

## Biology Self Efficacy Beliefs of the Students Studying in the Department of Biology and Department of Biology Teaching\*

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### ABSTRACT

The purpose of this study is to evaluate the self-efficacy beliefs toward biology of the students studying in the department of biology and studying in the department of biology teaching. Also in this study biology self-efficacy beliefs of students were examined according to variables of grade and department. The study was done through survey method. The research was held in 2008-2009 spring semester Faculty of Education Biology Teaching Program 1st, 2nd, 3rd, 4th grade students and Faculty of Science Department of Biology 1st, 2nd, 3rd, 4th and 5th grade students-478 students in total. As a tool of data collection, biology self-efficacy scale was used in this study. Findings indicate that biology self-efficacy beliefs of students are at the mid-level. In addition, in this study it was identified that biology self-efficacy of students studying in department of biology teaching is higher than the self-efficacy of students studying in the department of biology. Also, at the end of eta-square correlation coefficient analysis it was determined that variable of department affected self-efficacy towards biology at a low level ( $\mu=.01$ ). On the other hand, it was identified that variable of grade did not affect the biology self-efficacy beliefs.

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#### Keywords:

Self-efficacy, biology self-efficacy, grade, department of biology, department of biology teaching

### Introduction

One of the primary purposes of the education system is to bring up the individuals who are more conscious towards environment, like and protect the nature and the creatures and are more sensitive to the environmental problems and these individuals' awareness is also at a high level. To increase this awareness of the subjects of biology should be learned and applied to life at the early ages because science of biology both bears information for making the human life better and has a great significance in understanding all the creatures including humans. In this context, discipline of biology among the sciences includes all the subjects related to all the creature.

Although biology has been emphasized in almost all the fields in recent years, it has been stated that students' interests and levels of success towards biology are quite low (Bahar, Johnstone & Hansell, 1999; Johnstone & Mahmoud, 1980; Yıldırım, Kurtuldu & Öz Aydın, 2003). Results of the researches attribute that students' levels of success in biology are at a low level to the factors such as that students' not loving the science, insufficient knowledge related to their own departments during the university education and accordingly, their fears about finding a job in this field in future (Yıldırım et al. 2003). On the other hand, when the factors affecting the success of a particular field are examined, it is stated that one of the most

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significant factors is individuals' beliefs related to their own skills in their learning and successes (Ashton, 1984). These beliefs are self-efficacy beliefs the individuals improved for a certain field.

Self-efficacy belief firstly emerged with Bandura's theory of social learning and this concept is an affective factor related to people's individual judgements about how well they will do the actions being necessary to cope with the possible situations. In other words, self-efficacy beliefs are expressed as people's beliefs related to themselves about their capacities of demonstrating their behaviours and skills in the events. These beliefs determine how people's feelings, thoughts and behaviours will be towards the events (Bandura, 1994). In this context, self-efficacy beliefs affect the individual's choice of activities, perseverance for difficulties, level of his efforts and performances (Ekici, 2006).

The results obtained from the researches in this field demonstrate that individuals whose self-efficacy beliefs are at a high level make much more effort to succeed in a work, do not give up when they meet the negative situations, on the contrary, they are insistent and patient, they tidy themselves up in a short time in face of the difficulties and maintain their loyalties to their aims (Aşkar & Umay, 2001; Bandura, 1994; Schmitz & Schwarzer, 2000; Scholz, Dona, Sud & Schwarzer, 2002). Accordingly, significance of the concept of self-efficacy emerges about a person's being able to choose all the activities in which he will participate in the daily life and how long he will be able to cope with those situations when he meet difficulties.

Biology self-efficacy belief towards a specific field is defined as a person's judgements and beliefs related to themselves about learning the field of biology successfully. In this context, students' self-efficacy beliefs towards biology have a characteristic role in their feelings, thoughts and behaviours related to biology. In the results of the related research, it is revealed that students whose biology self-efficacy beliefs are at a high level participate eagerly in all the activities about biology and those expectations which will be obtained in these activities are higher (Ekici, 2009). As a result, students whose self-efficacy is higher like taking risks, make the difficult duties and behave eagerly than the students whose self-efficacy is low (Ekici, 2005). Because of these reasons, it should be regarded that self-efficacy belief of biology and factors affecting self efficacy have to be emphasized in the process of education.

According to Bandura (1977), there are four main source of self-efficacy: mastery experiences, vicarious experiences, social persuasions, and physiological states. Bandura, explains the four main sources as follows:

*Mastery Experiences:* The success achieved in a job by an individual indicates that the individual will be successful in similar jobs. In this context, the individual's achievement affects them as an award and this achievement motivate the individual for similar behaviours in the future.

When we examine these sources affecting self efficacy, it is seen that these sources associated with pre-service training. Because the success of individuals' professional practices depend on success of individuals' lessons about career and accomplishments in which they share their personal experiences and gain experience about ways of solving problems in the pre-service training (Kiremit, 2006). In the literature, it is seen that pre-service training is very important for individuals to gain main information, skills and competence (Pajares, 2002).

It is seen that the studies related to self-efficacy which have been made in recent years focus on university students and teachers' self-efficacy beliefs (Akbaş & Çelikkaleli, 2006; Altunçekiç, Yaman & Koray, 2005; Arsal, 2006; Aşkar & Umay, 2001; Berkant & Ekici, 2007; Chao, 2001; Işikal & Aşkar, 2003; Mudasiru, 2005; Özçelik & Kurt, 2007; Sarıkaya, 2004). However, when the studies are examined, a study for determining biology self-efficacy beliefs of the students studying in the department of biology in the faculty of science-literature and in the department of biology teaching in the faculty of education is rarely seen. Nevertheless, the biology self-efficacy has become one of the issues which have to be emphasized in students' judgements about the skill of realizing a work related to biology, being more eager towards biology, revealing the behaviours which exist in humans such as positive experiences' increasing self-efficacy and in this way, acquiring new behaviours. Moreover, in some of the researches it is seen that students' self-efficacy beliefs differ according to the courses (Riggs & Enochs, 1990). Therefore, it is considered that because students take different course each term, students' studying in the same department and different faculties and their grades will affect the biology self-efficacy belief. As a result, it is significant

to determine the students' biology self-efficacy beliefs which are efficient in their learning biology and to examine the factors affecting the biology self-efficacy belief.

### Purpose of the Research

The general purpose of this research is to determine biology self-efficacy beliefs of the students studying in the department of biology and in the department of biology teaching and to examine their biology self-efficacy beliefs according to the variables of department and grade. In the context of this purpose, answers have been looked for the questions below:

1. How is the general distribution of biology self-efficacy beliefs of the students studying in the department of biology and in the department of biology teaching?
2. Do the biology self-efficacy beliefs of the students studying in the department of biology and ones of the students studying in the department of biology teaching differ meaningfully according to their departments?
3. Do the biology self-efficacy beliefs of the students studying in the department of biology and ones of the students studying in the department of biology teaching differ meaningfully according to the variable of grade?

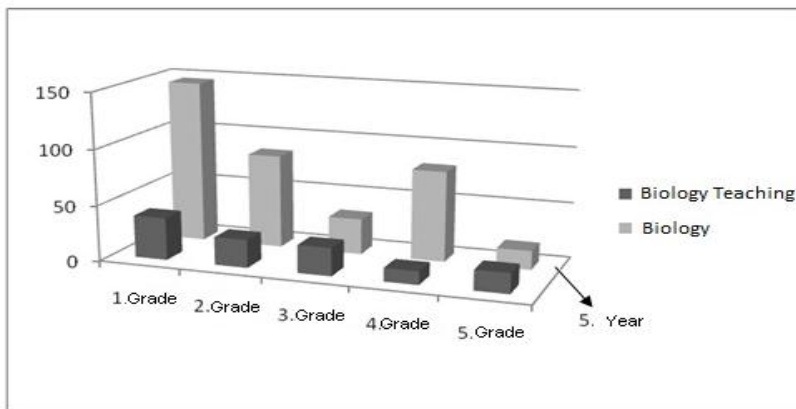
### Method

#### Design of Research

Survey model was used in this research which is a descriptive study. Survey model is a research model in which investigations are generally made on the large samples including taking participants' views about a subject or event or determination of the characteristics such as interest, skill and attitude (Fraenkel & Wallen, 2006).

#### Study Group

The study group of the research includes total 478 students studying in the Department of Biology Teaching and Department of Biology. These students have been chosen through simple random sampling in a state university. 360 students (75.31%) of the students forming the study group study in the Department of Biology and 118 (24.68%) ones of them study in the Department of Biology Teaching. The distribution of the students according to their departments and grades is shown in Figure 1.



**Figure 1<sup>2</sup>.** The distribution of the students according to their departments and grades

<sup>2</sup> In Faculty of Science in Biology Department, the educational program consists of a 4-year period. The expression of 5th year in Biology Department means that these students have not graduated from their department on time and extended their training 1 year.

As it is seen in Figure 1, 146 students of the ones (30.54%) studying in the Department of Biology study in the 1<sup>st</sup> grade, 84 ones of them (17.57%) study in the 2<sup>nd</sup> grade, 32 ones of them (6.69%) study in the 3<sup>rd</sup> grade, 81 ones of them (16.94%) study in the 4<sup>th</sup> grade and 17 ones of them (3.55%) study in the 5<sup>th</sup> year. Among the students studying in the Department of Biology Teaching 38 ones of them (7.94%) study in the 1<sup>st</sup> grade, 25 ones of them (5.23%) study in the 2<sup>nd</sup> grade, 25 ones of them (5.23%) study in the 3<sup>rd</sup> grade, 12 ones of them (2.51%) study in the 4<sup>th</sup> grade and 18 ones of them (3.76%) study in the 5<sup>th</sup> year.

### **Data Collection Tool**

Scale of biology self-efficacy which was developed by Baldwin, Ebert-May & Burns (1999) and adapted into Turkish by Ekici (2005) was used as the tool of measurement in the research. Scale of biology self-efficacy includes 23 items in 5 point likert scale. The scale consists of three factors such as biology methods (8 items), generalization of biology/other science courses and analysis of knowledge (9 items), practice of the biological concepts and skills (6 items) (Baldwin, Ebert-May & Burns, 1999). When the reliability values of scale of biology self-efficacy have been examined for this study, reliability value of cronbach alpha has been found as .94 for the overall scale, this value has been found as .88 for the sub-scale of the biology methods, .88 for the sub-scale of generalization to biology/other science courses and analysis of knowledge, and .84 for the sub-scale of practicing the biological concepts and skills.

### **Analysis of Data**

Students' self-efficacy levels have been determined for the analysis of data obtained in the scale of biology self-efficacy regarding the points they took from the scale. With this purpose, arithmetic mean and standard deviation values have been calculated and points have been operated as low-medium-high as 33% parts. SPSS (Statistical Package for the Social Science) was used in the analysis of data. Also, descriptive statistics, independent groups t-test and one-way variance analysis were used in the analysis of data. Moreover, analysis of eta-square correlation coefficient ( $\eta^2$ ) was used in the research to investigate the effect of independent variables on the dependent variable.

## **Findings**

### **Findings 1. The General Distribution of Biology Self-Efficacy Beliefs of Students Studying in the Department of Biology and the Department of Biology Teaching**

The general distribution of biology self-efficacy beliefs of students studying in the department of biology and the department of biology teaching is given in Table 1.

According to Table 1 when the overall scale and sub-scales of biology self-efficacy are examined, it is seen that students mostly intensify in the group at the middle level Department of Biology; overall scale=223; biology methods=215; generalization to biology/other science courses and analysis of knowledge=236; practicing the biological concepts and skills=231. Also Department of Biology Teaching; overall scale=77; biology methods=77; generalization to biology/other science courses and analysis of knowledge=75; practicing the biological concepts and skills=82. In the direction of the findings obtained, it can be said that biology self-efficacy beliefs of the students studying in the Department of Biology Teaching and Department of Biology are at the middle level.

### **Findings 2. Results of t-Test of Biology Self-Efficacy Beliefs of the Students Studying in the Department of Biology and the Department of Biology Teaching According to the Variable of Department**

Results of t-Test of biology self-efficacy beliefs of the students studying in the department of biology and the department of biology teaching according to the variable of department are given in the Table 2.

**Table 1.** The general distribution of biology self-efficacy beliefs of students studying in the department of biology and the department of biology teaching

	Biology Self-Efficacy Belief Scale	$\bar{x}$	SS	Score Interval	Name of the Group	f	%
DEPARTMENT of BIOLOGY	Overall scale	4.05	.570	1<X≤3.48	Low	68	18.9
				3.48<X≤4.62	Medium	223	61.9
				4.62<X≤5.0	High	69	19.2
	Biology methods	3.96	.655	1<X≤3.30	Low	64	17.8
				3.30<X≤4.61	Medium	215	59.7
				4.61<X≤5.0	High	81	22.5
	Practice of biological concepts and skills	4.07	.573	1<X≤3.50	Low	54	15
				3.50<X≤4.64	Medium	236	65.6
	Generalization to biology/other courses and analysis of knowledge	4.13	.659	1<X≤3.47	Low	53	14.7
				3.47<X≤4.79	Medium	231	64.2
4.79<X≤5.0				High	76	21.1	
<b>Total</b>					<b>360</b>	<b>100</b>	
DEPARTMENT of BIOLOGY TEACHING	Overall scale	3.89	.582	1<X≤3.31	Low	17	14.4
				3.31<X≤4.47	Medium	77	65.3
				4.47<X≤5.0	High	24	20.3
	Biology methods	3.85	.624	1<X≤3.23	Low	18	15.3
				3.23<X≤4.47	Medium	77	65.3
	Practice of biological concepts and skills	3.92	.590	1<X≤3.33	Low	21	17.8
				3.33<X≤4.51	Medium	75	63.6
	Generalization to biology/other courses and analysis of knowledge	3.88	.626	1<X≤3.25	Low	17	14.4
				3.25<X≤4.51	Medium	82	69.5
				4.51<X≤5.0	High	19	16.1
<b>Total</b>					<b>118</b>	<b>100</b>	

**Table 2.** Results of independent groups t-test related to points of biology self-efficacy according to department

Biology Self-Efficacy Belief Scale	Department	N	$\bar{x}$	SS	sd	t	p	Eta square
Biology methods (1)	Biology	360	3.96	.65	476	1.494	.136	-
	Biology Teaching	118	3.85	.62				
Practice of biological concepts and skills (2)	Biology	360	4.07	.57	476	2.422	.016	0.01
	Biology Teaching	118	3.92	.59				
Generalization to biology/other courses and analysis of knowledge (3)	Biology	360	4.13	.65	476	3.603	.000	0.02
	Biology Teaching	118	3.88	.62				
<b>Overall (g)</b>	Biology	360	4.0	.57	476	2.612	.009	0.01
	Biology Teaching	118	3.89	.58				

When Table 2 is examined, it is seen that average points of self-efficacy of the students studying in the Department of Biology are 3.96 and points of the students studying in the Department of Biology Teaching are 3.85. When the points in the sub-scale of practicing the biological concepts and skills are examined, it is seen that average self-efficacy points of the students studying in the Department of Biology are 4.07 and points of the students in the Department of Biology Teaching are 3.92. Whereas students in the Department of Biology have a self-efficacy point as 4.13 and students in the Department of Biology Teaching have a self-efficacy point as 3.88 when the points in the sub-scale of generalization to biology/other science courses and analysis of knowledge are investigated, as for the overall scale, it is seen that students in the Department of Biology have 4.0 points and students in the Department of Biology Teaching have a point as 3.89. In the end of the independent groups t-Test which was made in order to understand whether the difference between these self-efficacy points are statistically meaningful, it is revealed that the difference in the overall scale and other sub-scales except for the sub-scale of biology methods is statistically meaningful. In this context, it can

be said that biology self-efficacy beliefs of the students studying in the Department of Biology are higher than the self-efficacy beliefs of the students studying in the Department of Biology Teaching.

In the result of the analysis of eta-square correlation coefficient which was made in order to understand how much the variable of department affected the biology self-efficacy belief, it has been determined that the variable of department has an effect at a low level ( $\eta^2_{(g)}= 0.01$ ;  $\eta^2_{(2)}= 0.01$ ;  $\eta^2_{(3)}= 0.02$ ) on the biology self-efficacy belief.

When the literature related to effect size is examined, it is expressed that effect size is a statistical technique that used commonly in order to determine the strength of relation between variables in design of ANOVA. Effect size, which does not require linearity between any variables, shows how the effectiveness of independent variable on the dependent variable. In other words, it reveals the amount of total variance explained in dependent variable by the factor or independent variable. In this context, the effect size is interpreted as 0.01=low, 0.06=medium, 0.14=high (Green, Salkind & Akey, 2000; Köklü, Büyüköztürk & Bökeoğlu, 2006).

**Findings 3. Results of ANOVA of Biology Self-Efficacy Beliefs of the Students in the Department of Biology and in the Department of Biology Teaching According to Grade**

Findings related to the results of ANOVA of biology self-efficacy beliefs of the students in the department of biology and in the department of biology teaching according to grade are given in Table 3.

As it is seen in Table 3, students in the 1<sup>st</sup> grade among the students studying in the Department of Biology and students in the 2<sup>nd</sup> grade among the students studying in the Department of Biology Teaching have the highest point in the sub-scale of biology methods. On the other hand, when the sub-scale of Generalization to Biology/Other Science Courses and Analysis of Knowledge are examined, it is seen that students who take the highest point are students in the 5<sup>th</sup> year of the Department of Biology and in the 2<sup>nd</sup> grade of the Department of Biology Teaching. When the overall scale and sub-scale of Practicing the Biological Concepts and Skills are investigated, it is determined that students in the Department of Biology who take the highest point study in the 5<sup>th</sup> year and students in the 2<sup>nd</sup> grade of the Department of Biology Teaching take the highest point. One-way variance analysis was made to see whether the difference between these values is statistically meaningful and the results obtained are presented in Table 4.

**Table 3.** Results of arithmetic mean and standard deviation of the points in the scale of biology self-efficacy beliefs of the students in the department of biology and in the department of biology teaching

Sub-scales	Grade (Class)	N	$\bar{x}$	SS
Biology methods	<b>1. grade</b>	<b>146</b>	<b>4.0</b>	<b>.61</b>
	2. grade	84	3.96	.69
	3. grade	32	3.92	.59
	4. grade	81	3.87	.70
	<b>5. year</b>	17	3.98	.67
Generalization to biology/other courses and analysis of knowledge	1. grade	146	4.0	.54
	2. grade	84	4.1	.59
	3. grade	32	3.93	.65
	4. grade	81	4.03	.57
	<b>5. year</b>	<b>17</b>	<b>4.22</b>	<b>.53</b>
Practice of biological concepts and skills	1. grade	146	4.10	.62
	2. grade	84	4.10	.66
	3. grade	32	4.09	.61
	4. grade	81	4.07	.74
	<b>5. year</b>	<b>17</b>	<b>4.18</b>	<b>.66</b>
Overall scale	1. grade	146	4.07	.53
	2. grade	84	4.08	.59
	3. grade	32	3.97	.57
	4. grade	81	3.98	.61
	<b>5. year</b>	<b>17</b>	<b>4.13</b>	<b>.51</b>

**Table 3.** Results of arithmetic mean and standard deviation of the points in the scale of biology self-efficacy beliefs of the students in the department of biology and in the department of biology teaching (Continued)

Sub-scales	Grade (Class)	N	$\bar{x}$	SS	
PARTMENT of BIOLOGY TEACHING	Biology methods	1. grade	38	3.81	.66
		<b>2. grade</b>	<b>25</b>	<b>4.12</b>	<b>.68</b>
		3. grade	25	3.72	.64
		4. grade	12	3.91	.49
		5. grade	18	3.74	.40
	Generalization to biology/other courses and analysis of knowledge	1. grade	38	3.83	.68
		<b>2. grade</b>	<b>25</b>	<b>4.17</b>	<b>.58</b>
		3. grade	25	3.85	.54
		4. grade	12	3.91	.48
		5. grade	18	3.87	.44
Practice of biological concepts and skills	1. grade	38	3.82	.71	
	<b>2. grade</b>	<b>25</b>	<b>4.14</b>	<b>.63</b>	
	3. grade	25	3.83	.60	
	4. grade	12	3.80	.51	
	5. grade	18	3.75	.43	
<b>Overall scale</b>	1. grade	38	3.82	.65	
	<b>2. grade</b>	<b>25</b>	<b>4.14</b>	<b>.61</b>	
	3. grade	25	3.80	.56	
	4. grade	12	3.88	.46	
	5. grade	18	3.79	.40	

**Table 4.** One-Way ANOVA results related to the points students of biology and biology teaching took from biology self-efficacy belief scale according to variable of grade

Sub-scales	Total of Squares	sd	Mean of Squares	f	p		
DEPARTMENT of BIOLOGY	Biology methods (1)	Between Groups	1.124	4	.281	.651	.627
		Within Groups	153.22	355	.432		
		Total	154.35	359			
	Generalization to biology/other science courses and analysis of knowledge (2)	Between Groups	1.25	4	.312	.949	.436
		Within Groups	116.89	355	.329		
		Total	118.14	359			
	Practice of biological concepts and skills (3)	Between Groups	.727	4	.182	.415	.798
		Within Groups	155.65	355	.438		
		Total	156.37	359			
	<b>Overall scale (g)</b>	Between Groups	.781	4	.195	.598	.664
		Within Groups	115.89	355	.326		
		Total	116.67	359			
DEPARTMENT of BIOLOGY TEACHING	Biology methods (1)	Between Groups	2.51	4	.629	1.650	.167
		Within Groups	43.06	113	.381		
		Total	45.58	117			
	Generalization to biology/other science courses and analysis of knowledge (2)	Between Groups	2.04	4	.511	1.491	.210
		Within Groups	38.73	113	.343		
		Total	40.77	117			
	Practice of biological concepts and skills (3)	Between Groups	2.25	4	.565	1.461	.219
		Within Groups	43.65	113	.386		
		Total	45.91	117			
	<b>Overall scale (g)</b>	Between Groups	2.16	4	.542	1.631	.171
		Within Groups	37.55	113	.332		
		Total	39.72	117			

In the results of the analysis in Table 4, it has been determined that there is not a statistically meaningful difference between the average points which the students in the Department of Biology and the Department of Biology Teaching took from the overall and sub-scales of the biology self-efficacy belief scale according to the variable of grade [Department of Biology:  $(1)F_{(4-355)}=.651$ ,  $(2)F_{(4-355)}=.949$ ,  $(3)F_{(4-355)}=.415$ ,  $(g)F_{(4-355)}=.598$ ,  $p>.05$ ]. [Department of Biology Teaching:  $(1)F_{(4-113)}=1.650$ ,  $(2)F_{(4-113)}=1.491$ ,  $(3)F_{(4-113)}=1.461$ ,  $(g)F_{(4-113)}=1.631$ ,  $p>.05$ ].

## **Results and Discussion**

In this study biology self-efficacy beliefs of the students studying in the Department of Biology and in the Department of Biology Teaching have been determined and they have been investigated according to the variables of department and grade.

At the end of the research, it is determined that biology self-efficacy beliefs of the students studying in the Department of Biology and in the Department of Biology Teaching are at medium level. In their study which was carried with the students in the Department of Biology and in the Department of Biology Education, Hevedanlı & Ekici (2009) have determined that there is no meaningful difference between the biology self efficacy beliefs of these students and biology self efficacy beliefs of both groups are at medium level. On the other hand, there is no other research in the literature concerning the results of this study.

Biology self-efficacy belief has a very significant role in the aspect of understanding biology better, using the biological concepts and processes and enabling students to feel confident themselves (Berkant & Ekici, 2007). Therefore, searching the factors affecting the biology self-efficacy beliefs of the students studying in the Department of Biology Teaching and in the Department of Biology and making studies which improve students' self-efficacy beliefs regarding these factors have a great significance.

Many factors causing students' biology self-efficacy beliefs to emerge as low, middle or high levels have been defined when the related literature is examined. These factors are expressed by Bandura (1995) as experiencing similar behaviour at first-hand (precise experiences), b) finding an opportunity to follow other people's behaviours in the same type (social models), c) being persuaded by an authority (verbal persuasion) and d) an individual's perception of his own physiological and emotional situations. When these four factors expressed by Bandura (1995) are examined, it draws the attention to that they are skills the students should obtain in the undergraduate courses. On the other hand, Palmer (2002) expresses that the features such as teaching methods individually or in groups practiced in the courses according to individual learning differences, students' previous learning experiences regarded in the courses and students' levels of readiness increase the self-efficacy belief. In the direction of these factors, it can be said that the courses students took during their undergraduate educations and methods and techniques used in the courses have a great significance in improving students' self-efficacies. In this context, effect of the variables of grade and department on the biology self-efficacy belief was investigated in this research.

In the findings obtained, it has been seen that biology self-efficacy beliefs of the students in the Department of Biology are higher than the biology self-efficacy beliefs of the students studying in the Department of Biology Teaching. In the result of the analysis of eta-square correlation coefficient which was made in order to understand how much the variable of department affects the biology self-efficacy belief, it has been determined that the variable of department has a low effect on the biology self-efficacy belief.

On the other hand, it has been determined that there is not a statistically meaningful between the average points students took from the overall and sub-scales of biology self-efficacy belief according to the variable of grade. Unlike the results of this study, studies to determine the relationship between biology self-efficacy beliefs and grade level generally reveal that the increase in grade levels (as well as the increase of age) boost the students biology self-efficacy beliefs. According to the findings of the studies, as the class levels of the students increase their compatibility to the department also increase and so they can learn the topics included in their program easier. They feel themselves as real teachers and gain experiences on how to teach a topic to their students and make them enjoy it. Hence the common opinion states that the self efficacy beliefs of the students were increased (Akkoyunlu & Orhan, 2003; Ekici & Çevik, 2008; Özenoğlu Kiremit & Gökler, 2010; Umay, 2002; Woolfolk Hoy, 2000).



When the sub-scales of the biology self-efficacy belief (biology methods, generalization of biology to other science courses and practicing the biological concepts and skills) are investigated, it is seen that these sub-scales are the skills which should be obtained by the students studying in the Department of Biology and Department of Biology Teaching during the courses they took in the undergraduate. Moreover, when the contents of the courses in the Department of Biology and Department of Biology Teaching on term basis, it is seen that number of the courses in which students of the Department of Biology will experience at first-hand is more than the number of the courses in the Department of Biology Teaching (YÖK=Council of Higher Education, 2009). Regarding that in addition to the courses, methods used in the courses also improve the biology self-efficacy belief; it can be considered that only excessiveness of the courses does not affect the students' biology self-efficacy beliefs too much. Therefore, that there is not a relationship between the variable of grade and biology self-efficacy belief and there is a relationship between the variable of department and biology self-efficacy belief at low level can be seen as a natural conclusion. When the related literature is examined, it is expressed that the most significant factor affecting the self-efficacy belief is the necessity of giving much significance to the individual differences in the undergraduate courses and the practices students will experience at first-hand (Berkant & Ekici, 2007; Gerhardt & Brown, 2006).

Students' requests to learn and factor of success that will emerge according to these requests are directly proportional to students' self efficacy. Because one of the basic conditions of being successful in a course is that students have a strong belief about being successful in that course (Sewell & St George, 1999). In this context, for effective teaching students' self efficacy towards their field should be determined and necessary studies should be done for the development of education.

In the context of the results obtained in the research, suggestions for the next studies are presented below.

### Suggestions for the Next Studies

1. This research is a quantitative research for determining the biology self-efficacy belief of the students studying in the Department of Biology and Department of Biology Teaching. Therefore, factors affecting the students' biology self-efficacy beliefs also can be searched in a qualitative research.
2. This research was done together with the students studying in the Department of Biology and Department of Biology Teaching. Biology self-efficacy beliefs of the students graduated in the department of biology and biology teaching can be investigated in the next research.
3. How much the courses and the methods applied in these courses of the Department of Biology and biology teaching affect the biology self-efficacy beliefs can be examined in the researches.

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