Concept Teaching To Mentally Retarded Students Through Mobile Devices

Metin Çengel
Sakarya University, Faculty of Education
cengel@sakarya.edu.tr

ABSTRACT
In the process of design, refinement and selection of the software required for mentally retarded students' education, the characteristics of students should be taken into consideration. Mobile application software can be used as a supplementary material in the education of students who need special education. Many studies reveal that computer assisted programs increase the motivation and concentration time of mentally retarded students and they enjoy studying with mobile devices (Tablets, Smartphones).
Apart from ordinary students, mentally retarded students should also be provided with opportunities of technology in their education after developing technology gets into every aspect of the life and is also used in education. In this study, concept teaching based on animation and simulation is intended by making use of technology in the education of mentally retarded students. This process makes a valuable contribution to students in terms of concept learning at schools and rehabilitation centers which facilitate for learning by technology assisted visual programs.
This study was conducted with 40 students at four schools of mentally retarded and rehabilitation centers inning Sakarya. The evaluation of the data obtained from the application, students who have been learning the concepts of mobile learning tools revealed that they are more successful than those who had learned classical learning methods. According to these results, it can be said that mobile devices make a contribution to concept learning of mentally retarded students.

Keywords: Mentally retarded students, concept teaching and technology.

INTRODUCTION
Reintegrating disabled people into social life within the scope of social rule of law is accepted by all modern countries. In this regard, Information technologies assisted education which facilitates the development of mentally retarded individuals, helps them to get a better place in society and make them more social should be assisted by information technologies (Yıldız, 2010).

Intelligence is the result of the combination of many abilities that work in a harmony and include the functions of the mind as perception, thinking, reasoning and learning. Mental disability which results from the slow development of intellectual abilities is a state with extremely complex properties (Bilir 1986, Yörükoğlu 1998, Eripek 2002).

A Mentally retarded individuals associated with significant retardation than normal in general mental functions in the process of development and also shows inability in adaptive behaviors (Özsoy, Özyürek, Eripek,1988).

With the increasing use of information and communication technology, educators state that global education is inevitable and global education practices must be initiated. These rapid developments in communication technology affect the form and structure of the education and force educators to find new education programs and to develop new teaching-learning models (İşman, 2005). İşman states that with the active use of technology, countries make radical changes in their education systems by developing different methods in education and training.

Learning is basically a mental process. Mentally retarded individuals are expected to be less successful than others due to retardation in mental functions and showing maladaptive behaviors. Learning ability of the mentally retarded individuals is the most significant feature that distinguishes them from healthy individuals.

Individuals in need of special education are the kind of individuals that need a more special education in normal education process because of their cognitive, affective, sensory, communicative and physical features. Different educational efforts are needed for the education of these individuals. The requirements for the education of individuals with special needs are designing special curriculum, using special materials, getting

help from special education specialist, making special physical arrangements in places etc. (Güven, 2003). With developing technology, education systems and teaching methods are changing. The technology used as active in every aspect of education begins to be integrated into their education. It gives a chance to consolidate what they learn in order to ensure the permanence as well as learning a lot of things in a limited time.

In studies on special education, different teaching methods were developed, but technological studies have been began to be used in these methods for last years. In fact, mentally retarded individuals are member of the developing and changing time as well as other people and they are also curious about devices such as computers, mobile phones and tablets. By using their curiosity, information technologies make a huge contribution to educators in teaching of the concepts they use in daily life. A number of factors which are difficult to achieve with classical training are easy to put into practice through information technology. "Also, the studies that include the comparison of education through traditional education programs and computer assisted teaching programs show that computer assisted teaching has positive effects on the learning of mentally retarded children (Pişkin, 1995; Heimann et al, 1995; Moore, McGrath and Thorpe, 2000; Bosseler and Massaro, 2003; Hetzroni and Tanous, 2004; Özdener and Erkoç, 2006)."

Studies reveal that computer assisted teaching increases the motivation of disabled children, gets them to concentrate better and that disabled children love studying through computer (Bayram, 2008, p.3).

In order to teach concept to the mentally retarded, computer can be used efficiently. A study with ten autistic children ranging from 5 to 8 years old indicates that the success of the subjects who study with computer are higher than the success of the subjects who do not use computer while studying (Pişkin, 1995).

Features which use different sounds and perceptible moves of the objects make a significant contribution to mentally retarded children's learning (Moore & Calvert, 2004).

THE AIM OF THE STUDY

In mentally retarded children's education, animation and simulation based concept teaching is aimed in this study by making use of mobile devices. By using the program which is developed at the end of this study, the aim in the education of mentally retarded students through technological opportunities as visual and aural;

- reintegrating these individuals into society
- to raise awareness in the society
- providing the concepts that are a first step in their development through today's technology
- get them to use the technology
- not only in rehabilitation centers but also at any given time

THE UNIVERSE OF THE STUDY

The mentally retarded students in special education and rehabilitation centers in Sakarya constitute the universe of this study. These students are taught concepts through mobile education program.

Process of Illustration

The application of this research occurs in three different sequences. In the first phase, students' level of readiness is determined by applying pre-test. Thus, it is found out with which concept the training has to begin. The second phase is the education part. At this stage, the subject of the concept which is aimed is taught and with implementing a test, the comprehension of the subject is determined at the same time. At the final stage, by giving the final test it is checked whether the taught concept is permanent comprehended permanently or not.

LIMITATIONS

The limitations of the program which is developed for mobile phones can be summarized as follows:

- Socio-economic status of each student may not be convenient to buy tablet.
- Mentally retardation schools and rehabilitation centers may not prefer the use of tablets because of extra charges and prefer instead of this model the classical education model
- The attitudes of teachers towards the use of technology could be restrictive.

RESEARCH MODEL

As a research model, pre-test and post-test were used for experimental and control group models. At the end of the implementation, results of the post-test from the experimental and control groups were analyzed by using Paired samples t-Test.

DATA COLLECTION

The data used in this research, were obtained from results of mobile devices software application which was developed for students. The study is applied to twenty-one students at four different schools which are in the province of Sakarya. The aim of this work is to teach concepts with tablet computers to students with mental disabilities by using this education model.

DEVELOPED PROGRAMS FOR MOBILE DEVICES

The parts of the program which are used in teaching students with mental disabilities concepts are listed below.

MAIN MENU

Figure 1 shows the home page screen of the program. On this screen, it is shown how sections take place into the other areas of the program.

Figure-1 Home-page

The usage of menus and submenus will be explained in the order of appearance.

REGISTRATION

As seen in Figure -2, this screen contains the data such as name, surname, age, gender, language, level, sound, reinforcement and the photo of the student who will use this program. Once the personal information of the student is saved on the data base, the student just launches the program and work according to the previous given data.

Figure-2 Registration

APPLICATION SELECTION

With selecting a specified application, which are displayed on the selection screen in Figure 3 routing occurs. This is a sub-menu of the program.

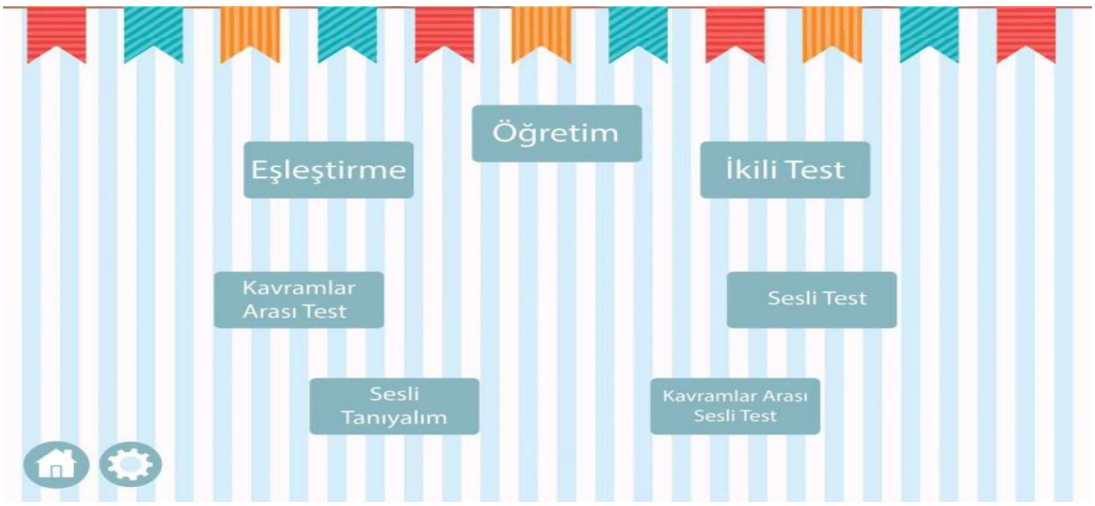

Figure-3 Application selection

Pre-Test Screen
This page is developed to measure student's readiness towards the selected concepts.

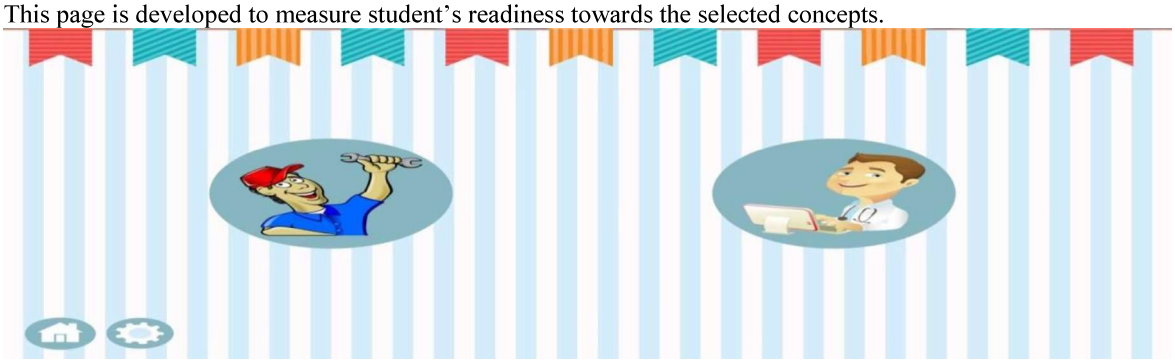

Figure-4 Pre-Test Screen

In the Figure 4, he question "Which is the doctor?" is voiced. When the student clicks on the right picture, positive reinforcement comes randomly on the screen. The reinforcement that appears with a motion picture is also voiced and appeal to the student with his/her name in voiced way.

This kind of study will motivate the students to increase and intensify their interest when they know the right answer.

REINFORCEMENTS
Random reinforcements appear in motion picture (GIF) if the student answers the question correctly.

Figure-5- Reinforcements

EDUCATION
By identifying the missing issues after applying the pre-test to the students, it can be passed to the education phase. First, the student chooses concept Figure-1 then moves on to Figure-3. On that screen, the training can be chosen and Figure-6 emerges in order to give training. On the concept training page, the theme varies according to the gender of the student. By clicking at the concept on the education page, it grows in the middle of the screen and repeats the concept three times voiced. Also, by adjusting the settings, it is possible to set the written version on the screen beside the sound.

Figure-6 Teaching Concepts

DATA ANALYSIS

The data are gathered from the research which is applied to four students from four diverse groups which learnability level is equal. They are located in the province of Sakarya and town of Hendek. Before starting to teach concepts through the developed program, the results of the pre-test are displayed on the table below by averaging the known concept with 1 and the unknown concept with 0. After giving training, the while-test results are gained with the same method. After two months since the training program, the results are gathered with the same technique which is mentioned above. The relation between the pre-test and the while-test is tested by using Paired Samples t-Test Method to determine the mean. Again, to test the durability of taught concepts, the relation between pre-test and post-test is tested with the same method and shown at the table below. The names of the schools and names of student from where the data were obtained are kept confidential.

First Group Data
Rehabilitation Centers: A
Students Name: X

Table-1

Vehicles	**Pre-Test**	**While-Test**	**Post-Test**
Apple	**1**	**1**	**1**
Pears	**0**	**1**	**0**
Orange	**1**	**1**	**1**
Lemon	**0**	**1**	**1**
Banana	**0**	**1**	**1**
Grapes	**0**	**1**	**1**

By looking at data of the pre-test results (Table-1), it can be deduced that the students of these groups do not know many of the concepts. After training students with the developed program for mobile devices and applying while-test, it is observed that they learned most of the concepts. Again after a certain period with implementing the post-test, it is scrutinized that students learned and comprehended the taught concepts permanently.

Table-2

EVALUATION	**N**	**Ẍ**	**S**	**Sd**	**t**	**p**
PRETEST	20	0,33	0,516	5	-3,12	0,025
WHILETEST	20	1,00	000			

The data of pre-test and post-test at Table-1 are measured through SPSS (Statistical Package for Social Sciences) program and Paired Samples t-test and the results are displayed at Table-2. As a result that value t is – 1.12, a significant change was observed between the pre-test and the post-test and this means that the program for teaching concepts has a great influence. Because the value of P is 0,025<.05, it is observed that this program has a significant contribution to students learning of concepts.

Table-3

EVALUATION	N	Ẍ	S	Sd	t	p
PRETEST	20	0,33	0,516	5	-1,12	0,045
POSTTEST	20	0,83	0,408			

The pre-test and post-test data in table-1 is obtained through Paired Samples t-Test via SPSS. Due to the t value of the table emanated negative, a significant change has been observed between the pretest and posttest data, and the program is seen as concept persistent. It has been observed that students made significant contribution on the persistency of the concepts since the P value is (0,046<.05).

Second group data
Rehabilitation Center: B
Student Name: Y

Table-4

Vehicles	Pre-Test	Mid-Test	Post-Test
Apple	**1**	**1**	**1**
Pear	**0**	**1**	**1**
Orange	**0**	**1**	**1**
Lemon	**0**	**1**	**1**
Banana	**0**	**1**	**0**
Grape	**0**	**1**	**0**

By taking the data in table 4 into consideration, in pretest results, most of the students in this group did not know most of the concepts and compared to X group, they knew less concepts, and in the mid-test they took after getting exercised through the program used in mobile devices, it has been observed that they learned the concepts, moreover, in the posttest which was conducted after a while, it has been observed that they learned what was taught and their learning became persistent.

Table-5

Measurement	N	Ẍ	S	Sd	t	p
Pretest	10	0,15	0,308	5	-5	0,037
Midtest	10	1	000			

By applying Paired Samples t-Test of SPSS software to the data of group Y students' pre and mid-test data in table-4, the results in table-5 are obtained. Because of the t value is resulted as negative, a significant change has been observed between the pretest and posttest data, and the program has a meaningful contribution to concept teaching. The P value, 0,037<.05) shows that the program made a significant contribution to students in learning concepts

Table-6

Measurement	N	Ẍ	S	Sd	t	p
Pretest	10	0,19	0,422	5	-3,162	0,027
Midtest	10	0,83	0,423			

By applying Paired Samples t-Test of SPSS software to the data of group Y students' pre and mid-test data in table-4, the results in table-6 are obtained. Because of the t value is negative, a significant change has been observed between the pretest and posttest data, and the program is seen concept persistent. The P value, 0,027<.05) shows that the program made a significant contribution on the persistency of the concepts.

Third Group Data
Rehabilitation Center: C
Student Name: Z

Table-7

Vehicles	Pre-Test	Mid-Test	Post-Test
Apple	**0**	**1**	**1**
Pear	**0**	**1**	**1**
Orange	**0**	**0**	**0**
Lemon	**0**	**1**	**1**
Banana	**0**	**1**	**1**
Grape	**0**	**1**	**0**

By looking the data Table-7, it has been observed that, in pretest results, none of the students in this group knew any of the concepts and after taking courses via the program developed for mobile devices, they learned the concepts and the posttest done after a particular time proved that they learned most of the concepts and the concepts became persistent.

Table-8

Measurement	N	Ẍ	S	Sd	t	p
Pretest	10	0,00	0,000	5	-1,12	0,015
Midtest	10	0,67	0,516			

By applying Paired Samples t-Test of SPSS software to the data of group Z students' pre and mid-test data in table-7, the data in table-8 is obtained. Because of the t value is resulted as negative, a significant change has been observed between the pretest and posttest data, and the program has a meaningful contribution to concept teaching. The P value, 0,015<.05) shows that the program made a significant contribution on concept learning of the students.

Table-9

Measurement	N	Ẍ	S	Sd	t	p
Pretest	10	0,00	0,000	5	-2,236	0,096
Posttest	10	0,50	0,448			

By applying Paired Samples t-Test of SPSS software to the data of group Z students' pre and mid-test data in table-7, the data in table-9 is obtained. Because of the t value is resulted as negative a significant change has been observed between the pretest and posttest data, and the program is seen as concept persistent. The P value, 0,015<.05) shows that the program made an almost significant contribution on persistency of concepts.

RESULTS

Nowadays, computer assisted education has become widespread and lessons are given in interactive environments. Mobile education systems can be used to assess the success of the individuals in or out of the educational institutions. Main objective is that individuals continue their education without time and location.. While starting this project, our objective was to learn the benefits of mobile education to educable mentally challenged individuals.

At the end of the concept teaching based on animation and simulation via mobile devices project, according to the survey results and feedbacks from educators, it is understood that when concept teaching is carried out by using the materials featuring visual, audial and kinesthetic characteristics, this makes a significant contribution on students' learning concepts and knowledge of the concepts becoming persistent.

When the findings of the study are taken into consideration, the softwares prepared and applied by taking the features and learning styles of autistic kids into account increase the academic success.

SUGGESTIONS

The studies show that computers ensure the active participation of the students with special needs to education, increase their motivation, help them keeping themselves focused for longer time and provide more practice chance for what they learn.

Special educations departments and computer and educational technologies departments can work collaboratively on developing educational softwares covering all concepts (fruits, vegetables, vehicles, colors, numbers, shapes and etc.) for autistic students.

The softwares being developed targeting the mentally challenged kids can be developed covering the matching activities (find the same, find the different and etc.).

The studies show that computers have an important role in kids with special needs, especially mentally challenged individuals' education, as supportive materials. The softwares developed focus on just one need (like concept teaching) of an autistic individual. When these softwares are used as supportive material, they present more effective results.

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