematik Eğitime İlişkin Tutumlarını Belirleme Aracı (The Identification Tool for the Preschool Teacher Candidates’ Attitudes about Early Mathematics Education)’ has been analyzed in Spss 15 packaged software.

3. Findings and Commentary

3.1. Findings related with the scale’s validity

For this study, it is decided to make factor analysis to establish the scale’s validity. Primarily, KMO and Baarlett tests are performed to understand whether the scale is suitable for the factor analysis. Within this scope, it is needed that the result of KMO test should be .60 and more, and the result of Barlett globosity test should be meaningful as statistically(Jinchul, 2004). At the end of this study, the result of KMO test is found .93, and the result of Barlett globosity test is found at the (P<0.01) level, and it is precipitated that commentary factor analysis can be made on the scale.

In consequence of factor analysis on attitude scale, three factors are acquired. The first factor explains 25.36%, the second factor explains 19.94%, and the third factor explains 11.75% of the total variations. After rotating factor, it is seen that the first factor consists of 9 points(3, 5, 6, 8, 9, 10, 11, 13, 14), the second factor consists of 5 points(7, 16, 17, 21, 22), and the third factor consists of 4 points(15, 18, 19, 20). The load points in the first factor’s points changes between 0.40- 0.80, the load points in the second factor’s points changes between 0.51-0.76, and the load points in the third factor’s points changes between 0.40-0.68. Buyukozturk(2002: 119) states that the points’ common variations are close to 1 or more than .66 is a good solution, but it is usually difficult in performing. It is tried out to entitle the factors considering the points’ contents. The first factor is entitled as ‘ the attitudes about child’s learning’, the second is entitled as ‘ the attitudes about education environment’, and the third is entitled as ‘ the attitudes about family involvement’.

3.2. Findings related with scale’s reliability

Cronbach Alfa, Gutmann Split Half reliability statistics are performed to establish the scale’s reliability. According to the statistics, it is ascertained that the whole scale Cronbach Alfa value is .78, Gutmann Split Alfa is

.73. Tezbasaran(1997:47) states that the reliability coefficient should be really close to 1 in a likert type of scale. According to these results, it can be said that the scale's reliability is at high level.

Table 1. Anova Results About Teacher Candidates' Attitude Subdimensions According to Their Graduation Fields in High School

Factors	Field	N	X	sd	Square Averages	F	p
The attitudes about child's learning	Equal Weight	46	33,47	2	11,70	,94	,39
	Numarical	65	34,10	142	12,45		
	Child Development	34	33,14	144			
The attitudes about education environment	Equal Weight	46	17,86	2	6,92	1,17	,31
	Numarical	65	18,16	142	5,87		
	Child Development	34	17,38	144			
The attitudes about family involvement	Equal Weight	46	16,97	2	1,43	,26	,76
	Numarical	65	17,75	142	5,34		
	Child Development	34	17,35	144			

P<0,05

In consequences of the performed statistical process, any meaningful difference could not be found between the fields that the teacher candidates have graduated from and the subdivisions of the attitude scale about early mathematics education ($F_{(4-142)}$, $p>0,05$). On the contrary to these findings, Tokgoz(2006) has decided that there is a difference in favour of classical high school and off-field undergraduate diplomaeds in this study related with the preschool teachers' attitudes about early mathematics education.

Although any meaningful difference could not be found between the fields that the teacher candidates have graduated from and the subdivisions of the attitude scale about early mathematics education, it is seen that the students graduated from numarical field are the ones who have the most positive attitudes about early mathematics education when the score averages are examined.

Table 2. T-test Results Related with the Subdivisions of the Attitude Scale According to the Grade Levels in which the Teacher Candidates are Undergoing Education

Factors	Undergoing Education		X	S	Sd	t	P
	Grade	N					
The attitudes about child's learning	Third	77	33,5844	3,19	143	,356	,72
	Fourth	68	33,7941	3,89			
The attitudes about education environment	Third	77	18,3506	2,33	143	2,47	,03*
	Fourth	68	14,3676	2,44			
The attitudes about family involvement	Third	77	17,1948	2,46	143	,46	,64
	Fourth	68	17,0147	2,11			

*P>0,05

In consequence of the performed statistical process, any meaningful difference could not be found between the grade levels in which the teacher candidates are undergoing education and the subdivisions 'the attitudes about the child's learning' and 'the attitudes about family involvement' of the attitude scale about early mathematics education ($p>0,05$). It is ascertained that there is a meaningful difference in favour of third grades between the grade levels in which the teacher candidates are undergoing education and the subdivision 'the attitudes about education environment'. In other words, it can be said that the third grades have developed more positive attitudes than the fourth grades about preparing education environment in early mathematics education. It can be said that the fourth grades have thought that they will have more difficulty since they are in more practice than third grades and they know better the arranging education environment and the importance of the materials. Couch and Kuchey(1998) put forth the importance of education environment in mathematics education in their study. It is indicated that the exposure to the valid and effective teaching strategies, and materials with 41 teacher candidates decreases the

anxiety of the teacher candidates. Also, a study which supports these findings is the study of Starkey and her friends. They put forth that it is enough for the teachers to enrich the class environment to prepare the child to the school mathematics about the teacher attitudes.

Perkkila(2002) has stated in his study about mathematical attitude done with 140 teachers that using manipulative materials in teaching/learning situations is helpful for encouraging the children to mathematics. Guven(1997) has revealed that the children's mathematics ability scores increase when the importance to the mathematics given by the parents increases, in his study done with the aim of determining the relationship between the views of some parents and the child's mathematics ability.

4. Result and Recommendations

In the consequence of the performed statistical process, any differences could not be found between the fields from which the students have graduated and the subdivisions of attitude scale about the early mathematics education. In consequence of the performed statistical process, any meaningful difference could not be found between the grade levels in which the teacher candidates are undergoing education and the subdivisions 'the attitudes about the child's learning' and ' the attitudes about family involvement' of the attitude scale about early mathematics education ($p>0,05$). It is ascertained that there is a meaningful difference in favour of third grades between the grade levels in which the teacher candidates are undergoing education and the subdivision ' the attitudes about education environment'. In the light of these information, the following suggestions can be offered:

- It can be said that the fourth grades have thought about that they will have more difficulty since they are in more practice than third grades and they know better the arranging education environment and the importance of the materials. Therefore, having the teacher candidates do the studies of arranging education environments and preparing materials mostly and more qualitatively,
- The teacher candidates have revealed that the mathematics lessons they have taken in their universities cannot be reduced to the preschool level. For this reason, the mathematics lessons in preschool education are given by the expert people on this field and in a practical way,
- It is seen that the score averages of the teacher candidates graduated from numerical field are higher. It can be said that the increasion of the students' mathematical knowledge affects their attitudes. Therefore, being augmented the quantity of lessons increasing the teacher candidates' mathematics knowledge, are advised.

References

- Büyüköztürk, Ş. (2002). Sosyal Bilimler İçin Veri Analiz El Kitabı. Ankara: PegemA Yayıncılık
- Couch-Kuchey, Debora L. (1998) The effect of a constructivist mathematics methods course on the level of mathematics anxiety in preservice early childhood teachers. Cincinnati: Division of Research and Advanced Studies of the University of Cincinnati. (Yayınlanmamış Doktora Tezi)
- Güven, Y. (2000). Erken Çocukluk Döneminde Sezgisel Düşünme Ve Matematik. İstanbul: Ya-Pa
- Güven, Y. (1997). *Anne-Baba Görüşlerinin Çocuğun Matematik Yeteneği İle İlişkisi Üzerine Bir Araştırma*" 4. Ulusal Eğitim Bilimleri Kongresi Bildirileri İçinde, Eskişehir: Anadolu Üniversitesi. Eylül: 4, 10-12
- Jinchul, J. (2004). Analysis Of The Factors And The Roles Of Hrd In Organizational Learning Styles As Identified By Key Informants At Selected Corporations In The Republic Of Korea. *Yayınlanmamış doktora tezi. Amerika: Texas A&M University. Major Subject: Educational Human Resource Development.*
- Karasar, N. (2002) . Bilimsel Araştırma Yöntemi. Ankara: Nobel Yayın Dağıtım.
- Kirova, A., Bhargava, A. (2002). Learning To Guide Preschool Children's Mathematical Understanding: A Teacher's Professional Growth Early Childhood Research And Practice Spring. Vol. 4, (1), S.1-99.
- Perkillä, P. (2003). Teachers' mathematics beliefs and enaning of mathematics textbooks in the first and the second grade in primary school umi.<http://www.lib.uim.com/dissertations/fullcit/f797745>, 79-77-45
- Starkey, P.; Alice, Klein, A.; Wakelley, Ann. (2004). *Enhancing young children's mathematical knowledge through a pre-kidergarten mathematics intervention.* Early Childhood Research Quarterly Earch: 226(1-22).
- Tokgöz, B. (2006). Okulöncesi Öğretmenlerinin Erken Matematik Eğitimi İle İlgili Tutumları Ve Yeterliklerinin İncelenmesi. Yayınlanmamış Yüksek Lisans Tezi. Gazi Üniversitesi Eğitim Bilimleri Enstitüsü Çocuk Gelişimi Eğitimi Bilim Dalı. Ankara.
- Tezbaşaran, A. Ata. (1997). *Likert Tipi Ölçek Geliştirme Kılavuzu* (İkinci Baskı). Ankara: Türk Psikologlar Derneği Yayınları.