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Abstract

The purpose of the study is to determine the relationships between teachers' ICT acceptance levels, ICT attitudes and individual innovation levels and to investigate their opinions. Mixed method research study including qualitative and quantitative data collection and analysis techniques is used. In this study, an interview form was used to get the opinions of the teachers with the help of Teachers ICT Attitudes Scale (TICTAS) developed by Aydın and Semerci (2017), Teacher Candidates IT Acceptance Scale developed by Baydaş (2015) and Individual Innovation Scale adapted to Turkish by Kılıçer and Odabaşı (2010). 201 special education teachers (35.8% male and 64.2% female) participated in the study. In line with the findings obtained in the study, there is no difference in the attitudes of gender, age, professional seniority and branch variables towards special education teachers' information and communication technologies. Moreover, there is positive relationship was found between ICT attitudes and IT acceptance levels. In addition, teachers expressed their opinions on the fact that information and communication technologies extend the special education students' attention span. Therefore, it is thought that the relationships between teachers 'ICT attitudes, ICT acceptance levels, and innovation levels affect the attention and focus times of special education students and will have a greater impact on students' academic success. On the other hand, it is suggested to carry out more comprehensive studies such as this study to improve the ICT attitudes, ICT acceptance and innovation levels of special education teachers. In addition, it is thought that providing in-service courses that are structured and better equipped to improve the ICT attitudes, ICT acceptance levels and innovation levels of special education teachers will be more effective for the special education field.

Introduction

The need of the current technologies being integrated into the education is increasing day by day (Bacanak et al., 2003; Burch & Mohammed, 2019; Daher et.al., 2018; Koumachi, 2019; Marpa, 2021; Şahin & Arslan Namlı, 2019). In the education, process technology is getting more and more importance and takes its place

(Karasar, 2004; Sisman & Kucuk, 2019). According to Karasar (2004) with the rapid advancement of technology, the learning environment has changed and developed too with the use of changing and developing technologies in the educational process. Especially in the 21st century, again with the development of technology, digital learning environments started to be preferred more at education and learning experiences gradually increased (Karademir Coşkun & Alper, 2019; Ozkale & Koc, 2020; Serhan & Almeqdadi, 2020; Wallace-Spurgin, 2020). Digital technology tools, which are developing to reach, create and share the right information, are gradually increasing and educational environments are getting richer. These tools that develop and enrich the digital learning environments are expressed as information and communication technologies (Eryılmaz, 2018; Işık & Kaya, 2012; Karadayı-Taşkıran et al., 2015; Karasar, 2004; Özel, 2016). Information and communication technologies are used in many areas such as sports, health, art, engineering, tourism, and unions (Benli, 2011; İçten & Bal, 2017; Ünüvar, 2014; Yücel & Devecioğlu, 2012). One of these areas is education (Susanto et.al., 2021; Tucker et.al., 2017). There are many digital media and tools used in education as information and communication technologies. Some of the most current of these are interactive devices, web 2.0 tools, virtual reality, augmented reality technologies.

With the help of developing technology, interactive devices can be used in various area in our daily life. According to Özkale and Koç (2014) tablet computers and smartphones are smaller in size and lighter than other devices. They stated that these devices which have its own keyboard and touchscreen instead of mouse are providing opportunities to users such as watch video, listen to music, search information, and share it on the internet. Current technologies such as augmented reality and virtual reality can also be used with interactive devices.

There are many studies in the literature both in the field of education and in all other fields about technological materials developed with virtual reality and augmented reality that have become popular recently (Çevik et al., 2017; Di Serio et al., 2013; Erdem & Sarı, 2018; Pérez-López & Contero, 2013; Sungur & Bülbül, 2019). In the study of Sungur and Bülbül (2019) stated that classroom teachers think that virtual museum applications containing rich and visual contents are an interesting learning environment for primary school students. According to this study, classroom teachers' opinions about application were taken and they stated that teachers do not have virtual reality experience in their undergraduate studies.

In addition, teachers stated that this application is beneficial for students and it was suggested that the lessons taught in the classroom teaching program should be supported with virtual environments. In the study conducted by Pérez-López and Contero (2013) the subject of 4th grade digestive and circulatory systems was discussed, and the subject was explained with AR applications. They used 3D models on anatomical structures and combined them with animations. Beside that it has been examined whether the information provides permanence thanks to the application of AR. As a result of this study, they determined that students were able to make the information they learned permanent, and their motivation and interest increased.

As summarized above, when the literature is examined, it is seen that many similar studies have been carried out in education. It is stated that the augmented reality and virtual reality studies that have become popular recently

have many positive effects and advantages (Durak & Karaoğlan Yılmaz, 2019; Tımur & Özdemir, 2018). When looking at the overall of such current technologies, opinions were expressed that it is easy for prospective teachers in terms of usability and the studies conducted were remarkable and memorable (Özçakır & Aydın, 2019). It was stated that the use of such technologies in education provides interacts in the classroom, collaborative work, increases the competitive environment, and increases the fun and motivation of the works (Karadayı-Taşkıran et al., 2015; Özçakır & Aydın, 2019).

While materials designed by technology are seen to be more especially in English and Science, studies in the field of special education are less than in other fields. Experimental research on this subject is very difficult due to the conditions. Özdemir et al. (2019) stated that virtual reality and augmented reality technologies are used to gain different skills for autism spectrum disorder, mental disability, learning disability and physical disability persons. However, it is seen in the literature that studies based on special education teachers are few.

It has been stated that studies should be carried out for assistive technology tools such as augmented reality or virtual reality suitable for the needs of teachers and students (Özdemir et al., 2019). In the study on the use of assistive technologies in special education, it has been stated that special education teachers about the use of assistive Technologies have lack of knowledge and need technical support in the use of technological tools (Kutlu et al., 2018). In this regard, technology acceptance is a prerequisite for special education teachers to use technology and to integrate technology into education. The acceptance of technology by teachers is also crucial for their success in education (Şahin & Arslan Namlı, 2019). Besides that, teachers' attitudes towards the use of technology in their lessons provided them many advantages. For example, in the study conducted by Cüre and Özdener (2008) it is stated that teachers' attitudes towards ICT positively affect their success in ICT application. In another statement, Cüre and Özdener (2008) emphasized that ICT increases the success of students and teachers, and it is necessary to provide interesting and effective teaching. Therefore, increasing the attitudes of teachers towards the use of ICT will also increase the quality of the learning environment. On the other hand, it has been observed that the individual innovators of teachers effect their personal creativity, their initiative, and their wishes positively (Kaya, 2017; Yenice & Yavaşoğlu, 2018). Therefore, for the technologies like AR, which are still popular today, to become widespread in the field of special education, they must first accept such technologies.

In this study, it was aimed to determine the relationships between teachers' ICT acceptance levels, ICT attitudes and individual innovation levels and to investigate their opinions on this subject. Since the information and communication technologies skills of teachers affect the academic success of students, (Karadayı-Taşkıran, Koral & Bozkurt, 2015; Özçakır & Aydın, 2019; Pérez-López & Contero, 2013; Sungur & Bülbül, 2019) it has become very important for special education teachers to strengthen their educational studies by revealing the relationships between ICT acceptance levels, ICT attitudes and individual innovation levels. Therefore, it will be useful to reveal whether the relationships between special education teachers' ICT acceptance levels, ICT attitudes and individual innovation levels affect both teachers' skills and students' academic achievement, to provide effective and efficient education in the field of special education. Developing technology needs to be formed by determining special education teachers views on the use of new and developed materials prepared for

education, such as augmented reality, virtual reality, or web 2.0 tools, which are still popular today, and by taking into consideration of their preferences, attitudes, acceptance levels and individual innovation. It has been observed that studies on special education teachers are inadequate. This study will contribute to fill this gap in the related literature.

Research Problems

1. Is there a relationship between ICT acceptance levels, ICT attitudes and individual innovation levels of Special Education Teachers?
2. Do ICT attitudes, IT acceptance levels and individual innovation levels of special education teachers differ according to their gender?
3. Do ICT attitudes, IT acceptance levels and individual innovation levels of special education teachers differ according to their ages?
4. Do ICT attitudes, IT acceptance levels and individual innovation levels of special education teachers differ according to their professional seniority?
5. Do ICT attitudes, IT acceptance levels and individual innovation levels of special education teachers differ according to their branches?
6. Is there a relationship between ICT attitudes, IT acceptance levels and individual innovation levels of special education teachers?
7. What are the opinions of special education teachers about the study?

Method

Research Design

This research is a mixed method research study including qualitative and quantitative data collection and analysis techniques. Mixed research is a pattern used to achieve stronger and more stable results by using both qualitative and quantitative data to better explain the problems that are sought in research (Caruth, 2013, p.2; Creswell & Sözbilir, 2017). In this study, a correlational study was carried out to see if there is a significant relationship between ICT acceptance levels, ICT attitudes and individual innovation levels of special education teachers.

In this study, 3 questionnaires were prepared for special education teachers and quantitative data were obtained. Quantitative findings were revealed by analyzing the quantitative data obtained. Later, a semi-structured interview form was applied to 6 teachers selected among the teachers who were surveyed. Qualitative findings were revealed by analyzing the qualitative data obtained from the interview form. The results obtained in the study were interpreted by combining the findings obtained from qualitative and quantitative studies. As a result, the opinions of the teachers were collected through interview method, which is one of the qualitative data collection methods. Quantitative data were collected and analyzed with statistics program. Interview questions were analyzed with content analysis method to interpret the quantitative data better at the end of the application.

Participants

This study consists of a total of 201 special education teachers working in Turkey. The working group of the qualitative research, which is the second stage of the study, consists of 6 teachers, 3 males and 3 females working in private educational institutions in Amasya. Information on the participants is given in Table 1.

Table1. Demographic Characteristics of Participants

Research Group			f
Group of The Quantitative Research	Gender	Male	72
		Female	129
		Total	201
	Age	21-30	78
		31-40	81
		41-60	42
		Total	201
	Professional Seniority	1-5	60
		6-10	56
		11-20	62
		21-40	23
		Total	201
Group of The Qualitative Research	Gender	Male	3
		Female	3
		Total	6
	Branch	Special Education Teacher	1
		Classroom Teacher	3
		Branch Teacher	2
	Professional Seniority	1-12	2
		13-27	3
		13-31	1

Data Collection Tools

In the research, an interview form was used to get the opinions of the teachers with the help of Teachers ICT Attitudes Scale (TICTAS) developed by Aydın and Semerci (2017) Teacher Candidates IT Acceptance Scale developed by Baydaş (2015) Individual Innovation Scale adapted to Turkish by Kılıçer and Odabaşı (2010). The demographic characteristics of the participants were collected through a personal information form. Personal information form and scales were brought together, and a measurement tool used in the research was created.

ICT Attitudes Scale (ICTAS): It is a scale for determining teachers' attitudes towards the use of Information and

Communication Technologies (ICT) in the education process. The scale consists of 16 items and five-point likert types collected in two dimensions ("Willingness to use ICT", "ICT anxiety"); it is reported by Aydın and Semerci (2017) that the scale includes the answer options such as "1- Strongly Disagree", "2- Disagree", "3- Undecided", "4- Agree", "5- Strongly Agree". It was stated that the willingness to use ICT consisting of 11 articles was rated between 0.549 and 0.808 factor load and the remaining 5 articles ICT anxiety rated between 0.600 and 0.824 factor load. It was reported by Aydın and Semerci (2017) that the two factors explained 53.60% of the total variance and the ratio was sufficient for the two-factor scales.

Information Technologies Acceptance Scale: It is a scale for determining teachers' information technology acceptance levels. It was reported by Baydaş (2015) that the scale consisting of six dimensions ("Facilitating conditions", "Perceived Convenience and Competence", "Anxiety", "Intention," Perceived Benefit "," Social Impact "); 6 negative, 24 positive, 30 articles in total, and five-point likert scale included the answer options such as "1- Strongly Disagree", "2- Disagree", "3- Undecided", "4- Agree", "5- Strongly Agree". Baydaş (2015) determined the reliability factors as "Facilitating Conditions" α = 0.88, "Perceived Benefit" α = 0.86, "Social Impact" α = 0.86, "Anxiety" α = 0.88, "Perceived Convenience of Use and Competence" α = 0.84 and "Intention" α = 0.72. Within the scope of this research, the reliability analyzes of the data obtained were determined based on factors "Facilitating Conditions" α = 0.89, "Perceived Benefit" α = 0.89, "Social Impact" α = 0.83, "Anxiety" α = 0.82, "Perceived Ease of Use and Competence" A = 0.88 and "Intention" α = 0.71.

Individual innovation scale: It is an "Individual Innovation Scale" which is aimed at determining the individual innovation levels of teacher candidates adapted to Turkish by Kılıçer and Odabaşı (2010). The scale is a five-point Likert type collected in four dimensions ("Openness to Experience", "Resistance to Change", Leadership of Opinion "and" Risk Taking ") and consists of 20 articles, 8 negative and 12 positives. It is stated by Kılıçer and Odabaşı (2010) that they include answer options such as "1- Absolutely Disagree", "2- Disagree", "3- I am in the middle", "4- Agree", "5- Absolutely Agree". Participants are categorized with scale scores. Innovation score with the help of scale; It is calculated by adding 42 points to the score obtained by subtracting the total score from the negative articles from the total score from the positive articles. With the help of the scale, the lowest 14 and the highest 94 points can be obtained. Those with a score of 80 or more called "Innovator", 69-80 are called "Pioneer", 57-68 are called "Interrogator", 46-56 are called "Skeptic" and those below 46 are called "Traditionalist". According to the scores obtained from the scale, 68 points and above are considered innovative, and 64 points and below are considered low-level innovators. Kılıçer and Odabaşı (2010) determined the internal consistency coefficient (Cronbach α) of the scale they adapted to be 0.89. In addition, they determined the reliability coefficients of the factors as "Resistance to Change" α = 0.81, "Opinion Leadership" α = 0.73, "Openness to Experience" α = 0.77 and "Risk Taking" α = 0.62.

Interview: A semi-structured interview form was used to get the experiences and opinions of special education teachers about information and communication technologies and assistive technologies. The interview form consists of twelve questions. The questions focused on the current information and communication technologies use process. The semi-structured interview form was prepared by the researcher considering the purpose of the study. Relevant literature was used while preparing the questions. After the questions were prepared, necessary

revising was made on the opinion form by a domain expert.

Data Collection Process

In this research, what the study meant for special education teachers was determined by interview form. In this process, three scales prepared for special education teachers were created on the online platform and filled by special education teachers. A 12-question semi-structured interview form covering the working process was applied to get thoughts from 6 special education teachers. The relationships between the three scales presented on ICT attitudes, ICT acceptance levels and individual innovation are interpreted in terms of different variables.

Data Analysis

SPSS 18.0 statistics program was used for quantitative data obtained by applying ICT attitudes, IT acceptance levels and individual innovation levels scales. Descriptive statistics were calculated for the total points that teachers obtained from the scale. Independent Sample t test to reach the results of gender comparisons from demographic features or ANOVA (One Way Variance Analysis) test to compare the scale averages of more group data (experience group, age group) and Correlation test to look for relationships between more than one dependent variable was used. While determining the analysis technique to be applied in quantitative data analysis, whether the distribution of data is suitable for normal distribution was tested with normality test. According to the normality test results ($p > .05$), the data showed a normal distribution in the ICT attitude scale and the cognitive innovation level scale. Büyüköztürk (2019, p. 40) stated that when the normal distribution does not show, the skewness coefficients do not show a significant deviation when they fall within the limits of +1 and -1, and in this case, the normal distribution feature can be assumed. It was observed that the ICT acceptance level scale showed normal distribution.

In the second part of the study, Nvivo 9.0 program was used for qualitative data. Opinions of special education teachers were recorded, and the records were transferred to the Word file. After the data saved in the Word file was transferred to the Nvivo program, the data was categorized here, and themes were determined. The collected data is conceptualized first by content analysis method and divided into categories after that themes were determined by organizing in a meaningful way. (Yıldırım & Şimşek, 2016, p. 242). For each theme and category, teachers' views are stated and exemplified by attribution. In addition, the internal consistency coefficients of the scales used in the study were shared, and the reliability of the scales was stated. The semi-structured interview form prepared for qualitative study was finalized by taking expert opinion.

Results

Quantitative Results

Results Related to the First Sub-Problem

The first sub-problem of the research is "Do the ICT attitudes, ICT acceptance levels and individual innovation levels of special education teachers differ according to their gender?"

Outputs of independent t-test results are shown in Table 2 to determine whether there is a difference between male and female teacher's ICT attitudes of special education teachers towards the use of information and communication technologies in education.

Table 2. t-Test Results of ICT Attitudes Scale Scores by Gender

	Gender	N	$\bar{X}$	S	sd	t	p
Willingness to Use ICT	Female	129	4.2889	.57287	199	.640	.523
	Male	72	4.2348	.57854			
ICT Anxiety Factor	Female	129	4.1969	.85804	199	.971	.333
	Male	72	4.0667	1.00028			
ICT Attitudes	Female	129	4.26	.58	199	.914	.362
	Male	72	4.18	.57			

When whether the information and communication technologies (ICT) attitudes of teachers differ in gender examined, it is seen that female teacher candidates average ($\bar{X}$= 4.26) are higher than male teacher candidates average ($\bar{X}$ = 4.18). To understand whether this difference is significant, it was analyzed with independent sample t test. According to the results of the analysis, although the average of female teachers is high, there is no statistically significant difference between them. (ICT Attitudes: t (199) = 0.914; p> 0.05, Willingness to Use ICT Factor: t (199) = 0.640; p> 0.05, ICT Anxiety Factor: t (199) = 0.971; p> 0.05).

Table 3 shows a difference between male and female teachers ICT acceptance levels of special education teachers towards the use of information and communication technologies in education.

Table 3. t-Test Results of IT Acceptance Level Scale Scores by Gender

	Gender	N	$\bar{X}$	S	sd	t	p
Facilitating Conditions Factor	Female	129	4.3941	.60486	199	1.222	.223
	Male	72	4.2801	.68280			
Perceived Benefit Factor	Female	129	3.5457	.93533	199	1.937	.54
	Male	72	3.8083	.89596			
Social Impact Factor	Female	129	3.9057	.88752	199	1.117	.265
	Male	72	3.7569	.93570			
Anxiety Factor	Female	129	3.9225	.90620	199	1.076	.283
	Male	72	4.0648	.88570			
Perceived Use Convenience and Competence Factor	Female	129	4.1628	.77772	199	.430	.668
	Male	72	4.2111	.74068			
Intention Factor	Female	129	3.8333	.94648	199	.389	.698
	Male	72	3.7778	1.01360			
ICT Acceptance Levels	Female	129	3.98	.54	199	.293	.770
	Male	72	4.00	.57			

When whether the Information Technology (IT) acceptance levels of teachers differ in gender examined, it is seen that male teacher candidates average ($\bar{X}$= 4.00) are higher than female teacher candidates average ($\bar{X}$= 3.98). In terms of factors, it is seen that the average of female teacher candidates is high in factors of facilitating conditions, social impact, and intent. On the other hand, it is seen that the average of male teacher candidates is high in factors of Perceived Benefit, Anxiety, Perceived Use Convenience and Competence. To understand whether this difference is significant, it was analyzed with independent sample t test. According to the results of the analysis, although the average of male teachers is high, there is no statistically significant difference between them. (IT Acceptance Levels: t (199) =0.293; p>0.05, Facilitating Conditions Factor: (t (199) =1.222; p>0.05), Perceived Benefit Factor: (t (199) =1.937; p>0.05), Social Impact Factor: (t (199) =1.117; p>0.05), Anxiety Factor: (t (199) =1.076; p>0.05), Perceived Use Convenience and Competence Factor: (t (199) =0.430; p>0.05), Intention Factor: t (199) =0.389; p>0.05).

To determine whether there is a difference between the individual innovativeness levels of special education teachers regarding the use of information and communication technologies in education, the outputs of the independent t test results are shown in Table 4.

Table 4. t-Test Results of Individual Innovation Levels Scale Scores by Gender

	Gender	N	$\bar{X}$	S	sd	t	p
Openness to Experience Factor	Female	129	4.4140	.58906	199	.851	.396
	Male	72	4.3361	.67622			
Resistance to Change Factor	Female	129	2.2839	.85020	199	.21	.983
	Male	72	2.2813	.84747			
Leadership of Opinion Factor	Female	129	4.0016	.76465	199	.311	.756
	Male	72	4.0361	.73720			
Risk Factor	Female	129	3.6008	.92572	199	1.834	.068
	Male	72	3.8472	.89064			
Individual Innovation Levels	Female	129	3.37	.44	199	.192	.848
	Male	72	3.39	.45			

When whether the Individual Innovation of teachers differ in gender examined, it is seen that male teacher candidates average ($\bar{X}$= 3.39) are higher than female teacher candidates average ($\bar{X}$= 3.37). In terms of factors, it is seen that the average of female teacher candidates is high in openness to experience and resistance to change. On the other hand, it is seen that the average of male teacher candidates is high in factors of Leadership of Opinion and Risk. To understand whether this difference is significant, it was analyzed with independent sample t test. According to the results of the analysis, although the average of male teachers is high, there is no statistically significant difference between them. (Individual Innovation Levels: t (.199) =0.192; p>0.05, Openness to Experience Factor: t (199) =0.851; p>0.05, Resistance to Change Factor: t (199) =1.937; p>0.05, Leadership of Opinion Factor: t (199) =0.311; p>0.05, Risk Factor: t (199) =1.834; p>0.05).

Results Related to the Second Sub-Problem

The second sub-problem of the research is "Do the ICT attitudes, ICT acceptance levels and individual innovation levels of special education teachers differ according to their ages?"

Descriptive results of One-Way ANOVA test results are shown in Table 5 to determine whether there is a difference between ICT attitudes age groups of special education teachers towards the use of information and communication technologies in education.

Table 5. Descriptive Results of Teachers' ICT Attitudes by Age Groups

	Age	N	$\bar{X}$	S
Willingness to Use ICT	21- 30	78	4.2541	.58300
	31-40	81	4.2626	.59370
	41-60	42	4.3117	.52824
	Total	201	4.2696	.57405
ICT Anxiety Factor	21- 30	78	4.0923	.92509
	31-40	81	4.1802	.90366
	41-60	42	4.2000	.91598
	Total	201	4.1502	.91121
ICT Attitudes	21- 30	78	4.2035	.60061
	31-40	81	4.2369	.59282
	41-60	42	4.2768	.51928
	Total	201	4.2323	.57921

When the ICT attitudes, ICT anxiety factor and the willingness to use ICT factor of teachers are analyzed by age groups, the 41-60 age group has the highest average. (ICT attitudes: X=4.2768, willingness to use ICT factor X=4.3117, ICT anxiety factor: X=4.2000). As can be seen from Table 4, teachers' ICT attitudes and factors differ according to age groups. One Way ANOVA test was conducted to see if these differences were significant. The data of the results of the test are in Table 6.

Table 6. ANOVA Table Showing the Differences of ICT Attitudes of Teachers According to Age Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Willingness to Use ICT	Between Groups	.097	2	.049	.146	.864	None
	In-group	65.810	198	.332			
	Total	65.907	200				
ICT Anxiety Factor	Between Groups	.439	2	.219	.262	.770	None
	In-group	165.624	198	.836			
	Total	166.062	200				
ICT Attitudes	Between Groups	.149	2	.075	.221	.802	None
	In-group	66.948	198	.338			
	Total	67.097	200				

When Table 6 is examined, it can be concluded that teachers' ICT attitudes, the willingness to use ICT factor

and ICT anxiety factor do not differ according to age groups. In other words, ICT attitudes, the willingness to use ICT factor and the ICT anxiety factor do not show any significant differ statistically in terms of age groups (ICT Attitudes: F (2.198) =0.221; p>0.05, Willingness to Use ICT: 2. 198) =0.146; p>0.05, ICT Anxiety Factor: F (2. 198) =0.262; p>0.05). Descriptive results of One-Way ANOVA test results are shown in Table 7 to determine whether there is a difference between ICT acceptance levels age groups of special education teachers towards the use of information and communication technologies in education.

Table 7. Descriptive Results of Teachers' IT Acceptance Levels by Age Groups

	Age	N	$\bar{X}$	S
Facilitating Conditions Factor	21- 30	78	4.4167	.63094
	31-40	81	4.3313	.65218
	41-60	42	4.2778	.61006
	Total	201	4.3532	.63455
Perceived Benefit Factor	21- 30	78	3.7179	.96238
	31-40	81	3.4914	.94236
	41-60	42	3.7810	.80705
	Total	201	3.6398	.92780
Social Impact Factor	21- 30	78	3.9380	.87209
	31-40	81	3.8189	.87963
	41-60	42	3.7579	1.01826
	Total	201	3.8524	.90557
Anxiety Factor	21- 30	78	4.0192	.89651
	31-40	81	3.9136	.91557
	41-60	42	4.0040	.88765
	Total	201	3.9735	.89930
Perceived Use Convenience and Competence Factor	21- 30	78	4.1795	.76181
	31-40	81	4.1284	.78505
	41-60	42	4.2810	.72993
	Total	201	4.1801	.76315
Intention Factor	21- 30	78	3.7628	1.03423
	31-40	81	3.8827	.86700
	41-60	42	3.7738	1.04299
	Total	201	3.8134	.96890
ICT Acceptance Level	21- 30	78	4.0419	.60597
	31-40	81	3.9416	.50521
	41-60	42	4.0032	.56193
	Total	201	3.9934	.55698

When Information Technology (IT) acceptance levels of teachers are analyzed by age groups, the 21-30 age group has the highest average. In terms of factors, the facilitating conditions factor, perceived benefit factor and

perceived use convenience and competence factor also have the highest average of 41-60 age group. While the social impact factor and anxiety factor are the highest in the 21-30 age group, the average of the 31-40 age group is higher in the intention factor than the other age groups. (ICT Acceptance Level: X=4.0419, Facilitating Conditions Factor: X=4.3117, Perceived Benefit Factor: X=3.7810, Social Impact Factor: X=3.9380, Anxiety Factor: X=4.0192, Perceived Use Convenience and Competence Factor: X=4.2810, Intention Factor: X=3.8827).

One Way ANOVA test was applied to understand whether these differences are significant. The data of the results of the test are shown in Table 8.

Table 8. ANOVA Table Showing Differences of Teachers' IT Acceptance Levels According to Age Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Facilitating Conditions Factor	Between Groups	.592	2	.296	.733	.482	None
	In-group	79.939	198	.404			
	Total	80.532	200				
Perceived Benefit Factor	Between Groups	3.098	2	1.549	1.814	.166	None
	In-group	169.064	198	.854			
	Total	172.162	200				
Social Impact Factor	Between Groups	1.38	2	.519	.630	.534	None
	In-group	162.973	198	.823			
	Total	164.010	200				
Anxiety Factor	Between Groups	.493	2	.246	.303	.739	None
	In-group	161.254	198	.814			
	Total	161.747	200				
Perceived Use Convenience and Competence Factor	Between Groups	.644	2	.322	.550	.578	None
	In-group	115.837	198	.585			
	Total	116.480	200				
Intention Factor	Between Groups	.655	2	.327	.346	.708	None
	In-group	187.099	198	.945			
	Total	187.754	200				
ICT Acceptance Level	Between Groups	.405	2	.202	.650	.523	None
	In-group	61.640	198	.311			
	Total	62.044	200				

It can be concluded that when teachers' CT Acceptance levels and factors are examined, they do not differ according to age groups. In other words, ICT acceptance levels and factors do not differ statistically in terms of age groups. (ICT Acceptance Level: F (2. 198) =0.650; p>0.05, Facilitating Conditions Factor: F (2. 198) =0.733; p>0.05, Perceived Benefit Factor: F (2. 198) =1.814; p>0.05, Social Impact Factor: F (2. 198) =0.630;

p>0.05, Anxiety Factor: F (2. 198) =0.303; p>0.05, Perceived Use Convenience and Competence Factor: F (2. 198) =0.550; p>0.05, Intention Factor: F (2. 198) =0.346; p>0.05).

Descriptive results of One-Way ANOVA test results are shown in Table 9 to determine whether there is a difference between Individual Innovation Levels age groups of special education teachers towards the use of information and communication technologies in education.

Table 9. Individual Innovation Levels of Teachers Descriptive Results by Age Groups

	Age	N	$\bar{X}$	S
Openness to Experience Factor	21- 30	78	4.4410	.56785
	31-40	81	4.4469	.59437
	41-60	42	4.1667	.72437
	Total	201	4.3861	.62113
Resistance to Change Factor	21- 30	78	2.3990	.98364
	31-40	81	2.1852	.72863
	41-60	42	2.2560	.77595
	Total	201	2.2830	.84710
Leadership of Opinion Factor	21- 30	78	4.1077	.65639
	31-40	81	4.0074	.78259
	41-60	42	3.8524	.84860
	Total	201	4.0139	.75326
Risk Factor	21- 30	78	3.6987	.94436
	31-40	81	3.7593	.88074
	41-60	42	3.5357	.94606
	Total	201	3.6891	.91874
Individual Innovation Level	21- 30	78	3.4667	.50218
	31-40	81	3.3636	.36674
	41-60	42	3.2607	.46963
	Total	201	3.3821	.44959

When the individual innovation levels of teachers are analyzed by age groups, the 21-30 age group has the highest average. In terms of factors, openness to experience and risk factor also have the highest average of 31-40 age group. 21-30 age group has the highest average in Resistance to Change and Leadership of Opinion factors (Individual Innovation Level: X=3.4667, Openness to Experience Factor: X=4.4469, Resistance to Change Factor: X=2.3990, Leadership of Opinion Factor: X=4.1077, Risk Factor: X=3.7593). One Way ANOVA test was applied to understand whether these differences are significant. The data of the results of the test are shown in Table 10.

Table 10. ANOVA Table Showing Individual Innovation Levels of Teachers According to Age Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Openness to Experience Factor	Between Groups	2.557	2	1.279	3.393	.036	2-3
	In-group	74.604	198	.377			In favor of 2
	Total	77.161	200				
Resistance to Change Factor	Between Groups	1.856	2	.928	1.297	.276	None
	In-group	141.660	198	.715			
	Total	143.516	200				
Leadership of Opinion Factor	Between Groups	1.785	2	.893	1.582	.208	None
	In-group	111.696	198	.564			
	Total	113.481	200				
Risk Factor	Between Groups	1.394	2	.697	.824	.440	None
	In-group	167.422	198	.846			
	Total	168.816	200				
Individual Innovation Level	Between Groups	1.204	2	.602	3.040	.050	1-3
	In-group	39.221	198	.198			In favor of 1
	Total	40.426	200				

Individual innovation levels and openness to change factor of teachers differ according to age groups. In other words, Individual innovation levels and Openness to Experience Factor show a statistically significant difference in age groups (Individual Innovation Level: F (2. 198) =3.040; p=0.05, Openness to Experience Factor: F (2. 198) =3.393; p<0.05). Post hoc analysis was applied since individual innovation levels and openness to change factor showed a statistically significant difference in age groups. According to Levene test results, Tukey test was used as post hoc analysis since variances were homogenous (p> 0.05). According to the Tukey test results, there is a significant difference between individual innovation levels between 1-3 in favor of group 1, and openness to change factor between 2-3 in favor of group 2. When other factors are analyzed, resistance to change, leadership of opinion and risk factors do not differ according to age groups. In other words, ICT acceptance levels and factors do not differ statistically in terms of age groups (Resistance to Change Factor: F (2. 198) =1.297; p>0.05, Leadership of Opinion Factor: F (2. 198) =1.582; p>0.05, Risk Factor: F (2. 198) =0.824; p>0.05).

Results Related to the Third Sub-Problem

The third sub-problem of the research is "Do the ICT attitudes, ICT acceptance levels and individual innovation levels of special education teachers differ according to their professional seniority?"

Descriptive results of One-Way ANOVA test results are shown in Table 11 in order to determine whether there is a difference between the ICT attitudes of special education teachers towards the use of information and communication technologies in education.

Table 11. Descriptive Results of Teachers' ICT Attitudes According to Professional Seniority Groups

	Professional Seniority Groups	N	$\bar{X}$	S
Willingness to Use ICT Factor	1- 5 years	60	4.1621	.60721
	6-10 years	56	4.3117	.63076
	11-20 years	62	4.3504	.47276
	21-40 years	23	4.2292	.58008
	Total	201	4.2696	.57405
ICT Anxiety Factor	1- 5 years	60	3.9933	.96302
	6-10 years	56	4.2107	.97415
	11-20 years	62	4.1935	.86458
	21-40 years	23	4.2957	.71572
	Total	201	4.1502	.91121
ICT Attitudes	1- 5 years	60	4.1094	.61836
	6-10 years	56	4.2801	.63982
	11-20 years	62	4.3014	.48657
	21-40 years	23	4.2500	.53267
	Total	201	4.2323	.57921

When the ICT attitudes and the willingness to use ICT factor of teachers are examined according to professional seniority groups, the 11–20 years group has the highest average. (ICT attitudes: $X = 4.3014$, willingness to use ICT factor: $X = 4.3504$). In the ICT anxiety factor, the 22–40 years group has the highest average according to professional seniority groups. ($X = 4.2957$). One Way ANOVA test was applied to understand whether these differences are significant. The data of the results of the test are shown in Table 12.

Table 12. ANOVA Table Showing the Differences of ICT Attitudes of Teachers According to Age Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Willingness to Use ICT Factor	Between Groups	1.235	3	.412	1.254	.291	None
	In-group	64.672	197	.328			
	Total	65.907	200				
ICT Anxiety Factor	Between Groups	2.285	3	.762	.916	.434	None
	In-group	163.778	197	.831			
	Total	166.062	200				
ICT Attitudes	Between Groups	1.338	3	.446	1.336	.264	None
	In-group	65.759	197	.334			
	Total	67.097	200				

When Table 12 is analyzed, it can be concluded that Teachers' ICT Attitudes, the willingness to use ICT factor and the ICT anxiety factor do not differ according to the professional seniority groups. In other words, ICT attitudes and factors do not show any significant differ statistically in terms of the professional seniority groups. (ICT Attitudes: F (3.197) =1.336; p>0.05, willingness to use ICT: F (3. 197) =1.254; p>0.05, ICT anxiety: F (3.

197) =0.916; p>0.05). Descriptive results of One-Way ANOVA test results are shown in Table 13 in order to determine whether there is a difference between the ICT acceptance levels of special education teachers for the use of information and communication technologies in education.

Table 13. Descriptive Results of Teachers' IT Acceptance Levels According to Professional Seniority Groups

	Professional Seniority Groups	N	$\bar{X}$	S
Facilitating Conditions Factor	1- 5 years	60	4.3472	.65977
	6-10 years	56	4.4286	.61122
	11-20 years	62	4.3306	.62978
	21-40 years	23	4.2464	.65688
	Total	201	4.3532	.63455
Perceived Benefit Factor	1- 5 years	60	3.7833	.98552
	6-10 years	56	3.4893	.90487
	11-20 years	62	3.6935	.91881
	21-40 years	23	3.4870	.82864
	Total	201	3.6398	.92780
Social Impact Factor	1- 5 years	60	3.8667	.93368
	6-10 years	56	3.9286	.83294
	11-20 years	62	3.8952	.84620
	21-40 years	23	3.5145	1.12132
	Total	201	3.8524	.90557
Anxiety Factor	1- 5 years	60	3.8694	1.02699
	6-10 years	56	4.0536	.82088
	11-20 years	62	3.9597	.90821
	21-40 years	23	4.0870	.70149
	Total	201	3.9735	.89930
Perceived Use Convenience and Competence Factor	1- 5 years	60	4.0400	.83142
	6-10 years	56	4.1714	.82102
	11-20 years	62	4.3323	.61131
	21-40 years	23	4.1565	.77449
	Total	201	4.1801	.76315
Intention Factor	1- 5 years	60	3.6500	1.04679
	6-10 years	56	3.9107	.90004
	11-20 years	62	4.0081	.88007
	21-40 years	23	3.4783	1.04966
	Total	201	3.8134	.96890
ICT Acceptance Level	1- 5 years	60	3.9639	.64307
	6-10 years	56	4.0196	.51254
	11-20 years	62	4.0419	.49951
	21-40 years	23	3.8754	.58077
	Total	201	3.9934	.55698

When the ICT acceptance level, perceived use convenience and competence factor and intention factor of teachers are examined according to professional seniority groups, the 11–20 years group has the highest

average. (ICT acceptance level: $X = 4.0419$, perceived use convenience and competence factor: $X = 4.3323$, intention factor: $X = 4.0861$). 6-10 years group in the facilitating conditions and social impact factor, 1-5 years in the perceived benefit factor and 21-40 years in the anxiety factor have the highest average (facilitating conditions factor: $X = 4.4286$, perceived benefit factor: $X = 3.7833$, social impact factor: $X = 3.9286$, anxiety factor: $X = 4.0870$). One Way ANOVA test was applied to understand whether these differences are significant. The data of the results of the test are shown in Table 14.

Table 14. ANOVA Table Showing Differences of Teachers' IT Acceptance Levels According to Professional Seniority Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Facilitating Conditions Factor	Between Groups	.614	3	.205	.505	.679	None
	In-group	79.917	197	.406			
	Total	80.532	200				
Perceived Benefit Factor	Between Groups	3.221	3	1.074	1.252	.292	None
	In-group	168.940	197	.858			
	Total	172.162	200				
Social Impact Factor	Between Groups	3.077	3	1.026	1.255	.291	None
	In-group	160.934	197	.817			
	Total	164.010	200				
Anxiety Factor	Between Groups	1.317	3	.439	.539	.656	None
	In-group	160.431	197	.814			
	Total	161.747	200				
Perceived Use Convenience Competence	Between Groups	2.630	3	.877	1.517	.211	None
	In-group	113.850	197	.578			
	Total	116.480	200				
Intention Factor	Between Groups	7.065	3	2.355	2.568	.056	None
	In-group	180,689	197	.917			
	Total	187,754	200				
IT Acceptance Level	Between Groups	.557	3	.186	.595	.619	None
	In-group	61.487	197	.312			
	Total	62.044	200				

When Table 14 is examined, it can be concluded that teachers' IT acceptance levels and factors do not differ by professional seniority groups. In other words, IT acceptance levels and factors do not show any significant differ statistically in terms of the professional seniority groups. (IT Acceptance Level: F (3. 197) =0.595; p>0.05, Facilitating Conditions Factor: F (3. 197) =0.505; p>0.05, Perceived Benefit Factor: (F (3. 197) =1.252; p>0.05, Social Impact Factor: F (3. 197) =1.255; p>0.05, Anxiety Factor: (F (3. 197) =0.539; p>0.05, Perceived Use Convenience and Competence Factor: F (3. 197) =2.568; p>0.05, Intention Factor: F (3. 197) =2.568; p>0.05).

Descriptive results of the One-Way ANOVA test results are shown in Table 15 to determine whether there is a difference between the levels of individual innovativeness of special education teachers regarding the use of information and communication technologies in education and professional seniority groups.

Table 15. Descriptive Results of Individual Innovation Levels of Teachers According to Professional Seniority Groups

	Professional Seniority Groups	N	$\bar{X}$	S
Openness to Experience Factor	1- 5 years	60	4.4367	.48502
	6-10 years	56	4.4857	.66372
	11-20 years	62	4.3452	.64087
	21-40 years	23	4.1217	.72548
	Total	201	4.3861	.62113
Resistance to Change Factor	1- 5 years	60	2.4250	1.01712
	6-10 years	56	2.1004	.82759
	11-20 years	62	2.3327	.70962
	21-40 years	23	2.2228	.70000
	Total	201	2.2830	.84710
Leadership of Opinion Factor	1- 5 years	60	4.0267	.61887
	6-10 years	56	4.1143	.76928
	11-20 years	62	4.0258	.81340
	21-40 years	23	3.7043	.83092
	Total	201	4.0139	.75326
Risk Factor	1- 5 years	60	3.7250	.88980
	6-10 years	56	3.7411	.98623
	11-20 years	62	3.6694	.93187
	21-40 years	23	3.5217	.81851
	Total	201	3.6891	.91874
Individual Innovation Level	1- 5 years	60	3.4583	.50381
	6-10 years	56	3.3643	.45434
	11-20 years	62	3.3927	.39368
	21-40 years	23	3.1978	.39814
	Total	201	3.3821	.44959

When the individual innovation level and resistance to change factor of teachers are examined according to professional seniority groups, 1-5 years group has the highest average. (individual innovation level: $X = 3.4583$, resistance to change factor: $X = 2.4250$). When other factors are analyzed, 6–10 years group has the highest average in terms of Leadership of Opinion, risk, and openness to experience factors. (Leadership of Opinion factor: $X = 4.1143$, risk factor: $X = 3.7411$, openness to experience factor: $X = 4.4857$). As can be seen from Table 15, individual innovation levels and factors of teachers differ according to professional

seniority groups. One Way ANOVA test was applied to understand whether these differences are significant. The data of the results of the test are shown in Table 16.

Table 16. ANOVA Table Showing the Differences of Individual Innovation Levels of Teachers According to Professional Seniority Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Openness to Experience Factor	Between Groups	2.420	3	.807	2.127	.098	2-3 In favor of 2
	In-group	74.741	197	.379			
	Total	77.161	200				
Resistance to Change Factor	Between Groups	3.312	3	1.104	1.551	.203	None
	In-group	140.204	197	.712			
	Total	143.516	200				
Leadership of Opinion Factor	Between Groups	2.787	3	.929	1.653	.178	None
	In-group	110.694	197	.562			
	Total	113.481	200				
Risk Factor	Between Groups	.897	3	.299	.351	.789	None
	In-group	167.919	197	.852			
	Total	168.816	200				
Individual Innovation Level	Between Groups	1.154	3	.385	1.930	.126	None
	In-group	39.271	197	.199			
	Total	40.426	200				

When Table 16 is examined, it can be concluded that individual innovation levels and factors of teachers do not differ according to professional seniority groups. In other words, individual innovation levels and factors do not show any significant differ statistically in terms of the professional seniority groups. (Individual Innovation Level: $F(3. 197) = 1.930$; $p>0.05$, Openness to Experience Factor: $F(3. 197) = 2.127$; $p>0.05$, Resistance to Change Factor: $F(3. 197) = 1.551$; $p>0.05$, Leadership of Opinion Factor: $F(3. 197) = 1.653$; $p>0.05$, Risk Factor: $F(3. 197) = 0.351$; $p>0.05$).

Results Related to the Fourth Sub-Problem

The fourth sub-problem of the research is "Do the ICT attitudes, ICT acceptance levels and individual innovation levels of special education teachers differ according to their branches?"

Descriptive results of One-Way ANOVA test results are shown in Table 17 to determine whether there is a difference between ICT attitudes of special education teachers' branches towards the use of information and communication technologies in education.

Table 17. Descriptive Results of Teachers' ICT Attitudes According to Branch Groups

	Branch Groups	N	$\bar{X}$	S
Willingness to Use ICT Factor	Special Education Teacher	102	4.3111	.55238
	Classroom Teacher	31	4.3255	.72794
	Branch Teacher	32	4.0881	.48627
	Vocational Courses Teacher	36	4.2652	.54864
	Total	201	4.2696	.57405
ICT Anxiety Factor	Special Education Teacher	102	4.1863	.92801
	Classroom Teacher	31	4.3097	.89419
	Branch Teacher	32	3.9375	.87612
	Vocational Courses Teacher	36	4.1000	.90774
	Total	201	4.1502	.91121
ICT Attitudes	Special Education Teacher	102	4.2721	.54781
	Classroom Teacher	31	4.3206	.75687
	Branch Teacher	32	4.0410	.52161
	Vocational Courses Teacher	36	4.2135	.52321
	Total	201	4.2323	.57921

When the ICT attitudes and factors of the teachers are analyzed according to the branch groups, the Classroom Teacher group has the highest average. (ICT Attitudes: $X = 4.3206$, Willingness to Use ICT Factor: $X = 4.3255$, ICT Anxiety Factor: ($X = 4.3097$). As can be seen from Table 17, teachers' ICT attitudes differ according to their branch groups. One Way ANOVA test was conducted to see if this difference was significant. The data of the results of the test are shown in Table 18.

Table 18. ANOVA Table Showing the Differences of ICT Attitudes of Teachers According to Branch Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Willingness to Use ICT Factor	Between Groups	1.327	3	.442	1.350	.259	None
	In-group	64.580	197	.328			
	Total	6.907	200				
ICT Anxiety Factor	Between Groups	2.460	3	.820	.987	.400	None
	In-group	163.603	197	.830			
	Total	166.062	200				
ICT Attitudes	Between Groups	1.586	3	.529	1.590	.193	None
	In-group	65.511	197	.333			
	Total	67.097	200				

Teachers' ICT Attitudes and factors do not differ according to their branch groups. In other words, ICT Attitudes and factors do not show any significant differ statistically in terms of the branch groups. (ICT Attitudes: F (3.

197) =1.590; p>0.05, Willingness to Use ICT Factor: F (3. 197) =1.350; p>0.05, ICT Anxiety Factor: F (3. 197) =0.987; p>0.05).

Descriptive results of One-Way ANOVA test results are shown in Table 19 to determine whether there is a difference between the branches of ICT acceptance levels of special education teachers for the use of information and communication technologies in education.

Table 19. Descriptive Results of Teachers' IT Acceptance Levels by Branch Groups

	Branch Groups	N	$\bar{X}$	S
Facilitating Conditions Factor	Special Education Teacher	102	4.4085	.63177
	Classroom Teacher	31	4.4032	.64661
	Branch Teacher	32	4.2604	.60158
	Vocational Courses Teacher	36	4.2361	.66114
	Total	201	4.3532	.63455
Perceived Benefit Factor	Special Education Teacher	102	3.6922	.95344
	Classroom Teacher	31	3.6323	.89159
	Branch Teacher	32	3.5000	.88573
	Vocational Courses Teacher	36	3.6222	.94510
	Total	201	3.6398	.92780
Social Impact Factor	Special Education Teacher	102	3.8088	.98571
	Classroom Teacher	31	3.9140	.79800
	Branch Teacher	32	3.8802	.80904
	Vocational Courses Teacher	36	3.8981	.86307
	Total	201	3.8524	.90557
Anxiety Factor	Special Education Teacher	102	3.9886	.91295
	Classroom Teacher	31	4.1774	.90363
	Branch Teacher	32	3.8073	.70851
	Vocational Courses Teacher	36	3.9028	1.00188
	Total	201	3.9735	.89930
Perceived Use Convenience and Competence Factor	Special Education Teacher	102	4,1745	.77876
	Classroom Teacher	31	4,3161	.69623
	Branch Teacher	32	4.1625	.70836
	Vocational Courses Teacher	36	4.0944	.83288
	Total	201	4.1801	.76315
Intention Factor	Special Education Teacher	102	3.8529	.99650
	Classroom Teacher	31	3.8710	.89413
	Branch Teacher	32	3.5313	.91526
	Vocational Courses Teacher	36	3.9028	.99153
	Total	201	3.8134	.96890
IT Acceptance Level	Special Education Teacher	102	4.0092	.56077
	Classroom Teacher	31	4.0817	.51775
	Branch Teacher	32	3.9021	.52772
	Vocational Courses Teacher	36	3.9537	.60988
	Total	201	3.9934	.55698

When the teachers' IT acceptance levels, social impact factor, anxiety factor, and perceived use convenience and competence factor are analyzed according to the branch groups, the Classroom Teacher group has the highest average. (IT acceptance levels: $X = 4.0817$, social impact factor: $X = 3.9140$, anxiety factor: $X = 4.1774$, perceived use convenience and competence factor: $X = 3.6922$). When other factors are examined, the Special Education Teacher group has the highest average at the facilitating conditions factor and the perceived benefit factor branch groups, and the Vocational Courses Teacher group has the highest average at the intention factor. (intention factor: $X = 3.9028$, facilitating conditions factor: $X = 4.4085$, perceived benefit: $X = 3.6922$). As can be seen from Table 19, teachers' ICT acceptance levels and factors differ according to the branch groups. One Way ANOVA test was conducted to see if this difference was significant. The data of the results of the test are shown in Table 20.

Table 20. ANOVA Table Showing Differences of Teachers' IT Acceptance Levels According to Branch Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Facilitating Conditions Factor	Between Groups	1.159	3	.386	.958	.413	None
	In-group	79.373	197	.403			
	Total	80.532	200				
Perceived Benefit Factor	Between Groups	.918	3	.306	.352	.788	None
	In-group	171.244	197	.869			
	Total	172.162	200				
Social Impact Factor	Between Groups	.411	3	.137	.165	.920	None
	In-group	163.599	197	.830			
	Total	164.010	200				
Anxiety Factor	Between Groups	2.376	3	.792	.979	.404	None
	In-group	159.371	197	.809			
	Total	161.747	200				
Perceived Use Convenience and Competence Factor	Between Groups	.851	3	.284	.483	.694	None
	In-group	115.630	197	.587			
	Total	116.480	200				
Intention Factor	Between Groups	3.097	3	1.032	1.101	.350	None
	In-group	184.656	197	.937			
	Total	187.754	200				
IT Acceptance Levels	Between Groups	1.159	3	.197	.631	.596	None
	In-group	79.373	197	.312			
	Total	80.532	200				

According to Table 20; it can be concluded that teachers' IT acceptance levels and factors do not differ according to their branch groups. In other words, IT acceptance levels and factors do not show any significant differ statistically in terms of the branch groups. (IT Acceptance Levels: F (3. 197) =0.631; p>0.05, Facilitating Conditions Factor: F (3. 197) =0.958; p>0.05, Perceived Benefit Factor: F (3. 197) =0.352; p>0.05, Social

Impact Factor: 3. 197) =0.165; p>0.05, Anxiety Factor: F (3. 197) =0.979; p>0.05, Perceived Use Convenience and Competence Factor: F (3. 197) =0.483; p>0.05, Intention Factor: F (3. 197) =1.101; p>0.05). Descriptive results of One-Way ANOVA test results are shown in Table 21 to determine whether there is a difference between the individual innovativeness levels of special education teachers regarding the use of information and communication technologies in education.

Table 21. Descriptive Results of Teachers' Individual Innovation Levels by Branch Groups

	Branch Groups	N	$\bar{X}$	S
Leadership of Opinion Factor	Special Education Teacher	102	4.0569	.78822
	Classroom Teacher	31	4.3097	.64050
	Branch Teacher	32	3.7000	.62631
	Vocational Courses Teacher	36	3.9167	.75347
	Total	201	4.0139	.75326
Openness to Experience Factor	Special Education Teacher	102	4.3569	.65921
	Classroom Teacher	31	4.5548	.48911
	Branch Teacher	32	4.3250	.47587
	Vocational Courses Teacher	36	4.3778	.71678
	Total	201	4.3861	.62113
Resistance to Change Factor	Special Education Teacher	102	2.2377	.80348
	Classroom Teacher	31	2.3629	.85960
	Branch Teacher	32	2,1797	.86773
	Vocational Courses Teacher	36	2.4340	.94467
	Total	201	2.2830	.84710
Risk Factor	Special Education Teacher	102	3.6667	.93696
	Classroom Teacher	31	3.9839	.91728
	Branch Teacher	32	3.4844	.67781
	Vocational Courses Teacher	36	3.6806	1.02227
	Total	201	3.6891	.91874
Individual Innovation Levels	Special Education Teacher	102	3.3652	.39557
	Classroom Teacher	31	3.5597	.40567
	Branch Teacher	32	3.2266	.41543
	Vocational Courses Teacher	36	3.4153	.59795
	Total	201	3.3821	.44959

When the individual innovation levels, Leadership of Opinion Factor, openness to experience factor and risk factor of teachers are analyzed according to the branch groups, the Classroom Teacher group has the highest average. (individual innovation levels: $X = 3.5597$, Leadership of Opinion Factor: $X = 4.3097$, openness to experience factor: $X = 4.5548$, Risk Factor: $X = 3.9839$). When looking at the resistance to change factor, Vocational Courses Teacher group has the highest average ($X = 2.4340$). As can be seen from Table 21,

teachers' individual innovativeness levels differ according to their branch groups. One Way ANOVA test was conducted to see if this difference was significant. The data of the results of the test are shown in Table 22.

Table 22. ANOVA Table Showing Individual Innovation Levels of Teachers According to Branch Groups

		Total of Squares	sd	Average of Squares	F	p	Significant Difference
Leadership of Opinion Factor	Between Groups	6.394	3	2.131	3.921	.010	1-2
	In-group	107.087	197	.544			In favor of 1
	Total	113.481	200				
Openness to Experience Factor	Between Groups	1.092	3	.364	.942	.421	None
	In-group	76.069	197	.386			
	Total	77.161	200				
Resistance to Change Factor	Between Groups	1.570	3	.523	.726	.538	None
	In-group	141.947	197	.721			
	Total	143.516	200				
Risk Factor	Between Groups	4.089	3	1.363	1.630	.184	None
	In-group	164.727	197	.836			
	Total	168.816	200				
Individual Innovation Levels	Between Groups	1.820	3	,607	3.097	.28	2-3
	In-group	38.605	197	,196			In favor of 2
	Total	40.426	200				

It can be concluded that the individual innovation levels of the teachers differ according to the branch groups. In other words, individual innovation levels do not show any significant differ statistically in terms of the branch groups. ($F(3.\ 197) = 3.097$; $p<0.05$). Post hoc analysis was applied since individual innovation levels showed a statistically significant difference in branch groups. According to Levene test results, Dunnett T3 test was used as post hoc analysis since variances were not homogenous. According to Dunnett T3 test results, there is a significant difference between 2-3 in favor of group 2.

When analyzed in terms of factors, it can be concluded that the leadership of opinion factor differs according to the branch groups. In other words, the leadership of opinion factor shows a statistically significant difference in terms of branch groups. ($3.\ 197) = 3.921$; $p<0.05$). Post hoc analysis was applied since leadership of opinion factor showed a statistically significant difference in terms of branch groups. According to Levene test results, Tukey test was used as post hoc analysis since variances were homogenous ($p> 0.05$). According to the Tukey test results, there is a significant difference between 1-2 in favor of group 1. It can be concluded that the openness to experience, resistance to change and risk factors do not differ according to the branch groups. In other words, the openness to experience, resistance to change and risk factors show a statistically significant difference in terms of branch groups. (openness to experience factor: $F(3.\ 197) = 0.942$; $p>0.05$, resistance to change factor: $F(3.\ 197) = 0.726$; $p>0.05$, risk factor: $F(3.\ 197) = 1.630$; $p>0.05$).

Results Related to the Fifth Sub-Problem

The fifth sub-problem of the research is "Is there a relationship between special education teachers' ICT attitudes, IT acceptance levels and individual innovation levels?". The relationship between ICT attitudes, IT acceptance levels and individual innovation levels of special education teachers was tested by Pearson Correlation analysis. This relationship is shown in Table 23.

Table 23. Correlation Table of The Relationship between ICT Attitudes, IT Acceptance Levels and Individual Innovation Levels of Special Education Teachers

		ICT Attitudes	IT Acceptance Levels	Individual Innovation Levels
ICT Attitudes	R	1	.626**	.007
	p		.000	.921
	N	201	201	201
IT Acceptance Levels	R	.626**	1	.133
	p	.000		.061
	N	201	201	201
Individual Innovation Levels	R	.007	.133	1
	p	.921	.061	
	N	201	201	201

When the table is analyzed, according to the results of the analysis, there is a positive significant relationship between the ICT attitudes and IT acceptance levels of special education teachers. In other words, as ICT attitudes of teachers increase, ICT acceptance levels increase. ($R=0.626$; $p<0.05$). According to variables of age, IT acceptance level and individual innovation level, regression analysis is given in Table 24 for predict the ICT attitude.

Table 24. Standard Multiple Regression Analysis Results for the Prediction of ICT Attitude

Model					Relation	
	Constant	Standard error	t	p	Binary	Partial
Constant	1.791	.337	5.315	.000		.060
Age	.047	.043	1.093	.276	.047	.632
IT Acceptance Levels	.663	.058	11.458	.000	.626	-.065
Individual Innovation Levels	-.086	.073	-1.186	.237	.007	.060

ICT Attitudes = 1.791 + 0.047 Age + 0.663 IT Acceptance Levels – 0.086 Individual Innovation Levels; $R^2=0.40$

It is seen that the variables of ICT attitudes, age, IT acceptance level and individual innovation level of the teachers predicted 40% of the total variance. It is seen that IT acceptance level affect the total variance the most and individual innovation level effect the least.

Qualitative Results

Results Regarding Demographic Features of Participants

In this part of the study, the opinions of teachers about which technologies are currently used are expressed. Demographic information of the teachers participating and consulted opinions in the study are given in Table 25.

Table 25. Results Regarding Demographic Features of Participants

Demographic		f
Gender	Male	3
	Female	3
	Total	6
Branch	Special Education Teacher	1
	Classroom Teacher	3
	Branch Teacher	2
Seniority	1-12	2
	13-27	3
	13-31	1
Branch Satisfaction	Satisfied	6
	Dissatisfied	0

The qualitative part of the study shows the demographic information of the teachers in the study group. Interviews were held with a total of 6 teachers 3 of them are male and 3 are female. When the branches of the teachers are examined, 1 of them is Special Education, 3 of them are Classroom Teachers and 2 of them are Branch Teachers. 2 of the teachers have between 1-12 years, 3 of them between 13-27 years and 1 of them has 13-31 years of experience. When the branch satisfaction is considered, it is stated that all the teachers are satisfied with their branches.

As a result of qualitative analysis made in this research, 2 main themes showed up. These are named as Field Definition and Technology.

Field Definition

The first of the themes, the Field definition, expresses opinions about the specialties of special education teachers about their field, the characteristics of special education students and the measurements made in the study and the general measurements made. There are 3 sub-categories of field definition. These are Field characteristics, Students' characteristics, and assessment of measurement. Considering the field characteristics, 2 of the participants stated that the main objectives and achievements related to the special education field are difficult. Ex: K5 said on this subject that “It is a difficult area, difficult to reach, difficult to goals, hard to achievements. The return of the obtained criteria and assessments can be measured in the long term.”

Considering the opinions of the participants about the student characteristics, 3 of the participants stated that the special education students are sensitive to the screen, the visuality is remarkable for them and their attention span is very low. Ex: K1 is expressed this topic as, "I think students are more sensitive to the screen." K3, on the other hand, said, “Students' attention span does not exceed 1-2 minutes at most. Visual based things are more impressive and more remarkable.”

When the teacher evaluations related to measurement are examined, since the scores of the tests performed before and after their studies with the AR did not result in quantitatively normal results to clarify this issue the teachers were asked questions and the participants expressed their opinions about the scores of the students. In this issue, 6 of the participants stated that the measurement results obtained may vary according to the environmental, psychological, and mental differences of the students and it cannot be explained completely according to how bad their circumstances. Ex: K3 said on this topic, “We cannot completely connect that to their bad circumstances. The environment and their current psychology are also important.” K6 said on this issue that "The environment or environment in which they live can affect these differences."

Technology

Technology, which is the second of the themes reached according to the research findings, expresses opinions about the technologies used by special education teachers in education and the contribution of these technologies to teachers and students. There are 3 sub-categories of technology. These are assistive technologies, the effect of technology on students, problems experienced by teachers. Considering the assistive technologies used by the participants in their lessons, most of the participants stated that they used computers (n = 4), laptop (n = 2) and smart board (n = 6). One stated that he used Xbox (n = 1) before, one got help from the printer (n = 1) to print, and one said that he used the phone (n = 1) for the students to watch videos in their lessons.

Considering the effects of lectures on students by using assistive technologies, most of the participants stated that technology prolongs students' attention span and attracts their attention. Ex: K3 said on this issue that “Attention times do not exceed a maximum of 1-2 minutes. After 2 minutes, they get bored, you will either open music or watch movies or have an activity on the smart board.” K4 said on this issue that "In special education, showing children the smart board and working at it attracts their attention a little more." On the other hand, one participant stated that technology may have negative effects on children. Ex: K6 said on this issue that "I think children who have a lot of engagement with technology have no imagination."

When the problems experienced by teachers about using technology in education are examined, 2 of the participants stated that they had difficulty in attracting students' attention and adapting to technology. Ex: K4 said on this issue that "Our biggest problem is to attract the attention of children." K5, on the other hand, said, "Our teachers are hard to adapt to this type of technological developments, they show a little delay in requesting or do not want to adapt."

Discussion and Conclusion

In this study, the attitudes of special education teachers towards information and communication technologies, acceptance levels for information technologies and their levels of individual innovation were examined. Teachers' attitudes, acceptance levels and individual innovation levels were evaluated in terms of gender, age, professional seniority, and branch variables. Individual innovation levels of teachers showed that they differ significantly according to age, professional seniority, and branch variables. In this section, the results of the research are discussed with the literature and suggestions are given.

In line with the findings obtained in the study, there was no difference in the attitudes of gender, age, professional seniority and branch variables towards special education teachers' information and communication technologies. It was observed that the average attitude scores of male and female teachers were close to each other with all the factors. When the age group is analyzed, it was determined that the average attitude scores of the teachers who are in the 21-30, 31-40 and 41-60 age ranges did not differ significantly in terms of all factors. When we look at the branch group, it was determined that the average attitude scores did not differ significantly according to all factors in the Classroom Teacher, Special Education Teacher, Branch Teacher and Vocational Courses Teacher branches. In terms of professional seniority, although the attitude point averages are high in favor of the teachers in the range of 11-20 years, this difference does not show a statistically significant difference. However, it can be said that experienced teachers use different methods for special education students to work more efficiently and develop these methods with the technologies they use in education. In his study, Aslan (2018) stated that the average attitude scores of special education teachers with 11-15 years of experience were high, but no significant difference was observed. In other studies, it was seen that teachers' attitudes towards assistive technologies did not differ according to age, seniority, and gender (Campbell, 2000; Murugaiyan & Arulsamy, 2013). According to these results, we can state that the results are consistent with the literature. When we look at the opinions of the teachers who participated in the studies on this subject, it was seen that the teachers who are experienced and at special education branch are more consistent against technology.

In line with the findings obtained in the study, no difference was observed in the information technology acceptance levels of special education teachers' gender, age, professional seniority, and branch variables. Along with all factors, the average acceptance level scores of male and female teachers were close to each other. When we look at the age group, it was determined that the average acceptance level scores of the teachers who are in the 21-30, 31-40 and 41-60 age ranges did not differ significantly in terms of all factors. When we look at the branch group, it was determined that the average acceptance level scores of the branches of the Classroom Teacher, Special Education Teacher, Branch Teacher and Vocational Courses Teacher did not differ significantly according to all factors. In terms of professional seniority, although the acceptance level point averages are high in favor of the teachers in the range of 11-20 years, this difference does not show a statistically significant difference. On the other hand, IT acceptance level was mostly seen as “I agree”. Considering the literature, acceptance levels for information technologies Şahin (2016) 's study did not show any difference in terms of gender, reached the conclusion that teachers' IT acceptance levels are mostly at the

level of "I agree". High use of IT, teachers generally find themselves sufficient in using IT and can be interpreted as having tendency to use in their lessons. In the context of the factor, it is seen that the facilitating conditions factor average is the highest according to the professional seniority and age. Again, in the study of Şahin (2016), it is seen that the average of Facilitating Conditions factor is the highest. In other words, it can be said that the factors that affect teachers' information technology acceptance levels the most are the infrastructure, technical support, software, and hardware they will have while using educational technologies in their lessons. Looking at the literature, it is stated that these elements are effective in using technologies used in education (Teo et al., 2012). In addition, the lack of complete assistive elements used in the literature is said to prevent the integration of information technologies at education (Bingimlas, 2009). In other words, we can say that the use of technology is restricted because of the opportunities that teachers do not have, and that is why they do not use it in their lessons. On the other hand, when we look at the opinions of the teachers, it is stated that authorized people should provide more opportunities to experienced teachers the technologies that they can use in education, and that technology use should be supported in special education. Considering these results, we can state that the findings are consistent with the literature. On the other hand, we can say that teachers' IT acceptance level is high, they have knowledge about this subject, and they tend to benefit from technology in their lessons and technology can increase their motivation. In the literature, similar studies have shown that when teachers use information technologies, their performance increases and the effect of education is positive (Baydaş et al., 2013; Turan & Çolakoğlu, 2011). In other words, we can interpret that as teachers can integrate technology into education within their means, increase their motivation and thus increase their performance.

In line with the findings obtained in the study, no difference was observed in the individual innovation levels of the special education teachers of the variables of gender and professional seniority. In the study of Şahin (2016) no difference was observed in terms of genders. However, differentiation is observed according to age and branch. When looking at differentiation by age, a significant difference was observed in favor of 21-30 years of age between the levels of individual innovation between 21-30 and 41-60 years. In here, it can be said that teachers who use technology more actively and able to follow it, constantly develop and want to integrate technology into their lessons tend to use new technologies. On the other hand, there was a significant difference in the Openness to Experience factor between 31-40 and 41-60 years in favor of 41-60 years. In this case, it can be said that our experienced teachers have more knowledge and can share more information and suggestions with their colleagues. In addition, young teachers 'expectations of technology use may differ from older teachers' expectations from technology. When analyzed by branch, it is concluded that Classroom Teachers have the highest level of individual innovation. In the study of Bitkin (2012) it is seen that teacher candidates of vocational courses have more individual innovation levels. It is thought that the results obtained in the studies may have changed due to the difference in the sample. There was a significant difference between Classroom Teachers and Branch Teachers in favor of Classroom Teachers. On the other hand, there was a significant difference between Special Education Teachers and Classroom Teachers in favor of Special Education Teachers in the Leadership of Opinion Factor. When the literature is examined, Rogers (2007) stated in their study with teacher candidates that there is no difference between the departments and their individual innovation levels. However, Şahin (2016) and Bitkin (2012) stated in their studies that there is a differentiation between some departments and individual innovation. Accordingly, it can be said that the samples of the studies are different

departments or branches and there are differences according to the study group. It can also be said that they are open to innovations and they are in search of more useful materials, as it is thought that classroom and special education teachers who are more experienced in this field than other branches, are thought to better understand the necessity of technology in their special education. In the research, classify way was used to the total points of the teachers to determine their individual innovation levels. Within the scope of the research, individual innovation categories of teacher candidates were determined. According to the results, it was observed that teacher candidates were mostly in the "Leader" category. According to this result, it can be interpreted that most teachers are individuals who follow innovations and want to use innovation at first. When the literature is analyzed, it was revealed in the research that the "Inquiry" category is the most common category than the "Leader" category (Bitkin, 2012; Çuhadar et al., 2013; Şahin, 2016; Şahin & Thompson, 2006). According to the research results, 29.9% of the teachers are low-level innovative, 26.4% are moderately innovative and 43.8% are high-level innovative. Accordingly, it is seen that teacher candidates are predominantly highly innovative. However, Kılıç (2015) and Şahin (2016) found that teachers were mostly low-level innovative and Kılıç found that they were the least high-level innovative, Şahin (2016) found that they were the least medium-level innovative. It is seen that the findings do not overlap according to the study of Kılıç (2015) and Şahin (2016). On the other hand, there are other studies in the literature where teachers or teacher candidates are mostly found to be highly innovative and overlap with the findings (Özgür, 2013). It is thought that these differences in findings may have resulted from the differences between the samples in which the research was conducted.

Considering the relationship between ICT attitudes, IT acceptance levels and individual innovation levels of special education teachers in line with the findings obtained in the research, a positive way relationship was found between ICT attitudes and IT acceptance levels. It can be said that teachers who find themselves sufficient in information technologies show more attitudes. On the other hand, IT acceptance levels were also seen to affect ICT attitudes most. In other words, it is concluded that ICT attitudes are determinative for technology acceptance. In the literature, similar studies show that there is an effect between technology acceptance levels or use of technology and individual innovation, and significant relationships between scores (Rogers, 2007; Şahin, 2016). It can be said that individual innovation is decisive for technology acceptance.

Teachers expressed their opinions on the fact that information and communication technologies extend the special education students' attention span. In similar studies in the literature (Coşkun, 2017; Di Serio et al., 2013; Durak & Karaoğlan Yılmaz, 2019; Izgi Onbasılı, 2018; Pérez-López & Contero, 2013), it has been found that when technology is used in education as information and communication, students have fun, are attractive and their motivation increases. In other words, it can be said that educational designs created with both audio and visual components also attract special education students' attention at one point and increase the focusing time.

Looking at the views of special education teachers, some teachers found assistive technologies necessary and sufficient, while some teachers gave the opposite opinion. When the literature is examined, it is seen that technological applications are positive and remarkable for teachers and students in the studies conducted, and teachers want to use these technologies in their lessons (Karademir Coşkun & Alper, 2019; Polat & Çağıltay,

2018). While teachers state that technological materials attract students' attention and increase their attention span, findings have been reached that it is easier for teachers to convey basic goals and achievements (Samsudin, et.al., 2017). In his study, Sani Bozkurt (2017) stated that this type of assistive technologies will be faster and permanent in the planning of teachers' lessons. It can also be said that one of the biggest problems that special education teachers experience in their fields is to increase students' attention span. Therefore, it can be said that special education students are interested in the screen and these interests increase with technological materials. Therefore, we can say that teachers' attention span of their students can increase. On the other hand, there are problems such as teachers' access to technology, use it and integrate it into their lessons. However, when we examine the literature on this subject, we can say that there are many problems in this regard such as the problems faced by the teachers, not having enough information about the educational technologies they use, not having the necessary equipment and not feeling sufficient in using the technologies (Kutlu et al., 2018).

Some special education teachers stated that they agree that assistive technologies should be used in this area. When we look at the literature on this subject, it was emphasized that the technologies developed for the education of special education students will be beneficial in terms of supporting the weaknesses of the special education students and increasing their strengths and the technologies developed in the name of education should make effective use of special education students in their curricula and that the curriculum should be updated in this direction (Sani Bozkurt, 2017). Some teachers, on the other hand, stated that such technologies should be used sufficiently and if they are used too much, they will affect students negatively in terms of education. In this aspect, when the literature is examined, it is seen that the teachers are worried because the students become addicted to the use of technology and therefore, they do not want to use the technology in their lessons (Sakallı Demirok et al., 2019). Therefore, considering the levels and individual differences of the students 'special situations, we can say that the technology preferences of teachers change according to the students' situations in their lessons.

Recently, many studies have been carried out on materials prepared with technology. In the studies of Durak and Karaoğlan Yılmaz (2019) he emphasized that teachers 'and students' views are important in the background studies, from the technology dimension of the applications to the design dimension, but the literature also stated that the studies on technological materials are insufficient. On the other hand, Izgi Onbasılı (2018), and Erdem and Sarı (2018) showed at their studies that the trainings were carried out in safer environments, students were entertained, motivated, not worried, and their self-confidence and practical skills increased.

Looking at the research in general, it can be said that the attitudes, acceptance levels and individual innovations of teachers in the field of special education affect the use of information and communication technologies in their lessons, and they attract the attention and motivation of special education students positively. And special education teachers stated that assistive materials prepared with technology will benefit special education students. Therefore, it is thought that teachers who integrate information and communication technologies in their lessons, improve their ICT skills and individual innovators to increase their effect on students 'academic achievement will have an even more impact on students' academic success.

Recommendations

This study has some limitations. This study with special education teachers is limited to 201 teachers. Therefore, the results obtained can be compared by conducting a more comprehensive study in future studies. On the other hand, it is possible to contribute to special education teachers by providing structured in-service trainings to improve the ICT acceptance levels, ICT attitudes and individual innovation levels of special education teachers. In addition, the findings obtained for teachers' ICT acceptance levels, ICT attitudes and individual innovation levels do not explain the effects on students in this study. Therefore, the effects of special education teachers' ICT acceptance levels, ICT attitudes and individual innovation levels on special education students can be determined by experimental studies. In addition, it is very important that parents contribute to the education of children (Erdener & Knoeppel, 2018). Therefore, by making a holistic and more comprehensive study on special education teachers, special education students and parents, the deficiencies in the use of ICT in the field of special education can be determined and education can be made more efficient by eliminating these deficiencies.

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