ATLANTIS PRESS

Advances in Economics, Business and Management Research, volume 105

1st International Scientific and Practical Conference on Digital Economy (ISCDE 2019)

The model of special computer interface for learning adult students

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***Abstract* — This investigation is carried out to create a model of special computer interface interface for learning adult students. Author suggests taking into account such factors as user's experience, individual phychological characteristics in order to create most suitable scripts for computer supporting learning and choice motivational game cases. The research helps to find the best interface for adult students**

Keywords — computer interface, learning adult students, individual phychological characteristics

I. INTRODUCTION

An educational scenario of learning software has to provide the deep knowledge of subject. Theory of human-computer interface studies the interactions and the relationships between humans and computers. At first human-computer interface was focused on interfaces using windows, icons and so on. As soon as interface problems were investigated, the researchers started to concern with shared understanding and explanations of human actions. The new essential challenges are improving the way people use computers to work. User modeling was derived from the need to provide support for human-computer collaboration as shared goals and learning.

The importance of user modeling was evidenced by their increasing influence in the design of software applications.

Elderly students study in order to decide their social problems. The main difficulty of their training is high-tempo environment. To solve a given math task, users sometimes use paper-based records to support performance. These records are operating documents that serve as cognitive aids, and have been shown to improve quality of knowledge by formalizing math algorithms. Conspectus is not new mean to train practice and have been widely in education process.

However, there are important differences between paper conspectus and interactive computer aids. It would be very effective to use different information sources and canals of perception in train of elderly students.

To realize new challenges and opportunities for education we have to change our point of view on active using electronic aids with intuitive understandable and interactive interface. Software developers must address these high-tempo, distributed demands.

Elderly users of educational programs have to learn dealing with team-based issues of coordination and communication [8, 9, 10, 14, 15].

How we must organize user interface in order to effectively learn older students with the help of contemporary technologies in short time? This article gives answer to this question.

II. RELATED WORKS

The problem of rational use of computers in the educational process is well known. Table 1 consists of the most important articles of the topic under consideration. A complete list of works devoted to various aspects of our topic, presented by different authors in [1-17].

On the base of study papers it is possible to define main internal and external factors affecting the achievements in mathematics of elderly students (Figure 1)

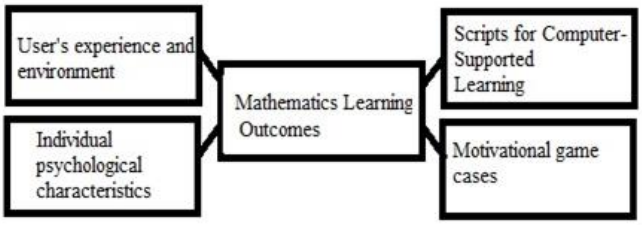

Fig. 1. Main internal and external factors affecting the achievements in mathematics of elderly students

Motivation is very important for learning mathematics. Special computer game environment and strong system of mathematical case-studies play an important role in improving the math performance. Currently, most researches related to the impact of using game are conducted for learning integral equations [9], mathematical statistics [15]. There is a lack of related research in the context of learning math old-aged students. The usage of e-learning systems has made educational material widely accessible to elderly students. There is thus a great need to accommodate learning process for individual differences [10, 14]. Therefore, research topic is necessary for conducting. This research explores important aspects of the organization of computer scenario and interface in learning software and their impacts on the student's knowledge. The results could be a base for creation learning software for adult students.

TABLE I. MAIN STATEMENTS OF ARTICLE

Name of article	Author(s)	Main statements of article
Mental Models in Human-Computer Interaction. Research Issues About What the User of Software Knows	John M. Carroll and Judith Reitman Olson(editors),	"At present, there is no satisfactory way of describing what the user knows. There way to characterize the differences among users of various systems as they go through the process of developing an awareness and understanding of how the system works or how a given task is to be performed"
Designing Inclusive Interfaces Through User Modeling and Simulation	Pradipta Biswas, Peter Robinson & Patrick Langdon	"This article presents a simulator that cans reflect problems faced by elderly and disabled users while they use computer, television, and similar electronic devices. The simulator embodies both the internal state of an application and the perceptual, cognitive, and motor processes of its user"
User Interaction Modeling and Profile Extraction in Interactive Systems: A Groupware Application Case Study	Cristina Tîrnauca, Rafael Duque and José L. Montaña	"This work constitutes a methodological contribution capable of identifying the context of use in which users perform interactions with a groupware application (synchronous or asynchronous) and provides, using machine learning techniques, generative models of how users behave"
The use of a game-based learning platform to teach mathematical statistics	Urazaeva L.	"Didactical games always gained attention as a technique to motivate students and improve learning".
Effective solutions to improving mathematics and science education	Urazaeva L.	The effective solutions to improving mathematical education are "based on the development of innovative computer educational programs which are able to identify the personal features of students"

III. MODEL DESCRIPTION

Author suggests using the F-model of interface (F=F(<A, B>, <C,D>), A=<A1(t),A2(t)>-levels of user experience and state of environment,, B=<B1(t),B2(t),..,Bn(t))-individual phychological characteristics, C=<C1(t),C2(t),..,Cm(t)>-scripts for computer supporting learning, D=<D1(t),D2(t),..,Dk(t)>motivational game case-studies. The F-model provides creation of rational interface of learning computer program.

The logical part of the rule's system describes by function F= F(<A, B>, <C,D>)(Fugure 2, Figure 3). The linguistic part includes a system of questions and answers.

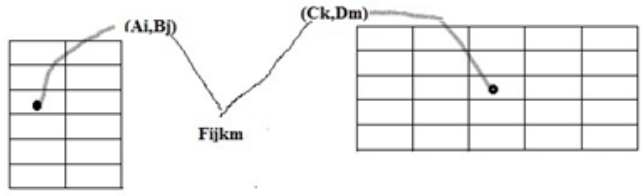

Fig. 2. The logical part of the rule's system

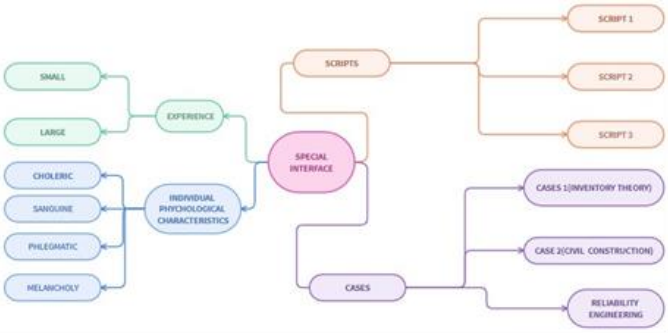

Fig. 3. Special interface choicing

Computer training in a game form stimulates collaboration in the educational process. The active use of educational materials allows you to quickly apply knowledge in solving professional problems by the mathematical methods. The activity diagram is shown in Fugure 4.

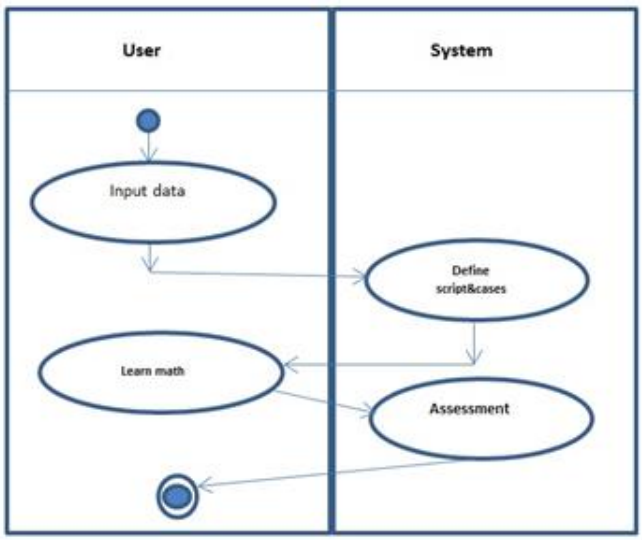

Fig. 4. Activity Diagam

First, it is necessary to fill the database tables with a large amount of test data in order to take into account all cases and satisfy all the requirements of future users (Fugure 5).

Then, developers should formulate rules for building an individual scenario and the choice of learning examples for each student.

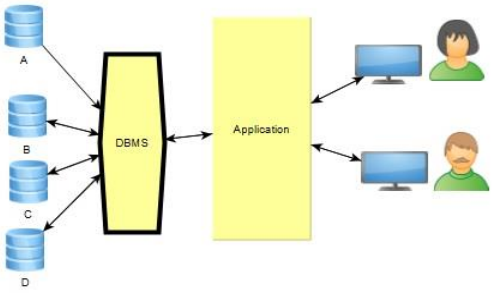

Fig. 5. Conceptual software architecture

Author suggests using the case-study to learn probability theory. This case-study is named "Newsboy problem". This problem is described in Inventory theory.

A newsboy has to purchase a quantity of newspapers for the day's sale. The purchase cost of the papers is $0.20 and they are sold to customers for a price of $0.35. Papers unsold at the end of the day are returned to the publisher for $0.05. The boy estimates that the mean demand during the day is 250 and the standard deviation is 50. Normal distribution is assumed. How many papers should he purchase?

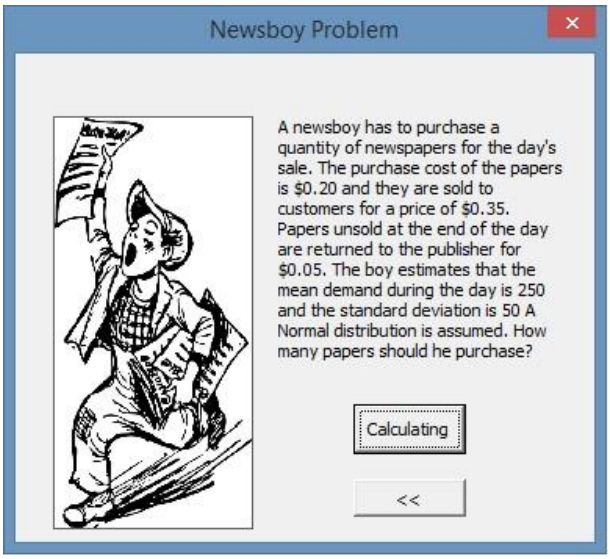

Fig. 6. Example of visualization (picture of newsboy is free for commercial use, https://pixy.org/323746/)

Usage of software prototype demonstrated the increasing of the student's motivation.

26 students from two groups consist of 34 persons (part-time form of education) were able to construct their own professional case on the base of "Newsboy problem" and solve it using with real data (76.47%)

IV. Conclusion

This article presents a systematic approach to solving the problem of training older students. The author offers a description of the software model and analyzes the use of the prototype. The program creates a user-friendly interface based on a combination of factors which impact on mathematical achievements in computer learning.The proposed tools confirmed the practical usefulness of this model for distance learning.

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