# Validity and reliability dissertation of the scale used for determination of perceptions and attitudes of teacher's proficiency in tablet pc-supported education

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**Abstract**

It is important to determine the proficiency perceptions and attitudes of the teachers towards Technologies of learning about the tablets in order to integrate the mobile learning technologies and to use the tablet PCs in the educational environments in an efficient way. Therefore, proficiency perceptions and attitudes of the teachers towards the Tablet PC-Supported Education have great importance. There are scales for assessing the proficiency perceptions and attitudes of the teachers in tablet-supported education. There have been found findings about the Proficiency Perceptions and Attitudes of 264 teachers working in the College of Near East towards the Tablet-Supported Education. In this assertion, we mention about an appropriate scale, test and application. For the tests of validity and reliability, the data has been obtained from 264 teachers working in the College of Near East within the school years 2013-2014. AT the end of this, 2 extents (Extent 1: Proficiency perceptions of the teachers about tablet usage, Extent 2: Teachers' attitudes towards Tablet-supported education) have been detected in the scale. Cronbach alpha (α) value belonging to the scale's sub-extents was found as .949 for the proficiency perceptions of the teachers about tablet usage, and as .934 for the teachers' attitudes towards the Tablet-supported education. Cronbach alpha (α) value of the general scale was found as .953.

Keywords: mobile learning, reliability, tablet supported learning, validity

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## 1. Introduction

Innovations within the field of information Technologies, which develops rapidly, provides the humans conveniences and alternatives in every area. This development in the information Technologies has integrated into every area of Daily life, and takes on important roles in an irreplaceable way.

Technology can be defined as the application of information to the products and processes in order to meet people's desires and needs (Cardullo, 1996; Tekin, Gulec & Burgess, 2000; Calp & Akcayol, 2015). In other words, the technology can be defined as the product or the process which minimizes the difficulties in human life through science. Together with the rapid progress and development of the information Technologies, it has been inevitable to utilize all these technological facilities in schools and classes. Thus, teachers can present their lessons with feature of multi- or hyper media and in an interactive way (Ozkale & Koc 2014; Baran & Maskan, 2010).

It is observed that the materials addressing to multi-senses of the students, the materials which present opportunity to review the audio or visual context, and the materials which are made alternative by Professional expression techniques increase the motivation of the students towards lessons (Balci, 2013; Tugun & Ozdamli, 2015).

Especially, the feature of mobile usage of the laptops has affected the users' computer preferences considerably (Ozkale & Koc, 2014). Expectations about the laptops having the same user interface and operating systems with desktop computers have not met the user preferences (Chambers et al., 2006). Tablet PCs are smaller in size, lighter in weight and easier in usage than the laptops and the desktop computers. They have no Mouse and keyboard to control the marker and they have touch-screen. Tablet PC is an efficient and new computer technology which provides the users to access the Internet, to watch videos, to record and listen to audios, to use different software, programs and applications, and to read e-books (Bulun et al., 2004; Gill, 2007; Marcial, 2010; Prey & Weaver, 2007). Because of their software, various programs and mobility, Tablet PCs are seen as not only an alternative computer but even also the first or primary computer preference by the users. Because the Tablet PCs provide the users some features such as searching, reading the news, watching videos and obtaining the information easily, they are regarded as mostly preferred technological product (Ozkale & Koc, 2014).

Together with all these features the Tablet PCs provide to the users, they have been used in education –especially, in the developed countries, and it is aimed to make the education more quality. Furthermore, with the usage of the Tablet PCs in the education, it has become a necessity to conduct studies in body of the literature for the determination of the proficiency perceptions and attitudes of the teachers towards tablet-supported education. In this research, it is aimed to develop a scale which can measure the proficiency perceptions and attitudes of the teachers towards tablet-supported education, and which could be helpful for the literature.

## 2. Aim of The Research

The aim of this research is to develop a valid and reliable Likert scale which can measure the proficiency perceptions and attitudes of the teachers working in secondary schools towards tablet-supported education.

## 3. Method

### 3.1. Study Group

The sample of this research is composed of 264 teachers working in the College of Near East which is a kind of private school connected to department of secondary school of the Ministry of National Education in Northern Cyprus.

### 3.2. Development of The Scale

It is required to use a measurement tool for determining the proficiency perceptions and attitudes of the teachers working in secondary schools towards tablet-supported education. For this purpose, the literature about usage of the tablets in the education and mobile learning has been scanned while creating the items of the scale; 33 statements have been written after the context analysis.

The scale for the tablet-supported education has been examined by a linguist in terms of the language used, and the language errors have been corrected. For the reliability of the scale's context and aspect, views of 10 lecturers working in the university have been received. After the view received from the experts, 1 statement was ommited from the scale because it was not suitable, and so, there have been 32 statements left. After making the required arrangements, test form of the data collection tool –which has been developed for the determination of the proficiency perceptions and attitudes of the teachers towards the tablet-supported education, took its final shape. By taking the processes such as factor analysis of the group in size, material analysis into consideration, it is recommended that number of the items should be twice more at least (Buyukozturk, 2005; Kline, 1994). I order to analyze validity and reliability of the data collection tool; it was applied to 64 teachers working in the College of Near East as a pre-test group. In the study, 5 point Likert scale was used for the reactions to be given to the statements. Participants were asked to choose one of the five categories –which are Definitely Disagree, Disagree, I don't Know, Agree, Definitely Agree- for each statement. In order to obtain a total score for each participant, the most important part was given 5 points and the least important part was given 1 point; and the answers received from the participants were scored between 1-5 points.

With the aim of determining the items of the scale, according to all the data obtained from the teachers mentioned above, each statement's arithmetic mean, standard deviation and total item correlation were accounted. While choosing the items for the scale, it was taken basis that coefficient of the total item correlation is above the value of .30. When examined the results of item analysis which was made in order to evaluate distinctiveness of the scale items, it was detected that there were 5 statements of which total item correlation values were under .30, and they were removed from the scale. Reliability coefficient of the whole scale was found as Cronbach $\alpha$=.953. As a result of the pre-test, it was found that the items were clear, yet there was a necessity to make changes on some statements. After making the required changes, the data collection tool has taken its final shape.

### 3.3. Application

Before applying the tools taken their final shape, the information including requires explanations related to the tablet-supported education was given in the introduction part of the data collection tool. After taking permission from the school manager of the College of Near East, the researchers applied the data collection tool to the teachers working in the College.

## 4. Results

The data of the scale developed for the determination of the students' attitudes towards tablet usage was entered to SPSS 20 program, and then, total scores of the scale were accounted. Because there were 27 statements in total in the scale, minimum score was 27 and maximum score was 135; and the range was 108. Average of the scale was 111.50, and standard deviation of the scale was 5.69. In the analysis, it was found that the skewness coefficient was -.466, and kurtosis coefficient was .515. All these findings Show that the data obtained from the students had normal range.

## 4.1. Validity

Providing the scale's validity is more difficult than providing its reliability. Factor analysis was made in order to determine the validity of scale structure. To measure suitability of the data and number of the sample according to the factor analysis, KMO and Barlett tests were performed. For the data to be suitable to the factor analysis, it is required that they were more than .60 in KMO test, and that the Barlett Test was required to be meaningful (Buyukozturk, 2004). In the study, coefficient of KMO sample suitability was found as .762. In the KMO test, if the value is under 0.50, it cannot be accepted; if the value is 0.50, it is weak; if it is 0.60, it is medium; if it is 0.70, it is good; if it is 0.80, it is very good; and if it is 0.90, it is perfect (Sharma 1996).

Table 1. KMO and Bartlett's Test

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of sampling adequacy | | .762 |
| Bartlestt's Test of Sphericity | Approx. Chi-squate | 1,699 |
| | df | 351 |
| | Sig. | .000 |

In order to reveal the sub-extents of the scale, Principal component factor analysis and varimax rotation were applied. It was taken basis in determining the scale items that factor load, after the varimax rotation analysis, should be at least 0.40, and that it should be under single factor. This value is not the same in all the literature and it changes. In general, the values .30 and .40 are regarded as the limit values (Tuan et al., 2000; Johnson& McClure, 2004; Tsai& Liu, 2005; Gurbuzturk & Sad, 2010).

There were found 2 factors in the scale of proficiency perceptions and attitudes of the teachers towards iPad-supported education. Total variance, obtained by the 2 factors, was 61.05%. The 2 factors' variance percentages, obtained after doing varimax rotation analysis, were: 46.81% for the first variance, and 14.24% for the second variance. The variance percentages, found after varimax rotation analysis of two extents, were: 33.72% and 27.34%. And the factor loads changes between .560 and .814.

The scale was basically composed of two extents. While naming these two structures, context and theoretic structure of the items of the factors were taken as basis. According to this, the sub-extents were names as "the proficiency perceptions of the teachers about tablet usage" (16 items) and "teachers' attitudes towards tablet-supported education" (11 items).

Table 2. Students' attitudes and availability towards the tablet-supported education; mean, factor and reliability results

| Items and Factors | Mean | SD | Item Total | Component factor load | Varimax factor load |
|---|---|---|---|---|---|
| *Factor I: The proficiency perceptions of the teachers about tablet usage α=.949* | | | | | |
| 25-iPad should be used in all the lessons actively. | 3.75 | .97 | .690 | .702 | .884 |
| 20-Using iPad increases efficiency in education. | 3.92 | .89 | .758 | .780 | .846 |
| 19-Using iPad increases intraclass performance. | 3.89 | .77 | .847 | .859 | .824 |
| 16- Lessons become more planned and organized through the usage of iPad. | 3.73 | .96 | .618 | .636 | .821 |
| 18-I think that it should be continued to use iPad in order not to waste trees and natural resources. | 3.78 | .84 | .789 | .806 | .794 |

| | | | | | |
|---|---|---|---|---|---|
| 23- Students learn less with iPad compared to other methods and techniques. | 3.89 | .79 | .729 | .745 | .775 |
| 14- I can manage the projects/homework of my students through iPad. | 3.82 | .93 | .772 | .786 | .771 |
| 15-Using iPad increases my motivation towards the lessons. | 3.71 | 1.01 | .710 | .729 | .762 |
| 21- Using iPad increases my efficiency in my profession. | 4.00 | .87 | .718 | .744 | .757 |
| 17- iPad usage provides the students to participate in the lessons actively. | 3.90 | .98 | .658 | .682 | .730 |
| 27- In the lessons taught with iPad, sharing materials is easy. | 4.14 | .81 | .705 | .730 | .704 |
| 24- The lessons taught with iPad are enjoyable. | 3.60 | 1.00 | .655 | .670 | .704 |
| 28- iPad usage provides me advantage in my career. | 4.07 | .84 | .549 | .577 | .599 |
| 31- Students can share materials with their peers more easily through iPad. | 4.31 | .55 | .590 | .622 | .595 |
| 30- Students can communicate with each other through iPad. | 4.20 | .67 | .564 | .591 | .478 |
| 29- Recording and reviewing the lessons taught through iPad provides the students to learn by reinforcing. | 4.10 | .73 | .448 | .476 | .459 |
| *Factor II: Teachers' attitudes towards tablet-supported education α=.934* | | | | | |
| 6- I can send mass message to the students when it is necessary. | 4.67 | .59 | .529 | .582 | .848 |
| 3-I can use the programs/applications used with my iPad. | 4.15 | .87 | .616 | .663 | .840 |
| 8- I can deliver the homework to my students through the iPad. | 4.60 | .65 | .628 | .684 | .815 |
| 10- I can record the application I made through iPad. | 4.35 | .80 | .586 | .634 | .808 |
| 11- I can share the lessons I recorded with my students. | 4.53 | .68 | .725 | .770 | .803 |
| 7- I can do search on the Internet through iPad. | 4.56 | .75 | .632 | .681 | .795 |
| 2- I can share my lesson materials with my students through the iPad. | 4.50 | .61 | .650 | .697 | .773 |
| 5- I can be online on the Internet via iPad. | 4.65 | .56 | .608 | .655 | .768 |
| 12-I can take small notes on the course notes inside the iPad. | 4.48 | .64 | .656 | .698 | .737 |
| 1- I can communicate with my students through the iPad. | 4.12 | .88 | .659 | .701 | .711 |
| 9- I can take the roll through the iPad. | 3.96 | .92 | .352 | .389 | .452 |

## 4.2. Reliability

In order to measure the reliability of the scale, Cronbach alpha (α) analysis was applied to all the scale and sub-extents. While selecting the items for the scale, it was taken basis that coefficient of the total item correlation is above the value of .30.

The results of the analyses of questionnaire reveal that the items were appropriate parameters. Average of the items changes between 3.60 and 4.67; and standard deviation of the items changes between .55 and 1.01. Total item correlations are between .847 and .352. For the whole scale, Cronbach alpha (α) was found as .953. When looked at the sub-extents of the scale; for the sub-extent of "the proficiency perceptions of the teachers about tablet usage" was

Cronbach alpha (α) .949, and for the sub-extent of "teachers' attitudes towards tablet-supported education" was Cronbach alpha (α) .934.

## 5. Discussion

After the mobile devices have entered to our lives, there have been many differences in many spheres of the life. The time-wasting Works such as communication, banking, shopping have become much easier. All these changes have affected also the education systems. Because the students have displayed positive attitudes towards the technology, it has been required to do some changes in the field of education. After Fatih Project has come to the fore, researchers have taken the action. Because the tablet-supported education has come to the fore, there has been arisen a necessity to determine the proficiency and attitudes of the teachers towards this point. In this study, it is aimed to develop a valid and reliable scale which can measure the students' attitudes towards tablet-supported education and the availability of the tablet-supported environments.

In order to determine the factor structure of the scale, exploratory and confirmatory factor analysis were made; and it was seen that the scale statements were summed up under two extents. After that, the statements under these factors were analyzed, and this two factors were named as "the proficiency perceptions and attitudes of the teachers about tablet usage" and "teachers' attitudes towards the tablet-supported education" in terms of their features. As a result of the study, it has been revealed that the scale has high validity and reliability.

## 6. Conclusion

It has been determined that the scale developed for measurement of the proficiency perceptions of the teachers about tablet usage and teachers' attitudes towards the tablet-supported education. As in every study, this study also has limitations. The limitation of this study is that it is applied only to the teachers working in the College of Near East.

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