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Determining the Problems Experienced by Undergraduate Students in Digital Courses in the Distance Education Process

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Abstract: In today's developing and changing world educational activities which are an important factor in our social life like many human activities, have switched to the distance learning model when face-to-face teaching is not appropriate. Distance education is an interdisciplinary field that tries to eliminate the limitations between learning, teaching, and learning resources, and use existing technology with a pragmatist approach to achieve this. With the distance education carried out during the Covid-19 period, students had to attend classes from their own homes or in other venues that allow participation in the lesson. Although distance education removes the restriction of space and allows the lessons to be watched again, in addition to these advantages, distance education has also brought some problems. The inability of every teacher to use technology with the same efficiency, the teachers' inability to convey the content to students, the inability to understand the formulas in numerical lessons, the inability to solve enough problems to reinforce the subject, the inability to carry out experiments in a real laboratory environment, the inability to prepare exams in a classroom environment are examples of these problems (Kiremit et al., 2021). This study will try to determine problems experienced by undergraduate students in digital courses during the distance education process. For this purpose, the study group consisted of undergraduate students studying the department of science teaching, who learned numerical courses such as mathematics, chemistry, and physics through distance education for about four semesters. The data were obtained with the Distance Education Scale developed by Kiremit et al. (2021). The analysis of data was analyzed with the help of the SPSS 18 package program.

Keywords: Distance education, Education, Science education, Undergraduate student

Introduction

Covid-19, which first appeared in Wuhan, China in December 2019, spread rapidly all over the world in a short time and was declared a pandemic by the World Health Organization. With the declaration of a pandemic, significant changes have occurred in all areas of life, especially in health, economy, education, and social activities (Bakioğlu & Cevik, 2020; Gordy et al., 2020). Due to the rapidly spreading pandemic all over the world, some measures have been taken, schools have been taken around the world to create social distance, especially to ensure that young people stay at home, and to prevent contagion, and many students have been adversely affected by this process (Bulut & Esitti, 2020; Pinar & Donel Akgul, 2020). Until the epidemic level in the world decreases or until the epidemic end, it has been decided that the education should be done by distance education, not face-to-face. After the first Covid-19 case in Turkey was seen on March 11, 2020, various measures were taken, and the distance education process was started instead of face-to-face education in Turkey as in the World (Ozdoğan & Berkant, 2020). Distance education is a concept that can be defined very broadly and in various ways, and in the most general sense, it is an education system where the learner and the trainer are not physically in the same place and learning-teaching activities are carried out through the active use of information and communication technologies (Balaban & Hanbay Tiryaki, 2021; Ozdoğan & Berkant, 2020).

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The main purpose of distance education is to provide education and training opportunities to people with systems that can keep up with the developing technology and contribute to human education without being affected by time and space, by removing the time and geographical barriers that disrupt education (Ozbay, 2015). With the distance education type, education has been given in the world and Turkey for many years. Distance education has many advantages such as providing equal opportunities for students, providing a rich educational environment, allowing students to progress at their own pace, giving the individual responsibility for learning, lifelong learning, and low cost (Akyurek, 2020; Klisowska et al., 2021). In addition, distance education has many disadvantages such as not providing face-to-face interaction, preventing students from socializing, some courses not suitable for distance education, not benefiting enough from practical courses, not being effective in performing behaviors related to skills and attitudes, difficulty in getting instant feedback and addiction to communication technologies (Kurt & Aydin, 2021; Akyurek, 2020). As a result, distance education is important in terms of accessing education in earthquakes, epidemics, and similar extraordinary situations. University-level students were taking common compulsory courses such as Atatürk's Principles and Revolution History, English and Turkish language with distance education before the epidemic, a rapid transition to distance education took place in all courses, and this brought various problems, especially in some courses. This study aims to determine the problems experienced by pre-service science teachers who were educated by distance education during the pandemic process, in numerical lessons during the distance education process. It can be ensured that the existing learning deficiencies in students are eliminated and that learning deficiencies that may arise in resuming distance education in similar emergencies encountered in the coming period can be prevented. For this purpose, the study group consisted of undergraduate students studying in the department of science teaching, who learned numerical courses such as mathematics, chemistry, and physics through distance education. The data were obtained with the Distance Education Scale developed by Kiremit et al. (2021).

Method

In this study, which was conducted to determine the problems experienced by prospective teachers in numerical lessons during the distance education process, the case study model was used. Creswell (2002) defines case study as a problem to be studied, which will reveal an in-depth understanding of a "case" or bounded system, which involves understanding an event, activity, process, or one or more individuals (VanWynsberghe & Khan, 2007). For this purpose, the study group consisted of undergraduate students studying the department of science teaching, who learned numerical courses such as mathematics, chemistry, and physics through distance education for about four semesters. The data were obtained with the Distance Education Scale developed by Kiremit et al. (2021) and interview form consisting of open-ended questions. The data obtained as a result of the research were analyzed using two types of analysis methods. First, the results obtained from the scale were analyzed with the t test using the SPSS package program, and then the answers given by the pre-service teachers to the interview form were analyzed with the descriptive analysis technique. The purpose of using the interview form in the study to support the quantitative data obtained from the scale. Semi-structured interview forms offer the opportunity to ask in-depth questions about the subject studied, and to make the situation more explanatory by asking questions again if the answer is incomplete or unclear (Cepni, 2009).

Data Collection Tools

In this study, data were collected using two types of tools. Firstly, the distance education scale developed by Kiremit et al. (2021) was used in order to determine the problems experienced by pre-service teachers in digital courses during the distance education process. The scale consists of 19 items and 3 dimensions in total. Its dimensions are expressed as questions, teachers and environments. There are 3 items in the question dimension, 5 items under the teacher dimension, and 11 items under the environment dimension. The scale is a 5-point Likert-type scale scaled as strongly disagree (1), disagree (2), undecided (3), agree (4), and completely agree (5). The researchers who developed the scale stated the Cronbach Alpha internal consistency coefficient of the scale as 0.92. The Cronbach Alpha internal consistency coefficient calculated for this study was 0.84. There is no reverse item in the scale. A high score from this scale indicates the problem experienced in the distance education process.

Then, an interview form obtained from open-ended questions created by the researchers was used in order to support the data obtained from this scale and to identify other problems of students, if any. After the semi-structured opinion form was created, the opinions of 2 experts were taken, then the parts that were not understood in the questions were updated and given their final form. The opinion form consists of 4 open-ended questions and approximately 20 minutes were given to the pre-service teachers to answer. The data obtained

from the semi-structured opinion form were analyzed by creating separate codes by two researchers and then tabulated under common codes with consensus. For the reliability of the qualitative data, the Miles and Huberman (1994) reliability formula (Reliability = Consensus / (Agreement + Disagreement)) was used and the agreement rate among the coders was found to be 87.9 %.

Findings

1. The Normality Test Results of the Data of the Scale for the problems experienced in digital courses in distance education.

Table 1. Normality values of the scale of problems experienced in distance education

	N	Maximum	Minimum	Ss	Kurtosis	Skewness
Scale	91	5	1	0.51	1.45	-0.69

For a likert-type scale to be considered normal, the kurtosis and skewness values should be between 2 and -2 (Joreskog, 1996). According to the results of the normality test analysis of the scale used in this study, the skewness value was found to be 1.45, and the kurtosis value was -0.69. In other words, the data of this search show a normal distribution.

2. t-test Values Regarding the Difference Between the Averages of Problems Experienced in Distance Education Process and the Gender of the Students

Table 2. t-test values of the difference between the gender of the students and the averages of problems experienced in distance education process

Dimensions of the scale	Gender	N	X	p
Insufficient Number of Solved Questions	Female	76	3.53	0.88
	Male	15	3.44	
Teacher	Female	76	3.32	0.96
	Male	15	3.24	
Ambient	Female	76	3.70	0.61
	Male	15	3.65	

According to Table 2, no significant difference between gender of students' was found in terms of the insufficient of the number of solved questions ($p=0.88$), teacher ($p=0.96$) and ambient ($p=0.61$) dimensions ($p>0.05$).

3. t-test Values Regarding the Difference Between the Averages of Problems Experienced in Distance Education Process and the Grade Level of the Students

Table 3. t-test values of the difference between the grade level of the students and the averages of problems experienced in distance education process

Dimensions of the scale	Gender	N	X	p
Insufficient Number of Solved Questions	2. Class	44	3.33	0.004
	3. Class	47	3.68	
Teacher	2. Class	44	3.22	0.36
	3. Class	47	3.39	
Ambient	2. Class	44	3.65	0.43
	3. Class	47	3.73	

According to Table 3, there is a significant difference between the grade level of the students and the insufficient of the number of solved questions ($p=0.004$). In the dimension of the insufficient of the number of solved questions, 3rd grade students ($X=3.68$) have more problems than 2nd grade students ($X=3.33$). There is no significant difference between the grade level of the students and the average score of the teachers ($p=0.36$).

Again, there is no significant difference between the students' grade level and the mean score of the environment ($p=0.43$).

4. Analysis of the Answers of the Students to the Interview Questions Regarding the Problems Experienced by the Students in the Distance Education Process

Table 4.1. Analysis of students' responses to the question "which course did you have the most problems with"?

Course	N	%
Physics	58	36.8
Chemical	38	24
Biology	14	8.6
Maths	28	17.8
All lessons	5	3.2
Quantitative Courses	6	3.9
Field / Education Courses	9	5.7
Total	158	100

According to the percentile distribution of the analysis results presented in Table 4.1, it is seen that the course in which the students have the most problems is physics with 36.8%. Again, according to Table 4.1, it is seen that the courses in which the students have the least problems in the distance education process are the field/education courses with 9%.

Table 4.2. Analysis of the responses of the students to the question "what is there a son for your having problems in this course?"

Cause of Problem	Sub-Causes	N
Teacher-related problems	Insufficient use of technology by the teacher	13
	Lack of communication	1
	Not effectively conducting the lesson	5
Distance Education	The shortcomings of the application chosen for the course	5
Tool/Technology/Internet Based Problems	Internet connection difficulty	10
Student-related problems	Not attending class	2
	Not solving enough questions	3
Media related issues	Inability to concentrate at home	1
	Disciplinary issue	1
Time and Economy related problems	Limited time	10
	Giving the questions as homework due to insufficient time for problem solving	3
	Internet fee is too high	1
Lesson related problems	Intensive course content	2
	Teaching the quantitative course as a qualitative course	1

According to Table 4.2., the most common reasons why students have problems during the distance education process are the inadequacy of the teacher's use of technology, not attending the course, limited time and the problem of internet connection. Again, according to table 4.2, the problems that students talk less about in the distance education process are; lack of communication, inability to concentrate at home, disciplinary issue, internet fee is too high, teaching the quantitative course as a qualitative course.

Results and Discussion

At the end of the study conducted to determine the problems experienced by university students in numerical courses during the distance education process, it was concluded that the problems experienced by the students didn't differ in terms of gender. Similarly, Kiremit et al. (2021) concluded that there was no difference in terms of gender because of their study with high school students. Similarly, in the study conducted by Yildiz (2016) with students receiving pedagogical formation education and, in the study conducted by Arslan and Korkmaz (2019) with graduate students of Theology were found that the problems experienced in the distance education process did not change significantly according to the gender. At the end of the study, it was observed that there was a significant difference in the question size of the scale according to the grade level. According to the data

obtained, 3rd-grade students stated that they had more problems with the inadequacy of question solutions on the scale. One of the reasons for this may be that the 3rd-grade students have passed more numerical courses in distance education than the 2nd-grade students. In other dimensions of the scale, no significant difference was observed in the grade level variable.

As a result of the analysis, it was concluded that the students had the most problems in the physics course. Similarly, in the study of the Kirtak Ad (2020), teacher candidates were asked about the courses they followed most during the distance education process. Most of the pre-service teachers stated that they followed the courses (such as optics, electricity, solid state physics, and nuclear physics) more. As a reason for this, they stated that these courses are mostly numerical, abstract, and more difficult to understand.

As a result of the analysis, the most obvious reasons why students have problems in lessons are the inadequacy of the teacher's use of technology not attending the course, limited time, and the problem of the internet connection. Similarly, in the study conducted by Gillies (2008), pre-service teachers stated that they did not feel like real students because they could not get an instant answer to their questions and interact with their teachers during the distance education period.

Recommendations

The study which the problems experienced by the students in the distance education process are tried to be determined, the working group can be expanded, solutions can be determined for all the problems that exist in the distance education process, and the success can be increased in the possible distance education process. In the distance education process, considering that the students have problems with the inadequacy of the number of questions solved especially in the numerical courses, the duration of the courses can be extended to increase the solution of the questions. Especially, since applied courses such as physics and chemistry are more difficult to understand, these courses can be planned as blended learning (face-to-face + online) as a solution.

Scientific Ethics Declaration

The authors declare that the scientific ethical and legal responsibility of this article published in EPESS journal belongs to the authors.

Acknowledgements or Notes

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