Preservice Special Education Teachers' Attitudes Towards Assistive Technologies

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Article Info	ABSTRACT
	Considering that all teachers use technology intensively in educational environments, especially after the Covid-19 pandemic, special education teachers are also expected to integrate technology into their lessons effectively and efficiently in the future. Thus, this study aims to determine the attitudes of preservice special education teachers' towards assistive technologies. The data were collected in the 2020-2021 academic year. Participants were 240 special education students from various universities. The data collection tool was an attitude scale consisting of 4 dimensions and 18 items. Findings reported no significant difference in the attitudes towards assistive technologies regarding variables such as the duration of daily Internet use, grade level, and gender. However, a statistically significant difference was found in terms of variables such as the frequency of following technological developments and taking an assistive technology course. Based on scale mean scores, special education students have positive attitudes towards assistive technologies. Given that following the technological developments is effective in developing a positive attitude towards assistive technologies, special education students are recommended to closely follow current technological developments in future. It is considered that students who follow these technological developments will be more beneficial to students with special needs.

INTRODUCTION

Today, technology is inevitable in everyday life. The use of technology has become a necessity for every professional group. Teachership is one of these groups that require effective and efficient use of technology. Teachers work in environments where new generation technology is used intensively and continue to live in such a society (Balay, 2004). In particular, the adverse conditions created by the Covid-19 pandemic have led to the change, revision and restructuring of the education system, and the acceleration of hybrid environments. Researchers conducted many academic studies on hybrid learning in our country, especially in the last fifteen years (Hebebci & Usta, 2015). This recalls the famous quote of the American educational theorist John Dewey: "*If we teach today's students as we taught yesterday's, we rob them of tomorrow.*" Therefore, it is quite natural to expect teachers to use technology effectively, considering that the age we live in is the age of technology, and children born in this age are individuals who use technology for consumption or production purposes.

Many technologies applied within the scope of general education are also used in the field of special education (Aslan, 2018). These technologies, which are used in special education, are called *"assistive technologies"* (AT) in a general framework (Özdamar, 2016; Tekinarslan & Yıkmış, 2005). AT refers to technologies that aim to help individuals with special needs, improve their quality of life and enable them to function better (Lancioni et al., 2013). In fact, it is an umbrella term that covers many technology-based products and services (Murugaiyan & Arulsamy, 2013). Accordingly, all kinds of technologies, equipment, systems and products that facilitate, develop and sustain the daily life skills of individuals with special needs are defined as AT (Pettersson & Fahlstrom, 2010; Reed & Bowser, 2005).

One of the dimentions that have the most important role in the effective integration of AT into lessons or classroom environments is teachers. Teachers adopting AT, having positive attitudes towards AT and successfully integrating AT into their lessons will pave the way for their students with special needs to use AT effectively at school and in daily life. Therefore, teachers must have positive attitudes towards AT. In such a situation, the issue that comes to the fore or needs to be taken seriously is the teacher's attitude towards AT. Teachers' effective use of AT varies depending on their attitudes towards AT (Aslan, 2018). Therefore, their attitudes towards AT must be positive so that they can use AT effectively in the field of special education.

Various studies have examined AT, focusing on the following variables: individuals' knowledge levels of AT (Alkahtani, 2013; Campbell, 2000; Ledger, 1999; Maushak et al., 2001), their perceptions (Kim et al., 2003), their opinions about AT (Çiçek et al., 2013; Demirkıran, 2005; Özdamar, 2016; Özgüç & Cavkaytar, 2011), the need (Özel et al., 2004), effectiveness (Özgüç, 2015), and usage of AT (Arı & İnan, 2010; Çakmak et al., 2014). On the other hand, many studies have examined attitudes towards AT. The participants of these studies are mostly special education teachers (Aslan, 2018; Çay et al., 2020; Demirok et al., 2019; Guggenberger, 2008; Ledger, 1999; Maushak et al., 2001; Memet & Şentürk, 2021; Sertkaya, 2021), teachers working in the field of special education (Bahçeci, 2019; Chukwuemeka & Samaila, 2020; Eryiğit, 2021; Kutlu et al., 2018; Onivehu et al., 2017; Otr, 2000), and general education teachers (Garcia & Seevers, 2005). The common finding is the positive attitudes towards AT. However, there is a dearth of research examining special education students' attitudes towards AT. Karakoç & Aslan (2017) studied the attitudes of fourth-grade students studying special education towards AT and found positive attitudes. The present research recruited special education students as the study group. Determining the attitudes of special education students towards AT will contribute to the development of the education services they offer especially to students with special needs.

Attitude towards AT can be considered an important factor in planning classroom activities for special education teachers. Teacher's attitudes towards AT and integrating it into their lessons also play

an important role in the planning and teaching of the content (Maloy et al., 2016). Based on the importance of special education teachers' attitudes towards AT (Campbell, 2000), it is vital to identify pre-service teachers' attitudes towards AT as they will be future special education teachers. Considering the intense integration of technology into lessons and educational environments, especially after the pandemic period (Aşkan & Usta, 2022), it is crucial to underline special education students' attitudes towards AT. Therefore, there is a need for more studies investigating attitudes towards AT. This research aims to examine preservice special education teachers' attitudes towards AT. To achieve this goal, answers to the following research questions were sought:

1. Do preservice special education teachers' attitudes towards AT differ significantly according to gender?

2. Do preservice special education teachers' attitudes towards AT differ significantly according to grade level?

3. Do preservice special education teachers' attitudes towards AT differ significantly depending on whether they take AT courses or not?

4. Do preservice special education teachers' attitudes towards AT differ significantly according to daily Internet use?

5. Do preservice special education teachers' attitudes towards AT differ significantly according to the frequency of following technological developments?

METHOD

Research Design

This study adopted the survey model. The survey model helps determining the views of the participants or their characteristics such as interests, skills and attitudes regarding a subject (Büyüköztürk et al., 2012; Fraenkel, Wallen, & Hyun, 2012).

Participants

The participants were 240 preservice special education students studying during the 2020-2021 academic year. The student characteristics, such as gender, grade level, whether they took AT (Assistive Technology) course, daily Internet usage time, and frequency of following technological developments, were presented below.

Table 1. *Participants' characteristics*

Variables	Categories	f	%
Gender	Male	106	44.2
	Female	134	55.8
Grade Level	First-grade	57	23.7
	Second-grade	60	25.0
	Third-grade	63	26.3
	Fourth-grade	60	25.0
Took AT Course	Yes	148	61.7
	No	92	38.3
Daily Internet Usage Time	0-2 hour-usage	88	36.7
	3-5 hour-usage	86	35.8
	6-7 hour-usage	66	27.5
Frequency of Following Technological Developments	Never followed	34	14.2
	Occasionally	114	47.5
	Frequently	92	38.3

As can be seen in Table 1, 44.2% (n=106) of the students were boys and 55.8% (n=134) were girls. The distribution of the students according to their grade levels was similar: There were 57

(23.7%) first-grade students, 60 (25%) second-grade students, 63 (26.3%) third-grade students, and 60 (25%) fourth-grade students. While 61.7% (n=148) of the students took courses related to AT, 38.3% (n=92) did not. There were differences in students' daily Internet use: 88 (36.7%) students in 0-2 hour-usage category, 86 (35.8%) students in 3-5 hour-usage category, and 66 (27.5%) students in 6-7 hour-usage category. 34 (14.2%) students never followed technological developments, 114 (47.5%) students followed it occasionally, and 92 (38.3%) students followed it frequently.

Research Instruments and Processes

The data were collected through the Attitude Scale Towards Assistive Technologies developed by Aslan & Kan (2017) and the Personal Information Form. The scale consisted of 18 (13 positive, 5 negative) items, including 4 dimensions (behavioral, affective, cognitive, and negative emotion components). It was a 5-point Likert type: "1: Strongly disagree; 2: Disagree; 3: Neutral; 4: Agree; 5: Totally agree" The total lowest score was 18 points, and maximum 90 points could be obtained. Obtaining high scores indicated positive attitudes towards AT. The reliability values of the scale were .80 for the behavioral dimension; .83 for the affective dimension; .71 for the negative emotion dimension; and .79 for the cognitive dimension. The Cronbach Alpha reliability coefficient for the entire scale was .88. The Personal Information Form was used for demographic information of the participants, such as gender, grade level, whether they took AT courses, their daily Internet usage time, and the frequency of following technological developments.

The data were collected online by the researchers during the 2020-2021 academic year. The scale was converted into an online format. Then, the link of the scale was shared with students through their emails. Also, the link was shared in various e-mail groups and on social media of special education departments. The emails included the following information: Participants were asked to fill in the attitude scale, participation in the research was completely voluntary, the information to be obtained would only be used for scientific purposes, and the questionnaire should be filled in completely. The link was kept active for 21 days and then was closed to access. During this time, 240 participants filled in the scale. After this number was deemed sufficient by the researchers, the scale form was closed to access and the data collection process was terminated.

Data Analysis

Data were analyzed via the IBM SPSS Statistics 22 program. Frequency (f), percentage (%), and comparison tests were used. Data were first checked in terms of missing items and extreme value analysis. Then, the normal distribution of the data was examined, using Kolmogorov-Smirnov and Shapiro-Wilk results. Data showed normal distribution. Thus, a t-test was used for variables such as gender and whether they took AT courses. One-way analysis of variance (ANOVA) was used to analyze the variables such as grade level, daily Internet usage time and frequency of following technological developments. A Post-Hoc test was used to determine between which groups there were significant differences. The significance level was considered .05.

FINDINGS

Table 2 shows whether special education students' attitudes towards AT differ in terms of grade level, daily Internet use and frequency of following technological developments.

As can be seen in Table 2, the frequency of following technological developments caused a significant difference in students' attitudes towards AT ($F(2, 237) = 11.044$, $p < .05$). according to Post-hoc Tukey's HSD tests, this difference was between students who frequently followed technological developments and those who followed them occasionally or never followed them. In other words, the mean attitude score of the students who frequently followed technological developments (M = 71.67, SD = 10.31) were higher than the students who followed them occasionally (M = 65.48, SD = 12.19) and never followed them (M = 62.64, SD = 11.37).

Daily Internet usage time did not have a significant difference in students' attitudes towards AT

(F(2, 237) = 1.287, p > .05). Although the mean attitude scores of the students who use the Internet for 6-7 hours a day (M = 69.07, SD = 11.46) was higher than the students who use 0-2 hours (M = 66.01, SD = 11.92) and 3-5 (M = 67.68, SD = 12.05) hours, it was not statistically significant.

For grade level, students' attitude scores towards AT did not show a significant difference (F(2, 237) = 1.287, p > .05). They had similar mean scores.

Table 2. *ANOVA results in terms of frequency of following technological developments, daily internet usage time and grade level variables*

Variables	Categories	n	Mean	sd	F	p	Meaningful Relationship
Frequency of Following Technological Developments	Never followed	34	62.64	11.37			Never followed-Frequently Occasionally- Frequently
	Occasionally	114	65.48	12.19	11.044	*.000*	
	Frequently	92	71.67	10.31			
Daily Internet Usage Time	0-2 hour-usage	88	66.01	11.92			
	3-5 hour-usage	86	67.68	12.05	1.287	.278	-
	6-7 hour-usage	66	69.07	11.46			
Grade Level	First-grade	57	68.77	12.81			
	Second-grade	60	67.18	11.37			
	Third-grade	63	66.12	11.13	.529	.663	-
	Fourth-grade	60	67.86	12.27			

Table 3 presented the t-test results performed to determine whether there was a difference in terms of taking AT courses and gender.

Table 3 reported no statistically significant difference in students' attitudes towards AT in terms of gender variable (t238 = .272; p > .05). Female and male students had similar scores. On the other hand, a significant difference was found between students' attitude scores in terms of taking AT courses (t238 = 1.961; p < .05). This difference was in favor of students who took AT courses. In other words, students who took AT courses (M = 69.34, SD = 11.10) had higher mean scores than those who did not take (M = 66.27, SD = 12.19).

Table 3. *t-test results in terms of gender and at course taking variables*

Variables	Categories	n	X̄	sd	df	t	p
Gender	Male	106	67.68	11.75	238	.272	.786
	Female	134	67.26	11.98			
Took AT Course	Yes	148	69.34	11.10	238	1.961	*.046*
	No	92	66.27	12.19			

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This study focused on special education students' attitudes towards AT regarding variables such as gender, grade level, daily Internet usage time, taking AT courses, and frequency of following technological developments. While students' attitudes towards AT differed significantly according to some variables (e.g., the frequency of following technological developments and whether they took AT courses), no statistically significant difference was found in terms of daily Internet usage time, grade level, and gender. These findings were discussed within the scope of the literature and suggestions were made.

Findings reported positive attitudes towards AT, which confirms the literature. Karakoç & Aslan (2017) found that special education fourth-grade students had positive attitudes towards AT. Besides, it has been reported in various studies that special education teachers (Aslan, 2018; Çay et al., 2020; Demirok et al., 2019; Guggenberger, 2008; Ledger, 1999; Maushak et al., 2001; Memet & Şentürk, 2021; Sertkaya, 2021), teachers working in the field of special education (Bahçeci, 2019; Chukwuemeka & Samaila, 2020; Eryiğit, 2021; Kutlu et al., 2018; Onivehu et al., 2017; Otr, 2000), and general education teachers (Garcia & Seevers, 2005) have positive attitudes towards AT. Accordingly, this study shares similar results with the literature, which is important in terms of efficient and correct

use of AT. The proficiency of teachers or pre-service teachers in the field of technology and their positive attitude towards technology can affect the use of AT (Kışla, 2008). Teachers' positive attitudes play an important role in integrating AT into lessons, planning the content as well as transferring the content (Maloy et al., 2016). In this sense, positive attitudes towards AT can be considered an important factor in special education teachers' organizing in-class activities (Kim et al., 2003), motivating students with special needs, peer acceptance and productivity in the classroom (Quenneville, 2001), and increasing student success (Garcia & Seevers, 2005). Therefore, teachers and especially students need to develop positive attitudes towards AT. The present study indicates that these attitudes are positive.

Findings showed that students' attitudes towards AT were not statistically significant in terms of daily Internet usage time, grade level, and gender. In terms of gender, mean scores of students' attitudes towards AT were similar. Similarly, students had similar mean scores in terms of grade level. Regarding daily Internet usage time, although the average score of the students' attitudes towards AT was high in favor of the students the Internet for 6-7 hours a day, this high average was not statistically significant. Various studies support these findings. For example, some studies have shown that the gender variable does not have a significant effect on attitudes towards AT (Aslan, 2018; Demirkıran, 2005; Karakoç & Aslan, 2017; Memet & Şentürk, 2021; Murugaiyan & Arulsamy, 2013; Onivehu et al., 2017; Sertkaya, 2021). This emphasizes the similarities between this research and the literature. These findings can be interpreted that the gender variable does not affect the attitudes of special education students towards AT. In other words, it does not predict their attitudes. Contrary to these findings, some studies have stated that the gender factor differs in attitudes towards AT (Alhossein & Aldawood, 2017; Bahceci, 2019; Campbell, 2000; Eryiğit, 2021; Özdamar, 2016). It is thought that these differences are due to the sample groups or the data collection tools.

Considering grade level, special education students' attitudes towards AT did not differ. There are studies in the literature that support this finding. For example, Guggenberger (2008) stated that the grade level did not make a significant difference. Maushak et al. (2001) found no statistically significant difference depending on the grade level. Accordingly, it can be said that this study and the literature share similar findings. That is, the grade level does not predict special education students' attitudes towards AT. It can be concluded that there is no change in the attitudes of special education students towards AT, no matter whether the grade level increases or decreases.

Regarding the duration of daily Internet use, students' attitudes towards AT did not differ significantly. In other words, the duration of daily Internet use did not have a statistically significant difference in special education students' attitudes towards AT. Although the average of attitudes of students who used the Internet for 6-7 hours a day was higher than the students who used the Internet for 0-2 hours and 3-5 hours, it was not statistically significant. In fact, the AT attitude score was expected to be high in favor of students who used the Internet more. However, no such finding was reached. The differences occurred between the students using the Internet more and the students using the Internet relatively less. Therefore, no connection was established between the duration of Internet use and the attitude towards AT. It can be stated that the time spent on the Internet is not a predictor of students' attitudes towards AT. Hence, there was no significant change in attitudes towards AT, no matter whether the duration of Internet use increased or decreased. In fact, the lack of difference can be associated with the fact that students generally use the Internet in different areas such as doing homework, playing games, and social media. From this point of view, while the time spent on the Internet for various purposes increases, this does not make any difference to the attitudes towards AT.

Other findings were that special education students' attitudes towards AT differed according to the frequency of following technological developments and whether AT courses were taken. Regarding the frequency of following technological developments, the mean scores of special education students' attitudes towards AT differed statistically. The mean attitude score of the students who frequently followed technological developments was higher than the students who followed them occasionally and

never followed them. Bahceci (2019) stated that teachers who use websites for current developments in the field had significantly higher scores compared to those who did not. This indicates that following technological developments is effective in developing a positive attitude towards AT. In other words, students who follow technological developments may have had more knowledge, skills, or behaviors about AT. This may have contributed to their positive attitudes towards AT. Based on this finding, it can be recommended that teachers, professionals working in the field of special education, and families follow technological developments. Considering technological developments, popular tools such as phones and tablets and tools that can be useful for children with special needs should be followed. Another suggestion might be to prioritize educational technologies. Thus, a positive contribution can be made to their attitudes towards AT.

Another finding was that the attitude point averages of special education students differed in terms of taking AT courses. This difference was in favor of students who took AT courses. The averages of the students who took the AT courses were higher than the students who did not take them. This finding confirms the literature. Memet & Şentürk (2021) observed that special education teachers who received in-service training on AT had a more positive attitude than teachers who did not. Similarly, Eryiğit (2021) found that the attitudes of special education teachers who received in-service training on AT were more positive than those who did not. According to Bahceci (2019), those who consider their technology education level good have a more positive attitude towards the use of AT compared to those who consider their technology education level medium or insufficient. Aslan (2018) concluded that teachers who received training on AT had higher attitude scores compared to those who did not. Investigating special education fourth-grade students' attitudes towards AT, Karakoç & Aslan (2017) stated that the attitude scores of the students who took the course were high and the difference was found to be significant. Therefore, the findings of this study are consistent with the findings in the literature. It can be interpreted that attitudes towards AT are affected by whether the individual took AT courses and that students who take courses have higher attitude scores. Based on these findings, it can be said that increasing the level of technology education will positively improve students' attitudes towards AT.

Findings reported no significant difference in the attitude towards AT according to the duration of daily internet use, grade level, and gender, but there was a significant difference regarding the frequency of following technological developments and taking AT courses. The scale used in this study has four different dimensions: behavioral, affective, negative emotion, and cognitive components. Further studies can examine whether different demographic variables have any significacae in these dimensions. Besides, experimental research can be conducted to examine the development of attitudes towards AT. Given that taking AT courses causes differentiation, special education students can be provided with AT courses. In-service training can be arranged for teachers.

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