Journal of Learning and Teaching in Digital Age, 2023, **8**(2), 276-283
https://dergipark.org.tr/en/pub/joltida
ISSN: 2458-8350 (online)

Research Paper

Examination of the Relationship between the Technology Competencies of Special Education Undergraduate Students and Their Views on Distance Education

Cem Aslan*[a]

[a](ORCID ID: 0000-0002-0300-5873), Gazi University, Turkey, cemaslan@gazi.edu.tr
*Corresponding author

ARTICLE INFO

Received: 12 December 2022
Revised: 10 February 2023
Accepted: 10 February 2023

Keywords:
Technology competency
Distance education
Special education
Undergraduate student

doi: 10.53850/joltida.1216837

ABSTRACT

This study aimed to examine the relationship between the technology competencies of special education undergraduate students and their views on distance education. This study employed the correlational research model. The study group consists of 212 students who study at the special education department in various universities in Turkey during the academic year of 2020-2021. The study used the "Basic Technology Competencies for Educators Inventory" and the "The Distance Education Evaluation Scale." Pearson correlation coefficient was computed to determine the relationships among the dependent and independent variables. We implemented standard multiple regression analysis to predict distance education's views by the dimensions of technology competencies. Technology competencies inventory's word processing sub-dimension significantly and positively indicated the distance education scale's technical sub-dimension. There was no statistical significance for other sub-dimensions. Technology competencies inventory's basic computer operation skills and media communication sub-dimensions significantly and positively; networking sub-dimension significantly and negatively predicted the distance education scale's learning process sub-dimension. There was no statistical significance for other sub-dimensions.

INTRODUCTION

Today, technology is constantly developing, and new technologies are added daily. Developing technologies change our lives a little more. While computer technologies improve rapidly, they are becoming more complex each day (Bakia et al., 2011). Computer technologies increase the quality of life of individuals, facilitate their lives, and offer individuals various opportunities. For example, using information technologies in educational settings has advantages such as making lessons more attractive, simplifying reaching goals, preventing time loss, and providing more permanent learning (Katranci & Uygun, 2013). Many studies revealed that information technologies improve students' cognitive abilities and self-learning skills (Almerich et al., 2016; Kemp et al., 2019; Wang et al., 2013).

The use of these technologies depends on teachers' attitudes (Buabeng-Andoh, 2012). It was also stated that as the competence levels of teachers increase, their attitudes toward technology would also increase (Lau & Sim, 2008). Capo and Orellana (2011) stated that people with advanced technology competencies can use these technologies more efficiently. However, various views exist around the concept of technology competence. For example, technology is defined as *the competencies that prospective teachers will need to teach with technology in their future classrooms* (Foulger et al., 2017). Huka and Kirongo (2018) viewed technology competencies as *"a set of knowledge, skills, behaviors, and attitudes related to task success or failure."* According to Algozzine et al. (1999), technology competence is defined as *"the skills related to fundamental computer operation and a series of computer software that enables individuals to use computers more effectively in professional activities."* These skills include different sub-skills such as basic computer use skills, skills in the use of databases, the understanding of technological legal and ethical issues, and skills in spreadsheet and word processing, media communication, internet networking, maintenance and troubleshooting, and telecommunication. Some use the term technology competence to refer *"to the capacity of an individual (or a collective) to handle certain situations successfully or complete a certain task or job."* (Ellstrom & Kock, 2012).

In short, distance education can be held anywhere through technological connections without the time and place limitations (Ilhan et al., 2021). Applications of and research on distance education have developed with computers and the Internet. Several definitions of distance education exist in the literature. The concept of distance education is referred to by different names, such as web-based learning, e-learning, and online learning. Distance education generally refers to *"experienced learning through the internet."* (Singh & Thurman, 2019). Distance education is defined as *"a planned teaching-learning process that requires regular, meaningful, and supportive instructor-student and student-student interactions by utilizing one or more instruments of technology as channels for learning when students are separated from the instructor."* (Karaaslan et al., 2022). Distance education is defined as *"a method or model of teaching where students and teachers are physically separated."* (Yılmaz et al., 2020). Distance education includes multidimensional operations such as programmed texts, TV, computer software, and web-based learning. The interactions can be real time (synchronous) or independent of time and space (asynchronous) (Griffiths, 2016).

Technology competencies are significant for distance education, which has become increasingly widespread in the last few years (Heckel & Ringeisen, 2019). However, the widespread use of distance education principally for educational practices started in the 2000s. Distance education is not a novel approach. The COVID-19 pandemic, which has recently affected the entire world, has increased the importance of distance education. During this period, various restrictions and quarantines were enforced to reduce the pandemic and its risk factors. For example, the COVID-19 pandemic led to the closure of schools globally, and the implementation of social distancing measures has created essential changes in forms of education. As a result, there has been a significant increase in the number of distance education applications (Viner et al., 2020). Incredibly, more than half a billion children have had to become virtual school students while taking shelter in their homes (Cohen & Kupferschmidt, 2020). The compulsory transition to distance education brought many advantages and limitations, and many teachers, families, and students were unprepared for this sudden change. Additionally, the pandemic has revealed the importance of education technologies. Individuals with high technical proficiency levels can quickly adapt to the distance education process. In contrast, individuals with low technology proficiency levels may need more time and energy to adapt to this process (Şahin, 2021).

In other words, while some degree of self-learning skills is required to benefit from distance education, it also requires technological competence. Moreover, technology automatically reduces cognitive load (Van Merrienboer & Sweller, 2005). Excessive cognitive load can decrease learning performance. Students with low technology proficiency face learning how to use technology before being able to focus their attention on what they are expected to learn. Thach and Murphy (1995) cited simple technology competence among distance education competencies in their research. Similarly, Perreault et al. (2002) in their research to find potential causes of failure in distance education stated that students and teachers have deficiencies in technology competencies.
A successful transition to distance education is influenced by the user's intention and how the technology is used (Kemp et al., 2019). For example, if students do not trust the technology they use or do not feel a sense of cognitive involvement or social connection, this may negatively affect their learning outcomes (Bower, 2019). Ultimately, if students believe that they have the knowledge, skills, and resources to support them, they will positively affect their application use (Alghamdi et al., 2020; Yakubu & Dasuki, 2019). If technology is used effectively, students and teachers can mutually collaborate (Botero et al., 2018; Bower, 2019; Gonzalez et al., 2020). To increase the success level of distance education, it is crucial to analyze the factors related to the competence of the instructors, the content, student motivation, and the use and acceptance of technology. Analyzing these factors can be used to ensure the success of distance education. Paechter and Maier (2010) compared distance education with face-to-face learning and determined that students' perceptions of distance education were positive. In some studies, it was revealed that there is no significant difference between the success levels of distance education and traditional education practices (Bernard et al., 2004).

The ability of both instructors and students to effectively use technology is essential for participation in distance education (Karaaslan et al., 2022). Before starting distance education, students who participate in such education may need training and assistance in using the relevant learning tools or platforms (Heckel & Ringeisen, 2019). However, such education or assistance content is not usually readily available to university students. It can be considered that students with different technical competencies and readiness levels are exposed to necessary distance education practices. Therefore, students' views on distance education may differ. This situation can be associated with the students having different technology competencies. In this context, determining the relationship between students' technology competencies and their views on distance education is significant, as it can identify which dimensions of technology competencies are related to which factors of distance education. Students with a high technical proficiency can make more effort in the distance education process. To improve students' views on distance education, the following is necessary. For example, it is essential to make inferences about technology competencies besides the usage areas of this variable. Accordingly, this research may provide some findings for administrators, principals, and teachers who are the decision makers regarding the distance education process. In addition, the results obtained from the research are expected to make a meaningful contribution to the literature. In this direction, this study aimed to examine the relationship between the technology competencies of special education undergraduate students and their views on distance education. Thus, the effect of students' essential technology competencies on distance education can be discussed.

RESEARCH METHOD

Research Model

This study employed the correlational research model. This model can measure two variables by implementing the statistical correlation without manipulating them (Price et al., 2018).

Participants

The study group is consists of 212 students who participated in synchronous distance education applications in the 2020-2021 academic year. These students study at the special education department in various universities (three state universities) in Turkey. 51.9% of the students are female, and 48.1% are male. Furthermore, 51.4% of the students participating in the study are under 22, 48.6% are over 21. Besides, of the students participating in this study, 27.8% are in 1st, 26.4% are in 2nd, 22.6% are in 3rd, and 23.1% are in 4th grade.

Data Collection Tools

In this study, two data collection tools were used. Information on these data collection tools is given below.

Basic Technology Competencies for Educators Inventory: The scale adapted to Turkish by Tekinarslan (2008) consists of 48 items and nine sub-dimensions: 1) Basic computer operation skills, 2) Setup, maintenance, and troubleshooting, 3) Word processing, 4) Spreadsheets, 5) Database, 6) Networking, 7) Telecommunication, 8) Media communication, and 9) Social, legal, and ethical issues. The scale offers both a sub-dimension score and a total score for technology competency. All items in the scale used a 4-point scale: 1 (not competent), 2 (somewhat competent), 3 (competent), and 4 (very competent). Factor loads values, which explain the relationship of the items with the factors, are expected to be high (Büyüköztürk, 2002). The factor loads of items in the scale range between .36 and .92. Item-total correlation coefficients provide evidence of whether the items measure the feature to be measured or not—the item-total correlation coefficients of the scale range from .41 to .69. The reliability coefficient for the overall scale was calculated as .97. The internal reliability coefficients of the nine dimensions in the scale were calculated and respectively found α=.87,. 90, .90, .96, .97, .95, .88, .90, and .91 for each dimension. Test-retest reliability coefficients of the nine dimensions in the scale were calculated respectively.

The Distance Education Evaluation Scale: Ozkul et al. (2020) developed a scale of 15 items and two sub-dimensions. *The first dimension* (six-item) measures the technical of distance education, while *the second dimension* (nine-item) measures the learning process in distance education. The items in the scale are formed in a five-point Likert-type. Factor loads values, which explain the relationship of the items with the factors, are expected to be high (Büyüköztürk, 2002). The factor loads of items in the scale range between .57 and .97. Item-total correlation coefficients provide evidence of whether the items measure the feature to be measured or not—the item-total correlation coefficients of the scale range from .55 to .87. The reliability coefficient for the overall scale was calculated as .96. The internal consistency Cronbach alpha coefficient of the scale for learning process sub-dimension is calculated as .96, and technical sub-dimension is calculated as .89. Test-retest reliability coefficients of the scale for learning process sub-dimension are calculated as .86, and technical sub-dimension is calculated as .84.

Data Analysis

The SPSS 20.0 software program was used for the statistical analysis of the study data. Before analyzing the data, the data set was examined for probable erroneous coding and incomplete or deviant values. The Mahalanobis distance was used to identify any extreme values on the study variables. The data of two students were excluded as a result. For reliable regression analysis, it is recommended that the sample size be *"N = 50 + 8 * (number of independent variables)*." (Tabachnick & Fidell, 2007). Accordingly, a sufficient sample is then met. Whether the relationship between the predictor variables and the dependent variable was linear and whether the scores showed a normal distribution were examined (Fraenkel & Wallen, 2006). The Kolmogorov-Smirnov and Shapiro-Wilk tests analyzed whether the Distance Education Evaluation Scale scores and the sub-dimension scores of the Technology Competencies Inventory were normally distributed. In addition to normality tests, the skewness and kurtosis values (between -1.5 and 1.5) were examined. In the analysis results, it was found that the data were normally distributed. *(r)* was used as the variables being studied were normally distributed. The researchers computed the Pearson correlation coefficient to determine the relationships between the dependent and independent variables. There should be no correlation of 0.80 or above between independent variables predicting the dependent variable (Tabachnick & Fidell, 2007). Therefore, the correlation between the independent variables of this study was examined. The correlations of the subscales forming these two scales with each other ranged between 0.27 and 0.57. Therefore, the data obtained in this study was suitable for regression analysis. To investigate this more carefully, the variance inflation factor (VIF) and tolerance were assessed. The VIF value should be less than 10, and the tolerance value should be higher than 0.10. (Akbulut, 2010). In the analysis, the highest VIF value was 4.80, and the lowest tolerance 0.20. According to this result, it was concluded that there was no multicollinearity problem (VIF < 10; Tolerance > 0.10). The present data satisfied these conditions. Multiple regression analysis was implemented to predict the views on distance education using the dimensions of technology competencies. Standardized *Beta (β)* coefficients and *t-test* results related to their significance were used to interpret the results of the regression analyses. It tested the collected data at the 0.05 significance level.

FINDINGS

Table 1 shows the independent and independent variables' arithmetic mean and standard deviation values and the correlation coefficients.

Table 1. Arithmetic Mean, Standard Deviation and Correlation Values of the Variables

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	$\bar{x}$	*Sd*
1.Basic computer operation skills	1											24.5	5.5
2.Setup, maintenance, and troubleshooting	.78**	1										18.6	5.6
3.Word processing	.80**	.69**	1									17.7	3.5
4.Spreadsheets	.55**	.73**	.66**	1								15.1	4.4
5.Database	.36**	.59**	.44**	.77**	1							13.4	4.7
6.Networking	.69**	.76**	.76**	.74**	.63**	1						16.9	3.7
7.Telecommunication	.53**	.68**	.60**	.74**	.70**	.70**	1					14.2	3.9
8.Media communication	.65**	.75**	.69**	.74**	.63**	.81**	.80**	1				15.5	3.8
9.Social, legal, and ethical issues	.44**	.67**	.48**	.72**	.67**	.66**	.75**	.71**	1			13.7	4.7
10.Technical	.52**	.53**	.57**	.51**	.39**	.48**	.50**	.49**	.44**	1		21.5	5.9

11.Learning process	.36**	.34**	.32**	.30**	.30**	.27**	.37**	.42**	.32**	.54**	1	24.3	11.1

*n=212;**p<.05*

According to the Table 1, the average basic computer operations skills dimension *(x̄=24.5)* in the students' technology competency dimensions was higher than the other dimensions. Regarding the views on distance education, the highest mean score was in the learning process dimension *(x̄=24.3)*. Also, as seen in the Table 1, a positive and significant relationship was found between the sub-dimension of technology competency and the sub-dimension of views on distance education. This difference was observed in all dimensions.

Prediction of Technical Sub-Dimension

Multiple regression analysis was used to determine how healthy technology competencies predicted views on distance education. Table 2 shows the multiple regression analysis results for predicting technical sub-dimension. In addition, the results obtained from the analysis of the *B* and *beta* correlation coefficients and significance levels of the study variables are summarized below.

Table 2. Multiple Regression Analysis Results Predicting Technical Sub-Dimension

Variables	*B*	*SE*	*β*	*t*	*p*
Constant	4.04	1.78	-	2.26	.02*
Basic computer operation skills	.12	.12	.11	1.02	.30
Setup, maintenance, and troubleshooting	.11	.12	.10	.88	.37
Word processing	.60	.19	.35	3.14	.02*
Spreadsheets	.14	.15	.10	.90	.36
Database	.02	.12	.01	.19	.84
Networking	-.25	.18	-.16	-1.40	.16
Telecommunication	.26	.16	.17	1.60	.10
Media communication	-.11	.18	-.07	-.60	.54
Social, legal, and ethical issues	.10	.12	.08	.84	.39

*F=14.886;*p<.05;R=.63;* R^2*=.37*

As a result of the analysis, a significant regression model ($F_{(9,202)}$ = 14.886, p <0.05) and 37% of the variance in the dependent variable ($R^2_{adjusted}$ = 0.37) were explained by the independent variables. Only the technology competencies inventory's word processing sub-dimension significantly and positively predicted the distance education scale's technical sub-dimension (β = .60, $t_{(202)}$ = 3.14, p < 0.05). In other words, with the increase in word processing proficiency, the participants' views on the technical dimension of distance education increased. There was no statistical significance in the other sub-dimensions.

Prediction of Learning Process Sub-Dimension

Table 3 shows the multiple regression analysis results for predicting the learning process sub-dimension. The results obtained from the analysis of the *B* and *beta* correlation coefficients and significance levels of the study variables are summarized below.

Table 3. Multiple Regression Analysis Results in Predicting Learning Process Sub-Dimension

Variables	*B*	*SE*	*β*	*t*	*p*
Constant	2.89	3.75	-	.77	.47
Basic computer operation skills	.60	.26	.30	2.29	.02*
Setup, maintenance, and troubleshooting	-.11	.40	-.05	-.44	.65
Word processing	.19	.40	.06	.47	.63
Spreadsheets	-.35	.32	-.14	-1.08	.27
Database	.44	.25	.18	1.75	.80
Networking	-1.16	.38	-.39	-3.01	.00*
Telecommunication	.20	.34	.07	.60	.54
Media communication	1.21	.39	.41	3.09	.00*
Social, legal, and ethical issues	.19	.25	.08	.78	.43

*F=7.255;*p<.05;R=.49;* R^2*=.21*

As a result of the analysis, a significant regression model ($F_{(9,202)}$ = 7.255, p < 0.05) and 21% of the variance in the dependent variable ($R^2_{adjusted}$ = 0.21) were explained by the independent variables. The technology competencies inventory's basic computer operation skills (β = 0.60, $t_{(202)}$ = 2.29, p < 0.05) and media communication (β = 1.21, $t_{(202)}$ = 3.09, p < 0.05) sub-dimensions significantly and positively predicted the distance education scale's learning process sub-dimension. In other words, with the increase in basic computer operation skills and media communication proficiency, the participants' views on the learning process dimension of distance education increased. On the other hand, the technology competencies inventory's networking sub-dimension significantly and negatively predicted the distance education scale's learning process sub-dimension (β = -1.16, $t_{(202)}$ = -3.01, p < 0.05). According to this finding, with the increase in networking proficiency, the participants' views on the learning process dimension of distance education decreased. There was no statistical significance in the other sub-dimensions.

DISCUSSION AND CONCLUSION

This study aimed to examine the relationship between the technology competencies of special education undergraduate students and their views on distance education. The study results showed that the students' basic computer operation skills sub-dimension scores were higher than the other dimensions. This finding is consistent with Menzi et al. (2012), who examined technology competencies and concluded that pre-service teachers had sufficient primary computer and word processing skills. Karagul (2020), who examined teacher candidates' perceptions regarding basic technology competencies, found that the most competent area was basic computer operation skills. The study, in which the validity and reliability studies of the Technology Competencies Scale were conducted, determined that the basic computer operation skills dimension had a higher average (Tekinarslan, 2008). Similarly, Ozdemir (2017) concluded that basic computer operation skills were heightened. Kocak and Onen (2013) reported similar results. Accordingly, there is a similarity between the results obtained from the study and the research findings in the literature. The fact that the basic computer operation skills of the students participating in this study were higher than the other sub-dimensions can be considered a favorable situation in reaching the goals of the distance education process and in increasing success in distance education.

According to the study results, the learning process sub-dimension had the highest average, and the technical sub-dimension had the lowest mean among the views on distance education. Therefore, when the literature was examined, similar findings of related studies using the data collection tool (Ozkul et al., 2020) used in this study could not be found. However, several studies were found in which distance education was discussed and participant opinions were examined. These studies used different data collection tools such as interviews (Durak & Ataizi, 2016; Hamutoglu et al., 2019), surveys (Karakus et al., 2020; Prior et al., 2016), and scales (Heidari et al., 2021; Kirali & Alci, 2016). In addition, the results of these studies differed. However, in these studies, it was observed that there was generally positive feedback about learning experiences related to distance education. Therefore, it can be concluded that the results obtained from this study are similar to the findings in the literature. In addition, it can be seen as a positive result that special education undergraduate students have a high opinion of distance education in the dimension of the learning process.
In many studies in the literature, technology competencies have been addressed as a whole (Heidari et al., 2021; Karagul, 2020). In other words, the researchers examined the technology competencies holistically without considering the sub-dimensions. Unlike the studies in the literature, in this study, the researchers evaluated technology competencies and their sub-dimensions and examined the relationship between each dimension. The research conducted in this aspect is key and will also contribute to the literature. In addition, we see this situation as the factor that makes the study more original.

In the study, it was seen that significant relationships were obtained when all variables in the model were together. Thus, it can be stated that the model is meaningful when all the basic technology competency variables are together. This finding indicates that when technology competencies are considered as a whole, it predicts the opinions of special education undergraduate students about distance education. In addition, as a result of the analysis, in the learning process and technical sub-dimensions, a significant regression model was found. Based on these findings, it can be concluded that the opinions on the distance education scale's technical and learning process dimensions are predicted in terms of technology competency. It determined that the variance explained in the technical sub-dimension was higher than the learning process dimension. This finding can be associated with the general structure of distance education. Technical difficulties may be similar for all individuals participating in the distance education process. It was stated in several studies in the literature that there are technical problems in the distance education process (Dilmac, 2020; Ozdogan & Berkant, 2020). Therefore, it can be interpreted that special education undergraduate students with high technological competencies see themselves as technically better. Some sub-dimensions of technology competencies might have affected the students' evaluations of distance education. However, it was also observed that not all dimensions were significant in terms of the sub-dimensions. For example, the technology competencies inventory's word processing sub-dimension significantly and positively indicated the distance education scale's technical sub-dimension. Furthermore, basic computer operation skills and media communication sub-dimensions significantly and positively and the networking sub-dimension significantly and negatively predicted the distance education scale's learning process sub-dimension. According to this result, with the rise in word processing proficiency, the participants' statements in the technical dimension of distance education increased. In addition, with the increase in basic computer operation skills and media communication proficiency, the participants' views in the learning process dimension of distance education increased; with the rise of networking ability, the participants' statements in the learning process dimension of distance education decreased. These findings also show us a difference between the predicted variables in the sub-dimensions. In this context, predictive technology proficiency variables should be considered in applications to be developed for distance education. In addition, considering technology competencies can provide more powerful and meaningful data. This consideration can ensure that the opinions on distance education are positive by developing technology competencies.

It can connect negative views on the distance education process and the lack of technology competencies. For example, Perreault et al. (2002) stated that one reason for the failure of distance education is the lack of technical competencies. In the distance education process, students are frequently faced with technology-related problems such as computer system-related problems, connection problems, file upload and download problems, insufficient technical support, and incompatibility problems (Dilmac, 2020; Yolcu, 2020). These problems faced by students can acquire negative opinions towards their distance education. Since users with high technology competencies are less affected by these factors, their views on distance education may not impact these negativities.
Teachers are critical resources for using technology in teaching. (Gardner et al., 1993). Hofer and Grandgenett (2012) recognized that teachers' technological knowledge contributes to better integrating technology into education. This situation is even more pronounced for special education teachers. Today, many teachers working in special education utilize several assistive technologies such as computers and the Internet in their classes (Yilmaz et al., 2021). Teachers include various technology practices during the education process, and the use of technology in special education is becoming increasingly common. Accordingly, the fact that

special education teachers have technology competencies can be expressed as an essential factor in the success of the education process. In some studies in the literature, it has been stated that teachers with special needs students have insufficient knowledge about technology (Flanagan et al., 2013). In addition, technology competencies are significant for distance education, which has become increasingly widespread in the last few years (Heckel & Ringeisen, 2019). Significantly, the COVID-19 pandemic, which has recently affected the entire world, has increased the importance of distance education. Additionally, the pandemic has revealed the importance of education technologies. Therefore, the relationship between technology competencies and distance education can be discussed. For example, Thach and Murphy (1995) cited simple technology competence among distance education competencies in their research. Similarly, Perreault et al. (2002) stated that students and teachers have deficiencies in technology competencies in their research to find potential causes of failure in distance education. Oostveen et al. (2019) found a positive relationship between technology competencies and success in online education. On the other hand, if technology is used effectively, students and teachers can interact and collaborate (Botero et al., 2018; Bower, 2019). According to this, special education teachers working in the field should gain technology competencies through pre-service or in-service training. In this way, it can support the development of technology competencies of special education teachers both in the current pandemic conditions and in the regular education process.

SUGGESTIONS

When the findings obtained from the study were evaluated, it was found that there was a positive and significant relationship between the basic technology competencies of special education undergraduate students and their opinions on distance education. In addition, it can be concluded that technology competencies significantly predicted the technical and learning processes for distance education. Especially in the last few years, with the spread of distance education, technical competencies in education have increased. Accordingly, it stands out that should improve the technology competencies of special education undergraduate students, teachers, experts, and even families working in the field of special education. As a result of the compulsory transition to distance education with the pandemic process, many teachers, families, and students were unprepared for this sudden change. However, educational institutions that provide distance education should consider that individuals have different technology competencies. In addition, these institutions should facilitate technology training to develop competencies before starting the distance education process. Teachers can improve their technology competencies through technology courses and by acquiring relevant state-issued certifications in word processing and computer operation, participating in education programs, and using internet resources. In this way, they can enable students to build technology competencies and prevent performance differences from arising from this situation. In addition to these suggestions, researchers can investigate the relationships between basic technology competencies and distance education regarding different variables in future research. The sub-dimensions of basic technology competencies that affect it can determine distance education. The extent to which these competencies predict the success or effect of distance education should be examined further. In addition, it can plan the quality of distance education applications.

Ethics Committee Approval Information: Ethics committee approval for this study was received from the Ethics Committee of Hakkari University (Date: April 1, 2021; Number: 2021/29, Approval Number: 01.04.2021-5033)

REFERENCES

Akbulut, Y. (2010). *Sosyal bilimlerde SPSS uygulamaları: Sık kullanılan istatiksel analizler ve açıklamalı SPSS çözümleri [SPSS applications in social sciences: Frequently used statistical analyzes and annotated SPSS solutions]*. İdeal Kültür.

Alghamdi, A., Karpinski, A. C., Lepp, A., & Barkley, J. (2020). Online and face-to-face classroom multitasking and academic performance: Moderated mediation with self-efficacy for self-regulated learning and gender. *Computers in Human Behavior, 102*, 214-222. https://doi.org/10.1016/j.chb.2019.08.018

Algozzine, B., Lonnie, R., Flowers, C. P., Gretes, J. A., Hughes, C. D., & Lambert, R. (1999). Developing technology competencies in a college of education. *Current Issues in Education, 2*(3), 1-12. https://www.proquest.com/openview/49529bf9387854cb09449c369edf119c/1?cbl=41688&pqorigsite=gscholar

Almerich, G., Orellana, N., Suárez-Rodríguez, J., & Díaz-García, I. (2016). Teachers' information and communication technology competences: A structural approach. *Computers & Education, 100*, 110-125. https://doi.org/10.1016/j.compedu.2016.05.002

Bakia, M., Murphy, R., Anderson, J., & Trinidad, G. E. (2011). *International experiences with technology in education: Final report.* U.S. Department of Education, Office of Educational Technology and the Office of Planning, Evaluation and Policy Development, Policy and Program Studies Service. https://www.oerknowledgecloud.org/archive/iete-full-report.pdf

Bernard, R. M., Abrami, P. C., Lou, Y., Borokhovski, E., Wade, A., Wozney, L.,...& Huang, B. (2004). How does distance education compare with classroom instruction? A meta-analysis of the empirical literature. *Review of Educational Research, 74*(3), 379-439. https://doi.org/10.3102/00346543074003379

Botero, G. G., Questier, F., Cincinnato, S., He, T., & Zhu, C. (2018). Acceptance and usage of mobile assisted language learning by higher education students. *Journal of Computing in Higher Education, 30*(3), 426-451. https://doi.org/10.1007/s12528-018-9177-1

Bower, M. (2019). Technology-mediated learning theory. *British Journal of Educational Technology, 50*(3), 1035-1048. https://doi:10.1111/bjet.12771

Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development Using Information and Communication Technology, 8*(1), 136-155. https://eric.ed.gov/?id=EJ1084227

Büyüköztürk, Ş. (2002). Faktör analizi: Temel kavramlar ve ölçek geliştirmede kullanımı [Factor analysis: Basic concepts and using to development scale]. *Kuram ve Uygulamada Eğitim Yönetimi*, *32*(32), 470-483.

https://dergipark.org.tr/en/pub/kuey/issue/10365/126871

Capo, B. H., & Orellana, A. (2011). Web 2.0 technologies for classroom instruction: High school teachers' perceptions and adoption factors. *Quarterly Review of Distance Education, 12*(4), 235-253. https://nsuworks.nova.edu/fse_facarticles/8/

Cohen, J., & Kupferschmidt, K. (2020). Countries test tactics in 'war'against COVID-19. *Science, 367(*6484), 1287-1288. https://doi:10.1126/science.367.6484.1287

Dilmac, S. (2020). Students' opinions about the distance education to art and design courses in the pandemic process. *World Journal of Education, 10*(3), 113-126. https://doi.org/10.5430/wje.v10n3p11

Durak, G., & Ataizi, M. (2016). Learner views about a distance education course. *Contemporary Educational Technology, 7*(1), 85-105. https://hdl.handle.net/11421/11150

Ellstrom, P. E., & Kock, H. (2012). Competence development in the workplace: Concepts, strategies and effects. *International Perspectives on Competence Development: Developing Skills and Capabilities, 9*(1), 5-20. https://doi.org/10.4324/9780203523032

Flanagan, S., Bouck, E. C., & Richardson, J. (2013). Middle school special education teachers' perceptions and use of assistive technology in literacy instruction. *Assistive Technology, 25*(1), 24-30. https://doi:10.1080/10400435.2012.682697

Foulger, T. S., Graziano, K. J., Schmidt-Crawford, D., & Slykhuis, D. A. (2017). Teacher educator technology competencies. *Journal of Technology and Teacher Education, 25*(4), 413-448. https://eric.ed.gov/?id=EJ1166372

Gardner, D. G., Dukes, R. L., & Discenza, R. (1993). Computer use, self-confidence, and attitudes: A causal analysis. *Computers in Human Behavior, 9*(4), 427-440. https://doi.org/10.1016/0747-5632(93)90033-O

Gonzalez, T., De La Rubia, M. A., Hincz, K. P., Comas-Lopez, M., Subirats, L., Fort, S., & Sacha, G. M. (2020). Influence of COVID-19 confinement on students' performance in higher education. *Plos One, 15*(10), 1-23. https://doi.org/10.1371/journal.pone.0239490

Griffiths, B. (2016). A faculty's approach to distance learning standardization. *Teaching and Learning in Nursing*, *11*(4), 157-162. https://doi.org/10.1016/j.teln.2016.04.004

Hamutoglu, N. B., Gultekin, G. S., & Savascı, M. (2019). Öğretmen adaylarının uzaktan eğitime yönelik görüşleri: Açıköğretim uygulamaları [The views of teacher candidates toward distance education: Open education practices]. *Yükseköğretim Dergisi, 9*(1), 19-28. https://doi.org/10.2399/yod.18.023

Heckel, C., & Ringeisen, T. (2019). Pride and anxiety in online learning environments: Achievement emotions as mediators between learners' characteristics and learning outcomes. *Journal of Computer Assisted Learning, 35*(5), 667-677. https://doi.org/10.1111/jcal.12367

Heidari, E., Mehrvarz, M., Marzooghi, R., & Stoyanov, S. (2021). The role of digital informal learning in the relationship between students' digital competence and academic engagement during the COVID-19 pandemic. *Journal of Computer Assisted Learning*, 1-13. https://doi.org/10.1111/jcal.12553

Hofer, M., & Grandgenett, N. (2012). TPACK development in teacher education. *Journal of Research on Technology in Education, 45*(1), 83-106. https://doi.org/10.1080/15391523.2012.10782598

Huka, G. S., & Kirongo, A. C. (2018, June). *Competence network for e-inclusion and assistive technologies*. [Conference presentation abstract]. 3rd Interdisciplinary International Scientific Conference.

Karaaslan, M. M., Çelik, İ., Kurt, Ş., Yavuz, A. Y., & Bektaş, M. (2022). Undergraduate nursing students' experiences of distance education during the COVID-19 pandemic. *Journal of Professional Nursing*, *38*, 74-82. https://doi.org/10.1016/j.profnurs.2021.11.010

Karagul, S. (2020). Türkçe öğretmeni adaylarının temel teknoloji yeterlik düzeyi algılarının incelenmesi (Burdur örneği) [Examination of Turkish teacher candidates' perceptions of basic technology proficiency level (Burdur example)]. In G. L. Uzun, B. U. Bozkurt, E. Arica Akkok & O. Dag Tarcan (Eds.), *Türkçenin eğitimi öğretiminde kuramsal ve uygulamalı çalışmalar [Theoretical and applied studies in teaching Turkish education]*. Ankara University.

Karakus, N., Ucuzsatar, N., Karacaoglu, M. O., Esendemir, N., & Bayraktar, D. (2020). Türkçe öğretmeni adaylarının uzaktan eğitime yönelik görüşleri [Turkish teacher candidates' views on distance education]. *Rumeli Dil ve Edebiyat Araştırmaları Dergisi, 19*, 220-241. https://doi.org/10.29000/rumelide.752297

Katranci, M., & Uygun, M. (2013). Sınıf öğretmenlerinin Türkçe derslerinde teknoloji kullanımına yönelik görüşleri [Classroom teacher's perspectives about using technology in turkish lessons]. *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi, 6*(11), 773-797. https://doi.org/10.14520/adyusbd.460

Kemp, A., Palmer, E., & Strelan, P. (2019). A taxonomy of factors affecting attitudes towards educational technologies for use with technology acceptance models. *British Journal of Educational Technology, 50*(5), 2394-2413. https://doi.org/10.1111/bjet.12833

Kirali, F. N., & Alci, B. (2016). Üniversite öğrencilerinin uzaktan eğitim algısına ilişkin görüşleri [University student opinions regarding the perception of distance education]. *İstanbul Aydın Üniversitesi Dergisi, 8*(30), 55-83. https://dergipark.org.tr/en/pub/iaud/issue/30078/324645

Kocak, C., & Onen, S. A. (2013). Evaluation of the basic technology competency of teacher candidates according to their personal innovativeness. *AWERProcedia Information Technology & Computer Science, 3*, 879-883. http://archives.un-pub.eu/index.php/P-ITCS/article/viewFile/1865/1653

Lau, B. T., & Sim, C. H. (2008). Exploring the extent of ICT adoption among secondary school teachers in Malaysia. *International Journal of Computing and ICT Research, 2*(2), 19-36. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.372.5339&rep=rep1&type=pdf

Menzi, N., Caliskan, E., & Cetin, O. (2012). Öğretmen adaylarının teknoloji yeterliliklerinin çeşitli değişkenler açısından incelenmesi [Examination of the competencies of pre-service teachers in terms of some variables]. *Anadolu Journal of Educational Sciences International, 2*(1), 1-18. https://dergipark.org.tr/tr/pub/ajesi/issue/1526/18732

Oostveen, R., Barber, W., Childs, E., DiGiuseppe, M., & Colquhoun, K. (2019, September). *Exploring the fully online learning community model: Comparing digital technology competence and observed performance on PBL tasks* [Conference presentation abstract]. International Conference on Web-Based Learning. Springer, Cham. https://link.springer.com/chapter/10.1007/978-3-030-35758-0_36

Ozdemir, S. (2017). Basic technology competencies, attitude towards computer assisted education and usage of technologies in Turkish lesson: A correlation. *International Education Studies, 10(*4), 160-171. http://hdl.handle.net/11772/1675

Ozdogan, A. C., & Berkant, H. G. (2020). Covid-19 pandemi dönemindeki uzaktan eğitime ilişkin paydaş görüşlerinin incelenmesi [The examination of stakeholders' opinions on distance education during the covid-19 epidemic]. *Milli Eğitim Dergisi, 49*(1), 13-43. https://doi.org/10.37669/milliegitim.788118

Ozkul, R., Kirnik, D., Donuk, O., Altunhan, Y., & Altunkaynak, Y. (2020). Uzaktan eğitim uygulamalarına ilişkin öğretmen görüşleri: Ölçek çalışması [Teachers' views on distance education applications: Scale study]. *Electronic Turkish Studies*, 1*5*(8), 3655-3667. https://dx.doi.org/10.7827/TurkishStudies.46557

Paechter, M., & Maier, B. (2010). Online or face-to-face? Students' experiences and preferences in e-learning. *The Internet and Higher Education, 13*(4), 292-297. https://doi.org/10.1016/j.iheduc.2010.09.004

Perreault, H., Waldman, L., Alexander, M., & Zhao, J. (2002). Overcoming barriers to successful delivery of distance-learning courses. *Journal of Education for Business, 77*(6), 313-318. https://doi.org/10.1080/08832320209599681

Price, P. C., Jhangiani, R., & Chiang, I. C. A. (2018). *Research methods in psychology*. BCcampus, Victoria.

Prior, D. D., Mazanov, J., Meacheam, D., Heaslip, G., & Hanson, J. (2016). Attitude, digital literacy and self efficacy: Flow-on effects for online learning behavior. *The Internet and Higher Education, 29*, 91-97. https://doi.org/10.1016/j.iheduc.2016.01.001

Singh, V., & Thurman, A. (2019). How many ways can we define online learning? A systematic literature review of definitions of online learning (1988-2018). *American Journal of Distance Education, 33*(4), 289-306. https://doi.org/10.1080/08923647.2019.1663082

Şahin, K. (2021). *İngilizce öğretmenlerinin teknoloji yeterliği özdeğerlendirme düzeyleri ve bu konudaki görüşlerinin incelenmesi: Aksaray ili örneği [Technological competency self-evaluation levels of english language teachers and studying their views about this topic: (Aksaray province case)]*. Yüksek Lisans Tezi, Mersin Üniversitesi, Mersin.

Tabachnick, B. G., & Fidell, L. S. (2007). *Experimental designs using ANOVA*. Belmont, CA: Thomson/Brooks/Cole.

Tekinarslan, E. (2008). Eğitimciler için temel teknoloji yeterlikleri ölçeğinin geçerlik ve güvenirlik çalışması [A validity and reliability study of the basic technology competencies scale for educators]. *Elektronik Sosyal Bilimler Dergisi, 7*(26), 186-205. https://dergipark.org.tr/en/pub/esosder/issue/6140/82389

Thach, E. C., & Murphy, K. L. (1995). Competencies for distance education professionals. *Educational Technology Research and Development, 43*(1), 57-79. https://doi.org/10.1007/BF02300482

Van Merrienboer, J. J., & Sweller, J. (2005). Cognitive load theory and complex learning: Recent developments and future directions. *Educational Psychology Review, 17*(2), 147-177. https://doi.org/10.1007/s10648-005-3951-0

Viner, R. M., Russell, S. J., Croker, H., Packer, J., Ward, J., Stansfield, C.,...& Booy, R. (2020). School closure and management practices during coronavirus outbreaks including COVID-19: A rapid systematic review. *The Lancet Child & Adolescent Health, 4*(5), 397-404. https://doi.org/10.1016/S2352-4642(20)30095-X

Wang, C. H., Shannon, D. M., & Ross, M. E. (2013). Students' characteristics, self-regulated learning, technology self-efficacy, and course outcomes in online learning. *Distance Education, 34*(3), 302-323. https://doi.org/10.1080/01587919.2013.835779

Yakubu, M. N., & Dasuki, S. I. (2019). Factors affecting the adoption of e-learning technologies among higher education students in Nigeria: A structural equation modelling approach. *Information Development, 35*(3), 492-502. https://doi.org/10.1177/0266666918765907

Yılmaz, I. E., Kabul, A., & Diler, İ. (2020). Distance education in higher education in the COVID-19 pandemic process: A case of Isparta Applied Sciences University. *International Journal of Technology in Education and Science, 4*(4), 343-351. https://doi.org/10.46328/ijtes.v4i4.112

Yilmaz, Y., Karabulut, H. A., Ucar, A. S., & Ucar, K. (2021). Determination of the education technology competencies of special education teachers. *European Journal of Special Education Research, 7*(2), 71-83. https://doi.org/10.46827/ejse.v7i2.3734

Yolcu, H. H. (2020). Koronavirüs (Covid-19) pandemi sürecinde sınıf öğretmeni adaylarının uzaktan eğitim deneyimleri [Preservice elementary teachers' distance education experiences at the time of coronavirus (covid-19) pandemic]. *Açıköğretim Uygulamaları ve Araştırmaları Dergisi, 6*(4), 237-250. https://dergipark.org.tr/tr/pub/auad/issue/57638/788890