



## The Relationship between Individual Innovativeness and Self-efficacy Levels of Student Teachers

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### Abstract

In this study, the innovativeness and sense of efficacy of student teachers are analyzed. This study aims to determine the effect of individual innovativeness, family socioeconomic levels and gender on teachers' sense of efficacy. This study was modeled using relational screening. As the data did not show normal distribution, non-parametric tests (Mann Whitney U and Kruskal Wallis) were applied for during analysis. This study is comprised of 252 student teachers. Three separate instruments were used to collect data: the Individual Innovativeness Scale to measure individual innovativeness, the Socioeconomic Level Scale to determine socioeconomic levels, and the Ohio State Teacher Efficacy Scale to measure the self-efficacy perceptions of student teachers. The resistance to innovation among student teachers was found to be at a medium-level as they expressed opinion-leading desires and openness to new experiences and risk-taking for innovation. The sense of efficacy of student teacher respondents varied significantly across subcategories which included motivation, instructional skills and guidance. The student motivation, instructional skills and guidance subscales of the self-efficacy scale were found to increase as the innovativeness level of the student teachers did. A significant relationship could not be found, however, between innovativeness scores and self-efficacy in the subcategories of socioeconomic level and gender. This study recommends that student teachers should be encouraged to make better use of innovative techniques.

**Keywords:** Innovativeness, Teacher Efficacy, Socio-economic Level, Gender, Student Teachers

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## INTRODUCTION

It is impossible today for educational organizations to resist major global changes, such as the onset of the knowledge era, new technological developments, and globalization given that these are fast becoming markers of the modern world. Educational organizations thus need to adjust their institutional structures, processes and strategies to embrace these changes in the external environment. To be able to address and embrace these changes, educational organizations require highly creative and innovative individuals. Innovativeness and a sense of efficacy are thus basic qualifications required for effective teaching. Most teachers today acquire this innovativeness and efficacy during time spent at teacher training/education facilities. These teachers then go on to develop their teaching career at surrounding elementary and high schools (Baloglu & Karadag, 2008).

## **Sense of Efficacy**

According to social learning theory (Bandura, 1997), cognitive processes have an effect on the behaviors of individuals. Self-efficacy, one of the most important terms of this theory, is defined as “beliefs in one’s capabilities to organize and execute the courses of action required to manage prospective situations”. It has been found that a student’s perception of the magnitude of their self-efficacy has an effect on (I) what activities they select, (II) how much effort they show, and (III) how persistent they are in the face of difficulties (Bandura, 1997).

Although “self-efficacy belief” is considered a “domain-specific self-efficacy”, some researchers have advanced a “general self-efficacy belief” (Schwarzer, 1994; Zhang & Schwarzer, 1995; Schwarzer & Jerusalem, 1995; Marakas, Yi, & Johnson, 1998; Choi, 2004). Domain-specific self-efficacy can be defined as the belief in an individual’s abilities to fulfill a certain situation or duty successfully (Bandura 1986, 1997). Luszczynska, Scholz, and Schwarzer (2005) define general self-efficacy as the belief in one’s competence to handle a number of stressful or challenging demands (Celikkale & Capri, 2008).

Researchers have shown that teacher efficacy has been linked to a variety of teaching behaviors and student outcomes, including teachers' behavior in the classroom (Tschannen-Moran & Hoy, 2001), student achievement (Armor et al., 1976; Gibson & Dembo, 1984; Ashton & Webb, 1986; Ross, 1992; Caprara, Barbaranelli, Steca, & Malone, 2006; Guo, Piasta, Justice, & Kaderavek, 2010; Muijs & Reynolds, 2002), motivation (Midgley, Feldlaufer, & Eccles, 1989; Woolfolk, Rosoff, & Hoy, 1990), own sense of efficacy (Anderson, Greene, & Loewen, 1988). Teachers' efficacy beliefs, defined as teachers' perceptions of their own ability to bring about desired outcomes, are critical factors in the improvement of teaching and learning (Caprara, Barbaranelli, Steca, & Malone, 2006; Geijsel, Slegers, Stoel, & Kruger, 2009; Raudenbush, Bhumirat, & Kamali, 1992; Ross, 1992; Tschannen-Moran, Hoy, & Hoy, 1998; Takahashi, 2011). In other words, teachers’ sense of efficacy refers to personal beliefs about their capacity to manage instructional activities such as planning, organizing and achieving goals at a desired level (Skaalvik, 2007; Dellinger, Bobbett, Olivier, & Ellet, 2008).

When efficacy for teaching is high, teachers tend to utilize a variety of instructional strategies that are autonomy-supportive and positive for student engagement and achievement outcomes, even when faced with challenging situations (Fives & Alexander, 2004; Lin, Gorrell, & Taylor, 2002; Skaalvik & Skaalvik, 2007; Tschannen-Moran, Woolfolk-Hoy & Hoy, 1998; Woolfolk & Hoy, 1990; Woolfolk, Rosoff, & Hoy, 1990). Teachers with high self-efficacy and task persistence tend to exhibit greater academic focus (Gibson & Dembo 1984), criticize students less (Ashton & Webb 1986), and become enthusiastic about adopting new methods and techniques (Gurcay, 2012). Teachers with a higher sense of efficacy (Tschannen-Moran, & Hoy 2001) and greater enthusiasm for teaching (Allinder, 1994; Guskey, 1984; Hall, Burley, Villeme, & Brockmeier, 1992), have a greater commitment (Coladarsi, 1992; Evans & Tribble, 1986; Trentham, Silvern, & Brogdon, 1985) to teaching and are more likely to remain in teaching and experience low levels of burnout (Betoret, 2006; Skaalvik & Skaalvik, 2010).

## **Innovativeness**

Innovativeness can be defined as the process in which new ideas are put into practice (Nail, 1994). Rogers (1995) defines innovativeness as “the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system” and classifies adopters based on the time at which they adopt an innovation. Agarwal and Prasad (1998) define technological innovativeness as becoming “more enthusiastic about experiencing/using new information and communication technologies than the other people in the environment of the individual”. Individuals with higher innovativeness thus have more positive attitudes towards these technologies and are able to take risks in terms of their use and application (Yi, Fiedler & Park, 2006).

Innovativeness can be an umbrella term for risk-taking, openness to experiences, creativeness and opinion-leading. Clearly, individuals have different experiences with and orientations to innovativeness. Rogers (1995) classifies individuals into five different categories in terms of their innovation characteristics. These categories are Innovators, Early Adopters, Early Majority, Late Majority and Laggards (Kilicer & Odabasi, 2010).

The infusion of technology into the discipline of education has affected teaching, learning, and planning processes (Yildirim, 2000). Today's teachers are expected to be technologically literate and to incorporate technological tools into their teaching practice (Pamuk & Peker, 2009). Hopson, Simms, and Knezek (2002) thus observe that technological improvements in the form of instructional and pedagogical developments have changed ordinary education standards. These technology-driven developments have led to changes in teaching/learning methods and environments (Marina, 2001). Furthermore, researchers (Zimmerman, 1986; Ropp, 1998; Lewis, 1998; Drucker, 2000; Balci, 2011) expect that technology will continue to change and advance learning

environments and strategies. Accordingly, the incorporation of new technologies in school curricula and the demand for teachers who are capable of using these technologies is increasing (Pamuk & Peker, 2009). Teachers must not fall back on using only the most basic technological tools; they must also be enthusiastic about new technology and its possibilities as well. High innovativeness levels are the expected outcomes when teachers take the responsibility for infusing innovations into their students.

Researchers (Berman, McLaughlin, Bass, Pauly, & Zellman, 1977; Guskey, 1988; Stein & Wang, 1988; Czerniak & Lumpe, 1996; Tschannen-Moran & Hoy, 2001) have noted that teachers with a high sense of efficacy are more open to new ideas and are more willing to implement instructional innovations and experiment with new methods to better meet the needs of their students. There are, however, only a few studies analyzing the relationship between individual innovativeness and one's perceived sense of efficacy. This study thus focuses on the relationship between the individual innovativeness levels and self-efficacy beliefs of student teachers. It attempts to determine how the innovativeness levels of student teachers effect their sense of efficacy. The socioeconomic status and gender of the student teachers constitute the other variables in the study.

## METHOD

### Population and Sample

This study was conducted with the senior student teachers studying at the Faculty of Education of Pamukkale University - fourth year students who have completed their in-school practicum. The population for this study consisted of 1079 student teachers, 260 of whom were sampled for the study. Because they did not complete the instrument, eight (8) student teachers were excluded and so 252 student teachers were included in the study. Of these, 167 (66%) student teachers were female and 85 (34%) were male. The distribution of student teachers based on their majors is as follows: 82 (32.5%) from Primary School Teaching, 39 (15.5%) from Preschool Teaching, 9 (3.6%) from English Language Teaching, 25 (9.9%) from Social Sciences Teaching, 15 (6.0%) from Music Teaching, 25 (9.9%) from Arts Teaching, 21 (8.3%) from Science Teaching and 36 (14.3%) from Turkish Language Teaching.

### Instruments

To collect the data, the following three separate instruments were administered: the Individual Innovativeness Scale (Kilicer & Odabasi, 2010) to measure individual innovativeness, the Socioeconomic Level Scale (Bacanli, 1990) to determine socioeconomic levels, and the Ohio State Teacher Efficacy Scale (Baloglu & Karadag, 2008) to measure the self-efficacy perceptions of student teachers.

**Individual Innovativeness Scale (IS):** The IS was designed by Hurt, Joseph and Cook (1977) to measure the general innovativeness of individuals and was adapted into Turkish by Kilicer & Odabasi (2010). While adapting the scale, the correlated factors were found in the 20-item Turkish in the scale. These factors were "Resistance to change", "Opinion-leading" and "Risk-taking" based on the literature and the features of these items. These four factors accounted for common variances between .415% and .628%. The reliability and validity of the scale was tested with 343 university students. To determine the internal validity of the Turkish form, Cronbach's alpha correlation coefficient was computed. As a result of the analysis, the internal validity for the scale was found to be  $\alpha=0.82$ , and the internal validity coefficients for the factors were found to be  $\alpha=0.81$ ,  $\alpha=0.73$ ,  $\alpha=0.77$  and  $\alpha=0.62$  for "Resistance to change", "Opinion-leading" and "Risk-taking" respectively.

The original scale consisted of 20 items based on a five-point Likert-type scale that ranged from strongly agree to strongly disagree and involved five different categories from innovator to laggard. The scale was comprised of 12 positive items (1, 2, 3, 5, 8, 9, 11, 12, 14, 16, 18 and 19) and 8 negative items (4, 6, 7, 10, 13, 15, 17 and 20). The innovativeness score was computed by subtracting the scores of the negative items from the score of the positive items, and adding 42 points to this score. Using the scale, the lowest possible score was 14 and the highest possible score was 94. Based on the calculated scores, individuals were categorized in terms of their innovativeness. Individuals with a score of 80 or more were classified as "*Innovator*", with a score between 69 and 80 as "*Early Adopters*", with a score between 57 and 68 as "*Early Majority*", with a score between 46 and 56 as "*Late Majority*" and with a score below 46 as "*Laggard*". It was thus possible to make evaluations about the innovativeness levels of the individuals based on their scores.

**The Socioeconomic Level Scale (SLS):** To identify the socioeconomic levels of the student teachers, the Socioeconomic Level Scale developed by Bacanli (1990) was administered. Some of the items were revised to better reflect present conditions. Choices for the question about monthly income, for example, were renewed. Some of the possessed goods were removed and other goods were added based on current technologies. Fridge, for

instance, was replaced by dishwasher. There were 16 items in the scale. Fifteen of the items had a certain score for each item option, and a score was assigned in the 12<sup>th</sup> question based on the number of possessed goods. At the end of administration, the points associated with each items were summed and the total score was obtained. To determine the socioeconomic levels of participants, standard deviation was subtracted from the arithmetic mean ( $41-9=32$ ), and this score was categorized as *low socioeconomic level* (SL). By adding standard deviation to the arithmetic mean, *high SL* was thus determined ( $41+9=50$ ). Scores between 32 and 50 were considered a *medium SL*.

**The Ohio State Teacher Efficacy Scale (OSTES):** This scale, developed by Tschannen-Moran & Woolfolk-Hoy (2001), was designed to evaluate teachers' sense of efficacy. The Ohio State Teacher Efficacy Scale was adapted into Turkish by Baloglu & Karadag (2008) and is now referred to as the Teachers' Sense of Efficacy Scale (TSES). Five-correlated factors were found in the 24-item scale and so the subscales were entitled "Guidance", "Behavioral Management", "Motivation", "Instructional Skills" and "Assessment and Evaluation". The eigenvalues and the explained variances of the subscales were respectively: (I) 3.262 and 13.591%, (II) 3.062 and 12.759%, (III) 2.465 and 10.273%, (IV) 2.402 and 10.009% and (v) 1.587 and 6.612%. The sum of the eigenvalues and the explained variances were 12.778 and 53.243% respectively. To identify the internal validity coefficient, Cronbach's alpha coefficient was computed. As the result of this analysis, the internal validity was found to be  $\alpha=.90$  for the whole scale. For the subscales of "Guidance", "Behavioral Management", "Motivation", "Instructional Skills" and "Assessment and Evaluation" the results were  $\alpha=.79$ ,  $\alpha=.78$ ,  $\alpha=.73$ ,  $\alpha=.69$  and  $\alpha=.66$ , respectively.

### **Procedure**

Data was obtained from student teachers studying at the Faculty of Education of Pamukkale University throughout the last two weeks of the 2011-2012 spring term. The data, across the different majors, was collected from the student teachers voluntarily after they finished their in-school practicum. Students who did not take school experience courses were excluded from the study. The instruments were administered in the classrooms of the participants, and adequate time was given to students to complete the questionnaire.

### **Data Analysis**

To examine the consistency of the data, the required statistical analysis was carried out, and it determined that a normal distribution was not present. Accordingly, the Kolmogorov-Smirnov value of the data was calculated as less than .05 excluding the resistance to change subscale on the individual innovativeness scale. For the Ohio State Teacher Efficacy Scale, the Kolmogorov-Smirnov value was calculated as less than .05, as well. There was not a normal distribution largely because it was less than the Kolmogorov-Smirnov table value. As the result of these tests, non-parametric tests were conducted in the data analysis. For the statistical analyses, the level of significance was considered to be 0.05. In analyzing the data, arithmetic mean, standard deviation, the Mann Whitney U test, the Kruskal Wallis test and Spearman's Correlation test were applied.

### **RESULTS**

For views of the participants on individual innovativeness and teachers' sense of efficacy, the results of the descriptive statistics (mean, standard deviation, Cronbach's alpha value, the Kolmogorov-Smirnov test, and correlation coefficients) are presented in Table 1.

Table 1: Descriptive Statistics and Correlations (N=252)

Scale and Sub-scale	Descriptive Statistics			Kolmogorov-Smirnov		Spearman Correlation Coefficient				
	$\chi^2$	SD	$\alpha$	Z	p	5	6	7	8	9
<b>Individual Innovativeness Sub-Scale</b>										
1. Resistance to Change	2.67	.73	.85	1.120	.163	-.252**	-	-.118	-.121	-
2. Opinion-leading	3.70	.65	.78	1.534	.018	.314**	.266**	.421**	.376**	.179**
3. Openness to Experiences	3.96	.63	.79	2.179	.000	.328**	.450**	.361**	.245**	.415**
4. Risk-taking	3.57	.84	.67	2.306	.000	.187**	.347**	.254**	.178**	.217**
<b>Teacher Efficacy Sub-scale</b>										
5. Behavioral Management	3.87	.48	.61	1.553	.016					
6. Motivation	4.06	.46	.73	1.600	.012					
7. Instructional Skills	3.84	.46	.66	1.789	.003					
8. Assessment and Evaluation	3.88	.54	.62	3.541	.000					
9. Guidance	3.96	.46	.73	1.513	.021					

\*\*Correlation is significant at the 0.01 level (2-tailed).

Based on Cronbach’s alpha internal validity coefficients, the scales are highly reliable since they are between .66 and .85 intervals. In the Individual Innovativeness Scale, the scores for resistance to change are close to the mean ( $\bar{x}$ =2.67/5), and the scores for the opinion-leading, openness to experiences and risk taking subscales ( $\bar{x}$ =3.70/5,  $\bar{x}$ =3.96/5 and  $\bar{x}$ = 3.57 respectively) are at high levels. According to these results, the student teachers resist change at a moderate level, and their views on opinion-leading, openness to experiences and risk-taking are above average. The student teachers’ sense of efficacy can be said to be fairly high, between  $\bar{x}$ =3.84/5 and  $\bar{x}$ =4.06/5. In Baloglu and Karadag’s study, the self-efficacy level of student teachers varied between  $\bar{x}$ =3.81/5 and  $\bar{x}$ =4.06/5 as well.

Based on the correlation analysis, a poor, negative and significant relationship at the level of  $p=.01$  was found between resistance to change and the behavioral management, motivation and guidance subscales of the self-efficacy scale. However, there is a significantly positive relationship at the level of  $p=.01$  between the five subscales of the teachers’ sense of efficacy scale and the other subscales of the individual innovativeness scale. The correlation coefficients vary between .178 and .450, and these values indicate a poor and moderate relationship.

As part of the study, the individual innovativeness scores of the student teachers were estimated. Student teachers with two points more than the standard deviation are deemed innovators. Student teachers with scores between one point more than standard deviation and two points more than standard deviation are deemed early adopters. Student teachers with scores between one point more than standard deviation and the mean are the early majority. Student teachers with scores between the mean and one point less than standard deviation are the late majority. Lastly, student teachers with scores one point less than the standard deviation are deemed laggards. The distribution of student teacher individual innovativeness scores are presented in Table 2.

Table 2: The Distribution of Individual Innovativeness Scores (N=252)

Categories of individual innovativeness	Individual innovativeness classification and scores	Frequency	Percent
Innovator	82>	6	2.4
Early Adopter	74-81	40	15.9
Early Majority	67-73	82	32.5
Late Majority	66-58	107	42.5
Laggard	57<	17	6.7

As shown in Table 2, approximately half of the student teachers are laggard and late majority, and have low innovativeness scores. Of note, the number of laggard and late majority student teachers is three times more than the number of early adopters and innovators. When the early majority group is considered to be cautious and deliberate around innovations, it can be said that the innovativeness level of the student teachers is low. This is concerning.

The effects of innovativeness levels of the student teachers on their sense of efficacy are presented in Table 3.

Table 3: The Effect of Individual Innovativeness Levels on Student Teachers' Sense of Efficacy

Subscale	Groups	N	Mean Rank	SD	$\chi^2$	p	Significance
<b>Behavior</b>	1- Innovator	6	172.00	4	4.57	.334	No significance.
	2-Early Adopters	40	135.71				
	3-Early Majority	82	128.99				
	4-Late Majority	107	118.17				
	5-Laggards	17	129.18				
<b>Motivation</b>	1-Innovator	6	215.00	4	16.68	.002	Innovator - Early Adopters Innovator - Early Majority Innovator - Late Majority Innovator - Laggards Early Adopters - Late Majority
	2-Early Adopters	40	146.50				
	3-Early Majority	82	130.59				
	4-Late Majority	107	112.16				
	5-Laggards	17	118.74				
<b>Instruction</b>	1-Innovator	6	202.33	4	17.03	.002	Innovator - Early Majority Innovator - Late Majority Innovator - Laggards Early Adopters - Late Majority Early Majority - Late Majority
	2-Early Adopters	40	143.26				
	3-Early Majority	82	137.33				
	4-Late Majority	107	111.13				
	5-Laggards	17	104.79				
<b>Assessment</b>	1-Innovator	6	191.42	4	6.50	.165	No significance.
	2-Early Adopters	40	134.51				
	3-Early Majority	82	123.59				
	4-Late Majority	107	123.76				
	5-Laggards	17	116.03				
<b>Guidance</b>	1-Innovator	6	193.83	4	14.07	.007	Innovator - Late Majority Innovator - Laggards Early Adopters - Late Majority Early Adopters - Laggards
	2-Early Adopters	40	148.45				
	3-Early Majority	82	131.84				
	4-Late Majority	107	113.84				
	5-Laggards	17	105.03				

The effect of individual innovativeness scores on student teachers' sense of efficacy was analyzed using the Kruskal-Wallis test. The significant groups were compared one by one with the Mann Whitney U test. Based on the results of these tests, at least two group means are significant in the motivation, instruction and guidance subscales in terms of their sense of efficacy. For the behavior and assessment/evaluation subscales, a significant correlation could not be found between the scores of individual innovativeness and sense of efficacy.

In the motivation subscale, the scores of early adopters, the early majority, the late majority and laggards are differentiated significantly in favor of innovators. The scores of early adopters are differentiated significantly from the scores of laggards in favor of early adopters. In the instruction subscale, the scores of the innovators are significantly differentiated from the early majority, the late majority and laggards in favor of innovators; early adopters from the late majority in favor of early adopters; and early majority from the late majority in favor of early majority. On the guidance subscale, the scores of innovators and early adopters are significantly differentiated from the scores of the late majority and laggards.

Having a high individual innovativeness score was not significantly differentiated on the behavior and assessment subscales. High individual innovativeness scores, however, indicate high self-efficacy on the motivation, instruction and guidance subscales.

The individual innovativeness scores of student teachers were analyzed with the Kruskal-Wallis test by comparing results with the socioeconomic level of the student teachers. The results of this analysis are presented in Table 4.

Table 4: A Comparison of the Views of Student Teachers about Innovativeness with Their SL

	SL_3	N	Mean Rank	SD	$\chi^2$	p
Resistance to Change	Low	48	133.16	2	.498	.780
	Moderate	161	125.05			
	High	43	124.50			
Opinion-leading	Low	48	114.81	2	2.565	.277
	Moderate	161	126.60			
	High	43	139.19			
Openness to Experiences	Low	48	124.46	2	1.488	.475
	Moderate	161	123.84			
	High	43	138.74			
Risk-taking	Low	48	139.75	2	2.799	.247
	Moderate	161	121.14			
	High	43	131.79			

As is seen in Table 4, a significant relationship could not be found between the individual innovativeness scores and SL of the student teachers. In other words, SL does not have an effect on the individual innovativeness scores of the student teachers. The reason for this might be that innovative technologies are getting cheaper and so individuals from each SL are able to acquire basic innovative goods, information technologies and knowledge.

It is commonly highlighted in the literature that teachers are largely from low and moderate socioeconomic. As shown in Table 5, the student teachers in this study are mostly of the moderate socioeconomic level. The Kruskal-Wallis test was conducted to see if the socioeconomic level of the student teachers had an effect on their sense of efficacy.

Table 5: Student Teachers' Sense of Efficacy Based on Their SL

	SL_3	N	Mean Rank	SD	$\chi^2$	p
Behavior	Low	48	117.60	2	.902	.637
	Moderate	161	128.46			
	High	43	129.10			
Motivation	Low	48	118.74	2	1.856	.395
	Moderate	161	125.49			
	High	43	138.95			
Instruction	Low	48	131.29	2	.302	.860
	Moderate	161	124.85			
	High	43	127.34			
Assessment/Evaluation	Low	48	126.63	2	.762	.683
	Moderate	161	124.28			
	High	43	134.66			
Guidance	Low	48	119.39	2	.606	.739
	Moderate	161	127.70			
	High	43	129.97			

A significant difference could not be found between the SL of the student teachers and their sense of efficacy. In other words, SL does not have a significant effect on the student teachers' sense of efficacy.

In many studies carried out with student teachers, gender is used as the independent variable. The effect of gender has, not surprisingly, been studied on a host of dependant variables. In this study, the effect of gender on individual innovativeness scores and student teachers' sense of efficacy was analyzed. The data from this analysis is presented in Table 6.

Table 6: The Effect of Gender on Individual Innovativeness Scores and Student Teachers' Sense of Efficacy

	Gender	N	Mean Rank	Sum of Ranks	U	p
Resistance to Change	Female	167	126.56	21135.00	7088.00	.986
	Male	85	126.39	10743.00		
Opinion-leading	Female	167	124.12	20728.00	6700.00	.465
	Male	85	131.18	11150.00		
Openness to Experiences	Female	167	126.01	21044.00	7016.00	.881
	Male	85	127.46	10834.00		
Risk-taking	Female	167	122.70	20491.50	6463.50	.237
	Male	85	133.96	11386.50		
Behavioral Management	Female	167	129.06	21553.00	6670.00	.430
	Male	85	121.47	10325.00		
Motivation	Female	167	123.41	20610.00	6582.00	.343
	Male	85	132.56	11268.00		
Instruction	Female	167	124.65	20817.00	6789.00	.569
	Male	85	130.13	11061.00		
Assessment and Evaluation	Female	167	121.95	20365.00	6337.00	.144
	Male	85	135.45	11513.00		
Guidance	Female	167	129.52	21629.50	6593.50	.354
	Male	85	120.57	10248.50		

As shown in Table 6, a significant relationship could not be found between gender, and individual innovativeness, and student teachers' sense of efficacy. In other words, being male or female did not have a significant effect on the innovativeness and self-efficacy of the student teachers.

## DISCUSSION

Based on the student teachers' views of individual innovativeness, their resistance to change is at moderate level and they have a high desire for opinion-leading, openness to experiences and risk-taking. The mean and standard deviation of individual innovativeness are ( $C = 66.82$ ) and ( $Sd = 7.56$ ). In Kilicer and Odabasi's (2010) study, the mean and standard deviation of individual innovativeness are ( $C = 66.86$ ) and ( $Sd = 8.94$ ). The mean score was 66.03 in the study authored by Yalcin and Yelken (2011). All three studies were conducted with student teachers and the results of each are remarkably similar. A different situation emerges, however, when student teachers are classified in terms of their individual innovativeness scores. As one third of the student teachers are cautious and deliberate when it comes to changes, they can be deemed to not have decided on their path. Half of the remaining student teachers are laggards and the late majority, and just one out of five is an innovator or early adopters. The distribution of innovativeness scores for laggards and the late majority differs from Baloglu and Karadag's study. The percentage of laggards in the present study is 6% lower and the percentage of the late majority is 6% higher than in Baloglu, and Karadag's study. The current study also differs from the studies of Hurt, Joseph, and Cook (1977) and Rogers (1995).

In terms of the relationship between individual innovativeness and student teachers' sense of efficacy, there is a poor, negative and significant relationship at the level of  $p = .01$  between resistance to change and the other subscales of behavioral management, motivation and guidance. There is a significantly positive relationship at the level of  $p = .01$  between the five subscales of the teachers' sense of efficacy scale and the behavioral management, motivation and guidance subscales of the individual innovativeness scale. In the innovativeness and self-efficacy relationship, the two correlated concepts are innovation and self-efficacy. In this relationship, self-efficacy enhancing innovation and self-efficacy transforming innovation have been discussed by Cakmakci (2008). In this relationship between innovativeness and self-efficacy, the resistance to change subscale correlates significantly with other subscales excluding the subscales of instructional skills and assessment/evaluation.

When the effect of individual innovativeness on students teachers' sense of efficacy is considered, the individual innovativeness levels correlate significantly with the motivation, instructional skills and guidance subscales of the sense of efficacy scale. For the behavior and assessment-evaluation subscales, there is not a significant relationship with individual innovativeness levels. According to these results, the self-efficacy beliefs of student teachers with a high individual innovativeness score are significant for early adopters, the early majority, the late majority and laggards in the motivation subscale. The innovators believe that they will motivate students better than the other groups. The same situation can be observed between early adopters and laggards in favor of



early adopters. Celik (2003, pp. 147-152) defines innovativeness as an important internal motivation tool. Student motivation in turn increases in encounters with new tools and ideas.

In the instructional skills subscale, the scores of innovators are significantly different from the scores of the early majority, late majority and laggards; the scores of early adopters from the scores of the late majority; and the scores of the early majority from the scores of the late majority. In the guidance subscale, the scores of innovators and early adopters differ significantly from the scores of the late majority and laggards. According to these results, having a high individual innovativeness score has a positive effect on self-efficacy beliefs in terms of motivating students, developing instructional skills and guiding students. In other words, the higher individual innovativeness score a student teachers has, the greater their sense of efficacy in terms of their motivating, guiding and instructing abilities.

Research related to self-efficacy has investigated the relationship between self-efficacy and variables such as gender, age, socio-economic status, and experience with gender being the most investigated of these. In this study, when considering the SL of the student teachers, a statistically significant difference could not be found between the individual innovativeness scores and self-efficacy scores of the student teachers. In other words, SL does not have an effect on the innovativeness and self-efficacy beliefs of the student teachers. Gender likewise does not correlate with the innovativeness and self-efficacy of the student teachers. In other words, being male or female is not a predictor of innovativeness or self-efficacy. A number of studies (Riggs, 1991; Cantrell, Young & Moore, 2003; Mulholland, Dorman & Odgers, 2004; Chan, 2004; Gencer & Cakiroglu, 2007; Rastegar & Memarpour, 2009; Pamuk & Peker, 2009; Gulden, Yaman, Deringol, Ozsari, 2011; Gungor & Yayli, 2012) corroborate the findings of this study in terms of the absence of a gender impact. There are, however, a few studies that contend that males or females have a higher sense of efficacy (Evans & Tribble, 1986; Kalaian & Freeman, 1994; Chester & Beaudin, 1996; Celep, 2000).

## CONCLUSION

Student teachers' sense of efficacy decreases when they resist change. Their sense of efficacy increases, on the other hand, when they are open-minded, take risks and seek to be opinion leaders. In this study, nearly half of the student teachers were found to be among the late majority or laggards, while only one out of five was an innovator or early adopter. One of three was deemed to be among the early majority.

Student teachers' sense of efficacy was evaluated in terms of their individual innovativeness. There was not a statistically significant result for the behavior and assessment/evaluation subscales. In other words, being innovator or a laggard did not affect the behaviors and assessment/evaluation understanding of student teachers. Their sense of efficacy was found to be statistically significant in terms of the motivation, instruction and guidance subscales. On these subscales, the self-efficacy beliefs of student teachers increase according to their innovativeness category. The self-efficacy scores of laggards are thus lower than the scores of innovators.

Socioeconomic level and gender did not have an effect on the student teachers' sense of efficacy and innovativeness. Thus, it did not matter from which socioeconomic level or gender the student teachers came from. Based on the results of this study, the innovativeness of student teachers must be reinforced. Student teachers could, for example, be encouraged to adopt more innovative techniques and applications from/for in-class activities.

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