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DETERMINING THE FACTORS THAT AFFECT THE ATTITUDE OF PRIMARY SCHOOL TEACHER CANDIDATES TOWARDS E-ASSESSMENT AND TECHNOLOGY

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Abstract

The aim of this study is to determine the attitudes of prospective primary school teachers towards technology and e-assessment in the distance education process. The study was designed according to the correlation method. The study was applied to students in all grades studying in the Department of Elementary Education of a state university in Turkey. In this study, "attitude scale towards technology", "attitude scale towards e-assessment and "demographic information form" were used to collect data. The results of the analysis showed that the relationship between the attitude towards e-assessment dependent variable and the independent variables of gender and continuous access to the internet was positive and direct. In addition, it was found that the relationship between the attitude towards technology and gender, the frequency of using technology and the frequency of using distance education was positive and directly related. It was observed that the independent variables of gender, grade level, frequency of distance education use, frequency of internet use positively affected the dependent variables of e-assessment and attitude towards technology. Accordingly, it can be said that these factors should be keep in mind in e-assessment and technology use.

Keywords: E-assessment, technology, attitude, pre-service elementary teacher.

INTRODUCTION

Presently, technological advancements hold the promise of distinguishing traditional education. It can be asserted that the integration of new technologies into educational settings is crucial for enhancing the efficacy of educational processes and simplifying the tasks of both students and teachers. Consequently, the incorporation of technology in educational institutions is essential to establish an advanced and contemporary education system (Musurmonov et al., 2021). Moreover, the active integration of technology into educational settings across various aspects of life fosters continuous learning. Arslan and Şendurur (2017) highlighted the close connection between technological advancements and the effectiveness of educational institutions, emphasizing that the impact is contingent on the institutions' qualifications. Particularly in the 21st century, the significance of technology in education is steadily increasing (Topçu & Ersoy, 2020). In an era where computer technologies play a vital role, technology-supported education has become indispensable on a global scale (Bhalla, 2013; Güllüpınar et al., 2013; Hew & Brush, 2007).

Educational technology plays a crucial role in providing students with interactive content, enhancing their comprehension of subjects. The use of audiovisual materials captures students' attention and facilitates their understanding. Moreover, educational technology allows for the customization of materials and learning pace according to individual student needs (Aktaş & Çoban Sural, 2023). This

individualized approach enables students to progress at their own speed, acquiring knowledge in a manner that aligns with their unique learning styles. Additionally, educational technology expands access for students facing learning difficulties due to factors like geographical location or physical barriers. Online resources, distance learning, and other technology-based methods empower students to learn from anywhere globally (Araz et al., 2023).

Technology tools create interactive learning environments, transforming students from passive listeners to active participants. The richness and variety of teaching materials provided by educational technology support classroom teaching, aiding teachers in planning lessons more effectively and efficiently. Furthermore, educational technology facilitates online interaction among students and teachers, improving collaboration and group work skills. It also offers innovative methods and tools, making teaching more effective, engaging, and student-centered (Ceylan et al., 2023). Notably, technology-supported teaching-learning environments contribute to enduring learning at the individual level (Cabı, 2016; Paydar & Doğan, 2019), and considering the ongoing development of technology, distance education initiatives also contribute significantly to individual growth.

Theoretical Background

Distance education is a field of education where students are provided with a curriculum using technology, without being physically in the same environment (Schumacker & Lomax 2010). Education increases student interaction through tools such as interactive learning tools, virtual classrooms and online forums. This enables students to build closer relationships with each other and with their teachers (Şenyurt & Şahin, 2022). Thanks to distance education, learners are able to manage the educational processes through the student-teacher, student-student and student-content interactions in asynchronous and synchronous environments (Çardak & Güler, 2022). Today, distance education is also defined as a form of teaching in which learners take part in learning activities together or independently via the internet (Clark, 2020; Orakçıoğlu, 2019). In addition to these, how important the content of applications is in distance education should not be overlooked.

While preparing content in distance education, it is known that transferring, introduction, original text, summary, exercises, evaluation questions and resources to be used should be included (Kocatürk Kapucu, & Uşun, 2020). These concepts are important to ensure the integrity of a lesson and to provide students with an effective learning experience. Each section should be carefully designed to enable students to understand, remember, apply and evaluate the topic. In the introduction part, the importance of the information to be given, why it should be known and learned is explained with the lives of the students. This is the part that will arouse students' interest and enable them to learn carefully. The main text part is the part where the content and subheadings are explained. In the original text, the content is in an informal form and there is a narration like speaking. In the summary part, explanations about the content described and the results of the discussion are included. In the exercises part, questions are included for students to repeat what they have read. The evaluation part includes the questions asked to enable students to see to what extent the goals under the learning goals heading have been achieved and to evaluate them. In the part of utilized resources, the sources used are given in this section with an explanation. Besides, the resources to be consulted for students who want to reach more detailed information are also given in this section (Kırbaç et al., 2023).

The role assumed by the teacher in distance education is very crucial in the success of the educational application. The teacher should start the session in a loud voice, informally, and frequently use student names (Akdemir, 2011). The teacher should look at the camera and make effective eye contact with the participants on the opposite side. Quick and unexpected movements should not be made. It should be spoken clearly, slowly, and regularly. The teacher should ask questions and wait for the answers to these questions (Çakır, Calp, & Doğan, 2015). In distance education, teachers can use video communication programs such as Zoom, Skype, FaceTime, and WhatsApp as alternative video conferencing (Kaya, 2012). It can be stated that teachers' motivation of students and increasing their motivation for learning will also contribute to the academic success of the student in the process of distance education (Amiryousefi & Geld, 2021).

In recent years, the rise of digitalization and distance education applications has transformed traditional assessment and evaluation methods and enabled us to turn to e-assessment applications. In this context, evaluations are required to determine whether distance education has achieved its general purpose. Evaluations made through distance education are also called e-assessment. E-assessment in distance education can be defined as evaluating student achievement and the distance education system (Altan & Seferoğlu, 2010). It is important to use different methods in this process to make the evaluation activities and teaching materials more objective and effective. It is very important for students and teachers to determine what and how much students have learned after distance education. This can provide feedback to both the student and the teacher. As a result of this evaluation, teachers choose to make educational activities more efficient, and students choose to overcome their learning deficiencies. The main objective of evaluation in distance education is to determine the success degree of education or practice objectively. For assessment in distance education to be impartial, the evaluation criterion should be prepared before starting the application (Çakır, Calp, & Doğan, 2015). In addition, high motivation and positive student attitudes also play a key role in the success of distance education.

Correctly using technology in educational processes allows both to obtain the highest efficiency from education and to conduct educational activities in compliance with the requirements of the age. Technologies frequently used in distance education environments are important for students to be accustomed to these tools. In this respect, it can be said that the technologies used in educational environments have a great benefit in the improvement of students' attitudes towards technology (Özdamlı, 2017). Improving the attitude towards technology in students brings along effective use of technology. The educational environment may be made more qualified by using certain technological materials according to the interests and needs of learners (Elçiçek, 2022).

It can be said that with the development of technology, distance education has gained importance and appealed to more students (Ersoy & Gürgen, 2021). In this context, the important and effective role assumed by the teacher in distance education increases the importance of teacher education. The training of prospective teachers should be versatile. Raising teachers who are asking, questioning, innovative, and most importantly with information skills will increase the quality of education and training. Teacher candidates should be familiar with distance education processes to be intertwined with technology, develop a positive attitude towards technology (Arslan at al., 2019; Bayram, at al., 2019; Kocayiğit & Uşun, 2020), and be able to reach and evaluate their students through distance education. Affective characteristics of students such as interest, attitude and anxiety are important in terms of getting effective results in education (Anderson & Bourke, 2013; Kasap, 2021). In addition, when distance education tools are employed in the distance education process, its relationship with students' performance requires the attitude variable to be kept in mind in the process (Hewson, 2012). On the other hand, the fact that individuals' attitudes towards the exam and their opinions affect the validity of the measurement makes the attitude variable important (Kurbanoğlu & Olcaytürk, 2023). In this context, students' attitudes towards e-assessment and their attitudes towards technology, which is thought to be directly related to the e-assessment process, should be kept in mind in the process of distance education.

As stated in the "2023 Education Vision of the Ministry of National Education of the Republic of Turkey", digital contents are interactive materials that have a strong pedagogical approach, prioritize conceptual depth and have subject integrity (Ministry of National Education, 2018). In this context, it can be said that it is easier to create digitally rich environments such as interactive experiments which are connected to real-life and difficult to perform in the physical environment, animations in which abstract concepts are visualized. Nowadays, with the advancement of technology, distance education has reached varying types of students with the different media and tools it offers. All these show that the easy access to information and communication technologies and the ability to use different technologies for educational purposes are effective in the widespread use of distance education applications (Seaman et al., 2018; Lee, 2017). The Covid-19 pandemic has led to widespread

recognition and acceptance of distance education as a method of learning and teaching. It has encouraged teachers, students and parents to engage with digital education tools and platforms.

Existing Research

Due to the Covid-19 outbreak, there has been a shift from face-to-face education to distance education in many countries. In this process, students from elementary school to university students in Turkey as well as education and training activities as well as in other countries has continued through distance learning. Thus, elementary teacher candidates' attitudes towards technology and e-assessment in the distance education were discussed in this study. When the researches related to this study and the literatures on distance education are examined, it is seen that the following topics are mostly emphasized: Application and history of distance education (Yıldırım et al., 2023). Realization of foreign language teaching through distance education (Şen Ersoy, 2023; Kasap, 2020), selection of distance education environments (Yeşil & Balcı Karaboğa, 2023), internet-based distance education (Akdemir, 2011), distance education in higher education (Cabı, 2016), attitudes towards distance education (Kokoç, 2019) and web-based distance education systems (Altan & Seferoğlu, 2010). However, when the research are examined, it draws attention to the paucity of any research examining the relationship between teacher candidates' attitudes towards e-assessment and the attitudes towards technology and the factors affecting this relationship. Barriers to distance education were identified in four areas: technical, instructional, communicative and environmental (Elçiçek, 2022). It was found that students' reading and listening skills developed well in distance English courses, but they had difficulty in writing (Karabacak, 2022). Otyakmaz (2022) stated that the students communicated well with their teachers in distance education and were satisfied with the learning process. Although the students experienced some problems in the distance education process, they were satisfied because it provided the opportunity to repeat and provided a flexible learning environment (Turan, 2022). Yiğit (2022), in his study with undergraduate students, stated that students have a negative attitude towards distance education. In addition, Bilgiç (2022), in his study on undergraduate students, stated that students have a negative attitude towards distance education due to various problems.

In the distance education, it can be said the materials and content used will greatly contribute to student motivation, attitude and learning. In addition, it can be said that this study is important in measuring elementary teacher candidates' attitudes towards technology and e-assessment in the process of distance education. In this connection, it is hoped that this study will make important contributions to researchers and teacher candidates. It is thought that the study can make important contributions to researchers about what theoretical or practical measures can be taken by determining the relationship between elementary teacher candidates' attitudes towards e-assessment and technology, and it will be useful for elementary teacher candidates in recognizing the factors that affect the process of distance education. Furthermore, considering the importance of continuing distance education in the epidemic period all over the world, it is vital to reveal the factors affecting the attitudes of elementary teacher candidates towards e-assessment in the study and to resolve the difficulties and deficiencies in this field and to develop solutions for this. However, there is no study that analyzes the mutual effects and relationships of these variables on the model, especially by using structural equation modeling. With this feature, it is predicted that this study will make important contributions to the field. In this context, the study aims to reveal the relationships between elementary teacher candidates' attitudes towards e-assessment and attitudes towards technology and some demographic variables.

Purpose of the Study

The purpose of this study is to investigate and understand pre-service primary school teachers' attitudes towards the integration of technology and e-assessment methods into the distance education process. As the educational environment evolves, it is crucial to examine how pre-service teachers perceive and interact with technology-supported learning environments, especially in the context of distance education. It is extremely important to assess teachers' technological competencies, investigate their attitudes towards technology and examine their perspectives on e-assessment. Identifying the perceived barriers and facilitators that affect pre-service classroom teachers' readiness to integrate technology and

e-assessment into their teaching practices is important for the effectiveness of the teaching process. It can provide useful information for the development of teacher education programs that aim to improve primary school teachers' technological readiness and pedagogical skills for effective participation in distance learning environments. It will not only provide a better understanding of pre-service teachers' attitudes towards technology and e-assessment, but also shed light on strategies for educators to find ways to improve distance education.

METHOD

Design of the Study

In the study, one of the quantitative research methods, the relational (correlational) method was employed. The relational method is a study that investigates the relationship between two or more variables without interfering with the variables. One of the aims of the relational method is to help explain human behavior or predict its consequences (Fraenkel at al., 2012). Correlational studies are divided into two as exploratory and predictive. The multifactorial predictive design was employed in this study. The multifactor predictive design used in this study aims to test a model in which multiple variables can predict each other. This design evaluates how well one or more independent variables can predict the dependent variable. That is, this study may aim to understand the predictive power of multiple variables on each other. This type of design provides researchers with the opportunity to examine the interrelationships of a set of variables and to assess the extent to which these variables influence each other. This method is a powerful research tool for understanding the complexity of multiple variables and their interactions with each other.

Participants

This study was conducted in the spring semester of the 2021-2022 academic year with students studying in the classroom teaching department of a state university in Ankara. The data were collected on a voluntary basis according to the convenience sampling method. The demographic characteristics of the participants are shown in Table 1.

Table 1. Descriptive information of the study participants

Variable	Category	N	%
Gender	Male	88	19.8
	Famale	356	80.2
Grade Level	1st grade	82	18.5
	2nd grade	174	39.2
	3rd grade	119	26.8
	4th grade	69	15.5
Continuous Access to the Internet	Yes	321	72.3
	No	123	27.7
Frequency of Using Distance Education	Never	6	1.4
	A Few Times a Week	263	59.2
	Everyday	175	39.4
Weekly Use of the Internet	1-7 hours	85	19.1
	8-21 hours	127	28.6
	22-35 hours	126	28.4
	More than 36 hour	106	23.9
Total		444	100

Data Collection Instruments

In the current study, the "attitude towards technology scale" was employed to determine elementary teacher candidates' attitudes towards technology, and the "attitude towards e-assessment scale" and "demographic information form" were used to determine their attitudes towards e-assessment. The permissions were obtained from the authors for the scales used in the study. Information about the instruments used to collect data is presented below:

Demographic Information Form: This form was developed by the researchers. In the demographic information form, there are items to elicit information about the participants' gender and grade level, if they have continuous access to the Internet, their frequency of using distance education, and their frequency of using the internet. The variables discussed in the study and the model established were selected and established according to previous studies and the theoretical framework. In this context, the variables in the above-mentioned demographic information form were included in the study by examining the relevant literature, considering that attitudes towards e-assessment and technology would be affected by technology-related variables and distance education process.

Attitude Scale towards Technology: To determine the attitudes towards the technology of the elementary teacher candidates, "The Technology Attitude Scale", which was developed by Aydın and Kara (2013), was employed for teacher candidates. The scale has 17 items and is one-dimensional. A confirmatory factor analysis was conducted, and the following goodness of fit index were obtained; chi-square / df = 4.55, RMSEA = .097, GFI = .86, AGFI = .81, CFI = .94, NNFI = .93, SRMR = .066. The Cronbach Alpha reliability coefficient of the scale was found to be .87. Within the scope of this study, confirmatory factor analysis was conducted. The number of items of the scale did not change. Goodness of fit indices were chi-square / df = 4.03, RMSEA = .090, GFI = .88, AGFI = .85, CFI = .95, NNFI = .94, SRMR = .060. The reliability in this study was found to be .90.

Attitude Scale Towards E-Assessment: "Attitude Scale towards E-Assessment for University Students" developed by Bahar (2014) was used to determine elementary teacher candidates' attitudes towards e-assessment. The scale has 23 items. An exploratory factor analysis was conducted and the scale was found to have a four-dimensional structure. While the first factor explained 27.1% of the total variance, the scale items as a whole explained 59.5% of the total variance. However, it was found that the factor loads in the scale varied between .52 and .88. The first factor included "exam characteristics", the second-factor "individual / physical" characteristics, the third factor "technical and environmental" features, while the fourth factor included the "pressure" dimension. Confirmatory factor analysis was not conducted in this scale development process. However, confirmatory factor analysis was conducted for this study. The goodness of fit indices of the scale were chi-square / df = 2.88, RMSEA = .066, GFI = .90, AGFI = .90, CFI = .96, NNFI = .95, SRMR = .058. The Cronbach Alpha reliability coefficient of the scale was found to be .85. The reliability of the scale in this study was found to be .88.

Data Collection Process

Data collection tools were applied online to students who volunteered after obtaining the ethics committee permission from the relevant institution, since universities started distance education due to Covid19. Although more than one scale was employed in the data collection process, due to the low number of items in the scales, the scales were given to the participants at the same time and they were filled in, and it took approximately 10 minutes for the participants to fill out the scales.

Analysis of the Data

The structural equation model was employed to test the relationship between dependent (attitude towards technology and attitude towards e-assessment) and independent (gender, grade level, whether they have their own computers, whether they have continuous connection to the internet, the frequency of using distance education and how often they use the internet) variables. For this purpose, firstly, data cleaning was performed in the data set and the missing-extreme values were extracted. After data cleaning analysis, structural equation modeling analyzes were conducted with a total of 444 students. During the data analysis process, dependent (latent) and independent (observed) variables were determined. In this context, principal components factor analysis was run on the items of the scale, which were set as dependent variables, and thus, the dimensions were determined. To determine the correlation between the verified latent variables and the observed variables, the structural equation model [SEM] was used. In SEM studies, one or more models are tested, and in the analyzes conducted in this context, it is revealed whether the models in question are verified by the data and whether the assumed relationships in the theoretical universe are also present in the data set obtained as a result of empirical observation (Şimşek, 2007). In this connection, a model was developed based on the

theoretical framework and review of the literature. In the structural equation model, various fit indices are used to decide whether the model predicted by the researcher is validated by the collected data. There is no definite rule as to which indexes should be used in studies on this subject. In this study, the indexes suggested by Kline (2011) were used to reveal the correlation between attitude towards e-assessment and attitude towards technology. These are chi-square fit test ((χ2 (df) and p, χ2 (df) / df), root mean square of prediction error (RMSEA (90.00% confidence interval)), comparative fit index (CFI), standardized root means square error (SRMR). A value of χ2 (df) / df of 5.00 shows an acceptable fit, and a 2.00 of a perfect fit. For RMSEA, a value of .10 indicates acceptable fit and a value of .05 indicates perfect fit. The value of .90 for CFI shows an acceptable fit and .95 value shows a perfect fit. For SRMR, .05 value means a perfect fit, and .10 value means acceptable fit (Kline, 2011). The data were analyzed by using SPSS 23.0, Mplus 7 version, and LISREL 8.71 package programs.

RESULTS

In this part, the findings from the analysis of the data are included.

Findings on Examination of Factors Affecting Attitudes Towards E-Assessment by Confirmatory Factor Analysis (MIMIC Model)

The variables predicted before the analysis of the data, the attitude towards technology (ATT) and the e-assessment attitude (EEA) and the characteristics of the exam (CE), which are the e-assessment sub-dimensions, physical properties (PP), technical characteristics (TC) and pressure (P) Correlation analysis was done to evaluate the relationships between the sub-variables. The relationship between the variables was analyzed using the Pearson Product-Moment correlation analysis method. The relationships between the predictor and predicted variables are given in Table 2.

Table 2. Examination of the relationship between variables with Pearson product-moment correlation.

			r		
Variables	**1**	**2**	**3**	**4**	**5**
1. CE	1	.03	.38**	.26**	.06
2. PI		1	.34**	.39**	.06
3. TC			1	.59**	.23**
4. P				1	.25**
5. ATT					1

**p < .01

The analysis of the correlation values presented in Table 2 shows that there is a small positive and statistically insignificant correlation (r= .03, p>.05) between examination characteristics and physical characteristics score. There was a moderate positive and statistically significant correlation between examination characteristics and technical characteristics scores (r=.38, p<.01), a small positive and statistically significant correlation between examination characteristics and pressure subscale scores (r=.26, p<.01), a small positive and statistically significant correlation between examination characteristics and attitude towards technique scores (r=.06, p>.05), and a moderate positive and statistically significant correlation between physical characteristics and technical characteristics scores (r=.34, p<.01). Moderate positive and statistically significant correlations between physical characteristics and pressure sub-dimension scores (r=.39, p<.01), low positive and statistically significant correlations between physical characteristics and attitude towards technique (r=.06, p>. 05), a positive and statistically significant moderate correlation between technical characteristics and pressure sub-dimension (r=.59, p<.01), and a positive and statistically significant low correlation between technical characteristics and attitude towards technology (r=.23, p<.01). There is a positive and statistically significant low level correlation between the pressure sub-dimension and attitude towards technology (r=.25, p<.01).

In the study after analysing the relationship between the dependent and independent variables, the effect on the independent variables such as gender, class level, frequency of using technology, frequency of using distance education and the internet, and the attitude towards technology and e-assessment attitude

variables, which are the dependent variables, was examined by path analysis. The path diagram is shown in Figure 1.

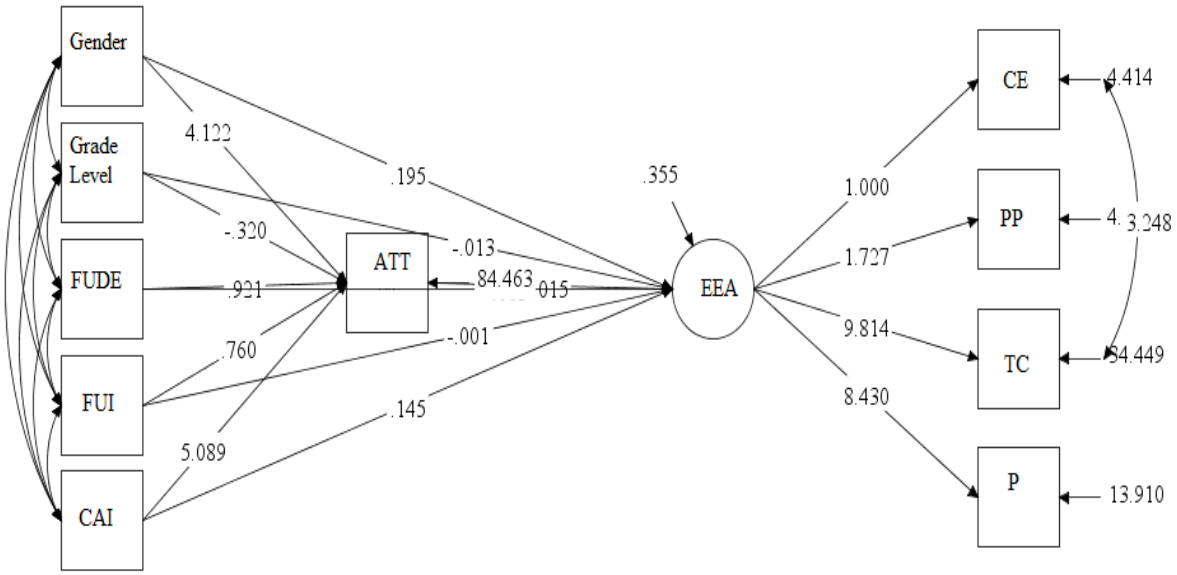

Figure 1. DFA (MIMIC model) diagram of factors affecting attitudes towards e-assessment and using technology.

When the findings in Figure 1 are examined, the CFA (MIMIC model) was used to reveal how the primary school teacher candidates' attitudes towards e-assessment and technology are affected by the variables of gender, class level, frequency of using technology, frequency of using distance education and frequency of using the internet and the relationships between the variables were tried to be determined. In this context, all variables in the tested model were defined as observed variables. First of all, before the analysis of the model, the measurement model was examined with confirmatory factor analysis. The p value for the $\chi 2$ value ($\chi 2$ (727) = 2098.73) was found to be significant ($p<.05$). When the $\chi 2$ value in the model is divided by the degrees of freedom ($\chi 2$ / df =2098.73 / 727= 2.88), it shows that the model fit is acceptable. Considering the size of the sample (450), examining other fit indices will contribute to the evaluation of the model. Accordingly, RMSEA= .050 for the model; CFI = .956; NFI = .919; SRMR= .028 was determined. In this case, it can be said that the ratio of the $\chi 2$ value to the degrees of freedom and the RMSEA value is at an acceptable level, and the CFI and NFI values are at an excellent level. In this direction, the analysis reveals that the model fits well with the data set.

After analyzing the performance index values of the model, we examined the parameters of the model and the parameter estimates of the trajectories defined in the model. In the structural model obtained, statistically significant differences were found between gender and attitude towards technology, frequency of technology use and attitude towards technology (ATT), attitude towards technology and attitude towards e-assessment, gender and attitude towards e-assessment, frequency of technology use and attitude towards e-assessment. However, no statistically significant differences were observed between the other variables. Table 3 presents the parameter estimates, including regression coefficients and t-values obtained from the structural model.

Table 3. Parameter estimations for the structural model.

Path	Unstandardized Regression Coefficients	Standardized Regression Coefficients	t
Gender←ATT	4.122	.165	3.768*
GL←ATT	-.320	-.031	-.696
FUDE ←ATT	.921	.047	1.008
İFU ←ATT	.760	.080	1.658
FUT←ATT	5.089	.308	6.961*
EAA←ATT	.015	.241	4.423*
Gender←EAA	.195	.122	2.292*
GL←EAA	-.013	-.019	-.360
FUDE ←EAA	-.063	-.051	-.910
İFU ←EAA	-.001	-.002	-.037
FUT ←EAA	.145	.138	2.432*

*p <.05

Note: GL: grade level, FUDE: frequency of using distance education, IFU: frequency of using the Internet, FUT: frequency of using technology, (ATT) and (EEA)

The parameter estimates of the resulting model, listed in Table 3, including unstandardized and standardized regression coefficients and t-values, were examined. Total, direct and indirect effects were then analyzed to assess the predictive power of the model parameters. Total, direct and indirect effects are presented in Table 4.

Table 4. Total, direct and indirect effects on the structural model.

Independent Variable	Dependent Variable	Direct	Indirect	Total	Standard Error
Gender	ATT	.16	.....	.16	1.10
GL	ATT	-.03	.....	-.03	.46
FUDE	ATT	-.04	.....	-.04	.91
IFU	ATT	.08	.....	.08	.45
FUT	ATT	.03	.....	.03	.76
EAA	ATT	.24	.....	.24	.005
Gender	EAA	.12	.03	.15	.09
GL	EAA	-.01	-.001	-.1	.03
FUDE	EAA	-.05	.01	.04	.07
IFU	EAA				
FUT	EAA				

Total and direct effect values given in Table 4 are the variables of gender (ß = .16, p <.01), frequency of using technology (ß = .03, p <.01), and attitudes towards technology variables (ß = .24, p <.01) shows that it affects the attitude variable towards e-assessment positively and directly.

Gender (ß = .12, p <.01) shows that it affects the variable of attitude towards e-assessment positively and directly. The frequency of using technology (ß =-.13, p <.01) shows that e-assessment directly affects the attitude variable negatively. When we look at the effect values here, the Eta square (η^2) effect size takes a value ranging from 0.00 to 1.00. A value up to .01 is interpreted as a small effect, a value of .06 as a medium effect, and a value of .14 and above as a large effect size (Büyüköztürk, 2017). The effect of gender on the variable of attitude towards technology was found to be η^2=.22 and it can be said that this has a wide effect.

The effect of frequency of use of technology and attitude towards technology variable was found as η^2=.29 and it can be said that this has a wide effect. The effect of the variable of attitude towards technology on the variable of attitude towards E-assessment was found as η^2=.23 and it can be said that this has a wide effect. The effect of gender on the e-assessment attitude variable was found to be η^2=.24 and it can be said that this has a wide effect. The effect of the variable of frequency of using technology on the variable of attitude towards e-assessment was found to be η^2=.06 and it can be said that this has a moderate effect. It also explains 24% of the total variation of the predictor variables on the predicted variables (R^2 = .24).

DISCUSSION, CONCLUSION, and RECOMMENDATIONS

In this part of the study, relationships between dependent variables (attitude towards technology and e-assessment) and independent variables (gender, class level, having their own computer, having continuous access to the internet, frequency of using distance education and using the internet) used in the research were determined. In determining these relations; Pearson product-moment correlation, path diagram of the factors affecting attitudes, parameter estimates related to the structural model, and conclusions, discussions and suggestions regarding the total, direct and indirect effects of the structural model are included.

In this study, the relationship between the variables was analyzed using Pearson Product Moment Correlation. The results showed that there was a positive and statistically insignificant weak correlation between test characteristics and physical characteristics, a positive and statistically insignificant weak correlation between test characteristics and attitude towards technology, a positive and statistically significant moderate correlation between test characteristics and technical characteristics scores, and a positive and statistically weak correlation between test characteristics and pressure subscale scores. In the study, a moderate positive and statistically significant correlation was found between physical characteristics and technical characteristics and between the scores of physical characteristics and pressure sub-dimensions. In addition, a low level positive and statistically insignificant correlation was observed between physical characteristics and attitude towards technology; a moderate level positive and statistically significant correlation between technical characteristics and pressure sub-dimensions; a low level positive and statistically significant correlation between technical characteristics and attitude towards technology sub-scores; and a low level statistically significant positive correlation between pressure sub-dimensions scores and attitude towards technology scores. Similar to these results, gender, computer and Internet were found to be effective for e-assessment, while school level and distance education were found to be neutral (Başar, et al., 2019; Berkant, 2013; Graham & Jones, 2011; Korkmaz & Altun, 2013; Tselonis, 2008).

The study analyzed the relationship between e-assessment and attitude towards technology and gender, grade level, technology use, distance learning use and frequency of Internet use through path analysis. DFA (MIMIC model) was conducted to reveal how the primary school teacher candidates' attitudes towards e-assessment and their attitudes towards technology were affected by the variables of gender, grade level, frequency of using technology, frequency of using distance education and frequency of using the internet, and the relationships between the variables were determined. When the $\chi 2$ value in the model was divided by the degrees of freedom ($\chi 2$ / df =2098.73 / 727= 2.88), it was observed that the model fit is acceptable. When the size of the sample (450) is considered, it can be said that examining other fit indices will contribute to the evaluation of the model. Accordingly, RMSEA= .050 for the model; CFI = .956; NFI = .919; SRMR=.028 was determined. In this case, it can be said that the ratio of the $\chi 2$ value to the degrees of freedom and the RMSEA value are at an acceptable level, and the CFI and NFI values are at an excellent level. In this direction, the results of the analysis show that the model fits well with the data set. After the goodness of fit index values of the model were examined, the model parameters and parameter estimates of the paths obtained in the model were examined. Accordingly, in the structural model obtained, there were statistical differences between gender and attitude towards technology, frequency of using technology and attitude towards technology, attitude towards

technology and attitude towards e-assessment, gender and attitude towards e-assessment, frequency of using technology and attitudes towards e-assessment. However, it was not statistically significant among other variables. In other studies conducted in parallel with this study, it was shown that the independent variables of gender, distance education and internet were effective on technology attitude, but grade level, computer and internet access did not have any effect (Bahar & Asil, 2018; Boz, 2019; Dolezal, 2011; Erten, 2019). Looking at other studies, it was concluded that the technological competencies of classroom teachers showed a significant difference in favor of male teachers according to the gender variable (Saykal & Uluçınar Sağır, 2021). In the study, it was emphasized that the technological competencies of classroom teachers increased as the time spent in front of the computer increased (Saykal & Uluçınar Sağır, 2021). In their research, İşigüzel (2014) concluded that there is a positive relationship between the time teachers spends in front of the computer and the levels of their technological competencies. It shows that the perspective on technology differs according to gender and male pre-service teachers have a more positive view of technology than female pre-service teachers (Aksoğan & Bulut Özek, 2020). This result of our research supports the studies of Özer (2018).

The study analyzes the parameter estimates of the structural model for the correlation between variables. Accordingly, in the obtained structural model, positive significant difference was observed between gender and attitude towards technology, frequency of using technology and attitude towards technology, attitude towards technology and attitude towards e-assessment, gender and attitude towards e-assessment and frequency of using technology and attitudes towards e-assessment. While the research finding obtained is supported by some research results in the literature (Sırakaya et al., 2014; Wen & Tsai, 2006), it also differs with some research results (Biçer & Korucu, 2020; Dermo, 2009). Furthermore, a significant correlation was found between attitude towards technology and gender and frequency of using distance education, and a non-significant relationship between class level, having one's own computer, the possibility of continuous access to the internet and the frequency of using the internet. Other studies reported similar results (Aktaş et al., 2020; Altun, 2011; Bakioğlu & Çevik, 2020; Gök & Erdoğan, 2008; Gök & Kılıç Çakmak, 2020; Moçoşoğlu & Kaya, 2020; Sorbie, 2015). However, different research findings were found in some studies (Dermo, 2009). It can be said that the results obtained from the parameter guesses and t values obtained according to the structural model are positively significant.

Finally, the total, direct and indirect effects on the structural model were examined regarding the relationship between variables. As a result, a positive and direct effect was found between gender and attitude towards e-assessment. In the study, a negative direct effect was observed between technology use frequency and attitude towards e-assessment. Similar to these results, Yassine (2020) stated that the correlation between attitudes towards technology and access to the Internet and gender is positive. In addition to these results; it was found that students studying in the final year had higher technology perspectives and technology usage skills than first year students (Aksoğan & Bulut Özek, 2020). The reason for this is thought to be that senior students acquire more skills by using technology in their lessons. There is a positive relationship between pre-service teachers' attitudes towards technology and their ability to use technology (Aksoğan & Bulut Özek, 2020). In contrast to this study, Örün et al., (2015) emphasized in their study that class level has no relationship with students' attitudes towards technology.

Studies in which the relationship between e-assessment and attitude towards technology dependent variables and the frequency of continuous use of the internet are examined, and which disagree with this result (Alston, 2017; Boese, 2018; Başar et al., 2019; Karadağ & Yücel, 2020; Karatepe et al., 2020; Jordan, 2014). Furthermore, it has been found that the frequency of using technology has a wide effect on the variable of attitude towards technology, and the variable of attitude towards technology has a wide effect on the variable of e-assessment. It was concluded that the effect of gender on the e-assessment attitude variable was large and the effect of the technology usage frequency variable on the e-assessment attitude variable was moderate. In other studies, it is seen that the independent variables of gender, internet and computer have a large effect on the dependent variables of e-assessment and

attitude towards technology (Başaran et al., 2020; Nikou & Economides, 2018; Ryan, 2016), moderate (Al-Emran & Salloum, 2017; Nikou & Economides, 2018) and small impact studies (Hwang & Chang, 2011; Timmers et al., 2013). It can be stated that this situation determined in the research also explains the total change in independent variables and dependent variables.

The results revealed that the independent variables of gender, class level, having access to the internet, frequency of using distance education, using the internet and having their own computers have a positive effect on the dependent variables of e-assessment and attitude towards technology. In this direction, it can be said that these factors should be taken into account in the use of e-assessment and technology. Considering the factors that affect teacher candidates' attitudes towards technology and e-assessment in primary school teacher training programs, necessary studies should be carried out to increase the skills related to these variables. An important result obtained in the research is that the attitude variable towards technology has a high effect on the e-assessment attitude variable. In this direction, since increasing the attitudes of teacher candidates towards technology will lead to an increase in their attitudes towards e-portfolio, activities that will enable pre-service teachers to develop positive attitudes towards technology should be included in teacher training, and various applications should be included in the lessons by ensuring that technology is adapted to various courses in order to increase these skills of teacher candidates.

The study is limited to primary teacher candidates attending a state university in Ankara. Therefore, different results are likely to occur in different groups. In this direction, a different study can be carried out with branch teachers as well as classroom teacher candidates. Then, the attitudes of these two groups of pre-service teachers can be compared. However, besides this study, different variables can be handled and factors affecting attitudes can be revealed. As a result, in the study, especially technology-related independent variables should be emphasized in order to ensure that the attitude towards e-assessment and technology is at higher levels. Various studies should be conducted on how these variables can be developed during my university and previous school periods, and activities should be carried out to increase these skills in various courses. It is thought that the attitudes of both variables will increase if the skills towards technology and e-assessment are increased through the trainings to be given to teacher candidates. In addition, attitudes towards distance education, academic achievement, motivation towards e-assessment performance level, anxiety variables can be added to the dependent variables discussed in this study and the relationships between them can be examined. It is believed that the study will contribute to the literature since the results obtained by analyzing the independent variables affecting the attitude towards e-assessment and technology together reveal the effect between each other. In addition, the factors that prevent teacher candidates from developing negative attitudes towards e-assessment and technology can be determined, and solutions can be developed in order to have more effective results in the process of distance education.

Limitations

The study was applied only to students in the basic education department of a specific state university. Therefore, the generalizability of the results may be limited. The study was conducted on students from only one Turkish university. Students from different geographical regions or with different cultural backgrounds may have different views. The independent variables considered in the study include only gender, continuous access to the Internet, frequency of technology use and frequency of distance education. In addition to these variables, other factors can be taken into account (e.g. how long teachers have been exposed to technology in initial education, the level of technology teaching in the classroom, etc.). Students' attitudes towards technology and online assessment are based on their own perceptions and experiences. This may not fully reflect students' actual attitudes.

Recommendations

Considering that pre-service teachers have a positive attitude towards technology and e-assessment, more content and application materials should be developed in these areas in education programs. The impact of factors such as gender, Internet access, frequency of technology use and frequency of distance education on student attitudes should be taken into account. Policies and practices should be developed

to ensure equality among these factors in education. Pre-service teachers should be given more comprehensive trainings on technology and e-assessment. These trainings will increase the skills and competencies of pre-service teachers on these issues. Current teachers and pre-service teachers should be provided with continuous training opportunities in technology and e-assessment. This will enable them to keep up with innovations in education and adopt best practices. To support pre-service teachers' positive attitudes towards technology and e-assessment, technological infrastructure and resources in educational institutions should be strengthened. Regular research on pre-service teachers' attitudes towards technology and e-assessment should be conducted and educational policies and practices should be updated in line with the findings. Students' opinions and feedback on this issue should be taken regularly. This would provide valuable information on how technology use and e-assessment in education can be effectively implemented.

Ethics and Conflict of Interest

This study was designed in accordance with ethical rules. Ethical permission was obtained from Hacettepe University on 21.04.2020 with the decision numbered 3583172-300 before it was put into practice in the data collection process. The contributions of the authors to the article are equal. There are no potential conflicts of interest related to the research, writing and/or publication of this article.

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