

Individual Innovativeness Levels and Lifelong Learning Tendencies of Preservice Teachers in Pedagogical Formation Training Certificate Program¹

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ABSTRACT

In this study, individual innovativeness levels and lifelong learning tendencies of preservice teacher in pedagogical formation training certificate program were examined. The sample of the research was composed of a total of 331 preservice teachers (203 female, 128 male) undertaking a pedagogical formation training certificate program at the Faculty of Education of Muğla Sıtkı Koçman University, Turkey, during the spring semester of the 2015-2016 academic year. The "Individual Innovativeness Scale," which was developed by Hurt, Joseph, and Cook (1977) and adapted to Turkish by Kılıçer and Odabaşı (2010), and the "Lifelong Learning Tendency Scale" developed by Diker-Coşkun (2009) were used during the data collection process. Data was analyzed using comparison techniques and multiple linear regression analysis. According to the results, individual innovativeness levels of some preservice teachers are high, and some are low. The preservice teachers are in the questioning category of individual innovativeness. While a statistically significant difference was found between their individual innovativeness according to the preservice teachers' faculty, there was no significant difference according to gender. Lifelong learning tendencies are above the medium level, and significantly differ according to gender and faculty variables. Lifelong learning tendencies of preservice teachers predict 30% of their individual innovativeness levels.

Key Words: Individual innovativeness, Lifelong learning, Pedagogical formation training certificate program

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INTRODUCTION

In the 1800's, Kant mentioned that children should not be educated for the present, but for the possibly improved condition of man in the future (Kant, 2016). Today, the objective of education is to prepare individuals for the future. Identification of the skills defined as 21st century skills by many international institutions are considered essential for the future, and upskilling these to learners through integrating skills into the curricula is the priority. Some 21st century skills determined by organizations such as Partnership for 21st Century Skills (P21) and OECD are critical thinking and problem-solving skills, cultural awareness, individual innovativeness and lifelong learning. In this sense, it is expected that teachers and preservice teachers educating learners who are aimed to acquire these skills must also possess these skills in order to teach them. Identifying the level of two of these skills, individual innovativeness and lifelong learning tendencies, is therefore crucial.

The origin of the "lifelong learning" concept is based upon the studies of Dewey, Lindeman and Yeaxlee at the beginning of 20th century (Jarvis, 2004). Lifelong learning originated in the United Nations Educational, Scientific and Cultural Organization's (UNESCO) International Development Commission Report; also known as the Faure report (1973) and OECD reports it as "adult education" at the end of the 1960's (Friessen, & Anderson, 2004). In the Faure report (1973), it was defended that education is more primary than economic development, and besides, education ought to be both universal and lifelong. In the report, it was suggested that education is essential for mankind and the term "education" must be revised. The main theme of the report suggests that learning is based on four basic precipitations, which are understanding, practicing, growing and living together, and this idea was also repeated in the 1996 Delors Report (Jarvis, 2004). The main idea of UNESCO and OECD reports is developing strategies in order to provide learning opportunities to individuals during their lifetime (Jallade, & Mora, 2001; Friessen, & Anderson, 2004). In the report of UNESCO, it was mentioned that lifelong learning ought to be understood as the key word for developed and developing countries. Lifelong learning in the 21st century was reviewed and its meaning explained according to the new century's needs in the UNESCO report of 2001 (Friessen, & Anderson, 2004).

Lifelong learning is a process of realizing the individual, social, and professional improvements of those individuals in order to increase their quality of life (Dave, 1976). Lifelong learning is the offering of learning opportunities to learners related to the necessary domains that individuals need without tie and place restrictions and in various forms (Friessen, & Anderson, 2004). Lifelong learning can be considered as a guide used for the development of educational practices to support learning during their lifetime (Knapper, & Cropley, 1991 as cited in: Hart, 2006).

Lifelong learning is essential because of the acceleration in social, economic, and cultural shifts. Because of the fact that the social change was slower than human life, and did not require any changes in the conditions, individuals fit into the conditions easily. The fast shifting 21st century makes lifelong learning essential (Knapper, & Cropley, 1991 as cited in: Hart, 2006). Having lifelong learning skills provides modernization locally and globally and even enables us to design our future. Hart (2006) mentions some competencies within the context of lifelong learning skills such as self-management, communication, and activating innovation and change through human-duty management.

There are different definitions for the term “Innovation,” which is stated as one of the required competences. According to Smith (2003), innovation is a form of problem solving, which starts with the necessity for change and ends with practicing a thought successfully. Rogers (1995) defines innovation as things, ideas, or practices perceived as new by the population that the innovation is introduced. Besides, “innovation” means both the creative process and the product itself. At the same time, “innovation” can be defined as the process of cognitive state of the person adopting the innovation, and becoming a part of behavioral repertoire (Zaltman, Duncan, & Holbek, 1973; Goldsmith, & Foxall, 2003). In this process, carrying the activities of following innovations, experiencing and practicing collectively can be defined as the innovative character of the individual.

Innovativeness can be seen in two forms in the literature, individual and institutional. Individual innovativeness is defined as being willing to experience new things, take risks, and be open to experience in terms of character (Goldsmith, & Foxall, 2003). The essence of individual innovativeness is the uniqueness of the intellectual picture of the individual in nature. In other words, innovators’ interpretation of what is happening in the unique view, understanding and reality surrounding them is the key to scientifically understanding individual innovation (Shavinina, & Seeratan, 2003).

Rogers (1995) interprets individual innovativeness as individual’s adopting new ideas earlier than the individuals in society; or in other words, the individuals in the theory of the diffusion of innovations. While Rogers (1995), in his study conducted with farmers, was seeking to answer the question, “Why do some farmers adopt innovations immediately, and some not?” he developed the theory of diffusion of innovations. According to this theory, in a society, individuals show different approaches in adopting, applying or practicing an innovation. These approaches are innovators (venturesome), early adopters (respectable), interrogators, (early majority-deliberate), skeptics (late majority) and traditionalists (laggards-traditional). Innovators have the lowest percentage on the distribution curve, which is 2.5%. Innovators are those who have got a more global perspective and follow the innovations in different societies, and bring innovation to the society they live in and use it first. Early adopters are second on the distribution curve with 13.5%. Early adopters are the first group that experiences the innovations which innovators bring. Innovators are seen as more extreme than early adopters by society so other groups in the classification are more inclined to practice the innovations that early adopters experience. Early adopters are deemed respectable in society, and their ideas and practices are generally cared about. In other words, early adopters play the leading role in practicing and using innovations in society. In Rogers’ individual innovativeness classification, the early majority-deliberate category is considered as interrogators.

In the literature, questioning is one of the sub-terms composing the basis of critical thinking (Nosich, 2001; Alkın-Şahin, Tunca, Altınkurt, & Yılmaz, 2015). However, according to Rogers (1995), interrogators, who represent 34% on the distribution curve, are those who are deliberate in adopting innovations, and who experience a long questioning and decision period about the benefits of the innovations. Skeptics, who also represent 34% on the distribution curve, show skeptical and timid behaviors. They wait to see the innovation in use and want to be sure after they see the results. Lastly, traditionalists represent 16% on the distribution curve, and once they accept the innovation in their society, it is no longer considered new. Traditionalists are individuals who are attached to their traditions and habits,

and need help in the usage of innovations. Some examples can be given for Rogers' categories, such as the usage of smartboards in education, and EBA social education platform. Innovators are those who follow innovations of different societies and lead to adopt them into education; early adopters are those who adopt the developed innovation immediately and use it actively; interrogators are those who are timid at the beginning and experience indecision process; skeptics are those who keep away from innovations until they see how others use it and what its benefits are; and traditionalists are those who continue with their old habits and deny the innovation.

In the literature, there are various studies analyzing teachers' and preservice teachers' individual innovativeness levels with different variables such as techno-pedagogic educational competencies (Çuhadar, Bülbül, & Ilgaz, 2013; Argon, İsmetoğlu, & Çelik-Yılmaz, 2015), information skills (Bitkin, 2012), reflective thinking skills (Koçak, & Önen, 2012), and critical-thinking tendencies (Örün, Orhan, Dönmez, & Kurt, 2015). In addition, there have also been studies comparing individual innovativeness levels according to demographic variables (Mutlu-Bayraktar, 2012; Özgür, 2013; Akın-Kösterelioğlu, & Demir, 2014; Gür-Erdoğan, Ekşioğlu, Zafer-Güneş, & Sezen-Gültekin, 2014; Yılmaz-Öztürk, & Summak, 2014; Demir-Başaran, & Keleş, 2015; Korucu & Olpak, 2015; Yüksel, 2015; Demiralay, Bayır, & Gelibolu, 2016).

There have been studies analyzing the lifelong learning tendencies of teachers and preservice teachers (Demirel, & Yağcı, 2012; Diker-Coşkun, & Demirel, 2012; Evin-Gencil, 2013), as well as lifelong learning and individual innovativeness levels analyzed in the studies of Kılıç and Ayvaz-Tuncel (2015). In Rogers' (1995) classification of adopting innovations, knowing in which category the individual is can be seen as a sign of how they internalize lifelong learning. In this sense, it is expected that teachers appointed to prepare generations of the future in this fast-changing and developing world ought to be the pioneers who continue their learning adventures for life. Teachers need to educate students who are responsible for their own learning, and who are open to innovation and change. In this sense, identifying the lifelong learning and individual innovativeness characteristics of teacher competencies for 21st century preservice teachers in pedagogical formation training certificate programs, a means of teacher training, determining the weak points of the program and improving the program are considered ways to improve and contribute to further studies.

The purpose of this current study is to identify the individual innovativeness levels and lifelong learning tendencies of preservice teachers undertaking a pedagogical formation training certificate program. Answers to the following research questions are sought in accordance with this purpose:

1. How are the individual innovativeness levels of preservice teachers in the pedagogical formation training certificate program?
2. Do the individual innovativeness levels of preservice teachers in the pedagogical formation training certificate program show a statistically significant difference according to gender or faculty?
3. What is the level of lifelong learning tendencies of preservice teachers in the pedagogical formation training certificate program?
4. Do lifelong learning tendencies of preservice teachers in the pedagogical formation training certificate program show a statistically significant difference according to gender and faculty?

5. To what extent do lifelong learning tendencies of preservice teachers in the pedagogical formation training certificate program predict their individual innovativeness behaviors?

METHOD

Research Design

The survey model was used in this current study. According to Karasar (2016), the survey method aims to describe an existing situation without changing it.

Population and Sampling

The population of this research consists of 800 preservice teachers undertaking a pedagogical formation training certificate program at the faculty of Education of Muğla Sıtkı Koçman University during the 2015-2016 academic year. The ideal sample size was calculated as 260 for 95% reliability level according to the $n=t^2.p.q/d^2$ formula. In the sampling process, students of each faculty applying for the pedagogical formation training certificate program were taken as a cluster, and 371 students were randomly reached through disproportional cluster sampling. Scales invalidly completed were rejected and not evaluated, resulting in analyses of 331 usable scales. Demographic features related to the sampling can be seen in Table 1.

Table 1. *Demographic characteristics of the sampling group*

Variable	Groups	n	%
Gender	Female	203	61.3
	Male	128	38.7
Faculties	Science	84	25.4
	Arts	132	39.9
	Tourism	24	7.3
	Sports Sciences	76	23.0
	Health Sciences	15	4.5
<i>Total</i>		331	100.0

The sample for this research consists of a total of 331 preservice teachers (203 female, 61.3%, and 126 male, 38.7%) undertaking a pedagogical formation training certificate program. 84 of the participants are students of the science faculty (25.4%), 132 are from the faculty of arts (39.9%), 24 from tourism faculty (7.3%), 76 from sports sciences (23%), and 15 from the faculty of health sciences (4.5%).

Data Sampling Instruments

In this study, the “Individual Innovativeness Scale” and the “Lifelong learning Tendencies Scale” were used as data sampling instruments. The Individual Innovativeness Scale was developed by Hurt, Joseph, and Cook (1977), and adapted to Turkish by Kılıçer and Odabaşı (2010). The scale consists of 20 five-point, Likert type items rated between “1–strongly disagree” and “5–strongly agree”. There are 12 positive (1-3, 5, 8-9, 11-12, 14, 16, 18-19), and eight negative items (4, 6-7, 10, 13, 15, 17, 20). By means of the scale, innovativeness score is calculated by adding 42 points to the obtained score after subtracting the total score of negative

items from the total score of positive items. The minimum score possible is 14, and the maximum score possible is 94. According to the scores calculated by the scale, individuals can be categorized within the context of innovativeness. Scores of 81 or above are interpreted as “innovators”; scores of 69 to 80 are interpreted as “early adopter”; scores of 57 to 68 are interpreted as “interrogators”; scores of 46 to 56 are interpreted as “skeptics”; and if the score is 45 or below, this is interpreted as “traditionalists” accordingly. Valuations can be made about individuals’ innovativeness levels according to the score calculated by the scale. While individuals scoring above 68 are read as rather innovative, those who score below 64 are read as at the low level in innovativeness. In the scale adaptation study of Kılıçer and Odabaşı (2010), the scale was gathered under four dimensions in the factor analysis results. As a result of the literature review according to the scale factors and features of the items, the dimensions were named as “resistance to change” (items 4, 6-7, 10, 13, 15, 17, 20), “opinion-leading” (items 1, 8-9, 11-12), “openness to experience” (items 2-3, 5, 14, 18) and “risk-taking” (items 16, 19) respectively. Cronbach’s Alpha reliability coefficient is mentioned as .88, whereas in this current study it was calculated as .86. After the factor analysis, it was identified that four factors of the scale explained 56.48% of the total variance, and that the factor load values ranged from .42 to .85.

The “Lifelong learning Tendency Scale” was developed by Diker-Coşkun (2009). The scale is composed of 27 six-point, Likert type items scored between the intervals “1–strongly disagree” and “6–strongly agree.” While the dimensions “motivation in lifelong learning” (items 1-6) and “perseverance” (items 7-12) are composed of positive items; other dimensions “lack of regulating learning” (items 13-18) and “lack of curiosity” (items 19-27) are composed of negative items. The minimum score which can be taken in the general average of the scale (27x1) is 27, the mean score is (27x3.5) 94.5, and the maximum score is (27x6) 162. Cronbach’s Alpha reliability coefficient of the scale was identified as .89, whereas in this current study it was calculated as .90. As a result of the factor analysis, four factors of the scale explain 54.76% of the total variance, and it was identified that factor load values varied from .43 to .79.

Data Analysis

In this research, descriptive statistics were used in data analysis. T-test was performed with data in which the distribution was normal in two-category variables, and Mann-Whitney U test was used with data in which the distribution was not normal. Kruskal Wallis H test was performed because the distribution was not normal in three or more factor comparisons. In dual combinations of the groups, Mann-Whitney U test was used for significant U values. Skewness and kurtosis values were examined for testing the normality of data, and Levene statistics was used for testing the homogeneity of the dataset. Then, nonparametric tests were used because distribution of the Individual Innovativeness Scale was not normal in comparison to its dimensions and variables. Parametric tests were used because the Lifelong Learning Scale dimensions were distributed normally according to the gender variable (kurtosis coefficients between -.01 and +1.37, Skewness coefficients between -.24 and +1.26). Nonparametric tests were used because normality was not observed in the faculty variable. The distribution of data is accepted as normal when kurtosis and Skewness values are between +1.5 and -1.5 (Tabachnick, & Fidell, 2013). Significance value was taken as $p < .05$ in the analysis of the data.

In order to identify to what extent the lifelong learning tendencies of teachers predict individual innovativeness traits, multiple linear regression analysis was performed. Before the

regression analysis, the hypothesis of the analysis was tested. Firstly, Mahalanobis range values were calculated by taking extreme values and $p < .01$ significance level. After unsatisfactory values were deleted, the remaining 331 data were analyzed. The normality of distribution were tested with Skewness and kurtosis coefficients, and these coefficients were observed between +1 and -1 (Skewness coefficients are between .91 and .42, and kurtosis coefficients are between .74 and .33 for all variables), so the distribution was agreed to be normal. Another condition to be provided in a regression analysis is that there are no multiple connections defining the correlation between independent variables. Correlation coefficients of the variables, variance increase factor (VIF) analysis and unstandardized regression coefficients (B) were used in order to provide this condition. There were multiple connections because of the fact that dual correlation level between independent variables was above .90, VIF value was above 10 (Büyüköztürk, 2013), and the B value was above 2 (Çokluk, Şekercioğlu, & Büyüköztürk, 2014). In this study, the highest VIF value and B value were calculated 2.87 and .20, respectively. In regression analysis, multiple connection problems among predictor variables were not found.

FINDINGS

In this section, findings related to the individual innovativeness levels and lifelong learning tendencies of the preservice teachers in the pedagogical formation training certificate program are introduced in accordance with the five sub-problems of the research.

Findings Related to First Sub-Problem

Table 2 shows distribution of the preservice teachers who are in the pedagogical formation training certificate program according to their individual innovativeness levels and categories.

Table 2. *Individual innovativeness levels and categories of preservice teachers*

<i>Individual innovativeness levels and categories</i>		<i>f</i>	<i>%</i>
Level	High-Level Innovative	140	42.3
	Medium-Level Innovative	73	22.1
	Low-Level Innovative	118	35.6
Category	Innovators (Venturesome)	34	10.3
	Early Adopters (Respectable)	106	32.0
	Interrogators (Early Majority-Deliberate)	150	45.3
	Skeptics (Late Majority)	31	9.4
	Traditionalists (Laggards-Traditional)	10	3.0
Total		331	100.0

According to the Table 2, 42.3% of the preservice teachers are highly innovative, 22.1% of them are medium-level innovative, and 35.6% of them are low-level innovative. In addition, 10.3% of the students are innovators; 32% are early adopter; 45.3% are interrogators; 9.4% are skeptics; and 3% are traditionalists .

Findings Related to Second Sub-Problem

Analysis was performed by the Mann Whitney U test in order to identify the discrepancy of individual innovativeness levels of the preservice teachers attending the pedagogical formation training certificate program according to the gender variable. The analysis findings can be seen in Table 3.

Table 3. Mann Whitney U results of preservice teachers' individual innovativeness levels based on gender

<i>Dimensions</i>	<i>Gender</i>	<i>n</i>	<i>Mean Rank</i>	<i>Sum of Ranks</i>	<i>U</i>	<i>p</i>
Resistance to change	1. Female	203	159.43	32364.50	11658.5	.12
	2. Male	128	176.42	22581.50		
Opinion-leading	1. Female	203	171.10	34732.50	11957.5	.22
	2. Male	128	157.92	20213.50		
Openness to experience	1. Female	203	164.93	33481.50	12775.5	.79
	2. Male	128	167.69	21464.50		
Risk-taking	1. Female	203	157.09	31890.00	11184.0	.03*
	2. Male	128	180.13	23056.00		
Total	1. Female	203	162.73	33034.00	12328.0	.43
	2. Male	128	171.19	21912.00		

*p<.05

As can be seen in Table 3, individual innovativeness levels of the preservice teachers has no statistically significant difference according to variable of gender in the dimensions resistance to change [U=11658.5; p>.05], opinion-leading [U=11957.5; p>.05], openness to experience [U=12775.5; p>.05], or for the total scale [U=12328; p>.05]; whereas there is a statistically significant difference in the dimension of risk-taking [U=11184; p<.05]. The risk-taking level of male preservice teachers is higher than that of the female preservice teachers.

Kruskal Wallis H Test was performed in order to identify whether or not there is a differentiation of individual innovativeness levels of the preservice teachers attending the pedagogical formation training certificate program according to their faculty of study. Mann Whitney U test was performed in order to identify the direction of the differentiation. The analysis results are shown in Table 4.

According to Table 4, there is a statistically significant difference in the dimensions of resistance to change [$\chi^2=30.14$; p< .05], opinion-leading [$\chi^2=14.27$; p< .05], openness to experience [$\chi^2=9.31$; p< .05] and for the total scale [$\chi^2=30.62$; p< .05]. It is observed that preservice teachers from the faculty of sports sciences show a stronger resistance to change than preservice teachers from the faculties of science, arts, and tourism. Opinion-leading and openness to experiences levels of preservice teachers in the faculty of sports sciences are lower than the levels of preservice teachers in the faculties of both arts and tourism. When the innovativeness levels are examined, it can be seen that innovativeness levels of preservice teachers in the faculty of sports sciences are lower than the levels of preservice teachers in the faculties of science, arts, and tourism.

Table 4. *Kruskal Wallis H test results of preservice teachers' individual innovativeness levels based on faculty*

Dimensions	Faculty	n	Mean Rank	sd	X ²	p	Difference
Resistance to change	1. Sports Sciences	76	118.68	4	30.14	.00*	1-2
	2. Science	84	188.33				1-3
	3. Arts	132	175.35				1-4
	4. Tourism	24	205.38				
	5. Health Sciences	15	135.40				
Opinion-leading	1. Sports Sciences	76	148.51	4	14.27	.01*	1-3
	2. Science	84	144.33				1-4
	3. Arts	132	182.11				
	4. Tourism	24	201.60				
	5. Health Sciences	15	177.23				
Openness to experience	1. Sports Sciences	76	142.36	4	9.31	.05*	1-3
	2. Science	84	161.71				1-4
	3. Arts	132	179.47				
	4. Tourism	24	189.73				
	5. Health Sciences	15	153.30				
Risk-taking	1. Sports Sciences	76	151.82	4	4.89	.29	-
	2. Science	84	166.86				
	3. Arts	132	172.16				
	4. Tourism	24	189.67				
	5. Health Sciences	15	140.97				
Total	1. Sports Sciences	76	119.68	4	30.62	.00*	1-2
	2. Science	84	171.85				1-3
	3. Arts	132	182.62				1-4
	4. Tourism	24	218.38				
	5. Health Sciences	15	137.90				

*p<.05

Findings Related to Third Sub-Problem

Lifelong learning tendencies of the preservice teachers in the pedagogical formation training certificate program can be seen in Table 5.

Table 5. *Lifelong learning tendencies of preservice teachers*

Scale	Dimensions	n	\bar{x}	S
Lifelong Learning	Motivation	331	30.2	4.11
	Perseverance	331	26.9	4.89
	Lack of regulating learning	331	12.5	4.86
	Lack of curiosity	331	20.4	7.91
	Total	331	129.3	17.94

When Table 5 is examined, preservice teachers' average scores for lifelong learning tendency scale is (\bar{x} =129.3), which is above the medium point of the scale (94.5). When the sub-dimensions of the scale are examined, the dimensions motivation (\bar{x} = 30.2) and perseverance (\bar{x} = 26.9) are above the medium level, and the dimensions of lack of regulating learning (\bar{x} = 12.5) and lack of curiosity (\bar{x} = 20.4) are below the medium level.

Findings Related to Fourth Sub-Problem

The differentiation of lifelong learning tendencies of the preservice teachers attending the pedagogical formation training certificate program according to the variable of gender are presented in Table 6.

Table 6. *T-test results of preservice teachers' lifelong learning tendencies based on gender*

<i>Dimensions</i>	<i>Gender</i>	<i>n</i>	\bar{x}	<i>S</i>	<i>sd</i>	<i>t</i>	<i>p</i>
Motivation	1. Female	203	30.64	3.51	329	2.56	.01*
	2. Male	128	29.53	4.28			
Perseverance	1. Female	203	27.25	4.61	329	1.57	.11
	2. Male	128	26.40	5.02			
Lack of regulating learning	1. Female	203	12.10	4.61	329	1.87	.06
	2. Male	128	13.10	4.93			
Lack of curiosity	1. Female	203	19.23	7.37	329	3.52	.00*
	2. Male	128	22.18	7.48			
Total	1. Female	203	131.55	16.60	329	3.05	.00*
	2. Male	128	125.64	17.95			

* $p < .05$

As can be seen in Table 6, a statistically significant difference in lifelong learning tendencies of the preservice teachers according to the variable of gender is identified in the total scale dimension [$t_{(329)} = 3.05$; $p > .05$] and in the motivation dimension of the scale [$t_{(329)} = 2.56$; $p < .05$]. Lifelong learning tendencies and motivation levels of female preservice teachers are higher than the levels of male preservice teachers. There is a statistically significant difference in the dimension of lack of curiosity [$t_{(329)} = 3.52$; $p < .05$] in the scale. Then, the level of male's lack of curiosity is higher than the levels of the females. No statistically significant difference was identified in the dimensions of lack of regulating learning [$t_{(329)} = 1.87$; $p > .05$] or perseverance [$t_{(329)} = 1.57$; $p > .05$].

The differentiation of the lifelong learning tendencies of the preservice teachers attending the pedagogical formation training certificate program according to the variable of faculty is shown in Table 7.

According to Table 7, there is a statistically significant difference in the motivation dimension [$\chi^2 = 13.39$; $p < .05$]; lack of regulating learning dimension [$\chi^2 = 30.67$; $p < .05$]; lack of curiosity dimension [$\chi^2 = 41.16$; $p < .05$]; and in the total scale [$\chi^2 = 32.70$; $p < .05$]. It is seen that preservice teachers of sports sciences faculty are less motivated than preservice teachers of arts faculty. It was identified that preservice teachers of sports sciences faculty have more lack of regulating learning and curiosity than preservice teachers from the faculties of science, art, tourism and health sciences. When individual innovativeness levels are analyzed generally, it can be seen easily that lifelong learning tendencies of preservice teachers of sports sciences faculty are lower than the levels of the preservice teachers from the faculties of science, arts, tourism and health sciences.

Table 7. *Kruskal Wallis H test results of preservice teachers' lifelong learning tendencies based on faculty*

Dimensions	Faculty	n	Mean Rank	sd	X ²	p	Difference
Motivation	1. Sports Sciences	76	140.22	4	13.39	.00*	1-3
	2. Science	84	153.17				
	3. Arts	132	186.00				
	4. Tourism	24	173.81				
	5. Health Sciences	15	179.97				
Perseverance	1. Sports Sciences	76	147.77	4	8.38	.08	-
	2. Science	84	153.86				
	3. Arts	132	181.92				
	4. Tourism	24	180.60				
	5. Health Sciences	15	162.90				
Lack of regulating learning	1. Sports Sciences	76	218.53	4	30.67	.00*	1-2
	2. Science	84	143.88				1-3
	3. Arts	132	155.10				1-4
	4. Tourism.	24	146.60				1-5
	5. Health Sciences	15	150.67				
Lack of curiosity	1. Sports Sciences	76	223.94	4	41.16	.00*	1-2
	2. Science	84	163.88				1-3
	3. Arts	132	136.09				1-4
	4. Tourism	24	161.83				1-5
	5. Health Sciences	15	154.23				
Total	1. Sports Sciences	76	114.41	4	32.70	.00*	1-2
	2. Science	84	167.46				1-3
	3. Arts	132	190.61				1-4
	4. Tourism	24	180.40				1-5
	5. Health Sciences	15	179.63				

*p<.05

Findings Related to Fifth Sub-Problem

Multiple linear regression analysis was performed in order to identify to what extent the variables of motivation, perseverance, lack of regulating learning and lack of curiosity predict individual innovativeness levels in preservice teachers attending the pedagogical formation training certificate program in lifelong learning. Regression analysis results related to the prediction of individual innovativeness level are presented in Table 8.

Table 8. *Multiple linear regression analysis of predictions of individual innovativeness behaviors of preservice teachers*

Variable	B	Std. Error	β	t	p	Zero-order r	Partial r
Constant	2.95	.29		10.12	.000		
Motivation	.21	.06	.26	3.30	.001	.49	.18
Perseverance	.03	.05	.05	.70	.488	.41	.04
Lack of regulating learning	-.12	.04	-.18	2.95	.003	-.44	-.16
Lack of curiosity	-.10	.04	-.17	2.50	.013	-.46	-.14

R= .551, R²=.304, F₍₄₋₃₂₆₎ = 35.541, p= .00

When Table 8 is examined, it is concluded that motivation, perseverance, lack of regulating learning and lack of curiosity variables, which are sub-dimensions of the Lifelong

Learning Tendency Scale, explain 30% of the total variance of the predicted variable. According to the standardized regression coefficient (β), the relative order of importance of predicting variables on the individual innovativeness levels are motivation, lack of regulating learning, lack of curiosity and perseverance. When *t*-test results related to the significance of regression coefficients are analyzed, it is seen that motivation, lack of regulating learning and lack of curiosity are significant predictors on the individual innovativeness level. However, the perseverance variable does not have a significant effect. When dual and partial correlation coefficients are examined, it can be seen that there is a positive and medium-level correlation between students' individual innovativeness levels and motivation dimension ($r = .49$) of their lifelong learning tendencies. On the other hand, when the other variables are checked, it can be seen that there is a positive and low-level correlation between these two variables ($r = .18$). There is a negative and medium-level correlation between individual innovativeness levels and lack of regulating learning ($r = -.44$) and lack of curiosity ($r = -.46$). When the other variables are checked, there is a negative and a low-level correlation with lack of regulating learning ($r = -.16$) and lack of curiosity ($r = -.14$). According to the regression analysis results, regression equality related to the prediction of the individual innovativeness level is as follows:

$$\text{Individual Innovativeness Level} = 2.95 + 0.21 \text{ Motivation} + 0.03 \text{ Perseverance} \\ - 0.12 \text{ Lack of Regulating Learning} - 0.10 \text{ Lack of Curiosity}$$

RESULT AND DISCUSSION

In this research study, individual innovativeness levels and lifelong learning tendencies of preservice teachers attending a pedagogical formation training certificate program were analyzed. It was found that most of the preservice teachers are individually innovative at a high level, and a notable number of them are individually innovative at a low level. In other research (Köroğlu, 2014; Yılmaz Öztürk, & Summak, 2014; Argon et al., 2015; Demir-Başaran, & Keleş, 2015; Yüksel, 2015), teachers or preservice teachers were included in the sampling, and it was identified that their individual innovativeness were at the medium level. In the studies conducted by Demiralay et al. (2016) and Kılıç and Ayvaz-Tuncel (2015), it was observed that individual innovativeness of teachers or preservice teachers were at the low level. In order to understand the reasons why the individual innovativeness of most preservice teachers was low, the literature defines barriers to individual innovativeness as individual barriers, institutional barriers and social barriers. Individual barriers against individual innovativeness are considered as factors such as individual's belief and attitude towards innovation and change, education level, risk-taking tendency, and socioeconomic and sociocultural condition. Values, norms, policies, and family structure belonging to the society that the individual lives in constitute the social barriers (Kılıçer, 2011). While the technological developments in the industrial sector are rapid, the reflection of the technological improvements on education can be slow and late (Brewer, & Tierney, 2010; Armstrong, 2014). According to research conducted by Getz, Siegfried, and Anderson (1997), higher education institutions' adopting innovation take three times longer than industrial institutions. Stability of academic staff, lack of accreditation, and political factors can be regarded as institutional barriers (Schneckenberg, 2009; Brewer, & Tierney, 2010; Armstrong, 2014). The reason of low-level individual innovativeness of some of the preservice teachers can be as a result of one or more of these barriers.

When preservice teachers' individual innovativeness are analyzed according to the categories that Rogers (1995) mentioned in his diffusion of innovations model, it can be seen that the accumulation is mostly on the interrogation category, and secondly on the leader category. Rogers (1995) pointed out that individuals in the interrogation category act carefully towards innovations, and take a period of time in order to think about the pros and cons of that innovation. Then, it can be said that preservice teachers resist against innovation, and their adoption period is prolonged (Kılıç, & Ayvaz-Tuncel, 2015). When research in this area conducted with teachers or preservice teachers were analyzed, interrogation category is seen to take top place (Argon et al., 2015; Bitkin, 2012; Çuhadar et al., 2013; Demiralay et al., 2016; Demir-Başaran, & Keleş, 2015; Gür-Erdoğan et al., 2014; Kılıç, & Ayvaz-Tuncel, 2015; Kılıçer, 2011; Koçak, & Önen, 2012; Korucu, & Olpak, 2015; Köroğlu, 2014; Özgür, 2013; Yılmaz Öztürk, & Summak, 2014; Yüksel, 2015). In fact, according to Rogers's individual innovativeness category (1995), teachers or preschool teachers are expected to be in the leaders' category. The reason why individuals cannot be in the leader category might be that those who prefer to become teachers come from families who have mostly medium-level socioeconomic structure. Besides, in Oktuğ and Özden's (2013) study on individualism/collectivism and individual innovativeness, it is considered that individual aims remain in the background in societies in which the requests of the society are deemed primary.

Individual innovativeness levels of the preservice teachers in the pedagogical formation training certificate program significantly differ in favor of male preservice teachers according to the gender variable and the risk-taking dimension; whereas, in other dimensions no significant difference was identified. Parallel with this finding (Argon et al., 2015; Bitkin, 2012; Çuhadar et al., 2013; Demir-Başaran, & Keleş, 2015; Kılıç, & Ayvaz-Tuncel, 2015; Korucu, & Olpak, 2015; Özgür, 2013; Rogers, & Wallace, 2011), no statistically significant differentiation at the individual innovativeness levels of teachers/preservice teachers according to the gender variable was found in the literature. In Yüksel's study (2015) conducted with preservice teachers, individual innovativeness levels of male teacher candidates were found higher, according to the gender variable. This finding is inconsistent with the findings of the current study. Finding the risk-taking levels of male preservice teachers high in this study may be because of the different roles and responsibilities of males and females afforded by society within the context of social gender in Turkish society.

No significant difference was reported according to the faculty variable in either the individual innovativeness levels or the resistance to change dimension. This difference is between preservice teachers from the sports sciences faculty and the preservice teachers of the faculties of science, arts, and tourism. It is observed that preservice teachers of sports sciences are more resistant to change, and that their individual innovativeness levels are lower. Between the preservice teachers of the sports faculty and both the arts and tourism faculties, the significant difference in the dimensions of opinion leadership and being open to experience is in favor of preservice teachers of the faculties of art and tourism. The culture of the community that the individual lives in might affect the individual values and the approach of the institution towards innovations and the innovativeness level of the individual is closely related (Choi, 2004). Problems in forming a common organization culture within a short pedagogical formation training certificate program can result in differentiation in the individual innovativeness levels of preservice teachers.

It was identified that lifelong learning tendencies of preservice teachers are above the medium level. Similar results were also seen in the literature (e.g., Demirel, & Akkoyunlu, 2010; Evin-Gencil, 2013; Garipağaoğlu, 2013; Kılıç, & Ayvaz-Tuncel, 2015; Özgür, 2016; Pınarcık, Özözen-Danacı, Deniz, & Eran, 2016; Şahin, Akbaşlı, & Yanpar-Yelken, 2010).

Lifelong learning tendencies of preservice teachers differentiate significantly in favor of female preservice teachers according to the gender variable. Therefore, it can be understood that female preservice teachers are more motivated in lifelong learning than male preservice teachers, and that female preservice teachers' sense of wonder is higher and they are more determined than their male counterparts. This finding matches with other studies (e.g., Ayra, Kösterelioğlu, & Çelen, 2016; Demirel, & Akkoyunlu, 2010; Deveci, 2014; Diker-Coşkun, & Demirel, 2012; Evin-Gencil, 2013; İzci, & Koç, 2012; Kılıç, & Ayvaz-Tuncel, 2015; Özçiftçi, 2014; Özgür, 2016; Şahin et al., 2010). Jerkins (2004) conducted a research with females on lifelong learning and employment in which he mentioned that lifetime roles and responsibilities for females such as raising a family and therefore stopping and starting working changed. He also pointed out that the perceived necessity for females to prove themselves because of sociocultural factors such as not being preferred first, being employed with a lower salary to their male counterparts, and mobbing have an effect upon their lifelong learning tendencies. In Turkey, the position of females and their need to prove themselves might have supported them developing themselves in this respect.

It was identified that lifelong learning tendencies of preservice teachers differentiate according to the faculty variable. Then, in the motivation dimension of lifelong learning, there is a significant difference in favor of the preservice teachers of arts faculty. Preservice teachers of sports sciences differentiate in lack of planning learning, lack of curiosity and in general scale in comparison to preservice teachers of other faculties. In other words, it was observed that preservice teachers of the sports sciences faculty are less successful, and are less curious and therefore show less lifelong learning tendency. Shouping, Scheuch, and Gayles (2009) mention that even if the students have the skills related to the domain they are educated, their basic research and learning skills are inadequate. They also mention that curricula must be re-planned in a form including multi-disciplinary creative activities.

It was concluded that motivation, constancy, lack of regulating learning and lack of curiosity variables, which are the sub-dimensions of lifelong learning tendency scale, explained 30% of the total variance in the predicted variable. The relative order of importance of predicting variables on preservice teachers' individual innovativeness levels is motivation, lack of planning learning, lack of curiosity, and constancy. It can be seen that in the *t*-test results related to the significance of regression coefficients, motivation is a significant positive predictor of individual innovativeness level, but that lack of regulating learning and lack of curiosity is a significant negative predictor of individual innovativeness level. Individual innovativeness and lifelong learning tendencies of the teachers were also analyzed in the study of Kılıç and Ayvaz-Tuncel (2015). The characteristics of "adopting innovations and changes" and "creative thinking" which are in innovation, take place in lifelong learning features. The reason for the significant difference between individual innovativeness and lifelong learning tendencies in terms of sub-skills can be resulted from this situation.

In this current research, individual innovativeness of preservice teachers were identified to be in the interrogation category, and lifelong learning tendencies of the preservice teachers were identified to be above the medium level and in favor of the female preservice

teachers. These findings and their reasons can be analyzed further through qualitative research methods. In such future research, learning environments supported by technology could be created in pedagogical formation training certificate programs in order that preservice teachers are open to the innovations seen in education. In such research, preservice teachers of pedagogical formation training certificate programs would be the research participants, and results could be compared using different samples and different variables.

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