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Investigation of the Relationship between Pre-Service Teachers' Technologies Self-Efficacy Perceptions, Attitudes towards the Use of Distance Education Environments, and Academic Procrastination Tendencies

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SUMMARY

The purpose of the current study is to investigate the relationship between pre-service teachers' technological self-efficacy perceptions, attitudes towards the use of distance education environments and academic procrastination tendencies. The sample of the study, which is designed in the relational survey model, consists of 246 pre-service teachers attending a state university and having distance education experiences. The data of the study were collected by using a demographic information form, the "Scale of Self-Efficacy Perception of Online Technologies", the "Attitude Scale Regarding the Use of Distance Education Environments in the Pandemic Process" and the "Aitken Procrastination Tendency Scale". In the analysis of the data, descriptive statistics, independent samples t-test, one-way analysis of variance and Pearson correlation analysis were used. The findings of the study have revealed that the pre-service teachers' self-efficacy perceptions of online technologies are at a high level, while their attitudes towards the use of distance education environments and their academic procrastination tendencies are at a medium level. While the gender variable is effective on self-efficacy perception and attitude, the department attended has no effect on the variables. There is a medium, positive, and significant correlation between the self-efficacy perceptions of online technologies and the attitudes towards the use of distance education environments and a medium, negative, and significant correlation between the attitudes towards the use of distance education environments and the academic procrastination tendencies.

Keywords: Distance education, Technological self-efficacy, Attitude towards distance education environments, Academic procrastination tendency, Pre-service teachers

INTRODUCTION

Parallel to the increase in knowledge production, the rapid technological development and increasing competition, as well as the change in the economic, social and cultural domains especially in the last quarter of the 21st century, have pushed all existing institutions and systems into an irresistible process of change (Kılıç, 1998). As a result of scientific and technological developments, the mutual relations between education and society have also been greatly affected. The world is changing so rapidly that both education and social order must be able to keep up with these changes at the same speed. Educators have to offer more students the opportunity to learn more in less time (Alkan, 2005). The concept of distance education comes to the fore in this context, and it has become a part of the current education system and has become increasingly widespread in educational institutions with the influence of developments in communication and internet technologies in recent years.

In the 21st century, which is called the information age, the developments in information technologies have made important contributions to the development of the global communication network with distance education applications. The global communication network is the main source of information for scientific research, productivity, cultural exchanges, global trade and global education (İşman, 2011). Today, the desire of more individuals to receive education, the aim of providing education services for wider masses, the efforts to provide equality of opportunity in education and to eliminate the limitations of traditional education have revealed the necessity of distance education (Yalın, 2007). Distance education is basically defined as carrying out educational activities in electronic environment and conveying them through electronic technologies (Gülbahar, 2012). With the introduction of technology into education life, the variety of tools and equipment used in the distance education process has increased and access to information resources has been facilitated. The basic role of technology in distance education, which is essentially a technology-based education, is to establish a communication link between the student, the teacher and the content; the distance education environment is defined as the system that surrounds the student and teacher technically and socially (Khan, 2000). In this context, integrated systems in which distance education is organized and managed by using different tools are called the learning management system (LMS) (Dalsgaard, 2006). Learning management systems are environments that provide active and independent learning opportunities which students in physically different environments use to communicate and collaborate with each other. The most common examples are Moodle, Blackboard and Sakai. An important factor

affecting the use of technology in distance education is the prevalence of the technology desired to be used and after the determination of which technology is appropriate, an infrastructure should be created on the basis of that technology. Students' interactions with these technologies can affect their perceptions, attitudes and behaviours about a particular technology, making the distance education process successful or unsuccessful. Distance education is one of the important opportunities provided by the innovations of information and communication technologies in education and has become an integral part of education activities, especially with the COVID-19 pandemic. In this process, the question of how ready the students are for distance education activities has gained importance (Canpolat & Narin-Canpolat, 2020, Sarıtaş & Barutçu, 2020). Hung (2010) discussed the concept of readiness together with dimensions such as motivation and self-efficacy perception of technology. The effect and importance of the concept of self-efficacy, which is defined as the affective dimension of learning in the literature, in the learning process is emphasized (Tekerek, Ercan, Udum, & Saman, 2012). In this connection, having technological self-efficacy in the distance education process is important in terms of the effectiveness and efficiency of the process (Ekici, Ekici, & Kara, 2012). Self-efficacy belief, which was first introduced within the scope of Bandura's Social Learning Theory and later considered as an important variable in many studies in different fields, is a concept related to the personal judgments of individuals about how well they can perform the actions necessary to cope with possible situations (Bandura, 1982). When it is considered in the distance education process, it has a significant effect on motivation, performance and learning outcomes (Bixler, 2006), and it appears as an important variable to be considered in the process of meeting expectations from distance education. It is stated that technology knowledge in the distance education process is effective on student attitude and the effectiveness of the learning process (Kırmacı & Acar, 2018; Sakal, 2017). In this context, another factor to be considered in the distance education process is student attitudes. According to Ogunniyi (2015), attitude can be seen as the sum of students' experiences about and tendencies towards the learning process. Knowing the attitudes of students towards the distance education process will enable the effective organization and use of distance education environments. On the other hand, another concept that comes to the fore in terms of the effectiveness of the distance education process and is directly related to the motivation for learning is the behaviour of procrastination (Doherty, 2006). The behaviour of procrastination refers to the voluntary postponement of the action despite the expectation that the existing situation in the intended action process will worsen due to the delay (Klingsieck, 2013). In this connection, the concept of academic procrastination refers to the postponement of related tasks and activities in the learning process (Steel & Klingsieck, 2016). Although distance education offers many advantages, it places many responsibilities on the shoulders of students. In this respect, it requires students to have self-regulation skills and intrinsic motivation regarding the learning process (Kocdar, Karadeniz, Bozkurt & Buyuk, 2018). This learner control, which is at a high level in distance education environments compared to face-to-face learning environments, may cause the tendency to procrastinate more commonly in distance education environments (Dunn, 2014; Goda et al., 2015; Lim, 2016). When the literature is reviewed, it is seen that most of the studies on general and academic procrastination have been conducted in face-to-face learning environments, and there is a need for more research on the effects of academic procrastination in distance education environments (Cormack, Eagle, & Davies, 2020; Hen & Goroshit, 2018). In addition, it is important to carry out studies to reveal the factors that affect the behaviour of academic procrastination (Aslan-Efe, 2016). In the study conducted by Uçar (2020) to understand the causes of academic procrastination in the learners of distance education, the importance of new studies to examine the effects of factors such as technology use and technology self-efficacy that may cause the behaviour and tendency of procrastination is emphasized. Thus, one of the prominent factors in this context is the use of technology and getting information about the learner's affective characteristics affecting their use of technology such as self-efficacy, attitude, motivation, anxiety, and the relations of these characteristics with each other and then offering suggestions for making the necessary arrangements should be considered as one of the basic issues. Correspondingly, determination of the self-efficacy perceptions of online technologies, attitudes towards the use of distance education environments, academic procrastination tendencies that are related to these two variables and learner motivation of pre-service teachers who are future educators who will be involved in distance education applications and will play a key role in the integration of technology into education and thus in improving the quality of education is seen to be important in terms of the quality of education. In this regard, the purpose of the current study is to investigate the relationship between the technological self-efficacy perceptions, attitudes towards the use of distance education environments, and academic procrastination tendencies of pre-service teachers having distance education experience. To this end, the following research questions guided the study:

1. What are the pre-service teachers' technological self-efficacy perceptions?
2. Do the pre-service teachers' technological self-efficacy perceptions vary significantly depending on
   a. gender,
   b. department?
3. What are the pre-service teachers' attitudes towards the use of distance education environments?

4. Do the pre-service teachers' attitudes towards the use of distance education environments vary significantly depending on
   a. gender,
   b. department?
5. How are the pre-service teachers' academic procrastination tendencies?
6. Do the pre-service teachers' academic procrastination tendencies vary significantly depending on
   a. gender,
   b. department?
7. Is there a significant correlation between the pre-service teachers' technological self-efficacy perceptions, attitudes towards the use of online education environments, and academic procrastination tendencies?

METHOD

Research Model

The study was designed in the relational survey model. The purpose of survey studies, which are carried out with larger samples than other studies, is to describe the current state of the research subject or event (Fraenkel & Wallen, 2006). The relational survey model on the other hand is used to reveal the relationship between two or more variables (Büyüköztürk, 2011).

Study Group

The study group of the current research is comprised of 246 pre-service teachers attending a state university. Demographic features of the study group are given in Table 1.

Table 1. Demographic features of the participants

Variable		***f***	**%**
Gender	Female	180	73.2
	Male	66	26.8
Department Attended	German Language Teaching	21	8.5
	Science Teaching	28	11.4
	English Language Teaching	33	13.4
	Primary Math Teaching	24	9.8
	Pre-school Teaching	30	12.2
	Art Teaching	15	6.1
	Counselling and Guidance	20	8.1
	Primary Teacher Training	35	14.2
	Social Studies Teaching	35	8.1
	Turkish Language Teaching	20	8.1
Total		**246**	**100.0**

As can be seen in Table 1, 73.2% of the 246 pre-service teachers are females and 26.8% are males. Of the pre-service teachers, 8.5% are attending the Department of German Language Teaching, 11.4% are attending the Department of Science Teaching, 13.4% are attending the Department of English Language Teaching, 9.8% are attending the Department of Primary Math Teaching, 12.2% are attending the Department of Pre-school Teaching, 6.1% are attending the Department of Art Teaching, 8.1% are attending the Department of Counselling and Guidance, 14.2% are attending the Department of Primary Teacher Training, 8.1% are attending the Department of Social Studies Teaching and 8.1% are attending the Department of Turkish Language Teaching.

Data Collection Tools

Demographic information form

A demographic information form was prepared to collect data about the gender and the attended department of the pre-service teachers.

Scale of self-efficacy perception of online technologies

To determine the technological self-efficacy perceptions of the participants, the "Scale of Self-Efficacy Perception of Online Technologies" developed by Miltiadou & Yu (2000) and adapted into Turkish by Horzum & Çakır (2009) was used. The five-point Likert-type scale consists of 4 dimensions and 29 items. The Cronbach alpha internal consistency coefficient of the scale was reported as .95.

Attitude scale regarding the use of distance education environments in the pandemic process

To determine the attitudes of the participants towards the use of distance education environments, the "Attitude Scale Regarding the Use of Distance Education Environments in the Pandemic Process" developed by Yıldız, Çengel & Alkan (2021) was used. The five-point Likert-type scale consists of 4 dimensions and 24 items. The Cronbach alpha internal consistency coefficient of the scale was reported as .93.

Aitken procrastination tendency scale

To determine the academic procrastination tendencies of the participants, the "Aitken Procrastination Scale" developed by Aitken (1982) and adapted into Turkish by Balkıs (2006) was used. The five-point Likert-type scale is one-dimensional and consists of 19 items. The Cronbach alpha internal consistency coefficient of the scale was reported as .82.

Data Analysis and Interpretation

The data obtained in the current study were analyzed using the SPSS 23 program package. Through the analysis of outliers, it was determined that there were no outliers in the data set. For each of the variables, the assumption of a normal distribution was checked, and for this purpose, the skewness and kurtosis coefficients were examined. If the skewness and kurtosis coefficients are between -2 and +2, it can be interpreted that the scores do not show a significant deviation from the normal distribution (Cameron, 2004). However, this range may not be valid for samples of 100 and above for positive kurtosis and for samples of 200 and above for negative Kurtosis (Tabahnick & Fidell, 2012). The skewness and kurtosis values of all the variables are given in Table 2.

Table 2. Skewness and kurtosis values for all the variables

	Gender	Department Attended	Self-efficacy Perception of Online Technologies	Attitude towards the Use of Distance Education Environments	Academic Procrastination Tendency
Skewness	1.052	.102	-.600	.664	.028
Kurtosis	-.900	-1.252	-1.295	.773	-.758

When Table 2 is examined, it is possible to say that all the variables used in the current study are within the recommended ranges and show normal distribution. Since the assumption of normal distribution was satisfied, an independent samples t-test, one of the parametric tests, and one-way analysis of variance were used in the data analysis. On the other hand, Pearson correlation analysis was used to determine the relationships between variables (technological self-efficacy perception, attitude towards the use of distance education environments, academic procrastination).

To determine the status of the participants based on their responses to the scale items, the mean scores and standard deviation values were calculated, and descriptive statistics were examined. For the arithmetic mean scores obtained, triple grouping was made as low, medium, and high. According to this grouping, the ranges and evaluation criteria in Table 3 are used.

Table 3. Ranges and evaluation criteris for data collection tools

Evaluation Criterion	Range
Low	1.00-2.33
Medium	2.34-3.66
High	3.67-5.00

To determine the reliability of the data collection tools used in the current study, the Cronbach Alpha value was calculated, and it was found to be .98 for the Scale of Self-Efficacy Perception of Online Technologies, .89 for the Scale of Attitudes towards the Use of Distance Education Environments during the Pandemia Process and .77 for the Aitken Procrastination Tendency Scale. Cronbach Alpha values of .70 and above indicate that the relevant data collection tools are reliable (Büyüköztürk, 2011).

FINDINGS

Pre-Service Teachers' Self-Efficacy Perceptions of Online Technologies

The pre-service teachers' self-efficacy perceptions of online technologies were determined based on the mean scores taken from the sub-dimensions of internet skills, synchronous interaction, asynchronous interaction I and asynchronous interaction II and the whole scale. The descriptive findings regarding the participants' self-efficacy perceptions of online technologies are given in Table 4.

Table 4. Descriptive findings on the pre-service teachers' self-efficacy perceptions of online technologies

Scale Sub-dimensions	N	$\bar{x}$	Sd	Level
Internet Skills	246	3.89	1.09	High
Synchronous Interaction	246	3.35	1.50	Medium
Asynchronous Interaction I	246	3.53	1.51	Medium
Asynchronous Interaction II	246	3.36	1.40	Medium
Whole Scale	246	3.71	1.26	High

When the descriptive values in Table 4 are examined on the basis of the ranges and evaluation criteria given in Table 3, it is seen that the general mean score of the participants' self-efficacy perceptions of online technologies and their mean score taken from the sub-dimension of internet skills are high and the mean scores taken from the sub-dimensions of synchronous interaction, asynchronous interaction I and asynchronous interaction II are medium.

Whether the Pre-Service Teachers' Self-Efficacy Perceptions of Online Technologies Vary Significantly Depending on Gender

An independent samples t-test was used to investigate whether the pre-service teachers' self-efficacy perceptions of online technologies vary significantly depending on gender. The findings obtained as a result of the analysis are given in Table 5.

Table 5. Results of the t-test conducted to determine whether the participants' self-efficacy perceptions of online technologies vary significantly depending on gender

Group	N	$\bar{x}$	Sd	df	t	p
Male	66	3.22	1.34	105.110	3.648	.000
Female	180	3.90	1.19			

As can be seen in Table 5, the participants' self-efficacy perceptions of online technologies vary significantly depending on gender ($t_{(105.110)}$=3.648, p<.001). The female participants' mean self-efficacy perception of online technologies ($\bar{x}$=3.90) is significantly higher than that of the male participants ($\bar{x}$=3.22).

Whether the Pre-Service Teachers' Self-Efficacy Perceptions of Online Technologies Vary Significantly Depending on the Department

One-way analysis of variance was used to determine whether the pre-service teachers' self-efficacy perceptions of online technologies vary significantly depending on the department attended. The findings obtained as a result of the analysis are given in Table 6.

Table 6. Results of the ANOVA conducted to determine whether the participants' self-efficacy perceptions of online technologies vary significantly depending on department

Source of the Variance	Sum of Squares	df	Mean Square	F	p	Significant Difference
Between Groups	15.390	9	1.710	1.072	.384	-
Within Groups	376.495	236	1.595			
Total	391.885	245				

As can be seen in Table 6, the participants' self-efficacy perceptions of online technologies do not vary significantly depending on the department attended ($F_{(9, 236)}$=1.072, p>.05).

Pre-Service Teachers' Attitudes towards the Use of Distance Education Environments

The pre-service teachers' attitudes towards the use of distance education environments were determined based on the mean scores taken from the sub-dimensions of competence and motivation, usability, effectiveness and satisfaction, and from the whole scale. Descriptive findings regarding the attitudes of the participants towards the use of distance education environments are given in Table 7.

Table 7. Descriptive findings regarding the participants' attitudes towards the use of distance education environments

Scale Sub-dimensions	N	$\bar{x}$	Sd	Level
Competence and Motivation	246	2.73	.68	Medium
Usability	246	2.85	.46	Medium
Effectiveness	246	2.89	.94	Medium
Satisfaction	246	2.97	1.06	Medium
Whole Scale	246	3.06	.58	Medium

When the descriptive values in Table 7 are examined based on the ranges and evaluation criteria given in Table 3, it is seen that the general mean score of the participants' attitudes towards distance education environments and the mean scores taken from the sub-dimensions of competence and motivation, usability, effectiveness and satisfaction are medium.

Whether the Pre-Service Teachers' Attitudes towards Distance Education Environments Vary Significantly Depending on Gender

An Independent samples t-test was conducted to determine whether the pre-service teachers' attitudes towards distance education environments vary significantly depending on gender. The findings obtained from the analysis are given in Table 8.

Table 8. Results of the t-test conducted to determine whether the participants' attitudes towards distance education environments vary significantly depending on gender

Group	N	$\bar{x}$	Sd	df	t	p
Male	66	2.62	.56	244	3.091	.002
Female	180	2.89	.64			

As can be seen in Table 8, the participants' attitudes towards distance education environments vary significantly depending on gender ($t_{(244)}$=3.091, p<.01). The female participants' attitudes towards the use of distance education environments ($\bar{x}$=2.89) are significantly higher than those of the male participants ($\bar{x}$=2.62).

Whether the Pre-Service Teachers' Attitudes towards Distance Education Environments Vary Significantly Depending on the Department

One-way analysis of variance was conducted to determine whether the pre-service teachers' attitudes towards distance education environments vary significantly depending on the department attended. The findings obtained from the analysis are given in Table 9.

Table 9. Results of the ANOVA conducted to determine whether the participants' attitudes towards distance education environments vary significantly depending on department

Source of the Variance	Sum of Squares	df	Mean Square	F	p	Significant Difference
Between Groups	4.765	9	.529	1.344	.215	-
Within Groups	93.007	236	.394			
Total	97.772	245				

As can be seen in Table 9, the pre-service teachers' attitudes towards the use of distance education environments do not vary significantly depending on the department attended ($F_{(9, 236)}$=1.344, p>.05).

Findings Regarding the Pre-Service Teachers' Academic Procrastination Tendencies

The pre-service teachers' academic procrastination tendencies were determined on the basis of the mean score taken from the one-dimensional measurement tool. The descriptive findings regarding the participants' academic procrastination tendencies are given in Table 10.

Table 10. Descriptive findings regarding the participants' academic procrastination tendencies

	N	$\bar{x}$	Sd	Level
Academic Procrastination Tendency	246	3.42	.58	Medium
Whole Scale	246	3.42	.58	Medium

When the descriptive values in Table 10 are examined on the basis of the ranges and evaluation criteria given in Table 3, it is seen that the participants' academic procrastination tendencies are medium.

Whether the Pre-Service Teachers' Academic Procrastination Tendencies Significantly Depending on Gender

An independent sample t-test was used to determine whether the pre-service teachers' academic procrastination tendencies vary significantly depending on gender. The findings obtained as a result of the analysis are given in Table 11.

Table 11. Results of the t-test conducted to determine whether the participants' academic procrastination tendencies vary significantly depending on gender

Group	N	$\bar{x}$	Sd	df	t	p
Male	66	3.41	.60	130.973	.181	.856
Female	180	3.42	.53			

As can be seen in Table 11, the participants' academic procrastination tendencies do not vary significantly depending on gender ($t_{(130.973)}$=.181, p>.05).

Whether the Pre-Service Teachers' Academic Procrastination Tendencies Significantly Depending on the Department

One-way analysis of variance was conducted to determine whether the pre-service teachers' academic procrastination tendencies vary significantly depending on the department attended. The results of the analysis are presented in Table 12.

Table 12. Results of the ANOVA conducted to determine whether the participants' academic procrastination tendencies vary significantly depending on department

Source of the Variance	Sum of Squares	df	Mean Square	F	p	Significant Difference
Between Groups	2.079	9	.231	.679	.727	-
Within Groups	80.237	236	.340			
Total	82.315	245				

As can be seen in Table 12, the participants' academic procrastination tendencies do not vary significantly depending on the department attended ($F_{(9, 236)}$=.679, p>.05).

Findings Regarding the Relationship between the Pre-Service Teachers' Self-Efficacy Perceptions of Online Technologies, Attitudes towards the Use of Distance Education Environments and Academic Procrastination Tendencies

Pearson correlation analysis was conducted to determine the relationship between the pre-service teachers' self-efficacy perceptions of online technologies, attitudes towards the use of distance education environments and academic procrastination tendencies. The obtained findings are presented in Table 13.

Table 13. Results of the Pearson correlation analysis conducted to determine the relationship between the pre-service teachers' self-efficacy perceptions of online technologies, attitudes towards the use of distance education environments and academic procrastination tendencies

	Self-efficacy Perception of Online Technologies	Attitudes towards the Use of Distance Education Environments
Attitudes towards the Use of Distance Education Environments	.571**	-
Academic Procrastination	-.109	-.302**

**Correlation is significant at the level of .01

As can be seen in Table 13, there is a positive and significant correlation between the attitudes towards the use of distance education environments and self-efficacy perceptions of online technologies (r=.571; p<.01); a negative and significant correlation between the attitudes towards the use of distance education environments and academic procrastination tendencies (r=-.302; p<.01). On the other hand, although there is a negative correlation between the self-efficacy perceptions of online technologies and academic procrastination tendencies, this correlation is not significant (r=-.109; p>.05). A statistically significant r value does not mean that this value is important in practice. While interpreting the r values, Büyüköztürk (2011) states that values between .00 and .29 indicate a low, values between .30 and .69 indicate a medium, and values between .70 and 1.0 indicate a high correlation. In this context, it can be said that there is a medium level of correlation between the attitudes towards the use of distance education environments and self-efficacy perceptions of online technologies and a medium level of correlation between the attitudes towards the use of distance education environments and academic procrastination tendencies.

CONCLUSION AND DISCUSSION

The current study was carried out to determine pre-service teachers' self-efficacy perceptions of online technologies, attitudes towards the use of distance education environments and academic procrastination

tendencies and to examine the relationship of these variables with each other in relation to some variables (gender, the department attended) with the participation of 246 pre-service teachers on a volunteer basis.

Within the context of the current study, first, the pre-service teachers' self-efficacy perceptions of online technologies were examined, and it was concluded that the self-efficacy perceptions of the participants are high. In a study confirming this result, Yıldız & Seferoğlu (2020) concluded that distance education students have high self-efficacy perceptions of online technologies. Similarly, there are studies in the literature that show that learners' readiness levels for online learning are sufficient (Bahadır, 2020; Uyar & Karakuyu, 2020). On the other hand, the participants' attitudes towards the use of distance education environments were found to be at the medium level. There are some studies in the literature that support the finding obtained in this study (Barış, 2015; Öztaş & Kılıç, 2017; Yenilmez, Turgut & Balbağ, 2017; Yıldız, 2016). Finally, the academic procrastination tendencies of the pre-service teachers participating in the current study were found to be at the medium level. The main problem giving rise to procrastination behaviours in individuals might be that they cannot motivate themselves to do the relevant work, which can lead to the emergence of procrastination behaviours in distance education environments (Dunn, 2014; Goda et al., 2015; Lim, 2016).

When it was investigated whether the pre-service teachers' self-efficacy perceptions of online technologies, attitudes towards the use of distance education environments and academic procrastination tendencies vary significantly depending on gender, significant differences were found in favour the female participants. In this regard, when the literature is examined, it is seen that there are different findings. When examined on the basis of gender, it was seen that the online participation levels of male participants in distance education environments were lower (Altuntaş Yılmaz, 2020). According to the study conducted by Bayram, Peker, Aka & Vural (2019), there is a significant difference between the male and female participants in terms of attitudes towards distance education in favour of the female participants. It is stated that female participants think that distance education environments are more advantageous compared to male participants. Similarly, in the study conducted by Ülkü (2018), although no gender-based significant difference was found between the attitudes towards distance education, it was stated that the attitudes of the female teachers were slightly more positive. On the other hand, there are studies revealing that the gender variable is effective both on online self-efficacy (Yılmaz, Sezen & Yurdugül, 2019) and on attitudes towards distance education (Yenilmez, Turgut & Balbağ, 2017) in favour of male participants. However, there are also studies showing that the gender variable is not effective on online self-efficacy, attitude towards distance education and academic procrastination (Durmuş & Bağcı, 2013; Gündüz, 2013; Karabıyık-Çeri, Çavuşoğlu & Gürol, 2015; Sakal, 2017; Yağcı, Alsancak-Sırakaya & Özüdoğru, 2015; Yıldız, 2016).

Another variable considered in the current study is the department attended and the pre-service teachers' self-efficacy of online technologies, attitudes towards the use of distance education environments and academic procrastination were found to be not varying significantly depending on the department attended. In this connection, the findings of the study conducted by Yakar & Yıldırım-Yakar (2021) support this result of the current study. However, there are also studies in the literature showing that the department attended causes a significant difference (Turgut & Balbağ, 2017; Yurdugül & Demir, 2017).

The current study also aimed to investigate the relationship between the pre-service teachers' self-efficacy perceptions of online technologies, attitudes towards distance education environments and academic procrastination tendencies and a positive, medium, and significant correlation was found between the self-efficacy perceptions of online technologies and attitudes towards the use of distance education environments and a negative, medium, and significant correlation was found between the attitudes towards the use of distance education environments and academic procrastination tendencies. In a study confirming these results, Akgün (2015) concluded that there is a positive correlation between the attitudes of students enrolled in distance education towards web-based teaching and their self-efficacy perceptions of online technologies. Similarly, there are studies in the literature that reveal that individuals with high technology self-efficacy have more positive evaluations and attitudes towards the distance education process (Atabey, 2016; Kırmacı & Acar, 2018; Pullu & Gömleksiz, 2020; Sarıtaş & Barutçu, 2020). Although there is no study investigating the relationship between academic procrastination tendencies, technological self-efficacy perceptions and attitudes towards technology use in the literature, there is a limited number of studies stating that there is a negative correlation between academic procrastination behaviour and technology use and emphasizing the need for conducting new studies to reveal the factors influential on academic procrastination behaviour (Aslan-Efe, 2016; Uçar, 2020). Emphasis is placed on the effectiveness of online self-regulation training on academic procrastination, which can also be expressed as a kind of lack of self-regulation (Gruschel, Patrzek, Klingsiec & Fries, 2018).

With the developments in web technologies, the concept of online technology has emerged, and distance education applications have become widespread. In this process, it is of great importance to increase the experience of educators. In order for distance education to work smoothly and to be beneficial to individuals in the field of education, it is very important for individuals to have high self-efficacy perceptions of online technologies and to have positive attitudes towards distance education. For supporting this process, it is important to provide educators

with exemplary practices beyond sharing theoretical knowledge about distance education technologies and initiatives to be made for this purpose should be supported. On the other hand, according to social learning theory, the most basic motivational structure behind the actions of individuals is self-efficacy beliefs. Increased self-efficacy will lead to higher performance (Bandura, 1982). It is stated that participants with high self-efficacy levels in distance education are more productive and have higher satisfaction levels (Eastin & LaRose, 2000). In this process, the factor that sparks and keeps this interest alive in the learner's self-learning is intrinsic motivation. In this context, in addition to the attitudes towards the use of distance education environments, self-efficacy perceptions of online technologies and academic procrastination tendencies, other affective characteristics such as motivation and anxiety can be investigated by further research to be conducted with larger samples by using qualitative data together with quantitative data to have more in-depth information so that better understanding of the issue can be reached.

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