

PRESCHOOL TEACHERS' SELF-EFFICACY BELIEFS EVALUATION OF SCIENCE TEACHING IN EARLY CHILDHOOD EDUCATION

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ÖZ

Fen ve bilim bir keşfetme ve aynı zamanda bilimsel bir sorgulama sürecidir. Matematik ve fen çocukların doğal öğrenme arzularına uygun temel alanlardır. Okul öncesi eğitim öğretmenleri çocuklara kaliteli deneyimler kazandırma fırsatına sahiptir. Öğretmenlerin sahip olduğu yüksek öz yeterlik seviyesi, onların daha zor kazanımlara ulaşmalarını sağlar. Bu çalışmanın amacı anaokulu öğretmenlerinin öz yeterliklerine yönelik görüşlerini analiz etmektir. Bu amaçla Kahramanmaraş ilinde görev yapan ve beş yaş grubu çocuklarla çalışan elli öğretmene ulaşılmıştır. Veriler anaokulu fen ve bilim öğretimi öz yeterlik anketi ile elde edilmiştir. Sonuçlar anaokulu öğretmenlerinin farklı seviyelerde olumlu öz yeterliğe sahip olduklarını göstermiştir. Anket maddeleri içerisinde öğretmenlerin olumlu olmak ile birlikte, fen eğitimi sürecinin teorik altyapısına yönelik maddelerde daha az puan aldıkları görülmüştür. Bu durum anaokulu öğretmenlerinin olumlu öz yeterliğe sahip ve aynı zamanda farklı etkinlik ve bireysel gelişime açık olduklarını göstermiştir.

Anahtar Kelimeler: Fen/bilim öğretimi, anaokulu, öz yeterlik

ABSTRACT

Science is a process of studying and finding out which is also called scientific inquiry. Mathematics and science skills are privileged domains that children have a natural tendency to learn, experiment, and explore. Early childhood educators have the opportunity to create quality experiences that will have a lasting impact on preschool children. High level of self-efficacy belief leads teachers to higher objectives and consistency in decisions of the individual; provides high levels of cognitive process and motivation. The purpose of this study was to evaluate preschool teachers' self-efficacy beliefs of science teaching. Sampling was fifty preschool teachers with five years old group. Data was collected using Preschool Science Teaching Survey. Results showed that preschool teachers positive self-efficacy at different levels towards science teaching. Among survey items, teachers' agreement level was low when it comes to technical background of the science teaching process. This result indicated that preschool teachers had self-efficacy and also open to use different science teaching activities and individual progress for scientific concepts.

Anahtar Kelimeler: Science teaching, preschool, self-efficacy

1. INTRODUCTION

Science is more than knowledge and information. It is a process of studying and finding out which we call scientific inquiry or science practice. Science inquiry refers to the diverse ways in which scientists study the natural world and propose explanations based on evidence from their work (NRC, 1996). It also has fun and creativity of discovery.

Today's world is filled with the products of scientific inquiry and scientific literacy has become a necessity for everyone. Everyone needs to use scientific information to make choices that arise every day. Everyone needs to be able to engage intelligently in public discourse and debate about important issues that involve science and technology (NRC, 1996). When it comes to young learners, science is just an extension of their everyday world. Because young children naturally wonder, discover, and explore around them through play. Children who have a broad base of experience in domain-specific knowledge move more rapidly in acquiring more complex skills. Mathematics and science skills are privileged domains that children have a natural proclivity to learn, experiment, and explore. These domains allow for nurturing and extending the boundaries of the learning in which children are already actively engaged (Bowman, Donovan & Burns, 2001).

Early childhood education aims to improve children's cognitive, social development and creativity (Dere, 2017). Early childhood educators have great impact and influence on shaping the thoughts and opinions of children (Duman, 2013). Most children obtain an opinion about science by the time they reach the age of seven. That puts a great amount of responsibility on early childhood professionals, especially with all of the emphasis being placed on STEM education (Tuğluk & Öcal, 2017). Early childhood educators have the opportunity to create quality experiences that will have a lasting impact on preschool children throughout their entire school experience.

Self-efficacy belief assists teachers in how much effort they will exert against difficult situations, how long they will exert efforts in facing difficulties and how they will pull themselves together (Pajares, 1996). Teachers' self-efficacy belief is a very important factor which is as important as skills, ability and knowledge in determining their achievement and behaviors (Bandura, 1997). High level of self-efficacy belief leads teachers to higher objectives and consistency in decisions of the individual; provides high levels of cognitive process and motivation. It has been established that the self-efficacy of the teacher positively affects the achievement and attitude of the student. Teachers become open to new ideas and the development of positive attitudes towards teaching (Tschannen-Moran & Hoy, 2001).

There has been significant differences have found between teachers who have a high level of self-efficacy and the teachers with a low level of self-efficacy in terms of classroom behaviors. These teacher behaviors were mainly related to the order of the classroom, educational environment of the classroom and delivering feedback to students (Küçükıılmaz & Duban, 2006). These behaviors directly affect the student achievement as well. It has been stated that none of the teacher features is consistent with the achievement of the student more than the self-efficacy of the teacher (Ashton, 1984). Students with a high level of self-efficacy approach teaching activities more willingly, exert greater efforts, use more effective strategies by endeavoring to overcome difficulties over a longer period of time and they exhibit a higher level of performance than the students with low levels of self-efficacy (Eggen and Kauchak, 1999).

Consequently, the self-efficacy belief of teachers is very delicate matter in terms of teachers' professional success and students' achievement. Children's science education starts at preschool. Science activities are the compulsory component of the National Preschool Program. Classrooms also have science learning centers available for children during free play time. Analyzing preschool teachers' self-efficacy belief level would help increasing the quality of the science teaching activities.

2. METHODOLOGY

One of the quantitative methods scanning model was used in this research. Screening model is a research approach that aims to describe the past or existing situation as it is (Karasar, 2005). This study aims to describe preschool teachers' self-efficacy beliefs regarding to teaching science. Data were collected using Preschool Science Teaching Survey (PSTS). PSTS was developed using the content analysis approach. The studies of self-efficacy and preschool teachers' theoretical background on science teaching were analyzed (Azar, 2010; Hazır Bıkmaz, 2002; Yılmaztekin & Erden, 2016). The items of the PSTS were established and sent to three specialists. The finalized form of PSTS was completed with 10 items employing as five point scale (1-strongly agree; 2-agree, 3-undecided, 4-disagree, 5-strongly disagree).

The participants were 50 preschool teachers from Kahramanmaraş City, teaching in preschool classrooms with the five years old groups. Participants were randomly selected among preschool teachers volunteered to involve to the study. The participants worked independently to provide chosen responses and there was no time constraint for the completion of the survey. The arithmetic means and standard deviations of answers were analyzed descriptively using SPSS 15.

3. FINDINGS

Preschool teachers reported their agreement level of self-efficacy beliefs on science teaching. Means and standard deviations of self-efficacy beliefs on teaching science are presented in Table 1.

Table 1. Preschool teachers' self-efficacy beliefs on science teaching

	Item	\bar{x}	SD
1	I will continually find better science activities to teach science	2.28	1.08
2	Even if I try very hard, I will not apply science activities as well as I will other educational activities	2.97	1.20
3	I know the steps necessary to teach science concepts affectively	2.14	1.25
4	I will generally teach science ineffectively	3.87	1.14
5	The inadequacy of a student's science background can be overcome by good teaching	1.32	1.12

6	I understand science concepts well enough to be effective in teaching science	2.15	0.87
7	Increased effort in science teaching cause only little change in science achievement	3.30	1.17
8	Students' achievement is directly related to their teacher's effectiveness in science teaching	3.55	1.18
9	I will typically be able to answer students' science questions	2.27	1.05
10	I wonder if I will have the necessary skills to teach science	3.14	1.24
	Overall mean (negative items reversed)	2.35	

1-strongly agree; 2-agree, 3-undecided, 4-disagree, 5-strongly disagree

Table 1 presents preschool teachers' self-efficacy beliefs levels on science teaching. When we analyze the self-efficacy items, preschool teachers reported that they were in agreement with the item 'I will continually find better science activities to teach science' (2.28), 'I know the steps necessary to teach science concepts affectively' (2.14), 'The inadequacy of a student's science background can be overcome by good teaching' (1.32), 'I understand science concepts well enough to be effective in teaching science' (2.15), 'Students' achievement is directly related to their teacher's effectiveness in science teaching' (3.55), and 'I will typically be able to answer students' science questions' (2.27). Preschool teachers also reported that they were undecided with the items 'Even if I try very hard, I will not apply science activities as well as I will other educational activities' (2.97), 'Increased effort in science teaching cause only little change in science achievement' (3.30) and 'I wonder if I will have the necessary skills to teach science' (3.14). Preschool teachers were in disagreement with the items 'I will generally teach science ineffectively' (3.87) and 'Students' achievement is directly related to their teacher's effectiveness in science teaching' (3.55). Preschool teachers overall mean score for PSTS was 2.35.

Findings showed that preschool teachers had positive self-efficacy beliefs towards seven of the science teaching items at different levels. Among these items, teachers' agreement level was low when it comes to technical background of the science teaching process. This result indicated that preschool teachers had self-efficacy and also open to use different science teaching activities and individual progress for scientific concepts. When it comes to comparing science teaching with other educational activities in preschool such as music or drama, they were undecided what activity they perform better. Besides, they did not state an agreement or disagreement regarding to affirmative results of increased effort in science teaching for children and individually having perfect skills for science teaching.

4. CONCLUSIONS

It has been stated that the individual teacher is key to any educational activity and teachers' self-efficacy belief is a very important factor for the success (Bandura, 1997). Teachers with high level of self-efficacy beliefs can reach advanced objectives and consistency. They also can apply new ideas and teaching instructions during educational activity. This skill is considerably important for science teaching activities. Because scientific improvements happen faster than before and there are new concepts almost every day. Children should be able to learn science concepts and apply them in their daily life. For this reason, preschool teachers should have higher self-efficacy towards science teaching. It is particularly important for teachers too because they are living with technological changings as well. Current study showed that preschool teachers had positive self-efficacy beliefs towards science teaching. This is particularly important to know that preschool teachers use and apply science activities with a good self-efficacy level. However, their self-efficacy beliefs still can be improved and their confidence level for the science education can be increased.

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