EXAMINING THE RELATIONSHIP BETWEEN SATISFACTION AND ATTITUDE LEVELS OF PRE-SERVICE SCIENCE TEACHER'S TOWARDS DISTANCE EDUCATION

Ali Günay BALIM
Prof. Dr., Dokuz Eylül University, İzmir
ORCID: https://orcid.org/0000-0003-2010-1696
agunay.balim@deu.edu.tr

Ece ALTAY
PhD. Student, Dokuz Eylül University, İzmir
ORCID: https://orcid.org/0000-0003-0234-0044
ecealtay.8@gmail.com

Betül ÖZTAŞ
PhD. Student, Dokuz Eylül University, İzmir
ORCID: https://orcid.org/0000-0003-4396-8479
betuloztas20@gmail.com

Abstract

With the Coronavirus affecting the whole world, it has caused people to create a new order, and this new order has caused major changes in many sectors. Among the affected sectors, perhaps the education systems of the countries that have undergone the biggest change have been. In the new order, people had to carry out their work and education remotely during the pandemic. It is an undeniable fact that teachers have the biggest role in conducting distance education. Our aim in this study is to investigate the relationship between the satisfaction levels of prospective teachers, the teachers of the future, towards distance education based on information technologies and their attitudes towards distance education. In the study, Pearson Correlation Analysis was the technique used for the purpose of this. The sample of the study consists of 162 pre-service science teachers' studying at the 1rd, 2rd, 3rd and 4rd grade levels in the 2021-2022 academic year. The research showed that there is a negative and statistically significant medium-level relationship between the attitude scores of prospective teachers towards distance education and the satisfaction levels of their students. In line with the results obtained here, it is planned to shed light on future research by suggesting how teacher candidates can better adapt to distance education and what can be done to prepare themselves for such a problem in the coming years.

Keywords: Attitude, distance education, information and communication technologies, satisfaction level.

INTRODUCTION

In the world of science, distance education has emerged as a very important learning method, especially in a world shaped by technological developments and intense global connections (Hüseyin, & Kocasarac, 2022). Distance education in science education attracts more attention than other fields and is greatly affected by technological developments related to distance education. Science education aims to develop students' scientific thinking skills, understand science subjects, and be able to produce solutions to various problems using scientific knowledge. Conversely, distance learning offers students the opportunity to receive education through online platforms when they are not physically in the classroom (Deshmukh, Forawi, & Jaiswal, 2012). Distance education in science education can affect students' level of understanding of science subjects, their participation in classes, their motivation, and their attitudes toward education in general. While difficulties experienced in distance education can negatively affect students' interest and attitudes toward science courses, a well-designed and effective distance education program can increase students' interest in science subjects, their participation in the course, and provide them with greater satisfaction from education (Altawalbeh, &

Al-Ajlouni, 2022; Bostan Sarıoğlan, Altaş, & Şen, 2020; Gür, & Filiz, 2022; Yazgan, 2022). The relationship between satisfaction in science education and attitudes toward distance education is a multifaceted and critical area that needs to be investigated. Research considering students' satisfaction with the process of distance education, their attitudes toward lessons, their motivation to learn, and their interest in science subjects has focused on the relationship between satisfaction and attitude toward distance education in science education. Such studies can provide important clues to understanding the effects of distance education on science education and to developing more effective education methods (Alamri, 2021; Aldhahi, Alqahtani, Baattaiah, & Al-Mohammed, 2022; Cleveland-Innes, Gauvreau, Richardson, Mishra, & Ostashewski, 2019; Elfaki, Abdulraheem, & Abdulrahim, 2019; Ercoşkun & Ergül, 2023).

In the context of distance science education, satisfaction encompasses various dimensions. It relates to the overall content delivery, technological interface, instructor effectiveness, administrative support, and the learning experience itself. Fulfilling these issues significantly affects students' perceptions of the educational process and their satisfaction with the course (Hussein, Abdel-Jaber, Labib, & Mohammad, 2021; Pandita & Kiran, 2023). One of the key determinants of satisfaction is the effectiveness of the learning platform. A user-friendly interface, seamless access to training materials, interactive tools and responsive technical support contribute to a positive learning environment. When students find technology accessible and helpful to their learning needs, their satisfaction with the distance education experience tends to be higher (Canbek, 2011; Pandita, & Kiran, 2023). Additionally, the role of instructors is another important point. It greatly affects students' satisfaction levels by helping them understand the lessons with interesting and informative lesson plans. Effective communication, timely feedback, and support in understanding complex scientific concepts are crucial in shaping students' satisfaction with the learning process (Ahea, Ahea, & Rahman, 2016).

Attitudes towards distance science education include students' perceptions, beliefs and feelings about this way of learning. It is shaped by various factors such as previous experiences, individual learning preferences and the content of the education received (Ercoşkun, 2022). The perception of the quality and dependability of education received through online learning is one of the variables determining attitude. If students believe that the content and instruction, they receive remotely are the same as in traditional classroom environments, their attitudes toward distance science education tend to be positive. This perception is generally linked to the reliability of the institution offering the program and the structure of the program (Kuloğlu & Yıldız, 2022). Another important aspect that affects attitude is the level of interaction and participation present in the distance learning environment. Opportunities for active participation, collaboration with peers, and access to resources that encourage the practical application of scientific theories play an important role in shaping a positive attitude towards distance education in science (Gray & DiLoreto, 2016).

While providing science education via distance education is at the forefront today, it is very important to examine the effects of this trend on students. The relationship between satisfaction and attitude in distance science education is intertwined and reciprocal. Higher levels of satisfaction are generally considered by researchers in the literature to lead to a more positive attitude towards the learning experience. When learners are satisfied with the way their education is structured, technological support, teaching quality, and general learning environment, they are more likely to develop a positive attitude towards distance learning within education in science (Yekefallah, Namdar, Panahi, & Dehghankar, 2021). Conversely, a positive attitude executed towards distance science courses may also increase satisfaction levels. Learners that have a positive attitude of this learning style are more probable to participate actively because perceive difficulties as a learning opportunity and exhibit greater resilience in overcoming the difficulties they encounter, thus contributing to the increased level of satisfaction with the learning process (Çobanoğlu Aktan, & Öztemür, 2022). Distance education is known for offering flexibility and accessibility to students. However, when examining the effect of this approach on students' attitudes and levels of satisfaction, some important factors emerge. Students' satisfaction with the distance education environment and their attitudes towards this process may affect their success (Akçay, 2023; Özyürek, Begde, Yavuz, & Özkan, 2016). Satisfaction in distance education refers to students' satisfaction with the course content, teaching materials,

teacher-student interaction, and technological infrastructure. How satisfied students are with the educational process can affect their motivation, desire to learn and success. If students are not satisfied with the course content or have technological difficulties, this may negatively affect their attitudes during the distance education process (Baloran & Hernan, 2021; Gray & DiLoreto, 2016). Conversely, the opinions of students on online learning are as significant. Attitude refers to students' general thoughts, expectations and approaches towards distance education. A positive attitude can encourage students to participate more willingly in lessons and make more learning efforts. However, a negative attitude can reduce students' motivation and affect their success (Kaban, 2021).

The relationship between satisfaction and attitude in distance education has become an important focus for teachers and instructors. The relationship between satisfaction in science education and attitudes towards distance education is complex and interdependent. Satisfaction, influenced by various factors such as technological support, teaching quality, and administrative assistance, significantly affects students' perceptions of their learning experiences. Meanwhile, attitude shaped by perceptions of educational quality, participation, and practical applicability affects how students' approach and interact with distance education in science (Alzahrani & Seth, 2021; Kıymet & Çakır, 2023). Factors such as the quality of educational materials, student-teacher interaction, technological infrastructure and student support can affect students' satisfaction level and attitude. For this reason, to improve the rate of success in distance learning and ensure student satisfaction, educational institutions, faculty members and program developers should take these factors into account and focus on continuous improvement (Bolliger & Wasilik, 2009). Consequently, one of the key variables influencing students' educational experiences in distant learning is the correlation between attitude and satisfaction. Students' satisfaction and attitude can directly affect their motivation, learning efforts, and outcomes. So, it is essential to consider feedback from students and pursue continual development in order to enhance the quality of the remote learning experience. Understanding this complex relationship between satisfaction and attitude in distance science education is essential for teachers and organizations looking to improve the efficacy of science education delivered at a distance. By addressing the key determinants of satisfaction and cultivating a positive attitude towards this form of learning, experts in this field can create an environment that maximizes the potential of distance education in providing quality science education to students around the world. With all of this knowledge in thoughts, the purpose of this paper is to explore the intricate relationships between attitude and satisfaction in the context of distance education and to highlight the significance of these relationships. For this purpose, the research's of problem statement is "What is the relationship between pre-service science teachers' satisfaction levels and attitudes towards in distance education?". Conclusions about the impact of remote learning conducted on pre-service science teachers during the pandemic period will be drawn from the study's findings.

METHOD

Model of the Research

The relational screening model was used because the purpose of this study was to identify correlations between two or more variables that already existed without the need for any kind of intervention (Fraenkel & Wallen, 2005).

Research methods known as relational screening models aim to identify correlations between variables and ascertain the presence and/or strength of co-variation between two or more variables (Sönmez & Alacapınar, 2011). Despite the lack of a true cause-and-effect link, the relational screening model permits the prediction of the other variable in the event that the state of one variable is known (Karasar, 2006). This study, which used a relational screening model, looked at the attitudes of pre-service instructors regarding remote education and the degree to which their students were satisfied with information technology-based distance learning.
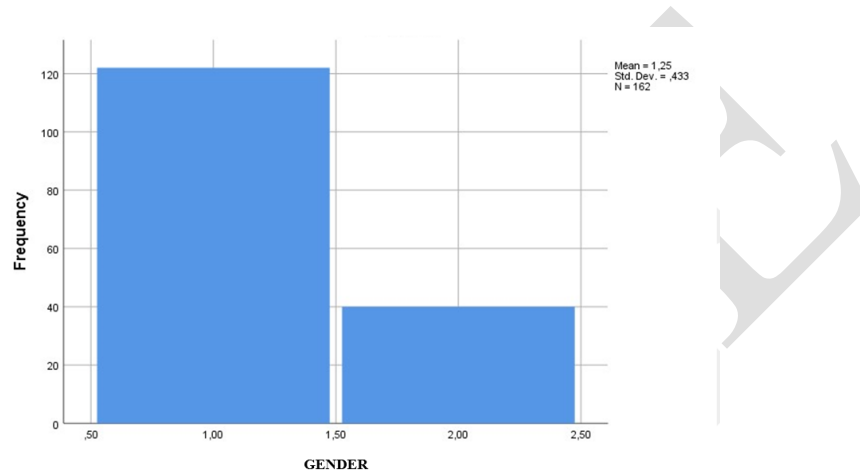
Sample

The study was conducted on pre-service science teachers a students in the 2021–2022 academic year at Dokuz Eylül University's Buca Faculty of Education. 162 students make up the research sample,

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which was chosen using a basic random sampling technique. 40 (24.7%) of these participants is males, and 122 (75.3%) were girls. Pre-service science instructors who participated in the research were distributed according to grade levels: 47 (29%) are in first grade; 31 (19.1%) are in second grade; 47 (29%) are in third grade; 37 (22.8%) are in fourth graders. The sample group's demographic data is included in Table 1, Figure 1, Table 2, and Figure 2.

**Table 1.** Data on demographics pertaining to the sample group's gender distribution

	Frequency	Percent
WOMAN	122	75,3
MALE	40	24,7
Total	**162**	**100,0**

Figure 1. Distribution of genders within the participant sample

Table 2. Data on demographics pertaining to the sample group's grade-level distribution

	Frequency	Percent
1RD GRADE	47	29,0
2RD GRADE	31	19,1
3RD GRADE	47	29,0
4RD GRADE	37	22,8
Total	**162**	**100,0**
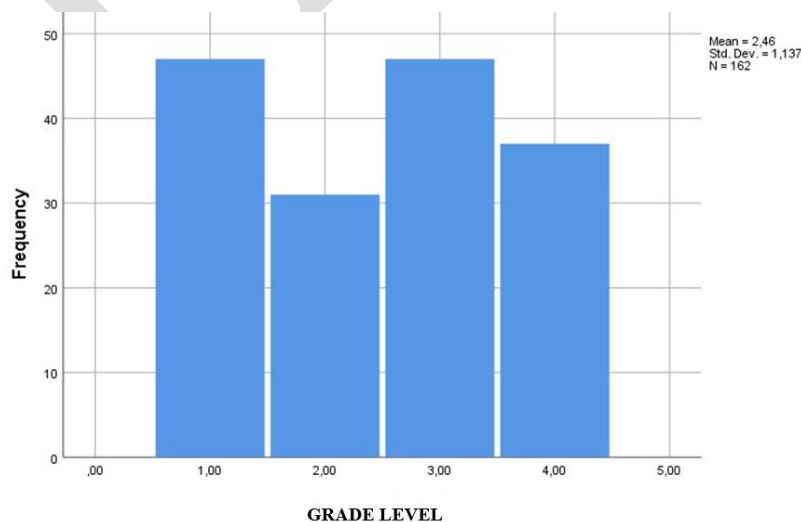
Figure 2. Distribution of grade level within the participant sample

Data Collection Tools

In the study, two scales were employed. To find out pre-service science instructors' satisfaction about distance education the "Distance Education Students Satisfaction Scale Based on Information Technologies" by Kukul (2011). Also, to find out pre-service science instructors' attitudes about distance education the "Attitude Scale towards Distance Education" by Kışla (2016). These data collection tools were arranged and applied to the first, second, third, and fourth grades pre-service science teacher's have implemented these data-collecting instruments.

Distance Education Students Satisfaction Scale Based on Information Technologies

The Kukul (2011) "Information Technologies-Based Distance Education Students Satisfaction Scale" was used to assess university students' satisfaction with information technologies-based distance learning. There are 42 items on the 7-point Likert-type scale. "Structure and Functioning of the Program, Interaction, Common Problem Areas" are the three components that comprise the scale. The internal consistency coefficient (Cronbach Alpha) was calculated as .97 by the researchers who developed this scale, which consists of 42 items. As a result of the tests conducted to determine the reliability of the scale within the scope of this research, the internal consistency coefficient (Cronbach Alpha) was determined as .96.

Attitude Scale Towards Distance Education

The attitudes of pre-service science instructors toward distance education used the "Attitude Scale Towards Distance Education" created by Kışla (2016). The scale is a 5-point Likert type with 35 items and one dimension. Items with a Likert scale: "Strongly Agree," "Agree," "Undecided," "Disagree," and "Strongly Disagree" were the ratings given. The internal consistency coefficient (Cronbach Alpha) was calculated as .89 by the researchers who developed the scale. As a result of the tests conducted to determine the reliability of the scale within the scope of this research, the internal consistency coefficient (Cronbach Alpha) was determined as .96.

Analysis and Interpretation of Data

The data from the scales of pre-service teachers were analyzed using frequency (N) and percentage (%) tables. In order to verify the linearity and normality assumptions of the variables, histograms, and Q-Q plot visuals were examined. Following the determination that the variables had a normal distribution, a Pearson correlation analysis was conducted in compliance with the study's objectives. A significance threshold of $p < 0.05$ was used to assess significance. The correlation coefficient is used to determine whether a linear link exists and, if so, to what extent following the correlation study. The correlation coefficient, represented by the letter "r," has a range of values from -1 to +1.

- If r= -1, there is a completely negative linear relationship.
- If r= +1, there is a fully positive linear relationship.
- If r= 0, there is no relationship between the two variables.

The following ranges are used to interpret the findings for r = Relationship in this context:

- 0.00 = No Relationship
- 0.01 – 0.29 = Low Level of Correlation
- 0.30 – 0.70 = Moderate Relationship
- 0.71 – 0.99 = High Level of Relationship
- 1.00 = Is a Perfect Relationship (Köklü, Büyüköztürk, & Çokluk Bökeoğlu, 2006).

RESULTS

The association between the attitudes of students participating in information technology-based distance education and their satisfaction levels with the program was ascertained through the application of Pearson Correlation Analysis. The results are shown in Table 3.

Table 3. Results of the correlation between satisfaction and their attitude with it in distance learning

Değişken	n	r	p
Doyum Tutum	162	-,604[*]	.000

*Correlation is significant at p<0.01 level

The relationship between the participants' satisfaction levels of information technology-based distance education students (M=4.54, SD=.95) and their attitude towards distance education (M=3.35, SD=.80) scores was measured with Pearson Correlation. A moderate, negative and significant relationship was found between these variables (r (160) = -.604, p<.001). This relationship is shown in Figure 1.
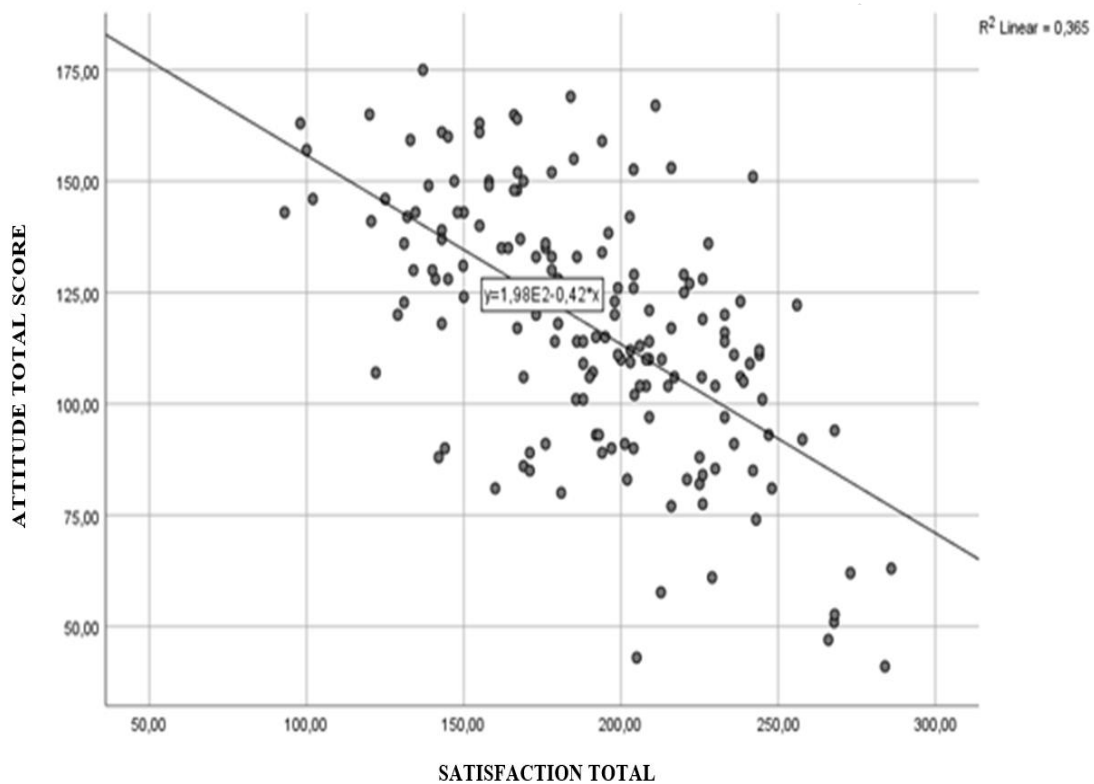
Figure 3. Correlation Graph

DISCUSSION and CONCLUSIONS

The study's findings showed that pre-service science teachers' attitudes regarding distance education and their satisfaction levels with the technology-based method of distance education were moderately, negatively, and significantly correlated. This section of the study goes into great detail on the outcomes that were achieved as well as potential explanations behind them.

Initial, the literature has review revealed that while numerous studies attempted to shed light on how the distance education process affected students (Aydın, 2022; Ercoşkun & Ergül, 2023; Kaban, 2021; Kuloglu, & Yildiz, 2022; Taşkın Ekici & Dereli, 2022; Uzoğlu, 2017; Yağan, 2021; Yenilmez, Turğut, & Balbağ, 2017), However, it was found that no research had looked at the connection between students' attitudes toward distance education and their satisfaction levels with the process. Furthermore, no research was located that looked also at the possibility of a connection between general attitude and students' satisfaction levels. However, within the theoretical knowledge of the educational process and affective variables, there are explanations that although the relationship between satisfaction levels and attitudes has not been studied before, there may be a positive and significant relationship. For this reason, in this part of the study, this situation is discussed in depth and possible reasons are explained.

The main aim of the research is to determine how the COVID-19 Pandemic caused pre-service teachers to transition to distance learning, and how this process unexpectedly gained significance in the area of education. Investigating which variables and to what extent distance education affects pre-service teachers' is particularly examined by researchers. While providing science education via distance education is at the forefront today, it is very important to examine the effects of this trend on students. The relationship between satisfaction and attitude in distance science education is intertwined and reciprocal. Researchers in the literature generally believe that higher levels of satisfaction will lead to a more positive attitude towards the learning experience (Yekefallah, Namdar, Panahi, & Dehghankar, 2021). However, this study shows us that the relationship is moderate and negative. It is not possible to determine and interpret which variable changes which variable in which direction from this result. The literature predicts a significant and moderate relationship between these variables. However, there may be several reasons why the relationship between variables is negative. First of all, since there is no study in the literature to examine the relationship between individuals' satisfaction levels and attitudes regarding the distance education process, it cannot test the accuracy or wrongness of the result. The fact that pre-service teachers have just experienced the distance education process could be another factor. The two applied scales and their items are basically about determining the structure, functioning and effects of the distance education process on individuals. For this reason, pre-service teachers' may not have adapted to this process because they have just experienced this process and data is collected by researchers during this process. Another important point is that continuing this study amidst the COVID-19 pandemic may have affected the pandemic anxiety levels of the participants. Accordingly, there may be variables that are not included in the scope of the study and affect the relationship (Stress, anxiety, age level, living conditions, use of technology, technological equipment and infrastructure facilities, etc.).

Satisfaction levels and attitude variables of the individuals examined within the scope of the study may not be variables that can be measured in a short time and with a single application, due to their structural characteristics. In order to determine its effects on individuals, it may be necessary for them to experience the distance education process for a long time and to determine its effects in this way. In this context, the number of samples might be another crucial factor. In the two scales used for this study, there are more than thirty articles. For this reason, it may be necessary to reach a larger sample size to identify the relationship between variables. Finally, pre-service teachers' may have some problems with the distance education platform (Technical, academics, internet, etc.). The reason for this is pre-service science teachers' satisfaction levels in the information technology-based distance education process are assessed based on the educational platform they utilize, and the applied scale's items are designed to assess this platform. As a result, they may not be satisfied with the problems experienced on the platform, that is, their satisfaction level is low, but they have a positive attitude towards this type of education or educational technologies.

The data provided within this study can be validated by additional research in this area as a consequence of the examinations and thorough discussion of the findings at the conclusion of the investigation. In this context, several suggestions are made for future research. First of all, in-depth information can be obtained by conducting experimental or longitudinal studies with a larger sample group and longer duration. In addition, in order to obtain in-depth data, it is strongly recommended to use interviews or different data collection tools to reveal the reasons for the relationships between the results. Thanks to such data collection tools, it is possible to obtain in-depth data from participants and reveal the underlying reasons for the findings. Finally, inside the constraints of the research, the items included in the scale applied to determine the satisfaction levels of Pre-Service Science Teachers in the distance education process based on information technologies are aimed at evaluating the educational platform used in the distance education process. Pre-Service Science Teachers taught their lessons on the SAKAI education platform during the distance education process. Therefore, within the scope of other planned studies, such a study can be conducted with participants using different distance education platforms (Teams, Zoom, etc.) and the structure of the relationship between these two variables examined on different platforms can be examined. It is believed that it will be helpful for students to conduct studies that include affective data and various variables

regarding the learning process and to evaluate the processes, given the educational processes in which individual learning has become widespread due to situations process and changes in living conditions like the COVID-19 Pandemic. To the extent that educators can benefit from these opportunities, they will have more data and will obtain useful feedback in structuring the learning process.

Ethics and Conflict of Interest

Producing rules for science, ethics, and citations were adhered to during while producing the paper titled "Examining the Relationship Between Satisfaction and Attitude Levels of Pre-service Science Teachers towards Distance Education"; no distortion was made on the data collected, and before the data was collected, Dokuz Eylül University Ethics Committee Ethical permission was obtained from with the decision dated 26.05.2021 and numbered E-87347630-640.99-59281. The contributions of the authors to the article are equal. There are no potential conflicts of interest related to the research, writing and/or publication of this article.

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