Investigation of the Relationship between Individual Innovation Profiles of Special Education Teacher Candidates and Their Tendency towards the Use of Technology in Class[1]

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Abstract

The purpose of this research is to examine the relationship between the individual innovativeness profiles of special education teacher candidates and their tendencies towards technology use in the lesson. The study group of the research designed in the survey model consists of 194 special education teacher candidates. Research data were obtained with "Personal Information Form", "Individual Innovativeness Scale", and "Scale of Tendency towards the Use of Technology in Class". Descriptive statistics, t-test, one-way analysis of variance, and Pearson correlation analysis were used to analyze the data. The research will contribute to the literature by revealing the relationship between the individual innovativeness profiles of special education teacher candidates and their tendencies towards the use of technology in the course, and the findings will be guiding for relevant individuals and institutions in terms of both research to be made in the field of innovation and professional development of special education teachers in terms of their professional development is considered.

Keywords: (individual innovation, special education, technology integration)

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Introduction

Large human societies, too much movement, dynamism, rapid change, scientific and advanced technology are the qualities that represent the age we live in. Developing and changing information technologies have reshaped individuals' perceptions of themselves and their environment and have made it inevitable that change and development take place at the same pace in the field of education. It is not possible to keep the rapidly increasing student population within the boundaries of the traditional education system, and education and technology emerge as the main elements with significant power in the process of making human life more effective (Alkan, 2005). While the knowledge economy surrounding the 21st century necessitates innovative and qualified manpower, integrating rapidly occurring technological developments with education requires having an innovative vision. While education and innovation affect each other mutually, education contributes to the development of innovation, and innovation increases the quality of education (Kılıçer, 2011). Innovation is one of the most important factors in the progress of the society and the increase of the welfare level, and the adaptation of individuals to the technology age and the ability to improve themselves necessitate and innovative education approach. In this context, creating innovative and qualified manpower becomes the main duty of the education system (İlhan-Fındıkoğlu, 2019).

With the transition from the industrial society to the information society, the industrial economy based on production has left its place to the service economy based on knowledge, creativity, and innovation. While expectations from individuals change with this transformation process and the increasing importance of 21st century skills, innovation is seen as the basis of development in our age (Korucu & Olpak, 2015). Innovativeness refers to the degree to which individuals or institutions who are at the centre of innovations and their state of accepting it are defined as individual innovativeness, and individuals are considered in five different categories in terms of their characteristics: innovators, pioneers, questioners, sceptics, and traditionalists (Rogers, 2003). Depending on the needs of individuals and societies for change, educational institutions should offer opportunities to respond to these needs. With the technological developments being an inseparable part of educational activities, the role of teachers, who are the shapers of the system, has also changed, and accessing different information, having an innovative understanding, adopting, and applying new approaches in education have become extremely important. The development of teachers' individual innovativeness is the basis for all these to happen. Çuhadar, Bülbül, and Ilgaz (2013) emphasized that there is a need to train innovative teachers and pre-service teachers when technology applications in education are considered, and that teachers and pre-service teachers should be individuals who lead the society with their innovative perspectives. Individual innovativeness emerges as a concept that is examined in the context of individuals and the differences in their reactions to trying innovations. Possession of the characteristics necessary to be innovative appears as

one of the most important factors affecting teachers' adoption of technology and its use in an educational context (Özbek, 2014). In the existing research, it is stated that individuals having the characteristics required by innovativeness have a more positive attitude towards the acceptance and use of current technologies (Akgün, 2017; Kim & Chai, 2017). The increasing importance of innovativeness and changing social structures have made innovativeness a subject that needs to be studied and emphasized in terms of education.

Individual innovativeness is closely related to the application of new developments and ideas in education, and it is thought that teachers having the characteristics required by innovativeness will be more willing to use educational technologies. Therefore, one of the most important features of innovative teachers is to integrate information and communication technologies into educational environments and to use them correctly (Kocasaraç & Karataş, 2018). The fact that technology has experienced new transformations, both in terms of support and education, also offers great opportunities for the field of special education. As in the education of all individuals, individuals with special needs also have the basic rights that their peers have, and technology can be used effectively in the process of arranging learning environments to address the individual needs of these learners. Technology has an important role in the process of increasing the learning capacity and independence of individuals with special needs and facilitating their communication (Hammond, Whatley, Ayres, & Gast, 2010; Sula & Spaho, 2014; Zisimopoulos, Sigafoos, & Koutromonos, 2011). Teachers should be able to use these technologies effectively in the education of individuals with different characteristics, skills, and special needs by following technological developments closely. In this context, technologies that can be employed affect the ability of learners with special needs to learn many skills, as well as their self-confidence, quality of life and ability to live as independent individuals. Effective use of technology in special education teachers and when the relevant literature is reviewed, it is seen that the number of studies on technology acceptance and use and related innovations is limited (Alhossein & Aldawood, 2017; Aslan, 2018; Deniz & Demirkıran, 2006; Kışla, 2008; Kutlu, Schreglmann, & Cinisli, 2017; Ogirima, Emilia, & Juliana, 2017; Sakallı, Demirok, Haksız, & Nuri, 2019; Sola-Özgüç & Cavkaytar, 2014). No study has been found investigating the attitudes of pre-service special education teachers towards the use of technology in class and their individual innovativeness characteristics together. Thus, the current study aimed to examine the relationship between the individual innovativeness profiles of pre-service special education teachers and their tendency towards the use of technology in class. To this end, answers to the following research questions are sought:

1. What is the distribution of the individual innovativeness profiles of pre-service special education teachers?

2. Do the individual innovativeness profiles of pre-service special education teachers vary significantly depending on their

    2.1. gender

    2.2. level of technology use

    2.3. self-efficacy perception of individual innovativeness?

3. What is pre-service special education teachers' level of tendency towards the use of technology in education?

4. Does pre-service special education teachers' level of tendency towards the use of technology vary significantly depending on their

    4.1. gender

    4.2. level of technology use

    4.3. self-efficacy perception of individual innovativeness?

5. Is there a significant correlation between pre-service special education teachers' individual innovativeness profiles and tendency towards the use of technology in class?

Method

Research Model

The current study, which aimed to determine the relationship between the individual innovativeness profiles of pre-service special education teachers and their tendency towards the use of technology in class, was carried out in compliance with the relational survey model. The purpose of survey research, which is carried out on relatively larger samples, is to describe the current state of the subject or event being studied (Fraenkel & Wallen, 2006). The relational survey model on the other hand is used to reveal the relationship between two or more variables (Büyüköztürk et al., 2013).

Study Group

In the selection of the participants of the study, the convenience sampling method was used and in this way a total of 194 pre-service special education teachers accepting to participate on a volunteer basis constituted the study group. The demographic features of the study group are presented in Table 1.

Table 1. Demographic features of the participants

Variable		*f*	%
Gender	Female	140	72.2
	Male	54	27.8
Total		194	100.0

Data Collection Tools

Personal Information Form

With the prepared personal information form, information was obtained about the participants' gender, level of technology use, and self-efficacy perception of individual innovativeness.

Individual Innovativeness Scale

To determine the individual innovativeness profiles of the participants, the "Individual Innovativeness Scale" developed by Hurt, Joseph, and Cook (1977) and adapted into Turkish by Kılıçer and Odabaşı (2010) was used. The five-point likert-type scale consists of four dimensions and 20 items. The Cronbach alpha internal consistency coefficient of scale was reported as .82.

Scale of Tendency towards the Use of Technology in Class

To determine the tendency of the participants towards the use of technology in class, the "Scale of Tendency towards the Use of Technology in Class" developed by Günüç and Kuzu (2014) was used. The five-point likert-type scale consists of two dimensions and 16 items. The cronbach alpha internal consistency coefficient of the scale was reported as .95.

Data Analysis and Interpretation

The data collected in the current study were analysed using the SPSS program, and the assumption of normal distribution was checked for each of the variables. For this purpose, skewness and kurtosis coefficient were examined. If the skewness and kurtosis coefficients are between -1 and +1, it can be interpreted that the scores do not show a significant deviation from the normal distribution (George & Mallery, 2010). In this context, it is possible to say that all the variables used in the study are within the recommended ranges and show a normal distribution. Since the assumption of normal distribution was satisfied, two parametric tests; independent samples t-test and one-way analysis of variance, were used in data analysis. On the other hand, Pearson correlation analysis was used to determine the relationships between the variables (individual innovativeness profile, tendency towards the use of technology in class).

To determine the status of the participants according to their answers to the scale items, descriptive statistics were examined by calculating the mean scores and standard deviation values. To determine the reliability of the data collection tools used in the study, the cronbach alpha value was calculated and it was found to be .74 for the "Individual Innovativeness Scale" and .94 for the "Scale of Tendency towards the Use of Technology in Class". A Cronbach alpha value of .70 and above is an indicator of reliability for the measurement tool (Büyüköztürk et al., 2013).

Results

Pre-service Special Education Teachers' Individual Innovativeness Profiles

Individual innovativeness profiles of the pre-service special education teachers were determined based on the mean scores taken from the sub-dimensions of resistance to change, opinion leadership, openness to experience and risk-taking and the whole measurement tool. The descriptive findings regarding the individual innovativeness profiles of the participants are given in Table 2.

Table 2. Descriptive findings regarding the participants' individual innovativeness profiles

Sub-dimensions	N	$\overline{x}$	Sd
Resistance to Change	194	3.38	.51
Opinion Leadership	194	3.82	.81
Openness to Experience	194	4.25	.59
Risk-taking	194	3.62	.99
Whole Scale	194	3.71	1.26

Correlation between the Pre-service Special Education Teachers' Individual Innovativeness and Gender

To determine whether the individual innovativeness profiles of the pre-service special education teachers vary significantly depending on gender, independent samples t-test was used. The results obtained from this analysis are presented in Table 3.

Table 3. Results of the independent samples t-test conducted to determine whether individual innovativeness profiles vary significantly depending on gender

Group	N	$\overline{x}$	Sd	df	t	p
Female	140	3.43	.53	192	1.832	.043
Male	54	3.28	.44			

As can be seen in Table 3, the participants' individual innovativeness profiles vary significantly depending on gender ($t_{(192)}$=1.832, p<.05). In this regard, the individual innovativeness profile of the female participants ($\overline{x}$=3.43) is higher than that of the male participants ($\overline{x}$=3.28).

Correlation between the Pre-service Special Education Teachers' Individual Innovativeness and Level of Using Technology

To determine whether the individual innovativeness profiles of the pre-service special education teachers vary significantly depending on their level of using technology, one-way variance analysis was used. The results obtained from this analysis are presented in Table 4.

Table 4. Results of ANOVA conducted to determine whether individual innovativeness profiles vary significantly depending on level of using technology

Source of the Variance	Sum of Squares	df	Mean Square	F	p
Between Groups	2.096	2	1.048	4.151	.017
Within Groups	48.217	191	48.217		
Total	50.313	193			

As can be seen in Table 4, the participants' individual innovativeness profiles vary significantly depending on their level of using technology and this difference is in favor of the participants having the adequate level of technology use ($F_{(2, 191)}$=4.151, p<.05).

Correlation between the Pre-service Special Education Teachers' Individual Innovativeness and Self-efficacy Perceptions of Individual Innovativeness

To determine whether the individual innovativeness profiles of the pre-service special education teachers vary significantly depending on their self-efficacy perception of individual innovativeness, independent samples t-test was used. The results obtained from this analysis are presented in Table 5.

Table 5. Results of the independent samples t-test conducted to determine whether individual innovativeness profiles vary significantly depending on self-efficacy perception of individual innovativeness

Group	N	x̄	Sd	df	t	p
Traditional	27	3.44	.55	192	.628	.769*
Innovative	167	3.38	.51			

*p> .05

As can be seen in Table 5, the participants' individual innovativeness profiles do not vary significantly depending on their self-efficacy perception of individual innovativeness ($t_{(192)}$= .628, p>.05).

Pre-service Special Education Teachers' Tendency towards the Use of Technology in Class

Based on the mean scores taken by the pre-service special education teachers from the sub-dimensions of affective and behavioural tendencies and the whole scale, the pre-service special education teachers' tendency towards the use of technology in class was determined. The descriptive findings regarding the tendency of the participants towards the use of technology in class are given in Table 6.

Table 6. Descriptive findings regarding the tendency of the participants towards the use of technology in class

Sub-dimensions	N	x̄	Sd
Affective Tendency	194	3.96	.79
Innovative	194	3.50	1.21
Whole Scale	194	3.82	.87

Correlation between the Pre-service Special Education Teachers' Tendency towards the Use of Technology in Class and Gender

Independent samples t-test was used to determine whether the pre-service special education teachers' tendency towards the use of technology in class varies significantly depending on gender. Findings obtained from the analysis are presented in Table 7.

Table 7. Results of the independent samples t-test conducted to determine whether the pre-service special education teachers' tendency towards the use of technology in class varies significantly depending on gender

Group	N	$\overline{x}$	Sd	df	t	p
Female	140	3.86	.91	192	1.147	
Male	54	3.70	.76			.094*

*$p > .05$

As can be seen in Table 7, the pre-service special education teachers' tendency towards the use of technology in class does not vary significantly depending on gender ($t_{(192)}=1.147$, $p>.05$).

Correlation between the Pre-service Special Education Teachers' Tendency towards the Use of Technology in Class and Level of Using Technology

One-way variance of analysis was used to determine whether the pre-service special education teachers' tendency towards the use of technology in class varies significantly depending on their level of using technology. Findings obtained from the analysis are presented in Table 8.

Table 8. Results of ANOVA conducted to determine whether the pre-service special education teachers' tendency the use of technology in class varies significantly depending on their level of using technology

Source of the Variance	Sum of Squares	df	Mean Square	F	p
Between Groups	10.662	2	5.331	7.561	.001
Within Groups	134.663	191	.705		
Total	145.325	193			

As can be seen in Table 8, the participants' tendency towards the use of technology varies significantly depending on their level of using technology and this difference is in favour of the participants having the adequate level of technology use ($F_{(2, 191)}=7.561$, $p<.05$).

Correlation between the Pre-service Special Education Teachers' Tendency towards the Use of Technology in Class and Self-efficacy Perception of Individual Innovativeness

To determine whether the pre-service special education teachers' tendency towards the use of technology in class varies significantly depending on their self-efficacy perception of individual innovativeness, independent samples t-test was used. The results obtained from this analysis are presented in Table 9.

Table 9. Results of the independent samples t-test conducted to determine whether the pre-service special education teachers' tendency towards the use of technology in class varies significantly depending on self-efficacy perception of individual innovativeness

Group	N	x̄	Sd	df	t	p
Traditional	27	3.36	.83	192	-2.998	.366*
Innovative	167	3.89	.85			

*p> .05

As can be seen in Table 9, the participants' tendency towards the use of technology in class does vary significantly depending on their self-efficacy perception of individual innovativeness ($t_{(192)}$= -2.998, p>.05).

Findings Related to the Relationship between the Pre-service Special Education Teachers' Individual Innovativeness Profiles and Tendency towards the Use of Technology in Class

Pearson correlation analysis was conducted to determine the relationship between the individual innovativeness profiles of the pre-service special education teachers and their tendency towards the use of technology in class. The obtained findings are presented in Table 10.

Table 10. Results of the Pearson correlation analysis conducted to determine the relationship between the individual innovativeness profiles of the pre-service special education teachers and their tendency towards the use of technology in class

	Individual Innovativeness Profile	Tendency towards of the Use of Technology in Class
Individual Innovativeness Profile	-	.227**

***Correlation is significant at the level of .01*

As can be seen in Table 10, there is a positive and significant correlation between the individual innovativeness profiles of the pre-service special education teachers and their tendency towards the use of technology in class (r=.227; p<.01). While interpreting the r values, Cohen (1988) states that values between .10 and .29 are low, values between .30 and .49 are medium, and values between .50 and 1.0 are high correlation values. In this context, it can be said that there is a low correlation between the individual innovativeness profiles of the pre-service special education teachers and their tendency towards the use of technology in class.

Discussion, Conclusion, and Recommendations

The current study was conducted on 194 volunteer pre-service special education teachers to determine their individual innovativeness profiles and their tendency towards the use of technology in class and to examine their relationship both with each other and with different variables (gender, level of using technology, self-efficacy perception of individual innovativeness).

In this connection, first, the individual innovativeness profiles of the pre-service special education teachers were examined, and it was concluded that the individual innovativeness levels of

the participants were high and the sub-dimensions of openness to experience and opinion leadership came to the fore. Parallel to this finding of the current study, Atlı (2019), investigated the relationship between individual innovativeness characteristics of primary teachers and their tendency towards the use of technology in class in terms of different variables and concluded that the individual innovativeness levels of the participants were high. Similarly, there are studies conducted with the participation of teachers and pre-service teachers in the literature, revealing a high level of individual innovativeness (Bahceci, 2019; Yıldırım, 2021). On the other hand, there are also studies that reveal a medium and low level of individual innovativeness (Kılıç, 2015; Şahin, 2016). When it was examined whether the innovativeness profiles of the pre-service special education teachers vary significantly depending on the variables of gender, level of using technology and self-efficacy perception of individual innovativeness, a significant difference was obtained in favour of the female participants and participants with an adequate level of technology use, while no statistically significant difference was found in terms of self-efficacy perception. When the literature is examined in this context, it is seen that there are different opinions. According to the findings of the study conducted by Korucu and Olpak (2015) to investigate different variables that affect the individual innovativeness levels of pre-service information technology teachers, "gender" was found to be a factor not affecting the individual innovativeness level. Similarly, there are studies showing that there is no significant difference between individual innovativeness and gender (Atlı, 2019; Başaran & Keleş, 2015; Demir-Başaran & Keleş, 2015; Kılıç & Ayvaz-Tuncel, 2014; Özgür, 2013; Yavuz-Konokman, Yokuş, & Yanpar-Yelken, 2016).

Another variable addressed in the current study is the tendency towards the use of technology, and it was concluded that the pre-service special education teachers have a high tendency towards the use of technology in class. In this context, when the relevant literature is reviewed, it is seen that the findings obtained in many studies support this result of the current study (Atlı, 2019; Bahceci, 2019; Güneş & Buluç, 2017; Yılmaz, Üredi, & Akbaşlı, 2015). When it was examined whether the pre-service special education teachers' tendency towards the use of technology varies significantly depending on the variables of gender, level of using technology and self-efficacy perception of individual innovativeness, a significant difference was obtained in favour of the participants having an adequate level of technology use, while no statistically significant difference was found in terms of gender and self-efficacy perception. However, when the literature is examined, it is seen that there are also studies emphasizing the significant relationship between self-efficacy perception and attitude towards using technology (Köroğlu, 2014).

In the current study, which was conducted to determine the relationship between individual innovativeness and the tendency towards the use of technology in class, it was concluded that there was a positive low-level significant relationship between individual innovativeness and the tendency

towards the use of technology in class. In a study confirming these results, Bahceci (2019) examined the attitudes of teachers working in the field of special education towards assistive technologies and their individual innovativeness levels and concluded that there is a moderately significant positive relationship between individual innovativeness and attitudes towards assistive technologies. Teachers with innovative characteristics are more willing to use educational technologies (Kim & Chai, 2017; Kocasaraç & Karataş, 2018). Similarly, there are studies in the literature that show that teachers and pre-service teachers with high levels of individual innovativeness have a more positive tendency towards the use of technology in class (Akgün, 2017; Atlı, 2019; Kartal, 2018; Örün, Orhan, Dönmez, & Kurt, 2015; Solmaz, 2019; Şahin, 2016; Yılmaz & Bayraktar, 2014).

As a result, the importance of technology integration into education in the process of increasing the quality of educational activities and training individuals with high technology self-efficacy is apparent. In this process, teachers play a key role as the direct implementers of the developing and changing technologies. The effective use of information and communication technologies in the classroom is directly related to teachers' positive attitudes towards these technologies. Innovative teachers are more willing to use educational technologies. In future studies, a holistic view of individual innovativeness profiles can be put forward by collecting data from larger participant groups through multivariate statistical methods. In this context, it may be possible to conduct more in-depth studies through qualitative studies to be carried out. It is thought that new studies to be conducted based on individual innovativeness profile and various variables such as grade level, 21st century skills such as problem-solving skills and creativity and lifelong learning which may have an impact on the tendency towards the use of technology in class, will also contribute to the literature.

Policy Implications

Developing and changing information technologies have reshaped individuals' perceptions of themselves and their environment and have made it inevitable that change and development take place at the same pace in the field of education. It is not possible to keep the rapidly increasing student population within the boundaries of the traditional education system, and education and technology emerge as the main elements with significant power in the process of making human life more effective (Alkan, 2005). Innovation is one of the most important factors in the progress of the society and the increase of the welfare level, and the adaptation of individuals to the technology age and the ability to improve themselves necessitate and innovative education approach. In this context, creating innovative and qualified manpower becomes the main duty of the education system (İlhan-Fındıkoğlu, 2019). With the technological developments being an inseparable part of educational acitivities, the role of teachers, who are the shapers of the system, has also changed, and accessing different information, having an innovative understanding, adopting and applying new approaches in

education has become extremely important. The importance of innovation and changing social structures have made innovation a subject that needs to be studied and emphasized in terms of educational policies.

Conflict of Interest

There is no conflict of interest between the authors of the article.

Credit Author Statement

Author 1: Conceptualization, Investigation, Project Administration, Writing

Author 2: Data Curation, Formal Analysis, Methodology, Project Administration, Writing

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