Available online at www.sciencedirect.com

ScienceDirect

Procedia Social and Behavioral Sciences 2 (2010) 4722–4727

Procedia
Social and Behavioral Sciences

WCES-2010

Examination of relationship between preservice science teachers' sense of efficacy and communication skills

Mehpare Saka[a] *, Hikmet Surmeli[b]

[a] *Educational Faculty, Trakya University, Edirnel, 22000, Turkey*
[b] *Educational Faculty, Ondokuz Mayis University, Samsun, 55000, Turkey*

Received November 5, 2009; revised December 8, 2009; accepted January 20, 2010

Abstract

The purpose of this study was to investigate the relationship preservice science teachers' sense of efficacy and their communication skills. The data was collected at the first semester of 2009-2010 academic year. The sample of the research was 130 preservice science teachers in a four year science teacher preparation programme at Marmara University in Turkey. Data related to preservice science teachers' efficacy and communication skills was collected through "Teachers' Sense of Efficacy Scale (TTSES)" and "Communication Skills Scale (CSS)". Statisticaly analysis of the data was carried out by means of SPSS 15.00 for Windows. Results were supported with suggestions for improving teacher education.

Keywords: Preservice teacher; self efficac; communication skills; science teachin; teacher education.

1. Introduction

1.1. Self Efficacy

A considerable amount of research has been conducted to identify preservice teachers' and teachers' level of self efficacy nearly 30 years (Carleton, Fithch, Krockover, 2008). In these studies many descriptions have been made to define self efficacy term. The construct of self efficacy was first introduced by Bandura (1977). Bandura (1986) defined self efficacy as a person's perceived ability to carry out a desired action and categorized four types of teacher experiences (Bandura, 1977) that play a role in the formation of teacher efficacy, which were; mastery experiences (an individual's past successes and failures), physiological and affective states (somatic information conveyed by physiological and emotional arousal), vicarious experiences (skill in question is modeled by someone considered competent by and comparable to the individual) and verbal persuasion (encouragement received from a knowledgeable source). He believed that positive experiences of these types generally contribute to the formation of high teacher efficacy, whereas negative experiences generally contribute to the formation of low teacher efficacy.

Studies determined that teachers with teaching efficacy find teaching meaningful and rewarding, expect students to be successful, assess themselves when students fail, set goals and establish strategies for achieving those goals,

* Mehpare Saka. Tel.: 0530 4178347; fax: 0216 338 80 60
E-mail address: mehparesaka@gmail.com

1877-0428 © 2010 Published by Elsevier Ltd.
doi:10.1016/j.sbspro.2010.03.757

have positive attitude themselves and students, have a feeling of being in control, and share goals with students (Ashton, 1984).

The changes in self efficacy of teachers' and preservice teachers' have been explored by a number of researchers for 30 years. In these studies to measure self efficacy instruments were created by the researchers (Gibson & Dembo, 1984). Many of these studies have been done to determine the relationship between teachers' self efficacy beliefs and teaching behavior to provide an education course to improve self efficacy (Lancaster & Bain, 2007; Tuzun & Topcu, 2008), and also students' achievement (Carleton, et al., 2008; Gencer & Cakiroglu, 2007). For example, Tuzun and Topcu (2008) discussed preservice elementary science teachers' epistemological beliefs and the relationships among their epistemological beliefs, epistemological world views, and self-efficacy beliefs.

In another study Carleton, Fitch and Krockover. (2008) examined in teacher efficacy in participating in a year long in-service teacher education program. Within this study researchers sought to science teachers' efficacy by using SISI (Standart-Based Science Instruction) program. Result of this study indicate positive correlations between changes in attitude and teachers' self efficacy. Similar result have been found in a study of Lancaster & Bain (2007). These researchers also sought to determine whether self efficacy was influenced differentially by the type of field based placement experienced by preservice elementary teachers in the course and they determined a consistent overall positive increase in self efficacy with participation in an inclusive education.

1.2. Communication Skills

It is widely accepted that schools plays a significant role in child's life, so a teacher should have some important qualifications. According to some studies teachers should be democratic, tender, patient, reliable and humorous to his/her students during the interaction process, and they should use ways of communication skills, verbal- non verbal behaviors, class management and activities effectively (Acıkgoz, 1996; Pehlivan, 2005; Karadag & Calıskan, 2009).These qualifications affect students' behaviors and also teaching system directly (Acıkgoz, 1996).

Many definitions have been made regarding to communication. In a definition of Karadag and Calıskan (2009) it is fundamental tool of information transfer and it affects the life of an individual throught his/her life. It is also defined as to make something common and share and it means social relations (Gursimsek, Vural, Demirsoz, 2008). In other words, the meaning of communication is process the of generating, transfering and interpreting of knowledge (Dokmen, 1994).

Studies showed that one of the major obstacles to effective teaching in schools is the inability of teachers to communicate effectively (Nwogu, 2000). However, effective communication skills have an important place in terms of teachers' professional and personal characteristics (Pehlivan, 2005). Teachers who have effective communication skills can make positive relationships with students and create effective impression in teaching process (Gursimsek, Vural, Demirsoz, 2008). Moreover studies determined that effectiveness of teacher was found related with student achievement and satisfaction (Sen ve Erisen, 2002).

Researcher emphasized some of the criterias for teachers that should be considered in order to interact and communicate in the classroom (Karadag & Calıskan, 2009) which were;

- The teacher must use an explicit language and should abstain from language.
- Teachers should analyze students' thoughts from their body reactions, control their own body reactions and use body language consciously.
- Teachers should annihilate the distracters which decrease the concern of student.
- Teachers should have enough knowledge of method and techniques. They should teach all subjects and units.
- Teachers should know the properties of tools and materials well and use them in a professional manner.
- Teachers should conduct classes like a game in order to facilitate and motivate learning. Because children learn about life through games.
- Teachers should choose tools and equipment that motivate students most.
- Teachers should use the feedback mechanism in effective ways and should evaluate feedbacks instantly.
- Other stimulants (lovely odours, wearing different clothes, etc.) should be applied.
- Teachers should always come and leave the class on time.

Since learning process is generally accepted as communication process (Pehlivan, 2005) and effectiveness of learning process is related with teacher competences, it can be said that communication skills may influence preservice teachers' self efficacy.

Many studies indicated that some of the factors influence science teaching positively. For instance, it was found that subject matter knowledge influence positively science teaching self efficacy (Perkins, 2008; Swackhamer, Koellner, Kimbrough, 2009). Significant relationship among science teaching efficacy, satisfaction of education program and attitudes towards the teaching profession was determeined in another study (Bakar, Konting, Jamian and Lyndon, 2008)

In this study, we believe that preservice teachers' self efficacy beliefs may be related to their communication skills and to teach science effectively preservice science teachers' not only need perceptions of ability to teach science (Perkins, 2008) and also they need good communication skills. This study therefore was undertaken to find if there was a relation between preservice teachers' self efficacy beliefs and communication skill.

This study further sought to determine whether preservice female teachers' self efficacy and communication skills differed from that of preservice male teachers before participating in teaching practice.

2. Method

2.1. Aim

The aim of this study is to investigate the relation between the self efficacy and communication skills of preservice science teachers that continue Science and Technology Education courses at Marmara University.

2.2. Sample

The sample of this study consist of total 125 preservice science teachers from Science And Technology Education department.

2.3. Research Instrument

The Communication Skills Inventory, developed by Ersanlı and Balcı (1998) was used to measure preservice science teachers' perceptions of their communication skills. This instrument is a 45 item measure and ask participants to rate each statement on a 5-point Likert scale.

The Self Efficacy Scale (TSES) adopted by Capa, Cakiroglu and Sarıkaya (2005) was used to measure preservice science teachers' perceptions of abilities in their science teaching. TSES instrument consisted of 24 items to which respondents marked their level of agreement on a 5-point scale.

2.4. Analysis

Pearson correlation coefficients were applied to determine the relation between self efficacy and communication skills of preservive science teachers and also t test was applied to determine differences between male and female groups.

The Cronbach alpha realibility coefficient for the self efficacy beliefs was found 0,88 in this study. However, the reliability of communication skills inventory was found lower than acceptable level (.70). Descriptive analysis for communication scale determined that some of the items needed to be deleted. Due to this result 11 items eliminated from the scale to increase reliability. After this procedure the reliability of communication scale was found 0,83.

In this study, to check the distribution of this sample, Kolmogorov-Smirnov test was done. The results of this test indicated that distribution is not different from a normal distribution (p>,05). Considering this result parametric analyse (t-test) was done for the data analysis.

3.Findings

Table. 1. Sample characteristics

	f	%	Valid %	Cumulative %
Gende				
Female	84	67,2	67,2	67,2
Male	41	32,8	32,8	
Grade				

3	48	38,4	38,4	38,4
4	77	61,6	61,6	
Total	25	100,0	100,0	100,0

Table 1 display the characteristics of sample. According to the table the sample consisted of 125 preservice science teachers of whom 84 were girls (67,2%) and 41 were boys (32,8%); 48 were third grade students (38,4%), and 77 were fourth grade students (61,6%).

Table 2. Results of descriptive statistics

Scales	**N**	$\overline{x}$	*SS*	$Sh_{\overline{x}}$
Communicatio	125	3,8515	,3066	,0274
Self efficacy	125	3,8307	,3612	,0323

Table 2 shows the descriptive analysis of communication skills and self efficacy scale. Table shows that mean score of communication scale was slightly higher than self efficacy scale. Assessment of the scales revealed that preservice science teachers' felt confident in their self efficacy beliefs ($\overline{x}$: 3,83) and communication skills ($\overline{x}$: 3,85).

Of the 34 items in communication inventory, preservice science teachers were most confident in their ability to understand peoples ($\overline{x}$: 4,38), to respect somebody elses ideas ($\overline{x}$: 4,20), not to be indifferent towards people ($\overline{x}$: 4,15), being understood by the person communicating ($\overline{x}$:4,72), and being happy by trusting a person ($\overline{x}$: 4,39).

Of the 24 items in self efficacy inventory, preservice science teachers were most confident in their ability to expect regarding students' behaviors ($\overline{x}$:4,09), to evaluate students' understandings ($\overline{x}$:4,04) and make their students to obey the classroom rules ($\overline{x}$:4,02).

Table 3. Correlation Between the Scores of Communication Skills and Self Efficacy Scales

Scales	**N**	**r**	**p**
Communication Self efficacy	125	0,513	0,00

Table 3 displays the Pearson correlation coefficient for the changes in efficacy beliefs and communication skills. Result of this table indicated that changes in efficacy were positively correlated with changes in communication skills and there was statistically significant difference between these scales (r: 0,513; p: <,05).

Table 4. The Results of t - Test

Scales	**Groups**	**N**	*SS*	$\overline{X}$	$Sh_{\overline{x}}$	**t- Test**		
						t	*Sd*	**p**
Communication	Female	84	0,308	3,8817	0,033	1,582	123	0,11
	Male	41	0,297	3,7898	0,046			
Self efficacy	Female	84	0,373	3,8517	0,040	0,931	123	0,35
	Male	41	0,335	3,7876	0,052			

To determine if the gender groups were contributing any significant difference to the existing levels of communication skills and self efficacy beliefs. Independent samples t-test were conducted to explore the relationship between the females' and males' skills of communication and self efficacy beliefs. t Test procedures were utilized by using gender as independent variables, and the preservice science teachers' communication skills and self efficacy measures were used as dependent variables.

Relative to communication skills, the data indicated that no statistically significant difference was found between females' and males' perceptions of their ability to perform 34 competences of communication (t: 1,582; p>,05) (see Table 4).

Relative to self efficacy beliefs, the data indicated that no statistically significant difference was found between females' and males' beliefs of their ability to perform 24 competences of self efficacy beliefs (t: 0,931; p>,05) (see Table 4).

4. Conclusion and Recommendation

For the improvement of teacher education programs researchers suggested a strong sense of efficacy (Cakiroglu, Cakiroglu & Boone, 2005; Gencer & Cakiroglu, 2007; Tuzun & Topcu, 2008). Cakiroglu, Cakiroglu and Boone (2005) emphasized that efficacy beliefs give a measure of the sense of how the preservice teachers perceived their strengths and preparedness as potential science teacher. This idea shows the importance of determination of preservice science teachers' self efficacy beliefs in terms of successful implementation of science education programmes.

In general studies on the self efficacy indicated that preservice teachers have positive self efficacy beliefs regarding science teaching (Bakar, et al. 2008; Gencer & Cakiroglu, 2007). The findings of this study also determined that preservice science teachers generally expressed high level of efficacy beliefs.

Cakiroglu, Cakiroglu and Boone (2005) investigated Turkish preservice science teachers' personal science teaching efficacy and determined that preservice teachers in Turkey had significantly higher beliefs on themselves for welcoming student questions about science or being able to answer students' science questions. On the other hand, in this study, it was found that preservice science teachers had higher beliefs on putting expectation clearly regarding students' behaviors, evaluating students' understandings and making students to obey the classroom rules.

The results suggested that gender was not a significant factor to predict one's self efficacy beliefs. Similar results were found in a study of Gencer and her colleagues (2007). They also revealed no significant differences between efficacy beliefs of prospective science teachers in terms of gender. However studies showed that although female teachers felt as confident as male teachers after teaching practice, female teachers' self efficacy regarding specific teaching competences was significantly lower than that of their counterparts before teaching practice (Brandon, 2000).

In regard to communication skills, the result of this study pointed out that the perception of communication skills of preservice teachers were found high. This result is consistent with the other studies in literature (Gursimsek et al., 2008; Pehlivan, 2005). Researchers have determined that teacher candidates' that continue primary education had high level communication skills (Gursimsek et al.,2008; Pehlivan, 2005).

In a study has been done with primary teachers, the mean score of elementary school teachers' communication skills was found medium level. Considering this result researchers suggested that education programmes should include courses which provide interaction skills (Bulut, 2003). Karadag and Calıskan (2009) also suggested that pedagogy courses should be added to teacher education programmes. They believed that an effective learning-teaching process cannot work without communicating and in order to communicate effectively, teachers should be balanced, reliable and have the ability to use different channels.

In this study, the results indicated that there was no statistically significant difference in preservice science teachers' perception of communication level in terms of their gender. This result consistent with the study of pr pre-service teachers attending to Department of Elementary Education (Pehlivan, 2005).

As for the relationship between efficacy beliefs and communication skills, it was found that preservice science teachers' self efficacy were positively correlated with communication skills. This result revealed that preservice science teachers with high self efficacy beliefs also have high perceptions of communication skills.

As emphasized by Cakiroglu, Cakiroglu and Boone (2005) successful implementation of science education programmes might depend on teachers' personal beliefs regarding their ability to teach science and to produce positive outcomes for students. In addition to this idea we can concluded that communication skills have also importance for successful science education,

In the light of research results, for successful teacher education programmes, pedagogy courses improving self efficacy and including communication skills shuld be added in assisting preservice teachers to build self efficacy beliefs and to enhance their communication skills.

References

Acıkgoz, K.U. (1996). Etkili Öğrenme ve Öğretme, Kanyılmaz Matbaası, İzmir

Ashton, P.T. (1984). Teacher efficacy: a motivational pradigm for effective teacher education, *Journal of Teacher Education*, 35, 28-32.

Bakar, A.R., Konting, M.M., Jamian, R., Lyndon, N. (2008). Teaching Efficacy of Universiti Putra Malaysia Science Student Teachers. College Student Journal, v42 n2 p493-509 Jun 2008

Bandura, A. (1986). Social foundations of thoughts and action: a social ognitive theory, Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1977). Self efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191-215.

Brandon, D. P. (2000). Gender differences of prospective primary teachers in Botswana. *Research in Education*, 64, 36-43.

Bulut, N.B. (2003). İlköğretim sınıf öğretmenlerinin iletişim becerilerine ilişkin algılarının çeşitli değişkenler açısından incelenmesi. XII. Eğitim Bilimleri Kongresi, Gazi Üniversitesi-Antalya, 15-18.

Carleton, L.E., Fitch, J.C., Krockover, G.H. (2008). An In-Service Teacher Education Program's Effect on Teacher Efficacy and Attitudes. *The Educational Forum,* 72(1), 46.

Çakıroğlu, J. Çakıroğlu, E., Boone, W.J (2005). Pre-Service Teacher Self-Efficacy Beliefs Regarding Science Teaching: A Comparison of Preservive Teachers in Tukey and the USA. Science Educator,14(1), 31.

Capa, Y., Cakiroglu, J., & Sarikaya, H. (2005). Development and validation of Turkish version of teachers' sense of efficacy scale. *Egitim ve Bilim (Education and Science*).

Dökmen, Ü. (1994). Sanatta ve Günlük Yasamda İletisim Çatısmaları Ve Empati. Istanbul: Sistem Yayıncılık.

Ersanlı, K., Balcı, S. (1998). İletişim Becerileri Envanteri Geçerlik ve Güvenirlik Çalışması. *Türk Psikolojik Danışma ve Rehberlik Dergisi*, 2(10), 7-12

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, 76(4), 569-582.

Gencer, A., S., & Cakiroglu, J. (2007). Turkish preservice science teachers' efficacy beliefs regarding science teaching and their beliefs about classroom management, *Teaching and Teacher Education*, 23, 664–675

Gursimsek, I., Vural, D.E., Demirsoz, E.S. (2008). The Relation Between Emotional Intelligence And Communication Skills Of Teacher Canditates*, Mehmet Akif Ersoy Üniversitesi Egitim Fakültesi Dergisi, December, 1-11*

Karadag , E., Calıskan, N. (2009). Interaction And *Communication* In The Process *Of Education* And Shared Common Area In The Classroom, *College Student Journal*, 43(1).

Lancaster, J., & Bain, A. (2007). The Design of Inclusive Education Courses and the Self-efficacy of Preservice Teacher Education Students, *International Journal of Disability, Development and Education,* 54(2), 245–256

Nwogu, S.A. (2000). Language barrier to education. Journal of Teaching, 12(1), 62-71. *Journal of Teaching,* 12(1), 62-71.

Pehlivan, K.B. (2005). Ögretmen Adaylarının İletişim Becerisi Algıları Üzerine Bir Çalışma, İlkogretim-Online, 42(2), 17-23. http://İlkogretim-online.org.tr.

Perkins, C.J. (2008) Toward Making the Invisible Visible: Studying Science Teaching Self-Efficacy Beliefs. Dıctoral Dissertation, Oregon State University

Swackhamer, L.E., Koellner, C.B., Kimbrough, D. (2009). Increasing the Self-Efficacy of Inservice Teachers through Content Knowledge, Teacher Education Quarterly, Spring, 63-78.

Sen, H.S., Erisen, Y.(2002). Ögretmen Yetistiren Kurumlarda Ögretim Elemanlarının Etkili Ögretmenlik Özellikleri, G.Ü. Gazi Egitim Fakültesi Dergisi Cilt 22, Sayı 1, 99-116

Tuzun, O.Y., & Topcu, M.S. (2008). Relationships among Preservice Science Teachers' Epistemological Beliefs, Epistemological World Views, and Self-efficacy Beliefs, *International Journal of Science Education* 30(1), 65–85