SOFTWARE MODEL DESIGNED FOR PERSONS
WITH SPEECH DISORDERS

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Abstract

This paper presents a model of user interface software designed for rehabilitation of speech disorders in early childhood. The aim of the research is to discover the unknown facts about the characteristics of user acceptance of information from the standpoint of concepts, discovery of trends in development of user interfaces as part of interactive software. Computer which is used in the work with pre-school children and in early elementary education must be used as didactic tool. Furthermore, the work (play) on computer in this delicate age mustn't be the purpose for itself but the accompanying content which will make children's experience richer. Nowadays, when there is a rich offer of educational software for children, children use computer as a source of information, as a help in development and creation of new ideas, as a help in learning foreign languages, for adoption of basic information knowledge. Technology progress imposes the change in methods of work at the very start of education. Evidences represent that speech disorders in early childhood are not frequent but it is important to notice them on time in order to avoid more serious consequences during children's growth and development. If parents notice certain problems in speech development of their children, they should ask for professional help as soon as possible. Although all speech disorders are cured by speech therapists this software could have important role in this process. It can be concluded from the said before that the usage of this software would be useful in the work with children who have speech disorders in order to improve their communication. These children could practice speech through games with or without a speech therapist.

Keywords: *user interface, design, software, education, therapist.*

1. Introductıon:

Speech is one of the most important ways of communication. We use speech to express our thoughts and emotions. Persons with speech disorders have to take serious efforts in order to be understood by other people.

What is speech?

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Speech is a verbal means of communication consisted of the following:

- Articulation - the way of producing sounds (it is sometimes necessary to teach children certain sounds in order to pronounce some words correctly).

- Voice – the way of using vocal cords and breathing in order to produce sounds (incorrect use of voice can cause hoarseness or aphonia).

- Speech fluency

- Speech rhythm (hesitation or stammering can influence speech fluency).

- When a person is not able to produce the sounds correctly or fluently or has voice problems then that person has speech defect.

    What is a language?

- A language is different from speech. It represents a union of common social rules according to which we understand and interpret the speech. This implies the following:

- Making of new words (by adding certain word endings we form new words with new meaning).

- Compiling sentences (an ability to form words in order to make meaningful sentences).

- Combination of words (an ability to make the best combination of words within a sentence which is most appropriate to certain situation).

- When a person has problems with understanding other people – receptive language, or with exchanging opinions, ideas and emotions – expressive language, then this person has language disorder.

- Meaning of words (some words have several meanings and it is necessary to determine the right meaning).

2. Interactive software

Interactive software is completed software which serves as a learning support or a support for knowledge improvement. Multimedia contents, such as cartoons, dialogues, sounds and clips can provoke interest and curiosity of young users and attract and keep their attention. High level of interaction allows users to research software on their own, to decide what information is necessary or to stop using it if they like (Vannucci et al).

- Users with special needs represent a special category so the interactive software designed for them is characterized by the following features:

- Users with disturbance of vision – increasing the surface of display, conversion of entrance/exit (input/output) in Braille alphabet or voice;

- Users with hearing impairment – conversion of audio information in video presentation.

- Users with motored disorder – special input/output devices should be used (special keyboards, joysticks, keys, "head-mounted" optical mouse...).

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It shouldn't be forgotten that every application has several classes of users; therefore, different levels of interaction should be anticipated. Since the users also improve, some individuals will probably go from lower to higher levels of interaction during software usage. At designing software it should be taken care about two main factors (Shnaiderman et al, 2006) usability (it is relied on function, effective presentation of information and product), and aesthetic side (by using appropriate colors, shapes, graphics, etc.). Target visitors also represent one of the main factors that should be taken care about. A good design should attract attention of as many users as possible so it has to be original, beautiful, but it should reflect the very essence of its realization. Design makes the first impression and because of that it is necessary to be of high quality.

On the ground of defined goals and defined assignments which software had to achieve it came to positioning basic demands which have to be accomplished during the process of making the software. As one of the basic demands, it was the accomplishing as much levers as possible of interactive software, because it is impossible to imagine the educational software without interactivity. Therefore, the software had to possess the high level of interaction between pupils and the software itself, and above all to accomplish possibilities by which the pupil himself can choose his process of acquiring knowledge. On the other hand it also enables individualization, in other words, ad adjusting the software to user's personal demands.

In elementary education, the advantages of computer aided teaching are also reflected in possibilities related to greater thinking mobility, active and independent work of students. Modern computers offer various possibilities such as simultaneous picture watching, listening to speech and the use of multimedia sources of knowledge, which contributes to faster and more complete assimilation of contents, more permanent remembering of learned units, more efficient use and creative implementation of assimilated knowledge. Computers communicate with students verbally and in written form, in dialogues, they give necessary information, graphs, pictures, films, book pages, projections, simulations, they give explanations of the presented material, clues, even offer additional instructions, correct mistakes and evaluate students' work. (Karuovic et al, 2012)

A. *Tools and methods for development of interactive software*

Development of interactive software is a complex process. It must fulfill some pedagogical factors as well as some factors from the field of computing. Within development process it must satisfy some requirements important for learning efficiency. These requirements are related to technical and pedagogical aspects of software and they are:

- **Interface efficiency** - Interface must be clear. The users, especially children, have to notice and understand the principle of navigation on the screen. Navigation from one scene to the other must be enabled by special commands which are clearly noticeable. Selection of pictures and animations plays a very important role as well.

- **Quality of multimedia contents** - Multimedia contents have crucial aspects according to which educational tools differ from books. Although multimedia are significant for software efficiency they also have a negative influence. It can happen that multimedia are not appropriate or they can distract attention from more important issues so the type of content must be chosen carefully.

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- **Multidisciplinary attitude to approach and content expansion** - It is not the same to create educational software for mathematics or art, for example, therefore, it is not the same to create software for children who attend primary or secondary school. ...

- **Modularity** - Modularity enables programmers to change and add software contents more easily in order to prolong their lifetime. If software has inbuilt tools for exchange, then teachers can change contents and adapt them to their users.

- **Transferability** - Educational tools must be available on all computers regardless of their operational system or architecture [1].

3. Interactive software "Let's speak correctly!"

Interactive software "Let's speak correctly!" (fig.2) represents an easy software designed mainly for pre-school children. If we consider standard classifications mentioned in the previous chapter, we can say that the software "Let's speak correctly!" belongs to software for special education, for development of skills and habits based on the model and methods of games.

This software is consisted of the following main components: "Say", "Show" and " Lyrics" (fig.1). These components represent a part of the software and each of them contains an exercise which enables a user to practice speech and reading. Although pre-school children usually cannot read they are able to recognize some written words.

In the first segment of the software "Say" (fig.3), a user's task is to watch carefully, listen to and pronounce the names of displayed objects and to pair those whose names are rimed. If a user wants to repeat the exercise it is enough only to click a "repeat' button. Right click on the picture activates pronunciation of the object so a user is enabled to pair the objects on the grounds of hearing and pronunciation.

Figure 1. – Display of cards "Say", "Show" and "Lyrics"

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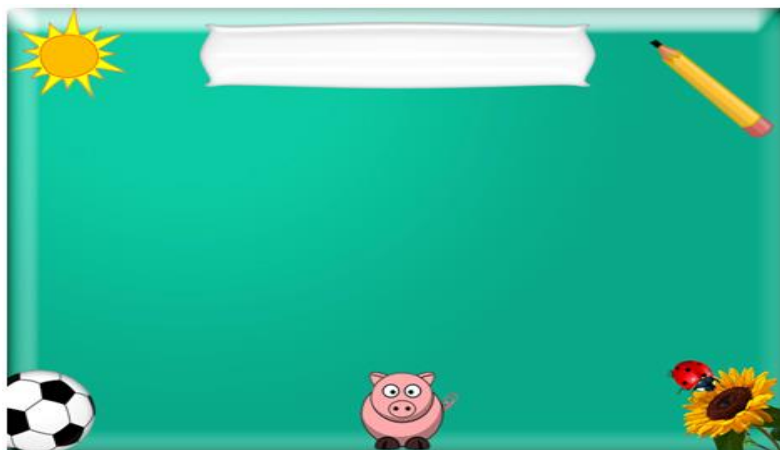University of Shkodra "Luigj Gurakuqi", Shkodra, Albania

Figure 2. – Display of application's background

In the second segment of the software "Show", a user's task is to connect the object with appropriate name. By using the right click on the name of the object a user can hear the name, pronounce it clearly and the name will be linked with the picture automatically. The words used in this segment are chosen according to the number of letters. Namely, children have more problems with pronunciation of long words so we have chosen such words.

In the third component of the software "Lyrics", we have chosen poems by Jovan Jovanovic Zmaj because they are short, contain rhymes and therefore ideal for pre-school children to improve their speech.

The component "Show" (fig.4) contains 10 pictures with the objects, dimensions 120x120 pixels, type jpg and 10 fields with names of these objects, dimensions 90x30 pixels, type.png. There is also a button "Forward" and "Back" here.

In order to create a quality software which is user oriented it is necessary that user is involved in development process of software. The aim is to understand: users' work tasks, their mental activity at solving these tasks and the tools which are already familiar to them.

Nowadays, there is a lot of talk about inclusive education and making the teaching process easier to children with special needs. The leading role in gaining basic skills, that make possible to an individual to have the elementary support for living and work to meet social expectances, has the education. The elementary education, which is followed by a secondary one and specialization, is there to make a young man capable to do the basic skills needed in the today's world. In Serbia, inside the system of education and its latest reform, there is considered under one (obligatory) year the nil year, which is followed by the elementary education of 8 years, which gives us 9 years. According to their material and technical support, some of preschool institutions have started using the educational software when applying the educational program with the preschool children. Interaction between a child and a computer is of a great importance for learning the IT and informational knowledge for certain, as well as the successful practical use of IT at the next levels of education, which lasts the whole life today (Gojkov et al, 201)

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Figure 3. – Display of field names in the segment "Say"

Figure 4. – Pictures of the objects with their names in the segment "Show"

4. Conclusions

Speech disorders in early childhood are not frequent but it is important to notice them on time in order to avoid more serious consequences during children's growth and development. If parents notice certain problems in speech development of their children, they should ask for professional help as soon as possible. Although all speech disorders are cured by speech therapists   this software could have important role in this process.

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Considering that speech therapists are not available everywhere, although every pre-school institution should have one, this software could serve as means of practice in these cases. It can be used in kindergartens, at home or in schools for first-grade-children. Using of this software could be categorized as some kind of distance learning without tests or other knowledge check.

The software is not complicated, it is only important that a child knows how to use computer mouse. It can be also used for prevention and for practicing correct speech through games. The words used in application are chosen in order to represent a challenge to children because the sounds are considered to be problematic in pronunciation.

It can be concluded from the said before that the usage of this software would be useful in the work with children who have speech disorders in order to improve their communication. These children could practice speech through games with or without a speech therapist. Using the most modern teaching resources always brings results.

References:

Vannucci, M., Colla,V., Educational software as a learning tool for primary school students New Achievements in Technology Education and Development, Safeeullah Soomro (Ed.), ISBN: 978-953-307-066-7, InTech, Available from: http://www.intechopen.com/books/new-achievements-in-technology-education-and-development/educational-software-as-a-learning-tool-for-primary-school-students.

Shnaiderman B., Plaisant C. (2006), Designing the User Interface, University of Maryland, College Park, ISBN 86-7991-282-4

Karuovic D., Vastag A., Eleven E., Radosav D., Tasic I., Karuovic V.: Interactive User Interface and Inclusion, SISY 2012, 10th Internatiomal Symposium on Intelligent Systems and Informatics, IEEE Proceedings, IEEE Catalog Number: CFP1284C-USB, CFP1284C-PRT, ISBN: 978-1-4673-4749-5 (pendrive); 978-1-4673-4748-8 (printed), September 20-22.09.2012. pp. 477-481 Subotica

Gojkov,G., Karuović,D., RadosavD., USE OF INTERACTIVE DEVICES AND SOFTWARE FOR TEACHING IN TECHNICAL AND COMPUTER SCIENCE, "Information technology and development of education", Proceedings, pp.234-239 ISBN: 978-86-7672-134-4, Tehnički fakultet "Mihajlo Pupin", Zrenjanin 01.07.2011.

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