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Developing course package for mobile devices, developing and assessment of the software

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Abstract

In this study, the subject of mobile learning and content packaging is handled and mobile content course package editor and a player that shows this content were developed for mobile devices. Mobile content course package software was used by 114 students who study in secondary schools at ninth grade. After then the forms of satisfaction questionnaire and attitude scale are applied to them. The mobile content lesson package editor was used by 15 teachers who work in secondary schools. It is wanted to buildup course packages according to sceneries given to them. The demographic data's of teachers were taken. Beside this, interviews are done with them about the usage of software and interview forms are filled out. According to analyses, teachers appreciate the software usage as easy and practical and it is seen that they made the procedures easily and they found the software user friendly, useful and more suitable for oral lessons. The students expressed that mobile course package software is functional and they liked the design. According to analysis of attitude scale that applied to students, the students think that in secondary education they must pass to mobile learning and it will be in urgent and inevitable in the next years. As a result; it is seen that the developed software can be used by students and teachers easily for contributing mobile learning and can be redesigned for tablets for expanding usage field.

Keywords: Mobile education; Mobile; Content developing; Course package; Mobile design ; Smart phone ; Mobile device
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1. Introduction

The areas of using training instruments change rapidly in today's world that technology changes rapidly in. This change is also reflects to the technological equipment and devices

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that is used in the life of society at. The educations supported by multimedia elements that address many sense organs are more permanent. For this reason, a time period was lived in the world of education that begins from cassette tapes and CDs, to projections, overhead projectors and video players to PCs and finally to mobile devices.

The use of technological tools in educational environments is in close relation with the tools commonly used in the current years. During the years of widespread use of videotapes, educational institutions and educators were preparing the support materials for lessons for these environments. Today, usage of mobile devices such as mobile phones, mobile computers, smart phones, laptops and tablets began widespread. These changes in technology made it necessity to transfer the educational content through mobile devices.

In the historical process, beside the traditional education performed face to face, it can be said that educational services were offered by newspapers and letters in the 1870s, through the printed materials in 1930-1950s, respectively on radio, television and video in 1950-1980s, by computers between 1980-1995 and more commonly over the Internet with web technologies after 1995 [1].

Mobile, is a French word origins (mobile), described as a portable, dynamic at Turkish Language Association official web site [2]. In terms of training, it is a learning style that gives the possibility of access to electronic content, with location and time-independent form.

Mobile devices are drawing attention with advanced technological capabilities, providing Internet access that's independent of location and time. These technologies have revealed mobile learning which is a new concept and practice. Mobile learning (m-learning) provides accessing to educational content on demand, or as needed without being bound by time and space. Also, M-learning is a learning that is supported by mobile devices and intelligent user interfaces [3]. Mobile devices has been used considerably in the field of mobile learning due to because of its advantages to using both Internet technology and downloaded applications

For many years, the development of mobile services has been checked by mainly mobile network operators (MNO), the administrators of the application and content providers, and some mobile phone manufacturers. Recently, this operation has changed with the emergence of new platforms such as mobile phones and the iPhone. Development of mobile applications has created more interest among independent and free developers [4]. In recent years, the mobile learning that is a new concept came into our lives. Mobile learning provides educational opportunities to learners who are at outside the classroom without being dependent on the class, with mobile computer - PDA (Personal Digital Assistant) or mobile phone [5].

Mobile learning is a learning format that occurred as a result of the evaluation of e-learning content and mobile computing. It gives the opportunities of accessing without being connected to a specific place to e-learning content, communicating with others and use the dynamically generated utilizing the services. As mobile learning can be used to support traditional learning also it can be used for distance learning [6]

In 2005 at Brown's study, the using style of short message service at the University of Pretoria in South Africa by three students who enrolled in two programs was investigated. In this study, the learning opportunity that wireless mobile devices provides while students are the move. As a result of study, it seemed that with using mobile networks widely in Africa for m-learning, more people were reached than with via online learning [7].

At Deakin University in 2005, the potential use of wireless mobile devices was investigated by Holt and Rice and Armatas. At the end of the research is concluded that mobile technologies have the ability to support online learning platforms that already have been and impose the information to students [8].

At the study done by Vavoula in 2005, the learning of adults took place by 51% at home or at work, the remained 49% part was ; while the remaining spare time (6%), office (21%), home of a friend (2%) on the air (5%), other places (14%) surgeries, cafes, hobby stores, places of worship in the car. Vavoula mentioned that only 1% of adults learn at travel [9].

At the research done by Thornton and Houser in Japan in 2005, they send a 100-word English vocabulary lessons to 44 Japanese university students mobile phones as e-mails at regular intervals hoping to increase regular work. They were compared regularly with the students who were to study with materials on paper or identical materials over the web. As a result of the study it seemed that the students who were sent email to their mobile phones learned more ($p < 0.05$). In the study 71% of students' preferred to buy these courses on mobile phones to personal computers. 93% of the students felt that it is a valuable method of instruction [10].

Mobile learning gained even more importance due to an increased need for information, both convergence within countries and between countries and because of mobile phones specifications developing and nearly reaching level of computers. Mobile devices new features such as strength of processor, the portability, having of Internet connection, running multimedia like video playback, image show, listening to music, huge, amount of memory, and software support has made training on mobile devices attractive.

Besides all of these, the amount of information and the number of learning areas that needed also increased. Content developing content for mobile devices, requires the expertise in the use of computers besides being a trainer. One of the foundations of the study is to satisfy the need in the field of mobile learning and aims to generate solutions to overcome it. But the main objective of this to make preparing the course content by the teacher knows his students best and make this processes be easy. Designing of screen is of great importance, considering the trainers who are non-specialist on IT will use the software.

In this study, first "mobile content course package organizer" designed than the code of it was written. Thus, it is aimed to make the teachers working in secondary schools prepare mobile content course packs easily. In this software, the teachers, have the opportunity to preview the software while creating pages for the subject. In addition, software was generated to make able to use the content by students.

At the study experts and graduate students have been interviewed about easy to use of the developed software named mobile content courses package organizer. Surveys are applied to students and teachers. The application for students was made on smart phone which is also mobile device. Teachers used the software on desktop or laptop.

In this research, it is tried to find the secondary school students views about the use of the content on mobile devices and the views of secondary school teachers about creating mobile content course packs.

2. Material and method

The study group consists of 15 teachers from different branches 114 students and Mimar Sinan Technical and Industrial Vocational High School students in class 9A and 9B, M. Rustu Uzel Technical and Industrial Vocational High School students in 9A and 9D, 9B, and 9E Ataturk Anatolian High School. These schools are under the Directorate of National Education of Ankara and study done at the second term of the 2011-2012 academic year. While selecting classes, views of school administrators, classroom structure and student characteristics are taken into consideration. Teachers were randomly selected on a voluntary basis. Although some students participated to study they didn't fill in the application forms.

Necessary explanations have been made before the study at schools with students and teachers. The measurement results of quantitative data were analyzed by SPSS 16.0 package program. Attitude scale reliability coefficient that calculated with SPSS and Cronbah-α value was 0.883. This attitude scale is consist of 26 items and answers were evaluated with 5 Likert scale (1strongly disagree, 2 disagree, 3 undecided, 4 agree, 5 strongly agree).

For the purpose of the study, qualitative data were collected from the study done with teachers. Teachers' views on ease of use about mobile course packet editor software were taken with detailed interview form. Issued semi-structured interview form was used at this form. Also, a quantitative research has been done based on teachers' demographic information.

Done with the students study, the use of quantitative information about the mobile course packaged software and ease of use was collected by quantitative data collection tools.

Students immediately detect attitudes at mobile learning were tried to measured after using mobile content course package software on a smart phone that is also a mobile device.

Mobile learning attitude scale was applied to mobile learning group students who were surveyed. Mobile learning attitude scale was designed to measure students' attitude towards mobile learning perception immediately. Students used the software package for about 2 minutes with smart phone that mobile courses had installed on it.

Adobe Flash CS5 package program and Action Script 3.0 was used while designing and coding the Mobile lesson package software and editor. The reasons of using this programming languages are; easy work with XML, be able to use effects, be able to use media objects easily, being good at this programming language, working at various mobile devices and smart phones and be able to use at android mobile phones and tablet pc after compiling for android and generating .apk files. XML was used as database. Adobe PhotoShop and Adobe FireWorks were used at designing screens.

With using Adobe Device Central with Flash CS5 program the content was emulated to see how it works in different phones. The software was tested to see how it works on Symbian, Windows and Android operating system Apk compiled software has been installed on Samsung Galaxy S II smart phone and Motorola Xoom tablet and the software ran without any failure. Because these devices have better properties as hardware, the software ran more rapidly and efficient on these devices. Adobe Flash CS 5.5 was used to create the APK file.

While developing the software, two graphic designer teachers helped to study for a better design who works at General Directorate of the Innovative and Education Technologies. The ideas and opinions were taken from two teachers who work at content assessment department of the same directorate. Beside these, the opinions of 20 master students were taken who studies at (Bilisim Enstitiusu) of Gazi University. Additional to this the opinions of nearly 30 attenders were taken in 2011 at ICITS sompozium held by FIRAT University in Elazig. The design was shaped as the expert’s views and opinions.

Teachers selected through random sampling and the study started with them after the guidance to teachers for the example scenario. Teachers were asked to enter the course and unit information is the first step in the script. The spaces that can be seen at Fig. 1 are filled by the teachers. Teachers' behavior was observed during the application. Unwanted or mistyped units can be deleted by "Delete" button and the new unit can be added by the software. The entered information was saved as xml file by "Save to File" button.

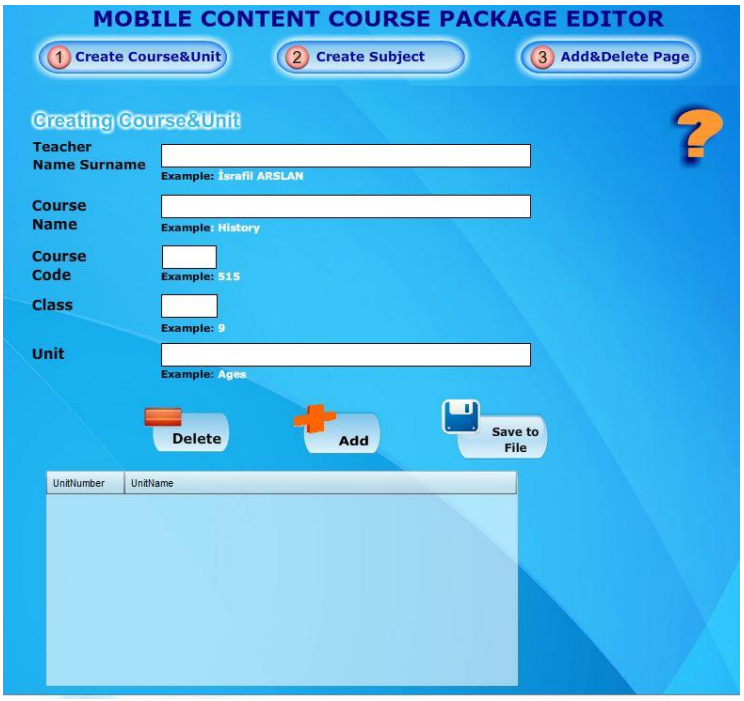


Fig. 1. Mobile content course package editor's course/unit creating screen.

In the second stage, by pushing "Creating Course&Unit" button, the subjects information's belong to the created course are added. The entered information is recorded in the same xml file.

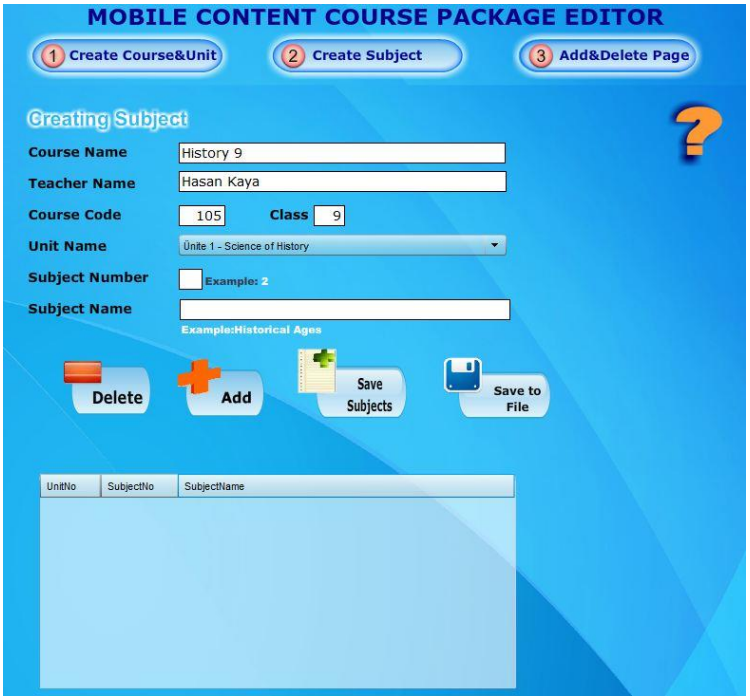


Fig. 2. Mobile content course package editor's subject creating screen.

In the third step the teachers can create the pages for the selected courses units by clicking "Add&Delete Page" button. At this step, by clicking “Add New Page” after selecting unit and subject, a new page can be created. By this process the suitable template is selected and by clicking Browse button the necessary file is selected for the page. At this procedure the sound file (. Mp3), text file (. Txt), a video file (. Flv) and link can be inserted. It is a very important requirement for ease of use of the software at especially smart phones that the file’s dimension must be small that is to be added.



Fig.3. Mobile content course package editor’s adding/deleting page screen.

In this section, the page can be added as a first page or last page or as a next page. The added page can be save by “Save to File” button to save permanently. Also the page that is added or deleted can easily be previewed at the screen on a sample mobile device.

At this study, it is tried to measure the level of pleasure of usage the software of 15 teachers from different branches. Beside this, it is tried to find out that whether the teachers who has basic IT information can create mobile content course packages by this editor.

The Mobile course package software shows the pages according to XML file that was created by the teachers with mobile content course package editor.

First the unit of the lesson than the subject that wanted to study is selected. If there is no page for the selected subject, an error message is shown. There is next, previous, stop, pause, exit and menu buttons on the screen. If there is a sound for the page, it plays automatically. At the case that text is too long for the screen it can be scroll down.

3. Results

114 students whom used the software at mobile device asked to fill the questionnaire of fascinating survey. Then at the end of evaluating of the forms the values at the table were reached .

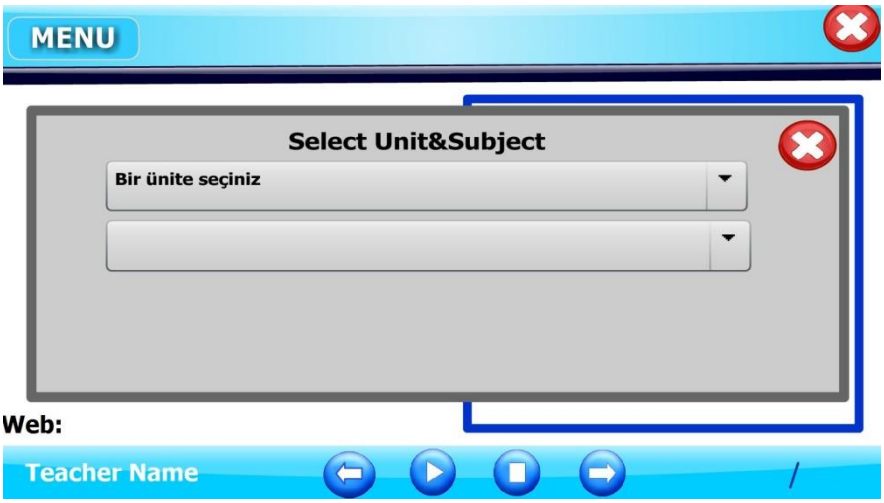


Fig.4. Mobile content course package editor's unit and subject selecting page.



Fig. 5. An example page of Mobile course package software.

The other part of the survey that was applied to student is consist of semi-structured questions for measuring the students past experiences with smart phone.

This questionnaire is consisting of 15 items that was a 5 point likert scale (1 definitely disagree, 5 definitely agree). The applicants read each statement and check the suitable one for them. All the answer are counted and the number of applicant (f) and its proportion is written to in front of each statement. 67.7% of the applicant check the "definitely agree" to the item of "I can use the next, back, play and pause buttons easily." Which are the most used functions at the software. 27.7% of the applicant checked I agree option for the same item. Only four students checked definitely disagree for the item from 114 applicants.

%61.1 of the applicant check the "definitely agree" to the item of "I appreciate the use of software easy" and 28.1% of the applicant check the "I agree" to the item of the same item. Totally %89.5 of the applicant thinks that as a general aspect it is easy to use this software and they are satisfied from the software.

From 114 applicants, 55% of them definitely thinks that the colors used at design are coherent, 32.5% of them thinks that that the colors used at design are coherent. The total proportion of the applicant who thinks that colors aren't coherent is only 10.5%.

72.8% of the applicant check the definitely agree to the item of "I can easily read the texts about course content and 17.5% of the applicant check the "I agree" to the item of the same item. As a result it is reached that students can easily read the contents text.

Table 1. Mobile course package software's satisfaction survey, statistics of total item for whole question

	Definitely	disagree	Disagree		Neither agree	nor disagree	Agree		Definitely	agree
Questions, n=114	f	%	f	%	f	%	f	%	f	%
1. I can select units and subjects easily.	2	1.8	6	5.3	6	5.3	21	18.4	79	69.3
2. I can read the name of units and subjects easily.	0	0	2	1.8	4	3.5	21	18.4	87	76.3
3. I can read the teacher name, page number info easily.	4	3.5	1	0.9	10	8.8	24	21.1	75	65.8
4. I can read the text of subject easily.	2	1.8	2	1.8	7	6.1	20	17.5	83	72.8
5. I can scroll text to up and down easily.	3	2.6	6	5.3	6	5.3	22	19.3	77	67.5
6. I can see pictures clearly.	2	1.8	3	3.6	10	8.8	26	22.8	73	64.0
7. I can see the video clearly.	2	1.8	5	4.4	12	10.5	31	27.2	64	56.1
8. I can use the next, back, play and resume buttons easily.	4	3.5	3	2.6	4	3.5	27	23.7	76	66.7
9. I can quit from software easily.	4	3.5	1	0.9	6	5.3	21	18.4	82	71.9
10. The colors that used at screen design are compatible.	7	6.1	5	4.4	10	8.8	37	32.5	55	48.2
11. I appreciate the usage of software easy as general view	3	2.6	1	0.9	8	7.0	32	28.1	70	61.4
12. I appreciate the feedbacks clear and understandable.	2	1.8	1	0.9	17	14.9	27	23.7	67	58.8
13. The page translations are fast.	7	6.1	5	4.4	10	8.8	26	22.8	66	57.9
14. The pictures and texts are loaded quickly.	4	3.5	4	3.5	8	7.0	31	27.2	67	58.8
15. I can hear the sounds at pages easily.	10	8.8	6	5.3	5	4.4	35	30.7	58	50.9
1. I can select units and subjects easily.	2	1.8	6	5.3	6	5.3	21	18.4	79	69.3

According to values at Table 1 and graphics at Figs. 1-4, it is reached as a result that the level of satisfaction about the use of Mobile course package software for high school students is so high.

The applicant of 15 teacher's 60% are at numerical branch and 40% of 15 are at lingual branches. 66.7% of teachers are using computer over 10 years and 80% of them got 75 hours Basic IT e service in treatment course given by National Education. 73.3% of these teachers accept themselves as middle level IT user and %20 of them accept themselves as basic level IT user. 66.7% of the participants prepared e-content. These teachers prepared text,

PowerPoint presentation, Fig. and graphics and these types has 73.3% ratio. None of them has prepared content for smart phones. Only two of the applicant (13.3%) said yes and 86.7% of them said no to the question of "do you think that you can develop course packages for smart phones". As a result of these ratios it can be said that most of teachers seems themselves unready and inexpert for developing contents and course packages for mobile devices.

At the survey done with 15 teachers, they filled the questionnaire of "Do you think MİDP software is practical and useful at developing mobile content, and why". Their answers are like table 2 at below.

Table 2. Teachers demographic information and their opinions about usage of the software

Demographic Information	His/her answer to question
34 years old, 13 years for computer usage and middle level user	Yes, I think, its structure is so basic, every adult who is middle level user of IT can use this software.
46 years old, 19 years for computer usage and middle level user	Yes
40 years old, 17 years for computer usage and middle level user	Yes, using it is easy.
31 years old, 10 years for computer usage and basic level user	I think it is practical because it was so easy for a basic level IT user like me.
38 years old, 14 years for computer usage and middle level user	Yes, practical usage, easy usage.
34 years old, 12 years for computer usage and middle level user	Yes, because it is easy to use.
40 years old, 15 years for computer usage and middle level user	It is not professional but a teacher who is not good at ICT can easily prepare packages, it is not complex.
40 years old, 14 years for computer usage and basic level user	Yes, practical and useful.
34 years old, 10 years for computer usage and middle level user	I think that it is quite practical. Over all it is simple and easy to understand the structure. It allows every type of content to add in it.

All of the teachers (100%) gave positive answer to the questionnaire of "what is your general view about mobile content course package editor (design, navigation, visually). Also they said that they liked the design, navigation is easy and comprehensible. All these shows that the satisfaction about software is very high for teachers. Some of the teachers gave these answers to the same question "I liked the design, its design is clear, the menus are easy to understand, the design is apparent, I think that the design is nice, the transitions are easy and usable, I liked it, I appreciate it so successful and stimulating"

The question of "Were there any processes that you get difficult? If yes, which processes and why" was signed as the meaning of no and only two teachers said they had difficult to find the help button. All these answers show that the software has simple and user friendly interface.

It is searched that weather the teachers who has basic IT education can use the software and build up a mobile content course packages or not. 53.3% of the teachers are 10-15 yearly teacher, 26.7% of them are 15-20 yearly and 13% of the teachers are over 20 yearly at their job between 15 teachers applied the study. 66.7% of the teachers are using computer over 10 years and 80% of them took the basic IT courses. Beside these 20% of the them accepts themselves as basic IT user; %70 of them accepts middle level IT user. 66.7% of the teachers made especially text, presentation, table and graphic for their lesson before the study. None of

the teachers developed e-content for smart devices before and 86.7% of them replied the question of "Do you think you can develop e-content for smart phones" as no.

Table 3. The answers of the teachers to the question of "Do you prefer Mobile e-content course package editor software? Why?"

Answer Number	The Question: "Do you prefer Mobile e-content course package editor software? Why?
1	Yes, definitely, I prefer to use the material that was created with the help of present book, at my lessons.
2	It can be suitable at the oral subjects, it is functional and okay as design.
3	It is ok at oral lessons but must be developed for the lessons like math and science.
4	I definitely prefer because it is user friendly.
5	I prefer to use. It is practical and useful for increasing the rating of the success so I prefer to use this software.
6	Yes, it is simple to process.
7	Yes, it can be practical for reaching to subjects and teaching as oral.
8	Yes, it is a practical way, it is suitable to build-up a subject
9	I prefer because it was very easy to add txt files, picture and video.

As it can be understood from table 5.3, most of the teachers thought that they can develop cause content packages with the developed software. Only one teacher who is 57 years old and working 29 year as a teacher who didn't develop any content before, presented his opinion as " I don't prefer because of my branch and it is hard for the students level". The opinions taken from teachers and the information's at the upper it can be said that there is a positive changes at the teachers behaviors to prepare mobile contents.

At the research, the attitude of the students who use the Mobile course packages software was tried to measure by the attitude scale. 114 students who attended the study filled the attitude scale. The data taken from attitude scale was input to SPSS 16.0 package program and analyzed. As a result of analysis the average and standard deviation numbers were given to each item at table 4.

At the study the near the column of the sentences with 26 rows, there are the columns given suitable for the 5'likert scale to identify the students opinion for each item. The answers were counted and seen that 108 students filled all the items. At the table the frequency, Average and standard deviation were given for each 26 items.

According to the students immediate detection attitude scale's results at mobile learning, So less of them thinks that mobile learning is boring (2.57±1.487). Students largely trust in mobile learning (3.81±1.285) and thinks that mobile learning will be unavoidable in the future (4,04±1.214). The students think that there must be mobile learning activities at secondary education (3.98±1.180) and increases their self-confidence (3.53±1.329). Beside these, they think that mobile learning provides them the opportunity of learning at their speed (3.90±1.235). The small values of standard devotion show that the answers given to questions and working group is homogeny and the testing error is so low.

4. Discussion and conclusion

In this study, a course package software and mobile content course package editor were developed for the teachers to make course packages easily for mobile devices.
The software was used by 114 students who study in secondary schools at ninth grade and by 15 teachers who work in secondary schools.

Table 4. The student's immediate detection attitude scale's results at mobile learning

Attitudes N(Frequency)=108	Average	Standard Deviation
M.L. [1] enhances the responsibility.	3.58	1.224
I advice the M.L. to my friends.	3.86	1.128
The technical problems at M.L. makes me angry.	3.52	1.322
There must be M.L. activities at secondary education.	3.98	1.180
I can get in communication to teachers with M.L.	3.39	1.230
M.L. is an alternative to education problems.	3.67	1.319
I forget the subjects that learned by M.L.	2.82	1.298
Wide spreading of M.L. will be useful for society.	4.03	1.218
M.L. affects the team working negatively.	2.93	1.394
M.L. provides me opportunity of learning at my speed.	3.90	1.235
M.L. encourage me to research.	3.81	1.316
There is a enough guideless at M.L.	3.35	1.226
M.L. lower my social side.	2.74	1.488
I can't allow time to myself because of M.L.	2.47	1.329
M.L. increases my self-confidence.	3.53	1.329
I can express my ideas freely at M.L.	3.73	1.145
M.L. promotes secondary education-industry cooperation.	3.65	1.274
I am bored while studying with mobile phone.	2.74	1.468
M.L. offers lifelong learning.	3.61	1.377
I think that M.L. is boring.	2.47	1.487
M.L. is as efficient as traditional education.	3.55	1.381
I trust to M.L.	3.81	1.285
M.L. is waste of time	2.48	1.453
I can get enough feedback at M.L.	3.70	1.168
I have sense of belonging to my high school.	2.61	1.470
M.L. will be unavoidable in the future	4.04	1.214

[1]M.L= Mobile Learning

It was determined that most of the students are using mobile phones between 1-3 years and nearly half of them has mobile phone and downloaded educational applications to their phones.

After students using the software installed on mobile phone with the 9th grade History lessons content, the results were reached that they found the software usage easy, they could see the pictures, videos and texts easily, the usage of buttons and list boxes are fine and the design is nice.

According to attitude scale's results, it was seen that students' advices mobile learning to their friends, thought there must be mobile learning activities at secondary education, definitely it is not boring, providing them the opportunity of learning at and their speed and the errors at software makes them angry.

The students using headphone will help them to hear the sound files and videos sound better and clear. At the study in schools, headphones can't be given to each student and because of the noise happened sometimes, it was observed that the pupils got difficult to hear the sounds well (average= 4.10 standard deviation 1.248 n=114). It is thought that using headphone will put away this problem.

At the study done with teachers, at first the aim of the study and the preparation steps were told to teachers, then the application part started at the study. At the beginning the demographic information of teachers were taken. From this information, it was seen that the teachers are working over ten years and most of them took the basic IT education (%80),

usually prepared text, presentations, graphic materials, hadn't developed any e-content for mobile devices before and don't think that they can do in future.

At the steps that the teachers using the mobile content course package editor according to sample scenario, it was seen that usually they didn't pay attention to case sensitive. Any important problem was seen at study. At the end of study, it was reached that the teachers found the software easy to use, basic and user friendly; definitely will prefer when creating e-contents; liked the property of preview, addition and deleting very easy and practical; it is better to use these software at oral lessons.

As a result, it was seen that both of the software can be used by teachers and students easily and satisfaction rate of usage is so high. By developing both of the software, more teachers can create more e-content easily and this will help to close the gap at the mobile content area in our country.

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