

Investigation of Pre-Service Teachers' Attitudes Towards Virtual Classroom Environment

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ABSTRACT

This study was conducted to determine the attitudes of pre-service teachers towards the virtual classroom environment. The research data were collected from a total of 355 students, 294 females, and 61 males, studying at different grade levels in the spring semester of the 2022-2023 academic year in four different teaching programs randomly selected from the teaching programs within the Faculty of Education of a state university with the "Scale for Determining Attitudes Towards Virtual Classroom Environment" developed by Çetin and Demirkan (2023). The survey model was used in the study, and the attitudes of pre-service teachers towards the virtual classroom environment were described as they are. The collected data were first subjected to normality tests in the context of variables, and after the normality of the distribution was concluded as a result of the analyses, T-test and One-Way Analysis of Variance (ANOVA) techniques were used for independent groups. In addition, effect size values were calculated to determine to what extent the independent variables used in the research questions have an effect on attitudes towards the virtual classroom environment. As a result of the research, it was observed that pre-service teachers' attitude scores towards the virtual classroom environment were concentrated in the "undecided" option, and this attitude structure was preserved according to different independent variables, and differences occurred within itself according to some variables.

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Keywords:

Virtual classroom environment, pre-service teachers, attitude

INTRODUCTION

Learning is a dynamic process that can take place in any environment. The important thing is to manage the learning process correctly and thus increase the quality of learning. For this, properly designed learning environments are needed. The vast majority of activities related to learning are designed and realized in schools and classrooms, which are an indispensable part of it.

Classrooms are common learning spaces where students build their knowledge and help shape their future (Franklin & Harrington, 2019). A virtual classroom is not much different from a traditional classroom; in a virtual classroom, there is a teacher who teaches a lesson, but not in the classroom, but somewhere in front of the computer's camera, and students participate in the lesson by sitting in front of the computer in their own rooms (Alhat, 2020).

A virtual classroom is where students meet live to learn. The software platform allows students in different locations to interact with each other and engage in learning activities. The term "virtual classroom" suggests the simulation of a classroom environment, or, in other words, the ability to communicate with others and see learning materials (Cook, 2019). Turoff stated that the educational methodology used for the virtual classroom concept reflects online or offline group communication and collaborative approaches to education. The student is an active part of a learning group but can also continue to learn individually regardless of the pace of other students in the group (Turoff, 1995).

Pappas recommends the following when designing virtual classrooms: When designing virtual classrooms, performance and learning objectives should be set first. This will guide teachers in the selection of teaching materials and teaching methods when designing virtual classrooms. Then it should be decided how to present the content. Visuals should be supported by detailed explanations. Interactive learning activities that encourage active participation should also be created. Active student engagement is crucial for a successful virtual classroom. The most effective way to achieve this is to create learning activities that engage students and make them think about how the topic relates to their own lives. For this reason, activities such as scenarios, games, or rich e-learning presentations can be created that draw students in. In addition, in virtual classrooms, class periods should be kept under one hour, and interaction should be provided every five minutes somehow. This will prevent boredom and trigger student engagement during the virtual training

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period. In addition, a detailed manual can be prepared for the students with information on how each virtual training session will be conducted, student roles, and what will be gained at the end of the training. After all these preparations, at least one pilot study should be conducted in a realistic environment to make sure that everything will run smoothly (Pappas, 2015).

Cook emphasized that the duration of education in virtual classrooms will vary according to the situation. In his studies, he stated that 30-minute virtual classrooms also work well, and two-hour virtual classrooms also work well. The important thing about the duration is that it should be suitable for student needs, and the task should be realized really well (Cook, 2019).

The main features that should be considered to ensure effective learning in virtual classrooms and facilitate this process are explained as follows (Sam, 2020);

- **Real-time instant messaging**

Every virtual classroom needs students to be able to chat with their instructors and peers and clarify minor doubts without the need for video or audio calls.

- **High-quality video chat**

This option maintains a sense of human connection and keeps learners' attention.

- **Streaming video**

This feature is essential for classrooms that host hundreds of students from all over the world. A virtual classroom needs a much more powerful solution, such as streaming video.

- **Secure file sharing**

An integrated two-way sharing system is critical for virtual classrooms. It enables seamless collaboration and facilitates the sharing of assignments, reports, and projects on a single platform in the learning environment.

- **Digital whiteboard**

Digital whiteboards make it easy to view content, markup, and annotate more vividly.

Third-party integration

Some virtual classrooms may need to be extended with additional features because even the best video conferencing software does not have them all. Seamless third-party integration allows information providers to leverage the existing system and extend its use for the benefit of students.

Teachers are responsible for creating an accessible, positive, and sympathetically supportive online environment (Greenan, 2021). They should develop skills that can motivate their students to learn online and digital skills that can help them integrate into the online classroom (Soare & Munteanu-Bănăţeanu, 2021). Teachers of successful virtual classrooms observe the virtual room and collect feedback not only to gauge how well students understand the subject matter but also to identify barriers that may prevent them from fully participating (Terada, 2020). Virtual classrooms facilitate learning in a virtual environment where learning is not limited to physical buildings. The virtual classroom is another transformative tool in the arsenal of digital educators and will continue to grow in popularity and use (Sam, 2020).

A traditional classroom environment provides a structured space that encourages socialization and communication; cues and non-verbal information are explicit. Research on virtual education, however, suggests that virtual classrooms offer a time-space shift that reduces communication and socialization (Caplan & High, 2006; Sherblom, 2010). Greenan emphasized that asynchronous virtual classrooms greatly reduce students' opportunities to communicate and socialize with their peers, while synchronous virtual classrooms offer space for communication and socialization. He explained that synchronous virtual classrooms are important for enhancing social presence and developing an inclusive classroom culture (Greenan, 2021). As we have experienced in the recent past, with the closure of traditional classrooms worldwide due to the pandemic, virtual classrooms, and online virtual meeting platforms have enabled education to continue online and at home.

However, the fact that education has turned predominantly to distance education, especially during the COVID-19 pandemic, and that education is carried out in virtual classroom environments inevitably brings students' attitudes towards these environments to the agenda. Positive or negative attitudes towards

education in virtual classroom environments greatly affect the realization of learning (Sanders & Morrison-Shetlar, 2001). Knowing the attitudes towards distance education environments is important in terms of increasing the quality of the education provided in this context, preventing the problems that may occur in this direction, and minimizing the problems (Gonzalez et al., 2020).

The aim of this study is to determine pre-service teachers' attitudes towards the virtual classroom environment. In line with this general purpose, answers to the following research questions were sought:

1. What are pre-service teachers' attitudes towards the virtual classroom environment?
2. Pre-service teachers' attitudes towards the virtual classroom environment;
 - Gender
 - Academic success
 - Perception of faculty members
 - Perception towards teaching profession
 - Is there a significant difference according to the variables of caring about the department courses?

METHOD

This research, in which pre-service teachers' attitudes towards the virtual classroom environment are determined, is in the descriptive research model. With the research, it was tried to describe students' attitudes towards the current subject as they exist. In this respect, the research has a descriptive feature in the survey model (Creswell, 2012).

SETTING AND PARTICIPANTS

The study group for the research consists of a total of 355 pre-service teachers, 294 female and 61 males, studying at different grade levels in the spring semester of the 2022-2023 academic year in four different teaching programs randomly selected from the teaching programs within the Faculty of Education of a state university. The sample of the study was determined by the convenience sampling method due to the limitations of the research (Emerson, 2021). Data were collected from pre-service teachers through an online questionnaire. Volunteerism was taken as the basis for data collection. The distribution of demographic information about the pre-service teachers participating in the study is given in table 1.

Table 1. Distribution of Demographic Characteristics of Participants

Variables	f	%	
Gender	Female	294	82,8
	Male	61	17,2
Academic Success	2,51-3,25	201	56,6
	3,26-4,00	154	43,4
Perception of Faculty Members	I like a little bit	74	20,8
	I like	238	67,0
	I like so much	43	12,1
Perception of the Teaching Profession	I like a little bit	70	19,7
	I like	140	39,4
	I like so much	145	40,8
Grade	1st grade	223	62,8
	3rd grade	40	11,3
	4th grade	92	25,9
Perception of Department Courses	I partially care	70	19,7
	I care a lot	183	51,5
	I care very much	102	28,7

DATA COLLECTION TOOL

The data collection tool used in the study consists of two parts. In the first part, questions were asked to collect personal information about the students, and in the second part, the scale items in the "Scale for Determining Attitudes towards a Virtual Classroom Environment" developed by Çetin and Demirkan (2023) were included. The scale on which the data were collected in the study is a five-point Likert scale consisting of 46 items and two sub-dimensions "Resistance to Virtual Classroom Environment, Positive Belief in Virtual

Classroom Environment". The Cronbach Alpha reliability coefficient for the reliability of the scale is .98 and the reliability values for each sub-dimension are .98 and .96. The rate of explaining the total variance of the scale is 62.79%. The highest score that can be obtained on the scale is 230 and the lowest score is 46.

DATA ANALYSIS

The data obtained from the application of the scale to the pre-service teachers in the sample was transferred to the SPSS 27 program and analyzed. In the first stage, the normality of the data set was examined; for this purpose, stem-leaf and histogram graphs, skewness, and kurtosis coefficients of the scores obtained from the whole scale and its sub-dimensions were examined, and Kolmogorov-Smirnov test results were evaluated. As a result of the analyses, it was decided that the distribution was normal.

According to the structure of the variables in the data set, T-test and One-Way Analysis of Variance (ANOVA) techniques were used for independent groups. In addition, effect size values were calculated to determine to what extent the independent variables used in the research questions have an effect on attitudes towards the virtual classroom environment.

RESULTS

In this section, the findings obtained in the context of the research questions are given, respectively. In this direction, the distribution of pre-service teachers' attitude scores towards the virtual classroom environment is given in table 2.

Table 2. Dispersion of Pre-service Teachers' Attitude Scores Towards Virtual Classroom Environment

Attitude	n	\bar{x}	sd	Min.	Max.	Item Number	X	
							156,41-230,00	
							f	%
	355	134,35	41,37	46	230	46	102	28,73

*High (156.41 points and above), medium (119.61-156.40), low (119.60 points and below)

When table 2 is analyzed, it is observed that the average total attitude score of the pre-service teachers participating in the study is \bar{x} =134,35. Considering the five-option answer category and the high score scale that can be obtained from the scale, it can be said that 28,73% of the pre-service teachers have a positive attitude less than one-third, while the remaining two-thirds of the pre-service teachers have 71,27% "undecided" and "negative" attitudes.

The distribution of pre-service teachers' attitude scores towards the virtual classroom environment according to gender variable is given in table 3.

Table 3. T Test Results of Pre-Service Teachers' Attitude Score Towards Virtual Classroom Environment According to Gender Variable

Scale Sub-dimensions	Gender	n	\bar{x}	sd	t	p	Effect Cohens (d)
Factor I	Female	294	77,13	25,41	,599	,550	-
	Male	61	74,98	25,76			
Factor II	Female	294	57,62	20,04	,028	,954	-
	Male	61	57,46	20,40			
Scale Total	Female	294	134,75	41,20	,396	,692	-
	Male	61	132,44	42,46			

When the mean attitude scores of the female pre-service teachers and male pre-service teachers participating in the study are analyzed in Table 3, the mean attitude scores of female pre-service teachers \bar{x} =134,75 and male pre-service teachers \bar{x} =132,44 do not show a significant difference [t (353) = ,396, p>0,05]. In line with this result, it can be stated that the attitudes of female and male pre-service teachers towards the virtual classroom environment are similar; in other words, both groups have an "undecided" attitude structure.

The distribution of pre-service teachers' attitudes towards the virtual classroom environment according to the academic achievement score variable is given in table 4.

Table 4. T Test Results of Pre-Service Teachers' Attitude Score Towards a Virtual Classroom Environment According to Academic Success Variable

Scale Sub-dimensions	Academic Success	n	\bar{x}	sd	t	p	Effect Cohens (d)
Factor I	2,51-3,25	201	77,49	25,39	,619	,537	-
	3,26-4,00	154	75,81	25,57			
Factor II	2,51-3,25	201	56,56	18,94	1,107	,269	-
	3,26-4,00	154	58,94	21,47			
Scale Total	2,51-3,25	201	134,05	38,90	,156	,876	-
	3,26-4,00	154	134,75	44,51			

In table 4, the mean attitude scores of pre-service teachers with academic achievement scores in the range of (2,51-3,25) and pre-service teachers with academic achievement scores in the range of (3,26-4,00) are analyzed. There is no significant difference between the mean attitude scores \bar{x} =134.05 of students with academic achievement scores in the range of (2,51-3,25) and the mean attitude scores \bar{x} =134.75 of pre-service teachers with academic achievement scores in the range of (3,26-4,00) [t (353)= ,156, p>0.05]. In line with this result, it can be said that the attitudes of pre-service teachers with achievement scores in different ranges towards the virtual classroom environment are similar; in other words, both groups have an attitude structure "close to undecided" and "undecided".

The distribution of pre-service teachers' attitude scores of the virtual classroom environment according to the variable of perception towards faculty members is given in table 5.

Table 5. One-Way Analysis of Variance Results of Pre-Service Teachers' Attitude Score towards a Virtual Classroom Environment According to the Variable of Perception towards Faculty Members

	Perception	n	\bar{x}	sd	F	p	Between Group Dif.	Effect Size (η^2)
Factor I	I like a little bit	74	77,84	28,86	,636	,530	-	-
	I like	238	77,16	25,13				
	I like so much	43	72,72	20,66				
Factor II	I like a little bit	74	54,24	22,69	1,363	,257	-	-
	I like	238	58,65	20,18				
	I like so much	43	57,51	13,39				
Scale Total	I like a little bit	74	132,08	45,43	,470	,625	-	-
	I like	238	135,81	41,88				
	I like so much	43	130,23	30,03				

Table 5 shows the comparison of pre-service teachers' attitude scores according to the variable of perception towards faculty members. When Table 5 is examined, it is observed that the attitude scores obtained from the total attitude towards the virtual classroom environment and the attitude scores obtained from the sub-dimensions of the scale [F (2-352) = ,470, p>0.05] do not differ significantly according to the perception variable of the pre-service teachers participating in the study towards the faculty members, and the three groups with different teacher perceptions have an "undecided" attitude score structure.

The distribution of pre-service teachers' attitude scores towards the virtual classroom environment according to their perception of the teaching profession is given in table 6.

Table 6. Analysis of Variance Results of Pre-Service Teachers' Attitude Scores Towards a Virtual Classroom Environment According to the Variable of Perception Towards the Teaching Profession

	Perception	n	\bar{x}	sd	F	p	Between Groups Dif.	Effect Size (η^2)
Factor I	I like a little bit	70	76,30	28,58	,048	,953	-	-
	I like	140	76,47	24,79				
	I like so much	145	77,26	24,63				
Factor II	I like a little bit	70	52,53	21,66	3,117	,046	1-3	,02
	I like	140	57,89	18,91				
	I like so much	145	59,75	20,09				
Scale Total	I like a little bit	70	128,83	43,95	,924	,398	-	-
	I like	140	134,36	40,37				
	I like so much	145	137,01	41,07				

Table 6 shows the results of the analysis to determine the scores of the pre-service teachers according to their perceptions of the teaching profession. As a result of the analysis of variance test conducted to test the significance of the difference between the mean scores of the pre-service teachers and the different perception groups according to the variable of perception towards the teaching profession, no significant difference was found between the total attitude scores of the pre-service teachers towards the virtual classroom environment [F (2-352)= ,924, p>0.05]. While a similar situation was observed in the first sub-dimension, it was observed that there was a significant difference between the mean attitude scores related to the second sub-dimension of the scale [F (2-352)= 3,117, p<0.05]. According to the results of the Scheffe test conducted to determine in which groups the scores differentiate, it was observed that the mean attitude scores of the pre-service teachers who stated that they "liked the teaching profession a lot" (\bar{x} =59.75) were higher than those of the pre-service teachers who stated that they "liked the teaching profession a little" (\bar{x} =52.53). In addition, when the results of the analysis related to the effect size of the variable of perception towards the teaching profession on the attitude scores of sub-dimension II are analyzed, it is observed that the variable of perception towards the teaching profession has a low effect (η^2 =,02).

The distribution of pre-service teachers' attitude scores towards the virtual classroom environment according to the grade level variable is given in table 7.

Table 7. Analysis of Variance Results of Pre-Service Teachers' Attitude Scores Towards a Virtual Classroom Environment According to the Grade Level Variable

	Perception	n	\bar{x}	sd	F	p	Between Groups Dif.	Effect Size (η^2)
Factor I	1st grade	223	73,19	25,33	6,152	,002	1-4	,03
	3rd grade	40	81,43	24,43				
	4th grade	92	83,38	24,74				
Factor II	1st grade	223	53,93	18,75	10,544	,001	1-3,1-4	,06
	3rd grade	40	63,10	21,82				
	4th grade	92	64,08	20,44				
Scale Total	1st grade	223	127,13	39,79	9,679	,001	1-3,1-4	,05
	3rd grade	40	144,53	42,78				
	4th grade	92	147,46	40,78				

When table 7 is examined, according to the result of the analysis of variance test conducted to test the significance of the difference between the mean attitude scores towards the virtual classroom environment in

the context of the grade level variable, a significant difference was found between the total attitude scores [$F(2-352) = 9,679, p < 0,05$]. According to the results of the Scheffe test conducted to determine in which groups the scores differentiate, it can be said that the mean attitude scores of the students in the 4th grade ($\bar{x}=147,46$) and the students in the 3rd grade ($\bar{x}=144,53$) were higher than those of the students in the 1st grade; in other words, they had more positive attitudes.

On the other hand, it is also observed that the distribution of attitude scores related to the sub-dimensions of the scale is similar to the overall scale. According to the effect size analysis, it is observed that the class of attendance variable has a "low" effect on the overall scale ($\eta^2=,05$) and sub-dimension I ($\eta^2=,03$) and a "moderate" effect on sub-dimension II ($\eta^2=,06$).

The distribution of pre-service teachers' scores towards the virtual classroom environment according to the variable of caring about the department courses is given in table 8.

Table 8. Analysis of Variance Results of Pre-Service Teachers' Attitude Score Towards a Virtual Classroom Environment According to the Variable of Caring About Department Courses

	Perception	n	\bar{x}	sd	F	p	Between Groups Dif.	Effect Size (η^2)
Factor I	1. Very much	70	81,73	27,17	4,598	,011	1-3	,03
	2. Much	183	78,22	22,88				
	3. Partially	102	70,72	27,63				
Factor II	1. Very much	70	54,39	18,02	2,789	,063	-	-
	2. Much	183	59,99	19,73				
	3. Partially	102	55,49	21,63				
Scale Total	1. Very much	70	136,11	37,27	2,865	,058	-	-
	2. Much	183	138,22	39,45				
	3. Partially	102	126,22	46,37				

When table 8 is examined, according to the result of the analysis of variance test conducted to test the significance of the difference between the mean scores of pre-service teachers' attitudes towards the virtual classroom environment in the context of the variable of caring about the department courses, no significant difference was found between the total attitude scores [$F(2-352) = 2.865, p > 0.05$]. While a similar situation was observed in the second sub-dimension, it was observed that there was a significant difference between the mean attitude scores related to sub-dimension I of the scale [$F(2-352) = 4,598, p < 0.05$]. According to the results of the Scheffe test conducted to determine which groups the difference is between; it is observed that the mean attitude scores of the pre-service teachers ($\bar{x}=81.73$) who consider the department courses "very important" are higher than those of the pre-service teachers ($\bar{x}=70.72$) who consider the department courses "somewhat important". When the results of the analysis of the effect size of the variable of finding department courses important on the attitude scores of Sub-dimension I are analyzed, it is observed that this variable has a low effect ($\eta^2=,03$).

DISCUSSION AND CONCLUSION

In the literature review, it was observed that while there were not many studies directly related to attitudes towards a virtual classroom environment, there were studies in the context of distance education, web-based education, online education, etc. While discussing the studies, this situation was taken into consideration, and studies about these topics were included.

As a result of the research, it is observed that pre-service teachers' attitude scores towards the virtual classroom environment are concentrated at the "undecided and negative" level. In a study conducted by Kuloğlu and Yıldız (2022), which is similar to the research finding, it was observed that undergraduate students' attitudes towards distance education were at the "medium" level. In the study conducted by

Altunyalçın et al. (2021), Yazgan (2021), and Kaban (2021), it was found that their attitudes towards distance education were negative.

It was observed that the mean attitude scores of pre-service teachers did not differ according to the gender variable; the attitudes of female and male pre-service teachers towards the virtual classroom environment were concentrated in an "ambivalent" attitude structure. Similarly, in the study conducted by Kaban (2021), when the attitudes of university students towards distance education were analyzed in terms of gender, it was concluded that the mean attitudes of both groups were low. However, it was observed that male students had a higher attitude than female students. On the other hand, similar to the research findings, Ateş and Altun (2008) concluded that students' attitudes towards distance education did not show a significant difference in terms of gender.

On the other hand, Akukwe et al. (2022) determined the attitudes of pre-service teachers towards virtual classroom application in teacher education and found that science teachers had positive attitudes towards virtual classroom application and that attitudes differed in favor of female pre-service teachers.

According to the academic success variable, the mean attitude scores of the pre-service teachers do not differ; it is observed that the attitudes of the students with achievement scores in different ranges have an attitude structure close to "undecided" and "undecided" towards the virtual classroom environment.

There is no significant difference between pre-service teachers' attitudes towards the virtual classroom environment according to the variable of perception towards faculty members. It is observed that the three groups with different perceptions of teachers reflect the "undecided" attitude score structure.

There is no significant difference between the general attitude scores obtained from the scale according to the variable of perception towards the teaching profession. However, it was observed that there was a significant difference only between the mean attitude scores related to sub-dimension II of the scale, that the mean attitude scores of the pre-service teachers who stated that they "liked the teaching profession a lot" were higher than the pre-service teachers who stated that they "liked the teaching profession a little" and that the effect size of the perception towards the teaching profession variable on sub-dimension II attitude scores was "low".

A significant difference is observed between the attitude scores of pre-service teachers towards the virtual classroom environment according to the grade level variable. It is also observed that the mean attitude scores of students in 4th grade and students in 3rd grade are higher than those of students in 1st grade, and the distribution of attitude scores related to the sub-dimensions of the scale is similar to the overall scale. In addition, according to the effect size analysis, it is also observed that the class of attendance variable has a "low" and "medium" level effect on the overall scale and its sub-dimensions. The findings of the study conducted by Kaban (2021) on the same variable are similar. In this study, when the mean attitudes of the students towards distance education were analyzed according to the grade level, it was seen that the 4th-grade students were at a medium level and the other grades were at a low level.

There is no significant difference between the general attitude scores of the pre-service teachers according to the variable of caring about the department courses. However, it was observed that there was a significant difference only between the mean attitude scores related to sub-dimension I of the scale; the mean attitude scores of the pre-service teachers who considered the department courses "very important" were higher than the pre-service teachers who considered the department courses "somewhat" important, and the variable of finding the department courses important had a low effect on sub-dimension I attitude scores.

In conclusion, the results of the study show that students have positive, undecided, and negative attitudes towards the virtual classroom environment. Determining the attitudes towards distance education and educational environments based on it, which have recently increased in popularity in parallel with the negative situations experienced in the world, is important in terms of increasing motivation and positive behaviors in this direction.

In light of the results obtained in this study, in order to make attitudes towards virtual classroom environments more positive, it can be recommended to determine the factors affecting the virtual classroom learning environment in the context of research and to organize virtual classroom environments and applications in this direction.

Declarations

Conflict of Interest

No potential conflicts of interest were disclosed by the author with respect to the research, authorship, or publication of this article.

Ethical Approval

The data were collected on a voluntary basis.

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Research and Publication Ethics Statement

Hereby, as the author, I hereby consciously assure that the following has been fulfilled for the manuscript "Investigation of Prospective Teachers' Attitudes Towards Virtual Classroom Environment":

- This material is the authors' own original work and has not been previously published elsewhere.
- The manuscript accurately and completely reflects the authors' own research and analyses.
- Conclusions are appropriately placed in the context of previous and current research.
- All references used are appropriately acknowledged.

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