Investigation of Mobile Learning Readiness of Students According to Tablet Usage

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Abstract—In this study, it was aimed to determine the mobile learning readiness of university students and to examine the change according to tablet usage. The research was carried out in the fall semester of 2021–2022. The study, which was carried out with the participation of 360 university students, was carried out using the survey model. In the research, a 4-week distance education mobile learning training was given to university students. In the study, 'Mobile Learning Readiness Scale' was used to collect data. The scale used in the research was delivered and collected by university students online. The analysis of the data was made by using the SPSS programme, frequency analysis and *t*-test. The results were added to the research in the form of tables. As a result of the research, it was determined that university students have advanced mobile learning readiness.

Keywords—distance education, mobile learning, readiness, tablet, university students

1 Introduction

The rapid development of technology has led to a change in learning trends around the world. Along with technology, mobile devices, such as smartphones and tablets, which facilitate the use of technology, have become widespread rapidly and these developments have provided learning opportunities beyond traditional education understanding. While the use of the Internet all over the world has brought about the spread of mobile learning, it has also made the use of mobile devices an important requirement.

1.1 Theoretical and conceptual framework

The widespread use of mobile devices in educational environments has led to the emergence of the concept of mobile learning. In the literature, it is seen that different

recognitions of mobile learning are made. In some studies in the field, it is stated that mobile learning is learning carried out with mobile devices, such as portable computers, smartphones and tablets [1]. In some studies, mobile learning has been defined as a learning environment where students can learn independently whenever and wherever they want [2]. In some studies, it has been stated that mobile learning is an important learning method used in the realisation of both in-class and out-of-class learning activities [3]. In another definition, mobile learning is defined as learning that takes place in a multifaceted context through social interaction and content interaction using personal electronic devices [4]. According to these definitions, it is seen that the common features in the concept of mobile learning are mobile learning devices, e-learning activities, any kind of learning that takes place when the learner is not in a predetermined place or learning wherein the learner uses the learning opportunities offered by mobile technologies [5].

Mobile learning has attracted great attention as it makes significant contributions to educational technologies. The reason for this is shown as the overflow of learning outside the school by combining in-class and out-of-class environments of mobile learning [6].

Another advantage of mobile learning, which primarily provides time- and place-independent learning opportunities, is the support of collaborative learning with the developed mobile applications [7]. The features of mobile technologies are expressed as portability, social interaction and individuality. These features are also seen as learning advantages; portability is expressed as the most prominent feature of mobile devices [8]. In addition to the advantages of mobile learning, some disadvantages and difficulties encountered in the learning process are also the subject of discussion. Despite the opportunities offered by mobile learning, it has been identified as having many challenges such as connectivity, small screen sizes, limited processing power and low input capacity. These challenges, however, are not an obstacle to the diffusion of mobile learning [9]. Mobile resources, which are used to provide access everywhere by using the advantages of mobile learning, have been accepted in societies that integrate technology into education. This acceptance has accelerated the spread of mobile learning worldwide [10].

1.2 Related research

When the researches in the field are examined, it is seen that there are many studies on mobile learning activities. Heflin et al. [11] evaluated participants' attitudes towards collaborative learning in collaborative learning environments with and without mobile devices. As a result of the study, it was revealed that mobile devices and students' positive perceptions of collaborative learning were related. Martin and Ertzberger [12] tried to determine the effects of mobile device learning and computer-based learning on the achievement and attitudes of university students. As a result of the research, it has been observed that the attitude values of the students in the learning environment with mobile devices are at a higher level than those who use the computer-based learning environment.

Using the technology acceptance model, which is an information system, Shin and Kang [13] demonstrated the acceptance of mobile learning by students and the effect of this model on students' success. As a result of the research, it has been determined that mobile technology acceptance has an effect on learning success both directly and indirectly. Tugun [34] researhed validity and reliability dissertation of the scale used for determination of perceptions and attitudes of teacher' proficiency in Tablet PC-supported education.

There are also studies in the literature to determine how mobile devices can be used to provide better education. Rogers [14] revealed in his research that mobile learning positively affects participation and interest. In his research, Ting [15] revealed that mobile learning strengthens the interaction between students. In another study, it was stated that university students frequently use mobile learning applications [16]. Nawaila et al. [17] designed a mobile application to increase students' digital literacy.

It is also seen that there are studies in the literature dealing with the effects of mobile learning readiness on learning. Dennen and Hao [18] revealed in their research that the low level of readiness of higher education students negatively affects mobile learning activities. Bakhsh et al. [19] stated in their study that students' readiness for mobile learning has a significant impact on the adoption and implementation of mobile learning. In his research, İlçi [20] revealed that university students' mobile learning readiness is at a moderate level.

Hamidi and Chavoshi [21] also examined the level of adoption of mobile learning in universities in their research. As a result of the study, it was emphasised that mobile learning is a promising educational technology for development in educational environments and usage culture.

1.3 Purpose of the research

The purpose of this research is to examine the mobile learning readiness of university students according to their tablet usage. In accordance with this purpose, the following sub-objectives have been determined:

1. How is the mobile learning readiness of the students before and after the mobile learning training?
2. Does the mobile learning readiness of the students differ according to the gender variable before and after the mobile learning education?
3. Does students' mobile learning readiness differ according to their tablet usage status before and after mobile learning training?

2 Method and materials

In this section, the research method, study group, process and data analysis are explained. The content of the cyber security training and the cyber security scale development processes are also included.

2.1 Research method

In this study, university students' readiness for mobile learning was evaluated using the survey model, which is one of the quantitative research methods, including the opinions of the participants on a subject or their interests, skills, abilities, attitudes etc. The studies in which the characteristics of the researches are determined and to describe the existing situation are called survey researches. In survey studies, the abilities, skills and attitudes of certain populations are examined [22]. In this direction, student readiness for mobile learning was handled in accordance with the scanning model.

2.2 Participants

In this study, which was conducted to determine the readiness of university students for mobile learning, the sample of the research consists of 360 students studying in various departments at universities in Kazakhstan in the fall semester of 2021–2022. The sample group consists of students who voluntarily chose to participate in the 4-week mobile learning training to be given within the scope of the research. The sample group was selected on a voluntary basis.

2.3 Data collection tools

The research data were collected with the Mobile Learning Readiness Scale developed by the researcher. The Mobile Learning Readiness Scale was applied to the students twice with an interval of 1 month. Between the two applications, a 4-week mobile learning training was given to the students.

With mobile learning education, it is aimed to increase the mobile learning readiness of university students. The training is planned for the students as 2 hours a week, with a total of 8 hours. The purpose of the training is to provide motivation for students' readiness to use mobile devices in learning activities. The training focused on three basic elements. The achievements of the students were determined based on these three basic elements. These items are developing self-efficacy, creating a positive perspective and gaining self-learning habits. In mobile learning education, applications for improving students' self-efficacy are explained as content. The importance of individual learning and the effect of individual learning on success were explained to the students with examples. Finally, it was tried to provide a positive perspective of the students. It has been observed that students participate in mobile learning education with interest. Student motivation was taken as a basis in the training given on the transformation of mobile device use into educational use. At the end of the training, the Mobile Learning Readiness Scale developed by the researchers was reapplied to the students.

The Mobile Learning Readiness Scale was prepared by following certain steps after a literature review on students' mobile learning readiness status.

Establishment of the item pool and expert opinion. An item pool was created by scanning the literature on mobile learning readiness. The item pool consists of 52 items. An item content validity analysis was conducted for the item pool. For the content validity analysis, a candidate expert group consisting of eight people was formed.

For the experts who will participate in the content validity study, a form was created with grades as 'The item measures the determined structure', 'The item measures the determined structure but should be improved' and 'The item does not measure the determined structure'. Experts evaluated 72 items in these 3 categories. As a result of the evaluation, 20 items were selected to be used in the scale among the items, with a content validity index above 0.80.

Data collection with pilot application. For the preliminary application of the Mobile Learning Scale, 268 university students were selected. The students who participated in the pre-application agreed to participate in the scale development study voluntarily. 119 students are female and 149 are male.

Analysis of pilot application data. SPSS 20.0 for exploratory factor analysis of the collected data, and SPSS Amos 25.0 for confirmatory factor analysis were used. Before the exploratory and confirmatory factor analyses, the suitability of the data, the Kaiser–Meyer–Olkin (KMO) coefficient and Bartlett Sphericity test were calculated. The KMO value was calculated as 0.889. The Bartlett test result was found to be (0.000) <0.05. Thus, the data set was found suitable for factor analysis. In the exploratory factor analysis, the eigenvalue and variance rates of the scale were examined. In the exploratory factor analysis, where the cumulative distribution was found to be 96,255, 3 factors with eigenvalues greater than 1 were determined. It was observed that the item factor load was over 30, indicating 3 factors, and 3 items in the scale were loaded on another factor. In this direction, three items in the 'Individual learning' sub-dimension were removed from the scale. In the confirmatory factor analysis, the goodness-of-fit index was examined. CMIN/df (χ^2/df <5)=1.903, GFI (>0.90)=1.183, CFI (>0.90)=1.662, NFI-TLI (>0.80)=1.252–0.932 and RMSA (<0.07)=0.065. Accordingly, the goodness-of-fit index was considered to be high. After the validity study of the scale, reliability study was conducted. The Cronbach alpha internal consistency coefficient was calculated for the three sub-dimensions of the scale and the overall scale. The sub-dimensions of the scale were determined as 'Self-efficacy', 'Positive perspective' and 'Individual learning'. The internal consistency coefficient for the 'Self-efficacy' sub-dimension is 0.89; the internal consistency coefficient for the 'Positive perspective' sub-dimension is 0.81; the internal consistency coefficient for the 'Individual learning' sub-dimension is 0.89; and the internal consistency coefficient obtained for the overall scale is 0.85.

Creating the final version of the scale. The mobile readiness scale was arranged to be applied to the sample group of the research after the pilot application. There are six items in the self-efficacy sub-dimension, seven items in the positive perspective sub-dimension and four items in the individual learning sub-dimension. The scale was developed in a 5-point Likert type. It is scored on the scales of 'Strongly agree', 'Agree', 'I am undecided', 'Disagree' and 'Strongly disagree'. Item score ranges are considered equal, with 5.00–4.20 strongly agree, 4.19–3.40 agree, 3.39–2.60 undecided, 2.59–1.80 disagree and 1.79–1.00 rated as strongly disagree. The final version of the mobile learning scale developed for the research is given in Table 1.

2.4 Data collection process

The data collection process of the research includes the stages of literature review, scale development, pilot applications and analysis, creating the final version of the scale, applying the scale, providing mobile learning training and evaluating the data by reapplying the scale. The process of developing the Mobile Learning Scale and making it ready for implementation took about 4 weeks; the mobile learning training took 4 weeks; the implementation process of the scale took 2 weeks; and the data analysis process of the scale took about 2 weeks. In this direction, it is possible to say that the research data covers a period of approximately 3 months for the collection process.

Table 1. Final version of the mobile learning scale

Mobile Learning Scale
Dimension 1: Self-Efficacy
I am confident in using the basic functions of mobile learning systems
I trust my knowledge and skills about mobile learning systems
I am confident in using mobile learning systems to communicate effectively with others
I feel confident when using the Internet to obtain or gather information for mobile learning
I feel confident when working on using mobile learning systems
I am confident in knowing how mobile learning systems work
Dimension 2: Positive Perspective
I like to work with mobile learning systems because I can work whenever I want
Mobile learning systems allow me to work more effectively
I like mobile learning systems that I can tailor to my needs
I like mobile learning systems
Mobile learning systems give people more control over their working time
The latest mobile learning systems are much more convenient
Mobile learning systems give me more freedom to study
Dimension 3: Individual Learning
I can manage my own learning process
I implement my own study plan
I set goals in my work and take a high degree of responsibility
I manage time well
*Items in the scale were measured with a 5-point Likert scale in the range of 1=Strongly disagree 5=Strongly agree.

2.5 Data collection analysis

SPSS 20.0 programme was used in the analysis of the data obtained after the mobile learning scale was applied to the study group of the research. The Mobile Readiness Scale was applied twice, before and after the mobile learning training. Kolmogorov–Smirnov normality test was calculated before data analysis of the scale. Since P>0.05

was found as a result of the test, it was determined that the data set showed a normal distribution. In this direction, parametric tests were applied. Tables containing frequency, percentage, standard deviation, weighted average and *t*-test results were created in the findings.

3   Results

The findings of the research are created as a result of the evaluation of the data obtained from the Mobile Learning Scale developed by the researchers.

In Table 2, demographic information about the gender and tablet usage status of university students participating in the research is given.

In Table 2, the distribution of the students participating in the research according to their gender and tablet usage status is given. 49.2% of the students participating in the research are girls and 50.8% are boys. While 55.3% of the students stated that they use tablets, 44.7% of them stated that they do not use tablets.

In Table 3, mobile learning readiness of university students participating in the research was evaluated before and after mobile learning training.

Table 2. The level of knowledge of the students about the concept of Internet of things

Gender	F	%
Female	177	49.2
Male	183	50.8
Sum	360	100
Tablet Usage Status		
User	199	55.3
Not user	161	44.7
Sum	360	100

Table 3. Mobile learning readiness of students before and after mobile learning training

	X	SS
Before Mobile Learning Training		
Self-efficacy sub-dimension	3.52	0.952
Positive perspective sub-dimension	3.56	0.980
Individual learning sub-dimension	3.44	0.827
Mobile Readiness Scale	3.51	0.889
After Mobile Learning Training		
Self-efficacy sub-dimension	4.30	0.892
Positive perspective sub-dimension	4.58	0.621
Individual learning sub-dimension	4.39	0.827
Mobile Readiness Scale	4.47	0.765

The findings in Table 3 show that the students participating in the research were in the self-efficacy sub-dimension (X=3.52), positive perspective sub-dimension (X=3.56) and individual learning sub-dimension (X=3.44) before mobile learning training, indicating a high level of readiness. It is seen that students have a very high level of readiness in the self-efficacy sub-dimension (X=4.30), positive perspective sub-dimension (4.58) and individual learning sub-dimension (X=3.51) after mobile learning training. Before the mobile learning training, the students' mobile learning readiness (X=3.51) was at a high level across the Mobile Learning Scale, while it was determined to be very high (4.47) after the mobile learning training.

In Table 4, mobile learning readiness of university students participating in the research was evaluated according to the gender variable before and after mobile learning education.

Table 4. Mobile learning readiness *t*-test results according to the gender variable before and after mobile learning education of students

Gender	N	X	SS	F	P
Before Mobile Learning Training					
Female	177	3.49	0.660	16,665	.365
Male	183	3.53	0.692		
After Mobile Learning Training					
Female	177	4.45	0.714	19,772	.443
Male	183	4.49	0.705		

The findings in Table 4 reveal that there was no significant difference (P=.364, P>0.5) in students' readiness for mobile learning according to the gender variable before mobile learning education. After the mobile learning training, no significant difference was found between the mobile learning readiness status of female and male students (P=0.443, P>0.05).

In Table 5, mobile learning readiness of university students participating in the research was evaluated according to their tablet usage status before and after mobile learning training.

Table 5. Mobile learning readiness *t*-test results according to tablet usage status of students before and after mobile learning training

Cinsiyet	N	X	SS	F	P
Before Mobile Learning Training					
Using Tablets	199	3.61	0.458	18,366	.000*
Tablet Kullanmayan	161	3.39	0.596		
After Mobile Learning Training					
Using Tablets	199	4.49	0.682	6,813	.265
Not Using Tablets	161	4.45	0.623		

The findings in Table 5 reveal that there is a significant difference in favour of students using tablets in their readiness for mobile learning (P=.000, P<0.005) according to their tablet usage status before mobile learning education. After the mobile learning training, there was no significant difference between the students' readiness for mobile learning (P=.265, P>0.05).

4   Discussion

It shows that the students participating in the research have a high level of readiness in the self-efficacy sub-dimension, positive perspective sub-dimension and individual learning sub-dimension before mobile learning training. After the mobile learning training, it is seen that the students have a very high level of readiness in the self-efficacy sub-dimension, positive perspective sub-dimension and individual learning sub-dimension. While the mobile learning readiness of the students was at a high level throughout the mobile learning scale before the mobile learning training, it was determined at a very high level after the mobile learning training. In their study, Mahat et al. [2] revealed that university students' readiness for mobile learning is high and their mobile learning self-efficacy is moderate. Similarly, Andaleeb et al. [23] revealed that the majority of students have a high level of mobile learning readiness. In the studies on mobile learning, it is seen that there are studies that reveal that university students' readiness for mobile learning is high [24–27].

As a result of the research, no significant difference was found in the mobile learning readiness status of university students before and after mobile learning education, according to the gender variable. This situation reveals that the mobile learning situation of female and male students and their mobile learning readiness are at a similar level. Although this result of the study overlaps with some studies in the field [28], it was stated that there was a significant difference according to the gender variable in some studies [29].

The mobile learning readiness status of university students participating in the research was evaluated according to their tablet usage status before and after mobile learning training. The findings showed that there was a significant difference in favour of students using tablets in their readiness for mobile learning according to the tablet usage status of students before mobile learning training. After the mobile learning training, there was no significant difference between the students' readiness for mobile learning. This situation reveals the efficiency of the mobile learning education given to the students. In the literature, there are studies on tablets and students' readiness for mobile learning [30]. Maxfield [31] revealed in his study that tablet usage is low in the mobile learning environment. In another study, Enriquez [32] stated that tablet use has positive effects in mobile learning. Likewise, in a similar study, Kohorst and Cox [33] also stated that tablet computers increase the interest in lessons and change students' attitudes towards mobile learning.

5   Conclusion

Tablet computer technology is used in distance education environments and in the traditional classroom environment. In this direction, the effectiveness of tablet computers in mobile learning has gained importance. Therefore, in this study, university students' readiness for mobile learning was examined according to their tablet use. In line with the results obtained from the research, before the mobile learning training, while the mobile learning readiness of the students was at a high level throughout the mobile learning scale, it was determined at a very high level after the mobile learning training. There was no significant difference in the students' readiness for mobile learning according to the gender variable before and after the mobile learning training. In addition, as a result of the research, it was seen that there was a significant difference in favour of students using tablets in their readiness for mobile learning according to the tablet usage status of students before mobile learning training.

6   Recommendations

As a result of the research, it was observed that the students' readiness for mobile learning increased after the mobile learning training given. In this direction, the following recommendations have been developed:

1. Mobile learning trainings should be organised to increase the use of tablets in mobile learning by university students.
2. Course content should be created in every department and every class within universities to improve the mobile learning readiness of university students.
3. Students' readiness for mobile learning should be evaluated over different mobile device usage situations.

7   References

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