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INVESTIGATING THE SELF-EFFICACY BELIEFS OF SCIENCE AND ELEMENTARY TEACHERS WITH RESPECT TO SOME VARIABLES[1]

(FEN BİLGİSİ VE SINIF ÖĞRETMENLERİNİN ÖZ-YETERLİK İNANÇLARININ BAZI DEĞİŞKENLER AÇISINDAN İNCELENMESİ)

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ABSTRACT

This study was carried out to identify how the level of the primary school science and elementary teachers' self-efficacy beliefs changed in terms of some variables such as branch, gender, seniority, weekly lesson hours, in-service training, satisfaction with her/his job, socio-economic level of the school, and satisfaction with the working environment. In this study, which is bases on the correlative investigation model, the Scale of Self-efficacy Belief in Science Teaching developed by Riggs and Enochs (1990) and studied in terms of validity and reliability by Hazır-Bıkmaz (2004), and a 12-question Personal Information Form were applied to the science and elementary teachers working in the primary schools in Aydın. The study was carried out with science teachers (N=58) and elementary teachers (N=74), in total 132 participants. 54.5% of the participants were female and 45.5% of the participants were male. The data gathered in this study were evaluated with SPSS 11.5, percent and frequency values were calculated and analysis of one-way ANOVA, 't' and 'Scheffe' tests were applied. According to the findings of this study, teachers' perception of self-efficacy does not differentiate in respect to gender, seniority, number of the lessons they give, having in-service training and being satisfied with the working conditions; it differentiates in respect to the branches and the job satisfaction. Additionally, between the number of the courses they give, science self-efficacy belief (r= -.178) and science teaching outcome expectancy negative and low level relations were found. Thus, it can be said that the more the number of the lessons they give increases, the more science self-efficacy beliefs decrease.

Keywords: Self-efficacy belief, self-efficacy belief in science teaching, science teachers, elementary school teachers

ÖZ

Bu araştırma ilköğretim okullarında görev yapan fen bilgisi ve sınıf öğretmenlerinin fen öğretimine yönelik öz-yeterlik inanç düzeylerinin branş, cinsiyet, mesleki kıdem, haftalık ders yükü, hizmet içi eğitim alma durumu, mesleğinden memnun olma durumu, görev yaptıkları okulun sosyo-ekonomik düzeyi ve görev yaptıkları okulun çalışma ortamından memnun olma durumu gibi değişkenlere göre nasıl değiştiğini tespit etmek amacıyla gerçekleştirilmiştir. İlişkisel tarama modelinde olan bu araştırmada Riggs ve Enochs (1990) tarafından geliştirilen ve Hazır-Bıkmaz (2004) tarafından geçerlik ve güvenirlik çalışması yapılan Fen Öğretiminde Öz-yeterlik İnancı Ölçeği ile 12 sorudan oluşan Kişisel Bilgi Formu Aydın ili ilköğretim okullarında görev yapan fen bilgisi ve sınıf öğretmenlerine uygulanmıştır. Çalışma, fen bilgisi (N=58) ve sınıf (N=74) öğretmeni olmak üzere 132 kişi üzerinde yürütülmüştür. Araştırmaya katılan öğretmenlerin %54.5'i kadın, %45.5'i erkektir. Araştırmadan elde edilen veriler SPSS 11.5 paket programında değerlendirilmiş, yüzde ve frekans dökümleri alınmış ve tek yönlü varyans analizi, t ve Scheffe testleri uygulanmıştır. Araştırma bulgularına göre, öğretmenlerin fen öz-yeterlik algısı cinsiyete, kıdeme, ders yüküne, hizmetiçi eğitim alma ile çalışma ortamından memnun olma durumuna göre farklılaşmazken, branşlara ve mesleğinden memnun olma durumuna göre değişmektedir. Ayrıca haftalık ders yükü ile fen öz-yeterlik inancı (r= -.178) ve fen öğretiminde sonuç beklentisi (r=-.177) arasında negatif ve düşük düzeyde ilişkiler olduğu saptanmıştır. Bu bağlamda, öğretmenlerin ders yükü arttıkça, fen öz-yeterlik inançlarının düştüğü söylenebilir.

Anahtar Sözcükler: Öz-yeterlik inancı, fen öz-yeterlik inancı, fen bilgisi öğretmeni, sınıf öğretmeni

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INTRODUCTION

The most important subject of education is the teacher. The success of an education system basically depends on the qualifications of the teachers. In other words, a school is good as the teachers who work within it. Therefore, the teachers, engineers, doctors and administrative staff lead a society's strategic human power (Saracaloğlu, 2000). The teacher of the 21st century is carrying the duties of providing learning, class management, assessment, leading, being a member of a family, etc. Because of these duties, a teacher has to lead a class well, present the context affectively, provide learning, assess objectively, and has to have know-how, be a consultant, follow the ethic rules of his job and be reliable (Saracaloğlu, 2006). From this point, we can say that teaching as an occupation needs more qualifications and efficacy today. Teachers' ability of carrying the efficacies and qualifications of teaching is strongly connected, not only with having a good education, but also teachers' internal belief of self-efficacy (Yılmaz, et al., 2004).

Self-efficacy is a key concept in social learning theory (Bandura, 1997) and described as the self-decision of an individual in organising actions in order to be successful in a certain field (Zimmerman 1995; Bandura 1997). For Bandura there are four sources of self-efficacy. These are experiences like being successful or unsuccessful, emotional and physical conditions like fear, excitement, observing others' experiences, and witnessing the success and verbal convictions of family, friends and colleagues (Woolfolk and Hoy, 2000). Self-efficacy belief feeds on these sources and affects the performance, endeavour and the struggle of the individual (Ekici 2006; Küçükyılmaz and Duban, 2006).

One of the most important concepts about self-efficacy is the teacher self-efficacy concept. Also, there are important studies about this field (Emmer and Hickmen, 1991; Ross, 1992; Hoy and Woolfolk, 1993; Soodak and Podell, 1998).

Tschannen-Moran and Woolfolk-Hoy (2001) describes the teacher's self-efficacy concept as the decision of the teacher about being able to teach every student including low motivated and difficult students.

Aston (1984) describes the self-efficacy concept as the teacher's ability to affect students' performances and their beliefs about fulfilling their duties about educating a learner.

The teacher of the 21st century has to answer the questions of today and tomorrow. He cannot remain a lecturer only. The teacher of today has to be a good organiser of the teaching and learning process, a good administrator, a good observer and has to be a qualified guide. Today, being a teacher requires more and more qualifications than yesterday (Gökçe, 2000).

Fulfilling the requirements of teaching not only requires a good education, but also needs a strong belief in oneself about being successful in

the learning and teaching field (Yılmaz et al., 2004). The levels of these beliefs can be found and used in guessing the teacher's behaviours about their responsibilities and their duties with the help of self-efficacy.

Parallel to this, the behaviours and the practices of the teachers in the classroom are connected with the self-efficacy of the teacher (Aston, Webb, Doda, 1983). A lot of studies have showed that the self-efficacy belief is also connected with the students' success (Brophy and Good, 1984; Ashton and Webb, 1986; Alinder, 1994; Ross, 1994; Goddard, Hoy and Woolfolk-Hoy, 2000). It has been observed that with increasing self-efficacy in the teacher there grows responsibility. The self efficient teachers are open to innovation and they are also eager to use new methods and strategies in teaching. They feel desirous about their students and teaching (Gibson and Dembo, 1984; Bandura, 1997; Pajares, 1997; Tschannen-Moran et al., 1998; Stein and Wang, 1998; Cousins and Walker, 2000).

When connected with the branches, the self-efficacy belief in science teaching can be described as the belief of the teacher in teaching science with new methods and an increase in student success. With regard to this, the teachers' self-efficacy can positively affect the students' success. Also it is important in changing the classroom attitude and teaching circumstances by developing positive approaches towards learning and gaining new ideas (Gibson-Demo, 1984).

There are some studies in our country and abroad about teachers' and pre-service teachers' perception of self-efficacy. The findings of these studies are summed up in the paragraphs below.

Tschannen-Moran and Hoy (2001), investigated the sources supporting the teachers' perception of self-efficacy. The study was carried out with 225 teachers and the Scale of Self-efficacy Belief, developed by researches, was used in the study. Low-level relationships were observed between teachers' seniority and their perception of self-efficacy. Similar to this, there was a low relation between parents' support on education and the teachers' perception of self-efficacy. High level relations were found between the schools' tools and equipment, and the support of administrators to the teachers and the teachers' perception of self-efficacy. It was observed that primary school teachers' perception of self-efficacy is significantly higher than secondary and high school teachers.

Özkan, Tekkaya and Çakıroğlu (2002) investigated the science pre-service teachers' insights of science concepts, their attitudes toward science teaching and their self-efficacy beliefs. The study was carried out with 229 science pre-service teachers. The data were gathered by the science comprehension test developed by researchers, the Scale of Self-efficacy Belief in Science Teaching developed by Enochs and Riggs (1990), and the Scale of Attitude in Science Teaching developed by Thompson and Shringley (1986). It was observed that pre-service teachers developed positive self-efficacy

beliefs and attitudes. Contrary to this, they have some misconceptions in science subjects. Also, it was found that teachers with high self-efficacy beliefs had positive attitudes toward science teaching.

Yaman, Cansüngü-Koray and Altunçekiç (2004) used the scale of self-efficacy belief on different levels of students in the science teaching department in the 2002-2003 summer semester and found that the more the seniority of the students increases, the more science self-efficacy beliefs increase. Also, according to this study, teachers' perception of self-efficacy does not differentiate in respect to school type and gender.

Altunçekiç, Yaman and Koray (2005) studied the relationship between the students' level of self-efficacy beliefs and their problem solving ability in Kastamonu Education Faculty, Primary School Department of Science, Mathematics and Primary School Teachers Branches, in 2003-2004. The participants were 240 students. "The Scale of Self-Efficacy", translated by Kaptan and Korkmaz (2001), and "The Scale of Problem Solving Abilities", developed by Yaman were both used as tools for data gathering. According to the findings, it was observed that the self-efficacy beliefs of pre-service teachers in the Science Teaching Department were the highest, while those in the Primary School Teaching Department were the lowest. Also, the self-efficacy beliefs of students in the first year were significantly low related to the other years. It was found that the self-efficacy of the students did not differ according to school type and gender and there was a high level, positive and significant relationship between the students' self-efficacy and their problem solving ability.

Önen and Öztuna (2005) investigated how the self-efficacy of maths teachers in primary schools changes related to their seniority. In the study, they used "Science Teaching Inventory of Self-efficacy", developed by Riggs and Enochs. Although prepared for science teachers, this inventory was revised for maths teachers and applied to 32 science teachers and 24 maths teachers in Bahçelievler and Kadıköy in Istanbul. According to the results, it was found that science and maths teachers have self-efficacy. In the study, self-efficacy of the teachers was observed to change related to seniority.

Akbaş and Çelikkaleli (2006) investigated whether the self-efficacy of primary school teachers differed related to gender and graduation from university. The participants are from Dokuz Eylül University (n=129), Balıkesir University (n=46), Cumhuriyet University (n=131), Mersin University (n=57), Ankara University (n=40) and Van Yüzüncü Yıl University (n=88), in total n=491 students. In the study, "the Scale of Self-efficacy Beliefs" developed by Riggs and Enochs (1990) and translated by Bıkmaz (2002) was used to investigate the pre-service teachers' attitude toward science teaching. According to the results, pre-service teachers' self-efficacy beliefs and outcome expectations toward science teaching did not differ in respect to gender. But according to their education types, although the self-

efficacy of the pre-service teachers did not change, their outcome expectations changed. Also, primary school pre-services teachers' self-efficacy beliefs and outcome expectations toward science teaching differed related to their university.

Ekici (2006) investigated the vocational high school teachers' self-efficacy beliefs according to some variables such as gender, seniority, and branches. The participants of the study were 240 teachers from 7 vocational high schools in Ankara. The scale, developed by Schmitz and Schwarzer (2000) and translated by Yılmaz (2004) was applied to the teachers. At the end of the study, it was observed that vocational high school teachers' self-efficacy beliefs were above the medium level. The self-efficacy beliefs of the teachers changed related to their gender and branches, also female teachers and culture lesson teachers had a significantly high level of self-efficacy beliefs. Another finding was that self-efficacy beliefs of the teachers did not change related to their seniority.

Kahyaoğlu and Yangın (2007) investigated pre-service teachers' self-efficacy beliefs according to their gender, department, education, seniority, and high school. The participants were pre-service teachers (n=330) in Dicle University, Siirt Education Faculty Primary School Teaching Department in 2005-2006. The data were gathered by the "Vocational Self-efficacy Questionnaire" developed by the researchers and had 0,89 reliability. In the study, it was found that science pre-service teachers felt more confident than the pre-service teachers in primary school and maths teaching departments. Also, the students in special students department had higher marks than the others. The self-efficacy marks of the pre-service teachers did not differ according to gender, seniority and graduated high school.

As seen in the researches above, the studies on teachers mostly focus on gender (Ekici, 2006), seniority (Tschannen-Moran and Hoy, 2001; Önen and Öztuna, 2005; Ekici, 2006), and branch (Ekici, 2006). The studies on pre-service teachers mostly focus on gender (Yaman, Cansüngü-Koray and Altunçekiç, 2004; Altunçekiç, Yaman and Koray, 2005; Akbaş and Çelikkaleli, 2006; Kahyaoğlu and Yangın, 2007)

The studies are mostly on preservice teachers, as is seen. Also, the investigations of teachers' self-efficacy have a critical importance. Especially in primary science education, the level of self-efficacy is very important both for the student and the teacher. This study was therefore conducted to find the levels and reasons for change in levels of self-efficacy of the elementary and science teachers.

Aim of Study

In this study, the questions below were investigated.

Does the perception of science teachers about their self-efficacy change according to branch, sex, seniority of service, weekly course load, in-service

training, satisfaction with his/her profession, and level of socio-economic status of the school, etc.?

METHOD

This study was conducted in a scientific way and includes data from the 2006-2007 education year. The relative scanning method was used. The subjects of the research were identified in their own circumstances (Karasar, 1991).

Universe and Sample

The universe of the research was the teachers working in the science and class lessons in primary schools in Aydın. The sample group consisted of volunteer teachers. The sample group was 132 people. 43.9% were science teachers (n=58) and 56.1% were elementary teachers (n=74). 54.5% of the attendants were women (n=72), 45.5% of the attendants were men (n=60). 15.5% of the attendants had 1-10 years of seniority in service, 33.3% of the teachers had 11-19 years of seniority, 36.4% of the teachers had 20-29 years of seniority, and 15.2% of the attendants had 30 years or more seniority in service. According to the data gathered from Aydın National Education Management, 19.7% of the teachers work in high socio-economical level schools (n=26), 50.8% of the teachers work in middle socio-economical level schools (n=67), 29.5% of the teachers work in the low socio-economical level schools (n=39).

Data Collection Tools

In the research, the scale which Hazır-Bıkmaz translated into Turkish was used about self-efficacy. The original scale which was developed by Enochs and Riggs (1990) has 25 paragraphs and two factors. The first factor is self-efficacy in science teaching and the second factor is the result gaining in science teaching. There are five choices in the answer part of the Likert-type scale. According to the factor analysis results, the scale was observed to have two factors but the sentences in the scale were decreased to 20. The first factor's reliability was .78, the second factor's was .60 and the total scale reliability was found as .71. In this study, the reliability of the whole scale was 85, Self-efficacy belief (first factor) reliance was 89 and result expectation (second factor) reliance was 69. There are 5 positive and 8 negative (total 13) paragraphs in the self-efficacy sub level. The lowest point that can be taken from the sub level is 13. The highest is 65. The result expectation sub level has 5 positive and 2 negative (total 7) paragraphs. The lowest point that can be taken is 7 and the highest is 35. In the scale, values are used such as "very positive", "positive", "medium positive", "negative", and "very negative". The evaluated numbers are 5 (very positive), 4 (positive), 3 (medium positive), 2

(negative), and 1 (very negative). While interpreting the arithmetic mean, the values between 1.00-1.79 are accepted as "very negative", the values between 1.80-2.59 are accepted as "negative", the values between 2.60-3.39 are accepted as "medium positive", the values between 3.40-4.19 are accepted as "positive" and the values between 4.20-5.00 are accepted as "very positive".

Data Analysis

The data collected were assessed in SPSS 11,5 package programme percent and the frequency were calculated. An analysis of one way ANOVA t, Scheffe and Dunnet's C tests were applied, also the correlation coefficient was calculated. In the analysis for weekly course load, the data were given in its original form. Then the numbers of lessons were grouped as 15-29 hours and above 30 hours and the independent sample t-test was applied.

FINDINGS AND COMMENTS

Teachers' Science Self-efficacy - Branches

Whether the points of science self efficacy of the teachers differ according to their branches or not was analysed with one way ANOVA and the results are shown in Table 1.

Table 1. Science Self-Efficacy of Teachers' Average Points according to their Branches by t-Test

Self efficacy belief point	**N**	**x**	**sd**	**t**	**p**
Science teacher	58	52.9138	5.8137	7.312	.000*
Elementary teacher	74	44.6622	6.8811		
Result expectation point	**N**	**x**	**sd**	**t**	**p**
Science teacher	58	25.9138	3.2195	5.775	.000*
Elementary teacher	74	22.5135	3.5199		

*p<.001

As seen in Table 1, the science self-efficacy points of the teachers showed a meaningful change of .001 level statistically by means of points in self-efficacy belief in science teaching and result expectation in science teaching. To identify the differences in groups, Scheffe test was applied and it was proved that this issue is for the benefit of the science teachers. In other words, science teachers gained higher points than the elementary teachers in science efficacy tests. With this result it can be said that science teachers are more senior in science self-efficacy when compared to elementary teachers. This result has some similarities to the research of Kozcu-Çakır and Şenler (2007) and Kahyaoğlu and Yangın (2007) on science teaching; pre-service

teachers have higher self-efficacy toward science teaching than the primary school teachers. Thus, science teaching lessons positively affect the self-efficacy beliefs of the teachers (Kaptan and Korkmaz, 2002; Savran and Çakıroğlu, 2003; Morell and Caroll, 2003; Neitfeld and Cao, 2003; Özkan, Tekkaya and Çakıroğlu, 2002; Woolfolk-Hoy and Spero, 2005; Palmer, 2006; Hazır-Bıkmaz, 2006).

Teachers' Science Self-efficacy - Gender

Whether the points of science self-efficacy of the teachers differ according to their gender or not was analysed with t-test and the results are shown in Table 2.

Table 2. Science Self-Efficacy of Teachers' Average Points according to their Gender by t-Test

Self efficacy belief point	**N**	**x**	**sd**	**t**	**p**
Female	72	48.4028	7.7052	.189	.850
Male	60	48.1500	7.5685		
Result expectation point	**N**	**x**	**sd**	**t**	**p**
Female	72	24.4444	3.8707	1.407	.162
Male	60	23.5167	3.6522		

As seen in Table 2, there was no meaningful difference in the points of teachers by means of gender. So we can say that science self-efficacy is independent of gender. This finding is parallel with other findings which examined the correlation before (Savran, Çakıroglu 2001; Zengin 2003; Yaman, Cansüngü- Koray and Altunçekiç 2004; Can, Gunhan and Erdal 2005; Altuncekıc, Yaman and Koray, 2005; Akbaş and Çelikkaleli, 2006; Çetin, 2007; Çakır and Senler, 2007; Kahyaoğlu and Yangın, 2007). However, there are some researches that show there is a link between gender and self-efficacy belief (Cantrell, Young and Moore, 2003; Ekici, 2006; Hamurcu, 2006; 2007). This may be a result of working with different sample groups.

Teachers' Science Self-efficacy - Seniority

Whether the points of science self-efficacy of the teachers differ according to their seniority was analysed with one way Anova and the results are shown in Table 3.

Table 3. Science Self-Efficacy of Teachers' Average Points according to Occupational Seniority by ANOVA

Self efficacy belief point	**N**	**x**	**sd**	**F**	**p**
10 years and less	20	49.4500	6.4029	1.328	.268
11-19 years	44	47.6818	7.6901		
20-29 years	48	47.2708	7.8273		
30-more	20	50.9000	7.8331		
Result expectation point	**N**	**x**	**sd**	**F**	**p**
10 years and less	20	23.9000	4.0379	.052	984
11-19 years	44	24.2045	3.6445		
20-29 years	48	23.9167	3.9724		
30-more	20	24.0000	3.6562		

As seen in Table 3, there is no meaningful change in science self-efficacy and result expectation belief statistics by means of occupational seniority. So it can be said that science self-efficacy is independent of seniority in occupation. This result is parallel to Ekici's study (2006) that the relationship between the teachers' seniority and their self-efficacy beliefs does not highly differ. In the study carried out by Tschannen-Moran and Hoy (2001), it was observed that there is a low relation between the teachers' seniority and their self-efficacy beliefs. To the contrary, the study carried out by Önen and Öztuna (2005), showed that science and maths teachers' self-efficacy differs according to their occupational seniority. This situation may be thought to occur from different participants in the studies.

Teachers' Science Self-efficacy – Weekly Course Load

Whether the points of science self-efficacy of the teachers differ according to their weekly course loads or not was analysed with t-test and the results are shown in Table 4.

Table 4. Science Self-Efficacy of Teachers' Average Points according to Weekly Course Loads by t-Test

Self efficacy belief points	**N**	**x**	**sd**	**t**	**p**
15-29 hours	29	49.2069	7.0375	.777	.464
30 hours or more	103	48.0291	7.7831		
Result expectation points	**N**	**x**	**sd**	**t**	**p**
15-29 hours	29	24.4828	2.8737	.739	.461
30 hours or more	103	23.8932	4.0095		

It is seen in the table that there was no meaningful difference in science self-efficacy belief points of the teachers. In addition, it is seen that the points of the teachers who give 30 hours lessons or above were relatively low. The result is not statistically significant but course loads may affect the teachers' self-efficacy. However, the number of lessons in a week is dependent on the teachers' science self-efficacy and outcome expectations. There are no findings in the literature about the relationship between the teachers' science self- efficacy and their weekly lesson numbers.

Teachers' Science Self-efficacy – In-service Training

Whether the points of science self-efficacy of the teachers differed according to their having in-service training was analysed with t-test and the results are shown in Table 5.

Table 5. Science Self-Efficacy of Teachers' Average Points according to In-Service Education by t-Test

Self efficacy belief point	**N**	**x**	**sd**	**t**	**p**
Had in-service education	111	48.6036	7.7884	1.096	.275
No in-service education	21	46.6190	6.5381		
Result expectation point	**N**	**x**	**sd**	**t**	**p**
Had in-service education	111	23.9279	3.7892	-.660	.511
No in-service education	21	24.5238	3.8290		

As seen in Table 5, it can be said that there was no meaningful difference between science self-efficacy and result expectation point is visible. So it can be said that the science self-efficacy levels are independent of their in-service education experiences. There are no findings in the literature about the relationship between the teachers' science self-efficacy and their having in-service training.

Teachers' Science Self-efficacy – Satisfaction with job

Whether the points of science self-efficacy of the teachers differ according to whether they are satisfied with their jobs was analysed by t-test and the results are shown in Table 6.

Table 6. Science Self-Efficacy of Teachers' Average Point according to Satisfaction With Job by t-Test

Self-efficacy belief point	**N**	**x**	**sd**	**t**	**P**
Those who are satisfied	110	49.2455	7.1577	3.354	.001*
Those who are not satisfied	22	43.5000	8.1868		
Result expectation point	**N**	**x**	**sd**	**t**	**P**
Those who are satisfied	110	24.3182	3.7902	2.028	.045*
Those who are not satisfied	22	22.5455	3.4877		

*p<.05

As can be seen, the results showed a meaningful difference regarding satisfaction with their jobs. The result indicated the science self-efficacy and the result expectation points of the teachers who were happy with their jobs. It can therefore be said that the teachers who are satisfied with their jobs are eager to improve themselves. There are no findings in the literature about the relationship between the teachers' science self-efficacy and their job satisfaction.

Teachers' Science Self-efficacy – Socio-Economic Situation

Whether the points of science self-efficacy of the teachers differ according to the socio-economic situation of their schools or not was analysed with one way Anova and the results are shown in Table 7.

Table 7. Science Self-Efficacy of Teachers' Average Point according to Socio- Economical Levels of the Schools where They Work by ANOVA

Self-efficacy belief point	**N**	**x**	**sd**	**F**	**p**
High	26	48.9615	6.2959		
Middle	67	48.6418	8.4058	.546	.581
Low	39	47.2308	7.0317		
Result expectation point	**N**	**x**	**sd**	**F**	**p**
High	26	24.1923	2.8287		
Middle	67	24.3433	4.0622	.863	.424
Low	39	23.3590	3.8558		

As seen in the table, it is observed that there was no meaningful change between self-efficacy belief and result expectation points. So it can be said that the socio-economic level of the students did not affect the self-efficacy beliefs and result expectations of the teachers. There are no findings in the literature about the relationship between the teachers' science self-efficacy and socio-economic situation of their schools.

Teachers' Science Self-efficacy – Working Conditions Satisfaction

Whether the points of science self-efficacy of the teachers differ according to their satisfaction with the working conditions or not was analysed with one way Anova and the results are shown in Table 8.

Table 8. Science Self-Efficacy of Teachers' Average Point according to Satisfaction about Working Environment by ANOVA

Self-efficacy belief point	**N**	**x**	**sd**	**F**	**p**
Satisfied	85	48.3294	7.8821		
Partly satisfied	37	48.1081	7.0623	.020	.981
Not satisfied	10	48.6000	8.0305		
Result expectation point	**N**	**x**	**sd**	**F**	**p**
Satisfied	85	24.2941	3.6214		
Partly satisfied	37	23.7297	4.0390	.848	.431
Not satisfied	10	22.8000	4.2895		

It is seen that there was no meaningful change between the self-efficacy and the result expectations statistically. It can therefore be said there is no visible link between the working environment and the self-efficacy belief. There are no findings in the literature about the relationship between the teachers' science self-efficacy and their satisfaction with the working environment.

The link between the weekly schedule of the teacher and the science self-efficacy was also analysed. Negative and low relations (18%) were found between weekly schedule and science self-efficacy belief (r= -.178; p= .041) and result expectations (r= -.177, p= .043).

CONCLUSION AND SUGGESTIONS

This study investigated the self-efficacy beliefs of science and primary school teachers according to some variables such as branch, gender, seniority, weekly course load, having in-service training, socio-economic level of the school and satisfaction with the working environment.

In the study, it is shown that science self-efficacy beliefs and outcome expectations of the teachers differed related to their branch and their job satisfaction. But science self-efficacy beliefs and outcome expectations of the teachers did not show a significant difference related to their gender, seniority, weekly course load, having in-service training, socio-economic level of the school, and the environment of the school. Also, self-efficacy of science

teachers was higher than the primary school teachers and this is a normal result of their form of education. In addition, science and primary school teachers were positive related to self-efficacy beliefs; but when related to outcome expectations, the science teachers were positive while primary school teachers were at the level of medium-positive. Primary teachers can therefore be thought to give importance on science education.

In addition, a negative and low level relation between weekly course load and science self-efficacy belief (r= **-.**178, p=**.**041; 18%) and result expectation in science teaching was found. Consequently, it can be said that when the course load increases the science self-efficacy level decreases.

Suggestions may be made as follows:

1. The Ministry of Education should prepare seminars, in-service training and documents about self-development of teachers.
2. There is a negative relation between the weekly schedule and the self-efficacy of the teacher, therefore the course load of the teacher should be decreased.
3. Teachers who are happy with their jobs have high self-efficacy and result expectation so they should be diverted to their interests and desires.
4. Improvement in the working environment may increase the job satisfaction of the teachers.
5. Investigation of the contents of lessons given to science and primary school teachers and observation of the practices can give new insights into self-efficacy beliefs' development.
6. Different researches can be carried out to find if demographic values change the teachers' self-efficacy belief.
7. Self-efficacy beliefs of science, primary school and pre-service teachers can be investigated by experimental and/or qualitative researches.
8. Different researches must be carried out to find different factors which affect the self-efficacy of the teacher.
9. Such kind of researches can be carried out not only in science but also in Turkish, Maths, and in different areas.

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