Akkaya, S., Ciğerci, M. F. & Kapıdere, M. (2021). Investigation of the relationship between prospective teachers' attitudes towards mobile learning and their readiness for mobile learning. *International Online Journal of Education and Teaching (IOJET), 8*(4), 2949-2965.

Received : 27.06.2021
Revised version received : 23.09.2021
Accepted : 28.09.2021

INVESTIGATION OF THE RELATIONSHIP BETWEEN PROSPECTIVE TEACHERS' ATTITUDES TOWARDS MOBILE LEARNING AND THEIR READINESS FOR MOBILE LEARNING

(Research article)

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Abstract

The aim of this research is to investigate the relationship between prospective classroom teachers' attitudes towards mobile learning and their mobile learning readiness levels. For this purpose, data were collected from prospective teachers using the Mobile Learning Readiness and Attitudes towards Mobile Learning scales, and the relationships between the dimensions that determine the scale levels of pre-service teachers were examined through correlation and regression analyses. T-test, one-way analysis of variance (ANOVA) and post hoc (Tukey, LSD) analyses were used to examine the differences in scale levels according to the descriptive characteristics of pre-service teachers. As a result of the study, it was found that the attitude towards mobile learning increased the general level of mobile learning readiness. The attitudes, satisfaction, impact on learning, motivation, and usefulness scores of prospective teachers towards mobile learning do not differ according to gender, the status of education studied via mobile learning. However, it has been found that there is a significant difference according to the internet access status. As a result of the research, it can be suggested that the internet infrastructure of universities should be improved, and prospective teachers should be encouraged to use mobile learning tools.

Key words: Mobile learning, readiness for mobile learning, prospective primary school teachers

1. Introduction

In the 21st century, one of the concepts that is frequently used in today's age, where the importance of accessing information, the speed of accessing information and reaching the right information is increasing day by day, and many fields such as health, environment and education are affected by the speed of technology in our age (Bozkurt, 2015). The traditional learning-teaching methods are limited to raise individuals with the skills required for this age and therefore, various information technologies such as computer, radio, television, video and internet are used in education-learning. Mobile learning which is one of these technologies enables access to numerous education-teaching content without constant physical space limitation, communicate easily with other individuals and increase efficiency and performance (Ergüney, 2017). The old technologies that fail to offer location- and time-independent learning environments are replaced with new generation technologies, mobile technologies and thus, mobile learning. This new generation of technology and the environment with mobile learning solves the individual's problems to be captured in front of the computer and provide unlimited learning opportunities all the time (Elçiçek & Bahçeci, 2015).

Mobile learning is a type of learning that is diversified according to the fields that individuals may need, and that provides individuals with the opportunity to start and end their learning processes whenever and wherever they want by offering new and different experiences (Altuntaş, 2017). Mobile learning is structured with mobile technologies that increase the motivation and performance of individuals, where they can communicate with other users by accessing educational content anytime and anywhere without being bound by four walls (Özdamar Keskin, 2010).

There are advantages and limitations of mobile learning. The advantages of mobile learning and mobile learning devices for individuals and their lives can be listed as follows (Gülseçen et al., 2010; Bozkurt, 2015; Şenel et al., 2019);

- Being student-centered,
- Addressing the different needs of individuals,
- Providing opportunities for cooperative learning,
- Being always ready for use,
- Allowing the individual to learn when he/she needs it,
- Learning independent of time and place,
- Offering individuals the chance to learn for life,
- Enabling uninterrupted learning in formal and informal learning environments,
- Increasing equality of opportunity in education,
- Providing instant evaluation and feedback,
- Facilitating individualized learning.

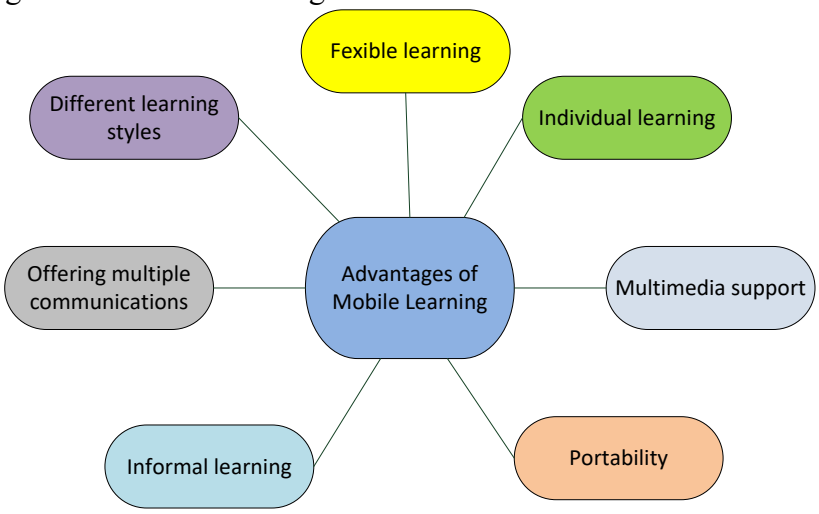

Figure 1. Advantages of mobile learning.(Alsancak Sırakaya & Seferoğlu, 2018).

The limitations of mobile learning and mobile learning devices can be listed as follows (Bozkurt, 2015; Ekren & Kesim, 2016; Gülseçen et al., 2010);

- Users' lack of adaptation to mobile phone functions,
- Insufficient storage capacity of mobile learning devices,
- Lack of internet access,
- Screens of mobile learning devices are too small for detailed applications,
- Occasional disconnection,
- Mobile learning devices have limited battery life,
- Experiencing security problems.

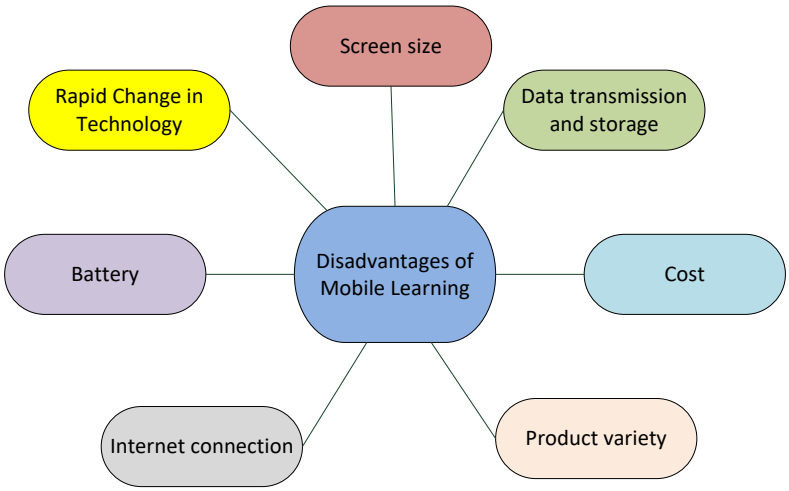

Figure 2. Disadvantages of mobile learning (Alsancak Sırakaya & Seferoğlu, 2018).

The rapid development of information and communication has introduced mobile technologies to our lives. Mobile technology is used in various fields and places, such as health, banking, socializing and libraries, which helps us to save time. Another area in which mobile technologies are included is education. A connection between formal and non-formal education can be made with mobile learning, and equality of opportunity is provided in education and opportunities for individual learning are provided (Elçiçek & Karal, 2019). In addition, various mobile technological devices, such as smartphones, tablets and pocket computers in the learning environment have brought a new dimension in education by taking it out of the class or school environment (Altuntaş, 2017). Today, these devices are used not only by adults but also by children (Uygun & Sönmez, 2019) and especially during the Covid-19 pandemic, students and teachers all over the world have become accustomed to using them more effectively.

Just like washing our hands and face and eating, using mobile devices for checking our emails, accessing various sources for class notes and curriculum has become a routine, and mobile learning has become more widespread as mobile devices are included in our lives (Güzelyazıcı et al., 2014). Mobile devices enable individuals to learn various information without noticing the applications they use in their daily lives. The use of such devices have featured the term of mobile learning. Although there are various definitions of mobile learning, there is no common definition for this concept. Mobile learning can be defined as students' obtaining information from a flexible learning environment by using mobile technology wherever and whenever they want (Sırakaya & Alsancak Sırakaya, 2017).

Mobile learning that provides opportunities by connecting formal and non-formal learning to support each other necessitates schools, managers and teachers to develop themselves in this field and create the environments to ensure learning in this field (Demir & Akpınar, 2016). Mobile learning is different from other learning models in some fields. Teachers' continuously being active, flexible learning environment, no limitations in terms of time and space for learners, learning based on individual differences, fast, practical and easy learning for learners and learning at learner's own speed can be listed as some of the differences (Kurnaz, 2010; Çakır, 2011). However, mobile learning also has certain limitations. Some of these limitations are problems due to technological infrastructure, viewing the various sources for the classes on a small screen, the additional financial burden for the students due to communicating via email or SMS and transfer speed problems due to file size when the large data files with class content are transferred (Kılınç, 2015; Kurnaz, 2010).

Mobile phones, tablets, computers, gaming gadgets and voice recorders are some of the examples of mobile learning devices, which enable individuals to learn without restriction of time and place (Ergüney, 2017). Among the mobile devices, it can be said that smartphone is one of the most commonly used one and the active and effective use of smartphones at every stage from elementary school to university can contribute to education if teachers guide students to use this device consciously and purposefully (Gökdaş et al., 2014). Also mobile learning that occurs with mobile devices bring limited storage space, speed and connection problems in mobile technologies such as Wi-Fi and Bluetooth and decreased mobile data in elevators and tunnels (Ekren & Kesim, 2016).

The purpose to raise individuals to guide the future in these days which the technology spreads rapidly and information increased rapidly is to raise individuals, who can find purposeful knowledge and source, select the most accurate information among the information cluster and use them according to a purpose. When achieving this purpose, mobile learning offers opportunities to children to access information fast and easy, expand their knowledge and experience questioning-curiosity emotions (Çam et al., 2019). Since the technology penetrated to all aspects of life, it is necessary to raise individuals at schools who know how to use the technology, purposefully use technology and find the topics they are curious about on their own without needing anyone (Bozkurt, 2015; Kavaklı & Yakın, 2019). Education field which only used written sources, such as books, encyclopaedia, supportive sources, newspapers and journals not started to develop tools that offer multiple learning environments with audio and video sources. Computers that emerged as a result of these developments brought the internet and the internet brought the electronic learning environments. E-learning environments enable the students to learn all the time and from anywhere (Korucu & Biçer, 2019).

In mobile learning, especially, children must be guided correctly since there are lots of mobile platforms, and it is possible to access numerous free and paid apps from the internet environment. At this stage, teachers and parents need to guide the children to platforms and applications with a suitable technological infrastructure that match their purposes (Özdamar Keskin & Kılınç, 2015). In a study, which was conducted to reveal mobile learning trends in education, in a study in which 76 studies were examined, the abundance of studies on research and development research as a method draws attention, and it was concluded that the undergraduate level was preferred with a rate of 39.5% as sampling (Zengin et al., 2018). When the studies on mobile learning are examined, it is seen that these studies mainly focus on variables, such as success, attitude, motivation and satisfaction. Apart from the experimental studies, the opinions of the relevant people were examined in many studies and some problems and obstacles in mobile learning were mentioned in these opinions. These problems naturally affect learning processes. Therefore, in terms of carrying out the mobile learning process effectively and efficiently, it can be said that it is important to firstly identify the observed problems and propose solutions to these problems (Alsancak Sırakaya & Seferoğlu, 2018). The aim of this research is to investigate the relationship between prospective classroom teachers' attitudes towards mobile learning and their mobile learning readiness levels. The aim of this research is to investigate the relationship between prospective classroom teachers' attitudes towards mobile learning and their mobile learning readiness levels.

1. What is the general attitude level of prospective primary school teachers towards mobile learning?
2. What is the mobile learning readiness level of prospective primary school teachers?

3. Do prospective classroom teachers' readiness levels for mobile learning predict their attitudes towards mobile learning?
4. Is there a significant difference between the general attitude levels towards mobile learning and the mobile learning readiness levels of the primary school teacher candidates according to the descriptive variables (gender, class level, getting education using mobile learning tools, internet access status)?

2. Method

2.1.Design

This study employed the quantitative research approach. This method was preferred in order to investigate prospective teachers' views on mobile learning readiness attitudes towards mobile learning. In the study, the general survey design aims to reach a general judgment about the universe. In order to investigate the predictive level of the mobile learning readiness on the results of prospective teachers' attitudes towards mobile learning, the correlational survey design was used. Correlational survey design is a research design applied to reveal the existence or degree of change between more than one variable. In this design, the distinctions between certain situations are determined research was carried out according to the correlational survey model, which is one of the quantitative research methods. The correlational survey model is a quantitative approach that includes the use of self-report measures of a carefully selected sample group. This model is a flexible approach that can be used to examine a wide variety of fundamental and applied research questions. As a matter of fact, the relationships determined by this design give some clues regarding the cause-effect relationship rather than forming precise judgments about it. Thus, what is known about a variable enables the researcher to make predictions about the unknowns about the variable on the other side (Karasar, 1999).

2.2.Participants

The participants of this research are (prospective classroom and preschool teachers) undergraduate students studying at a university in Turkey. The scales used in the research were sent to the students with forms. An information letter was written to the students stating that they have the right to withdraw at any stage of the research. The demographic characteristics of the students participating in the research are as in Table 1.

Table 1. *Distribution for Prospective Teachers' Defining Properties*

Groups	Frequency (n)	Percentage (%)
Gender		
Male	56	29.2
Female	136	70.8
Grade		
2	64	33.4
3	78	40.6
4	50	26.0
Education Status		
Yes	47	24.5
No	145	75.5
Internet Access Status		
Easy	152	79.2
Hard	40	20.8

For gender, students distributed as 56 (29.2%) male and 136 (70.8%) female. For class, students distributed as 64 (33.3%) as 2nd grade, 78 (40.6%) as 3rd grade and 50 (26.0%) as 4th grade. For education status, students distributed as 47 (24.5%) yes and 145 (75.5%) no. For internet access status, students distributed as 152 (79.2%) easy and 40 (20.8%) hard.

2.3.Data Collection Tool

2.3.1. Mobile Learning Readiness Scale

Mobile Learning Readiness scale developed by Lin et al. (2016) and adapted to Turkish by Gökçearslan et al. (2017). The construct validity of the scale was measured by Exploratory and Confirmatory factor analysis performed in two stages. As a result of the analyses made in the first stage, a 17-item scale with 3 sub-dimensions was obtained. Factor analyses were repeated for the validity of this scale. As a result, it has been reached that the first sub-dimension of the scale, which consists of 3 dimensions and 17 items, consists of 7 items, the second sub-dimension of self-efficacy has 6 items, and the third sub-dimension, the self-learning factor, consists of 4 items, and the total variance rate explained by the scale is 76.9%. The reliability of the scale was calculated using the Cronbach's alpha coefficient and test-retest method. The Cronbach's alpha coefficient of the scale was found to be .95. As a result of the test-retest, the correlation coefficient was calculated as .68. In this study, Cronbach's Alpha reliability was found as 0.918 which is highly reliable.

2.3.2. Attitude Towards Mobile Learning Scale

Demir and Akpınar (2016) developed the Attitude Towards Mobile Learning Scale. The KMO value was found to be .936. As a result of factor analysis, it was found that 21 scale items were collected in 4 factors and the scale explained 51,116% of the total variance. 45 items with item load higher than .40 were included in the scale. The loads of the items in the final version of the scale, which consists of four factors and 45 items, are between .82 and .40. The Cronbach's Alpha reliability coefficient for the final version of the scale was calculated as .950 and was found to be highly reliable. In this study, Cronbach's Alpha reliability was found 0.932 which is highly reliable, as well.

2.4. Data Analysis

The data obtained from this study were analysed by using SPSS 22.0 statistical program. To identify the defining properties of the participants, frequency and percentage analysis was used while average and standard deviation statistics were used to assess the scale. To determine whether the research variables showed a normal distribution, Kurtosis and Skewness values were investigated.

2. *Normal Distribution of Scales*

	N	**Kurtosis**	**Skewness**
Attitude Towards Mobile Learning	192	0.755	-0.116
Satisfaction	192	0.923	-0.319
Effect on Learning	192	1.091	0.052
Motivation	192	0.708	-0.223
Usability	192	-0.024	0.062
Mobile Learning Readiness General	192	0.755	-0.644
Self-Efficacy	192	1.449	-1.111
Optimism	192	0.446	-0.690
Self-Learning	192	0.942	-1.005

In the related literature, Kurtosis and Skewness values for the variable are considered as normal distribution for +1.5 and -1.5 (Tabacknick & Fidell, 2013) and +2.0 and -2.0 (George & Mallery, 2010). If the variable variance is unknown, t-test is applied; if the main mass does not show a normal distribution, non-parametric tests are applied (Field, 2009, p.42, 45, 345). Due to sufficient level of the sample for large numbers law and central limit theorem, the distribution was assumed as normal and the analyses were applied (Harwiki, 2013; İnal & Günay, 1993; Johnson & Wichern, 2002).

The relationship between the dimension that determines students' scale level was investigated with correlation and regression analysis. Based on students' defining properties, t-test, one-way variance analysis (ANOVA) and post-hoc (Turkey, LSD) analyses were applied to investigate the differentiation at scale level.

Cohen (d) and Eta square (η^2) coefficients were used to calculate the impact size. The impact size shows whether the difference between the groups were at significant level. Cohen value is assessed as 0.2: small; 0.5: medium; 0.8: large and Eta square value is assessed as 0.01: small; 0.06: medium; 0.14: large (Büyüköztürk et al., 2018).

3. Findings

In this part of the article, the tables regarding the data obtained as a result of the analysis and the findings under the tables are given.

Table 3. *Score Averages of Scales*

	N	Av.	Ss	Min.	Max.
Attitude Towards Mobile Learning	192	147.182	22.615	78.000	210.000
Satisfaction	192	69.760	12.119	27.000	100.000
Effect on Learning	192	34.609	5.210	18.000	52.000
Motivation	192	21.865	3.394	9.000	32.000
Usability	192	20.948	4.870	9.000	35.000
Mobile Learning Readiness	192	5.163	0.937	1.940	7.000
General Self-Efficacy	192	5.355	1.142	1.600	7.000
Optimism	192	4.946	1.166	1.430	7.000
Self-Learning	192	5.303	1.133	1.750	7.000

Students' "attitude towards mobile learning" average 147.182±22.615 (Min=78; Maks=210), "satisfaction" average 69.760±12.119 (Min=27; Maks=100), "effect on learning" average 34.609±5.210 (Min=18; Maks=52), "motivation" average 21.865±3.394 (Min=9; Maks=32), "usability" average 20.948±4.870 (Min=9; Maks=35), "mobile learning readiness general" average 5.163±0.937 (Min=1.94; Maks=7), "self-efficacy" average 5.355±1.142 (Min=1.6; Maks=7), "optimism average" 4.946±1.166 (Min=1.43; Maks=7), "self-learning average 5.303±1.133 (Min=1.75; Maks=7), were found extremely high. The results of the correlation analyses of the scales are presented in Table 4.

Table 4.*Correlation Analyses of the Scales*

	Attitude Towards Mobile Learning	Satisfaction	Effect on Learning	Motivation	Usability
Mobile Learning Readiness General	0,742** 0,000	0,709** 0,000	0,569** 0,000	0,649** 0,000	0,621** 0,000
Self-Efficacy	0.485** 0.000	0.495** 0.000	0.400** 0.000	0.386** 0.000	0.324** 0.000
Optimism	0.742** 0.000	0.684** 0.000	0.554** 0.000	0.654** 0.000	0.697** 0.000
Self-Efficacy	0.506** 0.000	0.489** 0.000	0.380** 0.000	0.484** 0.000	0.390** 0.000

*<0.05; **<0.01; Correlation Analysis

When the correlation analysis between attitude towards mobile learning, satisfaction, effect on learning, motivation, usability, mobile learning readiness general, self-efficacy, optimism, self-learning scores were investigated, there was positive r=0.742 correlation between mobile learning readiness general and attitude towards mobile learning (p=0,000<0.05), positive r=0.709 correlation between mobile learning readiness general and satisfaction (p=0,000<0.05), positive r=0.569 correlation between mobile learning readiness general and effect on learning (p=0,000<0.05), positive r=0.649 correlation between mobile learning readiness general and motivation (p=0,000<0.05), positive r=0.621 correlation between mobile learning readiness general and usability (p=0,000<0.05), positive r=0.485 correlation between self-efficacy and attitude towards mobile learning (p=0,000<0.05), positive r=0.495 correlation between self-efficacy and satisfaction (p=0,000<0.05), positive r=0.4 correlation between self-efficacy and effect on learning (p=0,000<0.05), positive r=0.386 correlation between self-efficacy and motivation (p=0,000<0.05), positive r=0.324 correlation between self-efficacy and usability (p=0,000<0.05), positive r=0.742 correlation between optimism and attitude towards mobile learning (p=0,000<0.05), positive r=0.684 correlation between optimism and satisfaction (p=0,000<0.05), positive r=0.554 correlation between optimism and effect on learning (p=0,000<0.05), positive r=0.654 correlation between optimism and motivation (p=0,000<0.05), positive r=0.697 correlation between optimism and usability (p=0,000<0.05), positive r=0.506 correlation between self-learning and attitude towards mobile learning (p=0,000<0.05), positive r=0.489 correlation between self-learning and satisfaction (p=0,000<0.05), positive r=0.38 correlation between self-learning and effect on learning (p=0,000<0.05), positive r=0.484 correlation between self-learning and motivation (p=0,000<0.05), positive r=0.39 correlation between self-learning and usability (p=0,000<0.05). The results of the regression analysis showing the effect of attitude towards mobile learning on mobile learning readiness are shared in Table 5.

Table 5. *Effect of Attitude Towards Mobile Learning on Mobile Learning Readiness*

Dependent Variable	Independent Variable	ß	t	p	F	Model (p)	R^2
Mobile Learning Readiness General	Constant	0.640	2.132	0.034	232.752	0.000	0.548
	Attitude Towards Mobile Learning	0.031	15.256	0.000			
Self-Efficacy	Constant	1.450	2.694	0.008	16.519	0.000	0.245
	Satisfaction	0.040	4.410	0.000			
	Effect on Learning	0.024	1.149	0.252			
	Motivation	0.040	1.182	0.239			
	Usability	-0.030	-1.254	0.212			
Optimism	Constant	-0.293	-0.712	0.477	65.815	0.000	0.576
	Satisfaction	0.033	4.728	0.000			
	Effect on Learning	-0.011	-0.669	0.504			
	Motivation	0.073	2.813	0.005			
	Usability	0.082	4.507	0.000			
Self-Learning	Constant	1.286	2.451	0.015	18.740	0.000	0.271
	Satisfaction	0.031	3.471	0.001			
	Effect on Learning	-0.008	-0.365	0.716			
	Motivation	0.107	3.224	0.001			
	Usability	-0.010	-0.447	0.656			

The regression analysis conducted to determine the cause-effect relationship between attitude towards mobile learning and mobile learning readiness general was found significant (F=232.752; p=0.000<0.05). The 54.8% of the total change at mobile learning readiness general level was explained by attitude towards mobile learning (R^2=0.548). The attitude towards mobile learning increased mobile learning readiness general level (β=0.031). The regression analysis conducted to determine the cause-effect relationship between satisfaction, effect on learning, motivation, usability and self-efficacy was found significant (F=16.519; p=0.000<0.05). The 3.6% of the total change at self-efficacy level was explained by satisfaction, effect on learning, motivation, usability (R^2=0.245). Satisfaction increased self-efficacy level (ß=0.040). Effect on learning had no effect on self-efficacy level (p=0.252>0.05). Motivation had no effect on self-efficacy level (p=0.239>0.05). Usability had no effect on self-efficacy level (p=0.212>0.05). The regression analysis conducted to determine the cause-effect relationship between satisfaction, effect on learning, motivation, usability and optimism was found significant (F=65.815; p=0.000<0.05). The 57.6% of the total change at optimism level was explained by satisfaction, effect on learning, motivation, usability (R^2=0.576). Satisfaction increased optimism level (ß=0.033). Effect on learning had no effect on optimism level (p=0.504>0.05). Motivation increased optimism level (ß=0.073). Usability increased optimism level (ß=0.082). The regression analysis conducted to determine the cause-effect relationship between satisfaction, effect on learning, motivation, usability and self-learning was found significant (F=18.740; p=0.000<0.05). The 27.1% of the total change at self-learning level was explained by satisfaction, effect on learning, motivation, usability (R^2=0.271). Satisfaction increased self-learning level (ß=0.031). Effect on learning had no effect on self-learning level (p=0.716>0.05). Motivation increased self-learning level (ß=0.107). Usability had no effect on

self-learning level (p=0.656>0.05). The results of prospective teachers' differentiation of attitude towards mobile learning scores for defining properties are given in Table 6.

Table 6. *Differentiation of Attitude Towards Mobile Learning Scores for Defining Properties*

Demographic Properties	**Attitude Towards Mobile Learning**	**Satisfaction**	**Effect on Learning**	**Motivation**	**Usability**
Gender	Av±SS	Av±SS	Av±SS	Av±SS	Av±SS
Male	146.643±26.962	69.357±14.418	34.339±5.810	21.857±3.988	21.089±5.616
Female	147.404±20.670	69.927±11.091	34.721±4.960	21.868±3.134	20.890±4.549
t=	0.212	-0.295	-0.460	-0.019	0.257
p=	0.850	0.792	0.646	0.985	0.814
Grade	Av±SS	Av±SS	Av±SS	Av±SS	Av±SS
2	144.578±22.334	67.891±11.990	34.453±5.114	22.078±3.077	20.156±4.462
3	144.192±22.222	68.680±11.391	34.090±5.682	21.321±3.584	20.103±4.845
4	155.180±22.088	73.840±12.664	35.620±4.463	22.440±3.418	23.280±4.738
F=	4.383	4.029	1.363	1.864	8.351
p=	0.014	0.019	0.258	0.158	0.000
PostHoc=	3>1, 3>2 (p<0.05)	3>1, 3>2 (p<0.05)			3>1, 3>2 (p<0.05)
Education Status	Av±SS	Av±SS	Av±SS	Av±SS	Av±SS
Yes	151.723±24.515	72.192±13.286	35.255±5.351	22.319±3.458	21.957±5.217
No	145.710±21.851	68.972±11.657	34.400±5.165	21.717±3.372	20.621±4.724
t=	1.590	1.589	0.978	1.057	1.643
p=	0.113	0.114	0.329	0.292	0.102
Internet Access Status	Av±SS	Av±SS	Av±SS	Av±SS	Av±SS
Easy	148.651±22.104	70.829±12.062	34.803±4.876	21.993±3.192	21.026±5.014
Hard	141.600±23.929	65.700±11.603	33.875±6.337	21.375±4.081	20.650±4.324
t=	1.764	2.411	1.002	1.025	0.434
p=	0.079	0.017	0.393	0.378	0.665

There was no significant difference for students' attitudes towards mobile learning, satisfaction, effect on learning, motivation, usability scores for gender ($p>0.05$). Students' attitude towards mobile learning scores showed significant difference for the grade ($F=4.383$; $p=0,014<0.05$; $\eta^2=0.044$). The reason for this difference was students in the 4th grade's attitude towards mobile learning scores were higher than the students in the 2nd grade's attitude towards mobile learning scores ($p<0.05$). The students in the 4th grade's attitude towards mobile learning scores were higher than the students in the 3rd grade's attitude towards mobile learning scores ($p<0.05$). Students' satisfaction scores showed significant difference for grade ($F=4.029$; $p=0,019<0.05$; $\eta^2=0.041$). The reason for that is the students in the 4th grade has higher satisfaction scores than the satisfaction scores of students in the 2nd grade ($p<0.05$). The students in the 4th grade have higher satisfaction scores than the satisfaction scores of students in the 3rd grade ($p<0.05$). Students' usability scores showed significant difference for grade ($F=8.351$; $p=0<0.05$; $\eta^2=0.081$). The reason for that is the students in the 4th grade has higher usability scores than the usability scores of students in the 2nd grade ($p<0.05$). The students in the 4th grade have higher usability scores than the usability scores of students in the 3rd grade ($p<0.05$). Students' effect on learning scores showed no significant difference for grade ($p>0.05$). There was no significant difference for students' attitudes towards mobile learning, satisfaction, effect on learning, motivation, usability scores for education status ($p>0.05$). The satisfaction scores of students with easy internet access ($x=70.829$) were found higher than the satisfaction scores of students with hard ($x=65.700$) internet access ($t=2,411$; $p=0,017<0.05$; $d=0.429$; $\eta^2=0.030$). There was no significant difference for students' attitudes towards mobile learning, effect on learning, motivation, usability scores for internet access status ($p>0.05$). The results of prospective teachers' differentiation of mobile learning readiness scores for defining properties are given in Table 7.

Table 7. *Differentiation of Mobile Learning Readiness Scores for Defining Properties*

Demographic Properties	**n**	**Mobile Learning Readiness General**	**Self-Efficacy**	**Optimism**	**Self-Learning**
Gender		Av±SS	Av±SS	Av±SS	Av±SS
Male	56	5.163±1.011	5.421±1.150	4.911±1.277	5.281±1.283
Female	136	5.164±0.908	5.328±1.142	4.961±1.122	5.313±1.070
t=		-0.004	0.515	-0.272	-0.173
p=		0.996	0.607	0.786	0.863
Grade		Av±SS	Av±SS	Av±SS	Av±SS
2	64	5.056±0.831	5.300±1.123	4.833±0.994	5.141±1.147
3	78	5.131±0.957	5.408±1.066	4.850±1.273	5.276±1.099
4	50	5.353±1.020	5.344±1.290	5.243±1.167	5.555±1.145
F=		1.497	0.158	2.216	1.937
p=		0.226	0.854	0.112	0.147
Education Status		Av±SS	Av±SS	Av±SS	Av±SS
Yes	47	5.318±0.862	5.617±0.874	5.055±1.228	5.404±1.225
No	145	5.113±0.957	5.270±1.207	4.911±1.148	5.271±1.103
t=		1.303	1.820	0.732	0.702
p=		0.194	0.070	0.465	0.484

Internet Access Status		Av±SS	Av±SS	Av±SS	Av±SS
Easy	152	5.223±0.895	5.459±1.080	5.001±1.141	5.314±1.119
Hard	40	4.939±1.065	4.960±1.290	4.739±1.250	5.263±1.198
t=		1.711	2.494	1.265	0.256
p=		0.089	0.013	0.208	0.798

There was no significant difference for students' mobile learning readiness general, self-efficacy, optimism, self-learning scores for gender ($p>0.05$). There was no significant difference for students' mobile learning readiness general, self-efficacy, optimism, self-learning scores for grade ($p>0.05$). There was no significant difference for students' mobile learning readiness general, self-efficacy, optimism, self-learning scores for education status ($p>0.05$). The self-efficacy scores of students with easy internet access ($x=5.459$) were found higher than the self-efficacy scores of students with hard ($x=4.960$) internet access ($t=2,494$; $p=0,013<0.05$; $d=0.443$; $\eta^2=0.032$). There was no significant difference for students' mobile learning readiness general, optimism, self-learning scores for internet access status ($p>0.05$).

4. Conclusion, Discussion & Recommendations

As a result of the research, it was found that the attitude towards mobile learning increased the general level of mobile learning readiness. The correlation results can be summarized as following. There is a high-level correlation between general mobile learning readiness and mobile learning attitude in the positive direction. High correlation is seen between general mobile learning readiness and satisfaction. There is a moderately positive correlation between general mobile learning readiness and effect on learning. A moderately positive correlation has been found between general mobile learning readiness and motivation. There is a positively moderate correlation not only between general mobile learning readiness and usefulness but also between self-efficacy and attitude towards mobile learning. A moderately positive correlation is realized between self-efficacy and satisfaction. Moderately positive correlation between self-efficacy and impact on learning, and moderately positive correlation between self-efficacy and motivation have been found. However, positive medium-level correlation between self-efficacy and usefulness have been realized. While positively high-level correlation between optimism and attitude towards mobile learning, and between optimism and satisfaction have been found, positively moderate level correlation between optimism and effect on learning, and between optimism and motivation have been realized. Moderate positive correlation between optimism and usefulness, and attitude towards self-learning and mobile learning have been found. Furthermore, moderate positive correlation between self-learning and satisfaction, and between self-learning and effect on learning have been realized. There has been a moderate positive correlation between self-learning and motivation, and a moderate positive correlation between self-learning and usefulness.

As a result of the analysis to identify how the learning styles of the prospective teachers influence their m-learning readiness, it was observed that there is a statistically significant relationship between the learning styles of the pre-service teachers and their m-learning readiness (Ata & Cevik, 2019). Based on the collected data, the relationship between readiness, attitude and acceptance has been demonstrated to be positive; it has been also observed that attitude and readiness towards mobile learning have a significant effect on the acceptance of mobile learning systems. According to the results obtained from this research, it can be said that as readiness and attitude levels are increasing in a positive sense, it is likely that the acceptance of mobile learning systems by the users will be increased accordingly (Tezer & Beyoğlu, 2018). The attitudes, satisfaction, impact on learning, motivation, and usefulness scores of prospective teachers towards mobile learning do not differ according to gender, and

the status of getting education using mobile learning. The attitudes of prospective teachers towards mobile learning differ according to their grade level, and their satisfaction scores differ according to their internet access status. The attitude scores of the pre-service teachers who continue their education in the 4th year towards mobile learning are higher than the prospective teachers in the 2nd and 3rd year. Satisfaction scores of those whose access to the Internet was easier were found higher than the prospective teachers having difficult access to the Internet. It can be said that applications containing more components or features to increase student motivation will be more accepted by teacher candidates, since one of the most important contributions of educational mobile applications in terms of education given in studies conducted with teacher candidates is to increase student motivation (Saban & Çelik, 2018).

When the Mobile Learning Readiness self-efficacy scores were examined, it was found that the score levels did not differ according to gender, class, and the status of receiving education using mobile learning, but differed significantly according to the status of internet access. Self-efficacy scores of those with easy access to the Internet were found higher than those with difficult Internet access. It is supported by many studies that there is no significant difference according to gender in studies conducted with mobile learning (Akbıyık & Kantaroğlu, 2017; Kirman & Schreglmann, 2020; Kuşkonmaz, 2011; Muhammet & Okan, 2018; Sırakaya & Alsancak Sırakaya, 2021).

Considering the effect of internet access on mobile learning attitude and readiness for mobile learning, it can be suggested that it is important for pre-service teachers to have access to the internet in order to realize mobile learning, and for this reason, infrastructure development studies should be carried out by developing Wi-fi points in universities so that all students can access the internet. The fact that the prospective teachers' attitude scores towards mobile learning who attend the 4th year are higher than the pre-service teachers who attend the 2nd and 3rd year can be explained by the fact that the prospective teachers participate more effectively in the learning and teaching process in the 4th year teaching practice course. With the changing educational paradigms, the teacher's leadership in learning has made it necessary for them to reach information quickly and effectively. For this reason, students can be directed to take part in projects where they can use mobile learning in order to support the learning experiences of students in the lower levels of the classroom teaching undergraduate program with rich stimulants. In future research, issues such as the problems of prospective teachers not being able to access the Internet or their self-efficacy levels in using mobile learning tools can be investigated.

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