USING MOBILE TECHNOLOGY TO ENHANCE LEARNING FOR DISADVANTAGED GROUPS: DESIGN OF EDUCATIONAL SCENARIOS

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Abstract

This article focuses on improvement of the conditions for educational integration by using mobile technologies, which will increase motivation and participation of the students in the educational process. The focus is placed on disadvantaged learners – groups at risk, whose ethno-cultural peculiarities, special needs and social-economic situation considerably limit the opportunities for adequate education for them. The integration of these groups depends mainly on their training and the knowledge they acquire. Mobile technologies facilitate memorizing and learning by offering visual and audio stimuli and therefore they are appropriate for people with deficits.

In the paper we present the following educational scenarios:

1 Enhancing of interactivity in teaching of Roma children using mobile devices. The use of multimedia resources in education by mobile devices would be appropriate, because they incorporate something new, figurative and attractive, which has a real chance of a beneficial effect on the motivation of the minority group.

2 Training of learners with hearing disabilities, supported by mobile devices. Our goal is integration of students with hearing disabilities into the learning process through the use of innovative educational technologies for learning by mobile devices.

3 Use of mobile technology to expand training opportunities of people with musculoskeletal disorders. Learning by mobile devices has the potential to increase access to education for people with limited mobility, to create a supportive learning environment, independent of time and place - removes spatial barriers - physical classrooms have become redundant in the traditional sense of the word and students can conduct courses from a place and at a time of their choice.

4 Use of mobile devices for distance learning of unemployed. This scenario will focus on people who have no access to education because of distance, lack of financial security, socio-economic exclusion.

Keywords: mLearning; mobile technology; Learning for disadvantaged groups; Educational Technology.

1 INTRODUCTION

The use of mobile devices and related to them digital resources for the purposes of educational and social integration is an innovative solution of a need, which has arisen in society:

- Mobile technologies give freedom both to teachers for complex presentation, and to students for extended study of a considered problem in accordance with their educational needs, what, according to the constructivist views, is a condition for manifestation of independence and initiative.
- The application of these technologies overcomes the limitations related to time, place and volume of the school material. The students can use these technologies both in the classroom and out of it in convenient time, and they can access a wealth of information resources.
- The use of these technologies does not require from the students preparation in advance. The interactive multimedia products are usually complied with their intuitive perceptions and their personal preferences and offer very good possibilities for building up steady interest and lasting motivation.

The benefit of this type of innovative learning is justified by the fact that the students willingly and enthusiastically accept everything new, related to technologies. The news in the field of technologies, applied to education, lead to raised motivation for active participation in the process of learning, considerable improvement of the process of memorizing the school material and, owing to the use of more senses, to possibilities for facilitating the learning process for disadvantaged people, what makes education more effective.

The study is subject to the hypothesis that digital resources, developed by means of mobile technologies, as well as the use of these technologies in the implementation of these resources in the process of learning, will lead to retention of Roma children in schools, to better acquisition of the school material by students with special educational needs, and it will be a better option for educational integration of disadvantaged people into the educational system, as well as a better opportunity for inclusion in this system for isolated due to social-economic reasons people. For confirmation or rejection of this hypothesis a study will be conducted, comprising development of appropriate mobile resources and use of adequate diagnostic tools.

The scientific research will be focused on the use of mobile technologies for stimulation and support of implementing innovations in the education of the following disadvantaged groups:

- Roma children and their teachers;
- Hearing impaired children and their teachers;
- People with musculoskeletal disorders;
- Unemployed people.

2 DESIGN OF FOUR EDUCATIONAL SCENARIOS

In the paper we present the following educational scenarios:

1 Encouraging interactivity in training Roma students by means of mobile devices;

2 Training hearing impaired students with the help of mobile devices;

3 Use of mobile technologies to expand training opportunities for students with musculoskeletal disorders;

4 Use of mobile devices for distant training of unemployed people.

The design of educational scenarios is based on the following prerequisites:

- The implementation of the augmented reality technology by using mobile devices in the educational process allows for applying specific approaches, based on the modern pedagogical theories and their realization in practice, what is due to the fact that it can be implemented successfully in training. Thus the interest toward attending study will be increased, as the students will look at their classes as a place for interesting and creative activities.
- The use of mobile digital resources during the lessons will practically contribute to students knowledge and skills integration and forming competences in various fields of knowledge. The students with special needs will be encouraged, by means of increasing their motivation and self-assessment for obtaining better education with a view to a better perspective for their socialization and fulfilment in life.
- Appropriate use of augmented reality technology on mobile devices in training creates prerequisites for full control over the basic components of the material.
- Training with the help of mobile devices has the potential to enhance the access to education for students, to create supportive learning environment, adaptive to their individual needs. Advancement in development of mobile technologies creates prerequisites for facilitating the online students in three main areas: Information resources delivery; Access to training resources; Interactive communication between educators and students. The main advantage, offered by training with mobile devices to students with special needs is that it removes the spatial barriers in front of them – the physical classrooms become unnecessary in the traditional sense of this word and the students can join a course from a place and at time, chosen by them.
- The fourth scenario addresses people who do not have access to education as it is far away from their place, because of lack of finances, or because of socio-economic isolation. In times

when big groups of people permanently remain outside the labour market, taking measures to increase employment and organizing retraining and motivation of the unemployed people are of primary importance. Obtaining additional training and qualifications is a prerequisite for start a job. For this scenario a package of courses for initial vocational training will be developed based on the platform for electronic training DIPSEIL [3].

The general objective of the scenarios is improvement of the conditions for equal access to education and training by enhancing the motivation to participate in the educational process, by facilitating the access and by additional activities with the students.

2.1 Scenario 1

Roma has its own specific characteristics and needs and their integration seeks alternative methods and approaches that will be able to render the necessary influence. The use of multimedia resources in education by mobile devices would be appropriate, because they incorporate something new, figurative and attractive, which has a real chance of a beneficial effect on the motivation of the minority group.

The focus of the scenario is placed on the ethnic minority groups-Roma students at risk of dropping out. The use of an innovative method of training for improving the conditions for access to education aims at making the schools more attractive by building up a supportive educational environment, by enriching with appropriate for the particular age school materials and school-aids.

The study is addressed on the one hand to facilitating teachers working with Roma students in organizing and conducting their training process by giving them the opportunity to update this process by implementing new teaching practices. On the other hand, conditions are created for these students to better acquire the school content by integration between the real and the virtual worlds.

The formulation of the objective is based on the following prerequisites:

- The implementation of the augmented reality technology by using mobile devices in the educational process allows for applying specific approaches, based on the modern pedagogical theories and their realization in practice, what is due to the fact that it can be implemented successfully in training. Thus the interest toward attending school by the children from minority groups will be increased, as they will look at their school as a place for interesting and creative activities.
- The use of mobile digital resources during the lessons will practically contribute to Roma children's knowledge and skills integration and forming competences in various fields of knowledge. The children will be encouraged, by means of increasing their motivation and self-assessment for obtaining better education with a view to a better perspective for their socialization and fulfillment in life.

2.2 Scenario 2

Unlike hearing children, the children with hearing impairment perceive information mainly visually, as their visual sensitivity is highly developed. Therefore in their training visual stimuli are used, which facilitate the process of memorizing the information.

The newest groping today in the modern education of hearing impaired children are related to implementing new educational electronic technologies and, in particular, interactive educational multimedia resources. This makes education more dynamic and adaptable to the individual peculiarities of the hearing impaired students. Specific feature of the multimedia resources is the possibility for high level of visualization of the school content. The integration of static illustrations and dynamic video, accompanying the text, gives possibilities to observe and study the changes in the different processes from a different angle. This, undoubtedly, facilitates learning and makes the process of training more effective.

Appropriate use of augmented reality technology on mobile devices in training hearing impaired children creates prerequisites for full control over the basic components of the school material.

The study is addressed, on the one hand, to facilitating teachers working with hearing impaired students in organizing and conducting their training process by offering them the opportunity to update the training process by applying innovative pedagogical technologies: training, using the "augmented

reality" technology on mobile devices. On the other hand, it will contribute to overcoming the learning difficulties, which are due to the specific extent of the hearing impairment.

Special attention will be paid to training the teachers in advance how to use the mobile technologies in the process of training.

2.3 Scenario 3

Training with the help of mobile devices has the potential to enhance the access to education for students with musculoskeletal disorders, to create supportive learning environment, adaptive to their individual needs. Advancement in development of mobile technologies creates prerequisites for facilitating the online students in three main areas:

- Information resources delivery;
- Access to training resources;
- Interactive communication between educators and students.

The main advantage, offered by training with mobile devices to students with musculoskeletal disorders is that it removes the spatial barriers in front of them – the physical classrooms become unnecessary in the traditional sense of this word and the students can join a course from a place and at time, chosen by them.

The effectiveness from the use of the platform for electronic learning DIPSEIL in training students with musculoskeletal disorders will be studied; the platform will provide adequate educational services for building professional technical competence. This approach will contribute to overcoming the difficulties in the process of learning, which are due to the specific impairment.

2.4 Scenario 4

This scenario is addressed to people who do not have access to education as it is far away from their place, because of lack of finances, or because of socio-economic isolation. In times when big groups of people permanently remain outside the labour market, taking measures to increase employment and organizing retraining and motivation of the unemployed people are of primary importance. Obtaining additional training and qualifications is a prerequisite for better employment.

For this scenario a package of courses for initial vocational training will be developed based on the platform for electronic training DIPSEIL [3].

Advantages, offered by distant learning to unemployed people from remote areas are:

- It removes the spatial barriers – the physical classroom now becomes unnecessary and the students can join the courses in the virtual learning environment from a place on their choice;
- Removes the time barriers – thus the various styles of learning are satisfied and the students follow a flexible schedule of learning in convenient for them time;
- Removes the dependence on the basic paper source of information (mostly a textbook), wherein a possible potential advantage is the access to more up-to-date and relevant information;
- Increases the commitment of the students to the learning process. This can happen in practice by facilitating the access to information and by wider choice of available materials.

3 THE USE OF AUGMENTED REALITY TECHNOLOGY BY MOBILE DEVICES FOR THE FIRST AND THE SECOND SCENARIOS

The construction of educational technology of teaching of the educational content using augmented reality complies the following factors:

- Psycho-physiological characteristics of Roma students and students with hearing problems;
- The principles of active learning.

Educational technology includes the following set of activities such as:

- Preparation of plan-scenarios of individual lessons from selected subjects. They reflect the place and manner of incorporating augmented reality technology;
- Selection of the appropriate system of methods and techniques of teaching and organization of educational process on selected topics using augmented reality technology by mobile devices.
- Preparation of appropriate tools for diagnostic of students' knowledge.

In preparing this structural element the experience and views of the teacher who set his teaching style and personal preferences is dominant. The teacher is the one who adapts prepared educational multimedia products for augmented reality to the characteristics of the students.

Educational technology includes the following methodological option to carry out the learning process:

- Augmented reality technology will be used for visualization of models of objects, which can be seen on the display of a smartphone or a tablet. These objects (text and illustrations – photos, images etc.) define the content and the context of the additional digital resources, offered to the students by the augmented reality technology. QR Codes are printed on transparent film, which is placed on the relevant page of the textbook. For each page of the book, for which there is multimedia content created, there are transparencies with a corresponding QR code. After being scanned, the QR code activates the corresponding audiovisual and multimedia content, which is seen on the display of the mobile device by the student [1].

Thus supplementing the educational content and its visualizing do not require investment in:

- Creation of new printed textbooks and school-aids;
- Use of a multimedia projector (electronic whiteboard) in class;
- Time for finding additional information on the Internet and time for preparing presentations.

The only used means is the textbook, the mobile device, and the transparent foil with the corresponding QR code.

The teacher plays a leading role in organizing the learning process. He sets the pace of work so that all students can work simultaneously. In the course of the lesson he organizes a targeted surveillance of multimedia resources related to the QR code.

4 THE USE OF DIPSEIL FOR THE NEEDS OF THE THIRD AND FOURTH SCENARIOS

DIPSEIL is a platform for electronic learning, giving possibilities for designing, development and offering resources for the educational process, characterized by ensuring help for the students when necessary and as much as required, so that they can deal with real assignments in the context of a problem-based type of education [2] [3]. DIPSEIL has two specific characteristics:

- The learning content is based on learning tasks. Performance tasks aim preliminary at specified learning outcomes.
- There will be no lectures, practicals or final examination. Students only perform the learning tasks throughout the semester and collect credits for each learning tasks they perform adequately. They receive a final mark at the end of the semester based on the collected credits.

DIPSEIL task for performance provides a combination of the following elements:

- Task description - the learning tasks is described, explaining the students what is expected of them.
- Task-specific training - training materials which help the user to learn while performing the task.
- Reference information - task relevant resources support students by making immediately available information, which they either have to study or use just in time to perform the task.
- Instructions how to perform the task.
- Expert advice about a task - expert advices part contains specific advice on performing tasks.

According to the needs and capabilities of the students, educational modules/courses will be developed and adapted on the platform for electronic learning DIPSEIL.

By means of DIPSEIL platform individual support will be provided and individual approach will be applied. To enable students to participate fully in the learning process, when developing the educational courses, both the capabilities and requirements of the particular group of students should be precisely analysed and well-grounded choice of the most appropriate mobile technology should be made for development of digital resources, adequate to their needs.

1 For the students with musculoskeletal disorders educational modules from a Master's degree course will be adapted. The use of the mobile technologies has a key and facilitating role in offering educational resources to students with musculoskeletal disorders because of the fact that mobile technologies give a flexible access to a wide spectrum of information and educational digital resources, tailored to their needs. They allow online courses to be accessed from mobile devices at any time and from any place.

2 For unemployed people a set of courses for professional qualification will be developed, based on the platform for electronic learning DIPSEIL. It will give a possibility to include in the educational system people, isolated for social-economic reasons.

5 CONCLUSIONS

For the purpose of the study mobile application with augmented reality for education was developed. Augmented reality technology will be used for visualization of models of objects, which can be seen on the display of a smartphone or a tablet.

The final result from the integration of digital educational resources both in the developed mobile application with augmented reality and in the system DIPSEIL and their implementation in education based on the developed conceptual model, is the package, consisting of the following structural elements:

- Mobile application with augmented reality;
- Platform for electronic learning DIPSEIL;
- Innovative educational technologies;
- Digital educational resources for mobile devices.

The introduction of this package in training is organized as a pilot experiment, during the conduction of which we will rely on assistance on the side of the families of the disadvantaged students, as well as on the side of social partners and non-governmental organizations.

The pilot experiment will be organized and conducted in accordance with the four scenarios with:

- Roma students from a few schools in the region;
- Hearing impaired students from the Secondary specialized school for hearing impaired children - Plovdiv;
- Students with musculoskeletal disorders from Plovdiv University "Paisii Hilendarski";
- Unemployed people from Smolyan region (Bulgaria), who have no access to education because of remoteness, lack of financial security, social-economic isolation. For their professional integration assistance will be sought from the Employment Agencies.

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