

## Determination of Mobile Technology Use in an Interactive Distance Education Classroom Environment

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**Abstract**—The aim of this study is to investigate the determination of university students' use of mobile technology in an interactive distance education classroom environment. The quantitative research method was used in the research. The research was conducted in the fall semester of 2021–2022. A total of 318 university students continuing their education in Kazakhstan voluntarily participated in the research. In the research, a 4-week online training was given to university students. The 'distance education and mobile technology' measurement tool developed by the researchers and compiled by experts in the field was used. The measurement tool was delivered and collected by university students via the online method. The analysis of the data was made by using the SPSS programme, frequency analysis, t-test and analysis of variance (ANOVA) test, and the results were added to the research in the form of tables. According to the results obtained from the research, it has been concluded that while university students' level of knowledge in terms of distance education and mobile technologies is high, the situation of university students not using mobile technologies is quite low, but the rate of using them very often is quite high; and it is used by reflecting on the distance education systems in the course.

**Keywords**—university students, distance education, mobile technology, interactive education

### 1 Introduction

Computer and Internet have started to show themselves in every field in distance education. However, different conveniences have come with it in many different areas, and technological products have become widespread and an inseparable part of daily life at the end of a certain period [1]. Cell phones, also called mobile phones, have an important place in the country. It is known that the individual fulfils many needs in this life not only with its communication feature, but also with many innova-

tions it has provided such as image, sound and Internet [2]. Especially in an environment where students or learners can individualise their learning needs in the areas they want, the individual learning approach is gaining more and more importance [3]. The use of technologies that support this approach provides a personalised learning environment. The fact that devices based on mobile technologies are gradually becoming learning centres for learning purposes reveals the mobile learning applications [4].

It is observed that important developments have been recorded in the mobile field with the ever-renewing and developing technology. Its main developments are the strengthening of laptop and tablet computers, the spread of pocket computers, portable media players and smartphones [5]. It is seen that wireless connection, GPRS connection, Bluetooth and infrared connection possibilities are increasingly used in order to enable mobile devices to connect online by themselves or by using them together. In addition, there are significant developments in technologies for storing and transporting information between mobile devices and transferring them between different formats [6]. In the lifelong learning process, the individual must learn by himself. The individual develops skills to access information in different ways in the learning process [7]. It is seen that technological developments play an important role in this process in order to reach information. By providing a flexible environment for the learner, it enables them to use their time more efficiently [8]. Flexibility will enable those who are physically challenged to be in the same environment, those who want to receive an education in addition to the education they have received and the opportunity to easily benefit from their home or any point they want to connect [9]. The rapid increase in information day by day and the desire to access information whenever and wherever makes it necessary to follow this increase, which has increased the importance of learning technologies.

In the studies, mobile devices have been used in different fields and as an environment where different learning activities are carried out. Mobile technologies have been used for application evaluation or experimentation in fields such as grammar, foreign language education, mathematics, management and computer science to support teaching [10]. Similarly, it is possible to come across applications for different purposes such as sharing course documents, formative assessment, exam, homework submission, research and writing [11]. In the mobile learning model, the interaction between the teacher and the students is created, and it is possible to participate in the teaching from different places, homes and even from different countries. Unlike the traditional learning approach, the student is at the centre of this contemporary organisation [12]. Contrary to the fact that all information is learned during the lesson, regardless of time and place, the student learns the subjects as he wishes and can easily connect with his teacher with the help of technology. Mobile learning can be learned without going to school, spending money and time for transportation [13]. Those who live far from schools have the opportunity to learn without leaving their place for reasons such as work, health and family.

### **1.1 Related research**

In their study, Acheampong et al. [14] aimed to investigate the potentials of using mobile technologies to improve the delivery of academic library services in the distance education environment, and as a result, they reached the conclusion that the use of mobile devices in the university environment has become widespread and that distance education supports this application.

Chiu [15], in his research, aimed to reveal the importance of adopting distance/online learning to help students continue learning during the closure of schools due to the COVID-19 pandemic, and as a result, distance education and digital support strategies better meet the needs of students. It has been concluded that needs are the predictors of participation level and that relationship support is very important.

In their study, Pastirmacıoglu et al. [16] aimed to determine the mobile internet usage levels of special education teachers. They concluded that the mobile Internet acceptance model of the special education teacher candidates is positive and they can easily use it in their daily lives. They also said that special education teacher candidates should combine mobile technologies with their own fields.

When the studies conducted in the related research section are examined, it is seen how important the power of mobile technology and distance education is and that they support students in their fields. It can be said that the same results are expected from this study.

### **1.2 Purpose of the study**

The aim of this study is to determine the mobile technology usage of university students in the interactive distance education classroom environment. In line with the purpose of the study, answers to the following questions were sought in the study:

1. What is the mobile technology performance status of the participants participating in the research?
2. What is the mobile technology satisfaction level of the participants participating in the re-search in general?
3. Is there a difference between the distance education satisfaction levels of the participants participating in the research?
4. Is there a difference between the mobile technologies and performance levels participating in the research?
5. Is there a difference between the levels of following the mobile device and distance education participating in the research?

## **2 Method**

When the method part of the research is handled, it is observed that information about which method is used in the research is provided.

## 2.1 Research model

The quantitative research method was used in the study; the data collection tool developed by the researchers was applied to university students with the help of an online questionnaire. When we collected data about the quantitative research method from the literature, it was seen that this method brought the results of numerical and statistical data to light. In addition, since this method is based on numbers, the sample representing the event or phenomenon should be determined completely and the right questions should be asked [17].

## 2.2 Working group/participants

The research was carried out in the fall academic year of 2021–2022. The research consisted of 318 volunteer students studying at universities in Kazakhstan at random. All of these students take their courses by linking distance education and mobile technologies.

**Gender.** In this section, the class status of the population participating in the research was examined and detailed information is given in Table 1.

**Table 1.** Distribution of university students by gender

Gender	Male		Female	
	<i>f</i>	%	<i>F</i>	%
Variable	161	50.63	157	49.37

As seen in Table 1, the gender data of the participants in the research are included. In this con-text, it is stated that 50.63% (161 people) are male and 49.37% (157 people) are female university students. In the gender section, the findings reflect the actual gender distribution.

**Class.** In this section, the class variable conditions of the population participating in the research are examined and detailed information is given in Table 2.

**Table 2.** Distribution of students participating in the study by class

Class	2.Class		3.Class		4.Class	
	<i>f</i>	%	<i>F</i>	%	<i>f</i>	%
Variable	107	33.65	110	34.59	101	31.76

As seen in Table 2, 33.65% (107 people) of the university students in the study group consisted of second-year students, 34.59% (110 people) were third-year students and 31.76% (101 people) were fourth-year students. Findings in the grade section reflect the actual distribution.

**Does encountering mobile technology in the classroom affect performance positively?** The question of whether seeing the primary school students included in the research with mobile technology in the classroom environment affects your performance has been sought and the distribution is given in Table 3.

**Table 3.** Mobile technologies’ performance status

Related question	Yes		No	
	<i>f</i>	%	<i>F</i>	%
Variable	298	93.71	20	6.29

When Table 3 is examined, it can be seen that 93.71% (298 people) answered yes and 6.29% (20 people) answered no, according to the distribution of whether mobile technology positively affects their performance in the classroom environment. It can be said that if it is processed in an environment, a positive result will be obtained.

### 2.3 Data collection tools

In the data collection tool section, it is seen that, first of all, information will be given about which type of data collection tool will be used in the study. The data collection tool, on the other hand, was prepared by experts in order to increase the mobile technology views of university students on interactive distance education classes, and the unsuitable items were removed from the research and corrected. A personal information form called ‘distance education and mobile technology’ measurement tool, which was applied to the participants participating in the research and developed by the researchers, was used. The content validity of the developed measurement tool was examined by four experts with professor titles working on distance education systems and mobile technology platforms and unnecessary items were removed from the measurement tool and rearranged.

1. Personal information form (demographic data): In the personal information form, information such as gender, class and mobile technology performance effects are included.
2. Distance education and mobile technology data collection tool: A 5-point Likert type questionnaire was prepared in order to obtain information about university students’ views on distance education and mobile technology situations. 24 items of the measurement tool consisting of a total of 26 items were used and 2 items were extracted from the measurement tool, thanks to expert opinion. The opinions of the participants participating in the research were sought from two factorial dimensions, such as ‘distance education’ and ‘mobile technology’ of the participants participating in the research. The Cronbach alpha reliability coefficient of the measurement tool as a whole was calculated as 0.95. The measuring tool was in the range of ‘strongly disagree’ (1), ‘disagree’ (2), ‘undecided’ (3), ‘agree’ (4) and ‘strongly agree’ (5). The measurement tool was collected from the people who participated in the research in the form of an online environment with a Google survey.

### 2.4 Application

Live lessons in the form of interactive distance education consisting of 7 sections in total were arranged for 318 primary school students continuing their education in

Kazakhstan. During the 4-week training, mobile technology courses were given on the increase and determination of students' interactive distance education and mobile technology status, including how to use the combination of distance education, interactive education and professional activity; how to reconcile it with time; what is distance education information adaptation; and so on. After the 4-week education, the interview data collection tool was applied to the students and the data are given in tables in the findings section. The education is arranged on the Google meet, which is preferred by most primary schools, and each section is limited to 50 people, distributed over the weeks, each lesson was taught in 40 minutes, and the participants participating in the research in the form of online education were expected to attend the lesson with video and microphone, thanks to their smart devices. The interview form applied to the students was taken with their families through Google Forms.

### 2.5 Analysis of the data

The data collected with the online questionnaire were analysed using the SPSS IBM 24.0 programme. Percentage, frequency and descriptive analysis results are given by t-test (independent samples t-test), Kruskal–Wallis H-Test and one-way ANOVA methods. Data on numerical developments were tabulated and interpreted, and whether there was a significant difference between independent variables was tested at the level of  $\alpha=0.95$ .

In addition, while the data was being analysed, the information in Table 4 was of assistance.

Among the values in Table 4, the values in the findings section were interpreted and shared in the findings section of the tables.

**Table 4.** Limitations

Weight	Limits	Choice
1	1.00–1.80	I strongly disagree
2	1.81–2.60	I do not agree
3	2.61–3.40	I'm undecided
4	3.41–4.20	I agree
5	4.21–5.00	Absolutely I agree

## 3 Findings

In this section, the determination of the professional activity adaptation based on distance education and mobile technology dimensions of the participants participating in the research and the findings related to the findings are included.

### 3.1 Descriptive statistical findings of the mobile technology satisfaction levels of the participants participating in the research

The descriptive statistics regarding the determination of the mobile technology satisfaction levels of the participants participating in the research are given in Table 5.

**Table 5.** Descriptive statistical findings of the mobile technology satisfaction levels of the participants of the study

Dimension	Course name	<i>N</i>	<i>M</i>	<i>S</i>
Registration to the System with Mobile Technology	Interactive Distance Education	318	4.20	0.578
Mobile Technologies Technical Support		318	4.17	0.683
Mobile Technologies Evaluation	Interactive Distance Education	318	4.11	0.871

As seen in Table 5, it is seen that there is an average of  $M= 4.20$  according to the status of registration to the system with mobile technology regarding the determination of the satisfaction levels of the participants participating in the research. In addition, it is seen that mobile technologies technical support status is and average of  $M=4.17$  and finally mobile technologies' evaluation score is  $M=4.11$ . In light of these findings, it can be said that the participant groups participating in the research have a high level of satisfaction with their mobile technologies, and that the registration, technical support and evaluation dimensions are appropriate.

### 3.2 T-test analysis findings of the participants' distance education satisfaction levels by gender variable

In order to determine whether there is a significant difference between genders in the distance education satisfaction levels of the participants participating in the research, the relevant data were given to the independent samples t-test findings.

As seen in Table 6, according to the gender variable, the arithmetic mean and standard deviation scores of male students were determined as  $M=4.12$ , and the arithmetic mean and standard deviation scores of female students enrolled in the distance education system were determined as  $M=4.09$ . From the findings, it can be said that there is no difference between male and female students. In addition, when another finding was examined, the distance education technical support department arithmetic mean and standard deviation scores of male students were  $M=4.22$ , and the distance education technical support arithmetic mean and standard deviation scores of female students were determined as  $M=4.18$ . From the findings, it can be said that there is no difference between male and female students according to the distance education system technical support department. Finally, in Table 6, the distance education evaluation feature arithmetic mean and standard deviation scores of male students were determined as  $M=4.28$ , and the system evaluation arithmetic mean and standard deviation scores of female students as  $M=4.26$ . From the findings, it can be

said that there is no difference between male and female students according to the distance education evaluation feature.

**Table 6.** t-test analysis findings of the participants' distance education satisfaction levels by gender variable

Dimension	Gender	N	M	SS	SD	t	p	Explanation
Registration to the distance education system	Male	161	40.12	0.53852	318	.261	.601	$p > 0.05$ (difference meaningless)
	Woman	157	4.09	0.58960				
Distance education technical support	Male	161	4.22	0.50835	318	.242	.762	$p > 0.05$ (difference meaningless)
	Woman	157	4.18	0.64684				
Distance education evaluation	Male	161	4.28	0.64029	318	.268	.742	$p > 0.05$ (difference meaningless)
	Woman	157	4.26	0.61052				

### 3.3 T-test analysis findings of mobile technologies and performance levels participating in the research

In this part, the data related to the independent samples t-test findings applied to determine whether there is a difference between the mobile technologies participating in the research and the t-test analysis findings of the performance levels of the university students according to the mobile technologies variable are given.

As seen in Table 7, the arithmetic mean and standard deviation scores of the students who answered yes according to the mobile technologies variable were determined as  $M = 4.22$ , and the arithmetic mean and standard deviation scores of the students who answered no according to the mobile technologies variable were determined as  $M = 2.80$ . From the findings, it can be said that there is a significant difference between the students according to the mobile technologies variable. In addition, as seen in Table 7, the arithmetic mean and standard deviation scores of the students who answered yes according to the mobile technology performance variable were determined as  $M = 4.28$ , and the arithmetic mean and standard deviation scores of the students who answered no according to the learning variable were determined as  $M = 2.42$ . Based on Table 7, it can be said that there is a significant difference when both dimensions are considered from the findings.

**Table 7.** t-test analysis results of mobile technologies and performance levels participating in the research

Dimension	Criterion	N	M	SS	SD	t	p	Explanation
Mobile technologies	Yes	311	4.22	0.5624	318	-5.49	0.000	$p < 0.05$ (significant difference)
	No	7	2.80	0.2684				
Mobile technology performance	Yes	311	4.28	0.57161	318	-8.31	0.000	$p < 0.05$ (significant difference)
	No	7	2.42	0.2735				

### 3.4 One-way ANOVA results of mobile device and distance education tracking levels participating in the research

In order to determine whether there is a difference according to the level of following mobile devices and media technologies of primary school students, data on values of one-way ANOVA results are given.

As seen in Table 8, it is seen that there is a statistically significant difference between the mobile device tracking levels of the participants participating in the research and their ‘mobile device’ tracking views. According to the findings, it can be said that the mobile device tracking dimension of the students is more effective than their performance. Finally, Table 8 shows that there is a statistically significant difference between the participant groups participating in the research according to their views on following ‘distance education technologies’. According to the findings, it can be said that the follow-up dimension of the distance education technologies of the participants participating in the research is effective.

**Table 8.** One-way ANOVA of primary school students’ levels of following mobile devices and media technologies

Dimension	Source of variance	Sum of squares	SD	Average of squares	F	p	Description
Mobile device	Intergroup	8.788	3	3.300	8.192	0.000	$p < 0.05$ (significant difference)
	In groups	38.689	315	0.359			
	Total	47.477	318				
Distance education technologies	Intergroup	17.109	3	6.036	18.57	0.000	$p < 0.05$ (significant difference)
	In-groups	33.367	315	0.308			
	Total	50.476	318				

## 4 Discussion

Sumadi et al. [18] aimed to examine the literature on the analysis of learning opportunities in the pandemic period regarding the effectiveness of online learning, and as a result, they concluded that distance education is the most preferred and used method because it is more practical and easy to use and parents can control the learning process. When this value is combined with the results of the research, it is seen that the students participating in the research have high-performance levels against distance education. In this context, it can be said that the power and importance of distance education is understood during the pandemic period and the values are high.

Kim et al. [19] aimed to provide a clear idea about the determining factors that increase students’ intention to use online learning systems (based on an integrated technology acceptance model and theory of planned behaviour) and to provide the moderator role of innovation as an important factor, and as a result, it is seen that they play a regulatory role in the relationship between innovativeness, subjective norms and behavioural intention, and that mobile technology contributes to the students entering this field. The results that they followed regularly were reached.

Xue et al. [20] aimed to investigate the action of online education and also aimed to target that online education includes policy development, education informatics policy, online education system and online education mechanism in China, especially during the epidemic, and as a result, simultaneously they stated in their research that they found classroom-based teaching mode, asyn-chronous enrollment and broadcast teaching mode, online flipped classroom teaching mode and online course-based teaching useful. It is seen that they achieved the results.

In this context, it can be said, based on the researches that distance education with mobile technology has a meaning and that education becomes more enjoyable with distance education. It is among the expectations that this research sheds light on other researches.

## **5 Conclusion**

When the results part of the research is considered, it is seen that the number of participants comes first; the number of participants in the research is always important for a research. Another result of the research is that the participant groups included in the study answered yes to the distribution of whether mobile technology positively affects their performance in the classroom environment. In this context, it is important for the research that they want to see mobile technologies in education.

When another value of the research is considered, it is seen that the status of registration to the system with mobile technology regarding determining the satisfaction levels of mobile technologies of the participant groups participating in the research is high; the technical support status of mobile technologies is high; and the registration, technical support and evaluation dimensions are appropriate. Another value is whether there is a significant difference between the genders of the participants in the distance education satisfaction level of the participants and it was concluded that there was no significant difference between both male and female participants. Among the final values of the study, it was concluded that the arithmetic mean and standard deviation scores of the students who answered yes according to the mobile technologies variable were higher; the arithmetic mean and standard deviation scores of the students who answered no according to the mobile technologies variable were lower. In addition, considering that the same situation is valid in the performance value, it can be said that there is a significant difference and reached when both dimensions are considered from the findings obtained.

When the final result of the research is considered, it is seen that there is a statistically significant difference between the mobile device tracking levels of the participants participating in the research and their 'mobile device tracking' views. According to the findings, it can be said that the mobile device tracking dimension of the students is more effective than their performance. Finally, it is seen that there is a statistically significant difference between the participant groups participating in the research according to their views on following 'distance education technologies'. According to the findings, it can be said that the follow-up dimension of the distance education technologies of the participants participating in the research is effective.

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