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EFFICIENT USE OF «SOLVING TASKS' ENVIRONMENT» IN DISTANCE LEARNING SYSTEM «WEB-ALMIR» DUIRING STUDYING LINEAR ALGEBRA

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We analyzed question of linear algebra studying as one of fundamental chapter in mathematics. We propose to study material by using "Solving tasks' environment".

Keywords: *information and communication technology, linear algebra, «Web-Almir», "Environment for the solving tasks", "Expert".*

Introduction

Global communications, allowing quickly overcome time and distance, became a new phenomenon of nowadays' culture.

Effective growth mechanism of quality education is the introduction of modern educational information technologies. So, decision of modern problems of educational field's development is not possible without providing with computing equipment and telecommunications.

Collection of methods and hardware, used for gathering, creating, organizing, storing, processing, transmission, presentation and using the information, provide establishing of information and communication technologies (ICT).

Computer networks are a new stage in the development of external means of intellectual activities, knowledge and communication. [1]

Daniel Bell, creator of post-industrial theory that characterizes information society, together with other scientists supports the idea of creating a new society. Indeed, these terms are used almost as synonyms: information age is treated as an expression of post-industrial society (PIC) and post-industrialization is often described as an information society.

Problem definition

The most actual questions is using of modern information technologies in areas of mental activity, what are most difficult to understanding, when the difficulty of training is depended on much work. [4]

Mobility of computer and communication technologies led to the Internet implementation into the educational process, which is primarily very optimal and leads to the efficiency of education.

Distance learning (DL) is one of the main ways of informatization of education. Distance technology can be examined as a natural stage of evolution of traditional systems of education: from the board with chalk to electronic and computer training systems, from books to electronic libraries, from the usual audience to a virtual audience.

One of the advantages in the automated process' using is the learning individualization. It provides the rate of filing and perception of material, which every student has separately, whereas in the classical "lectures and group" form teacher should orient on the whole group. (Fig. 1)

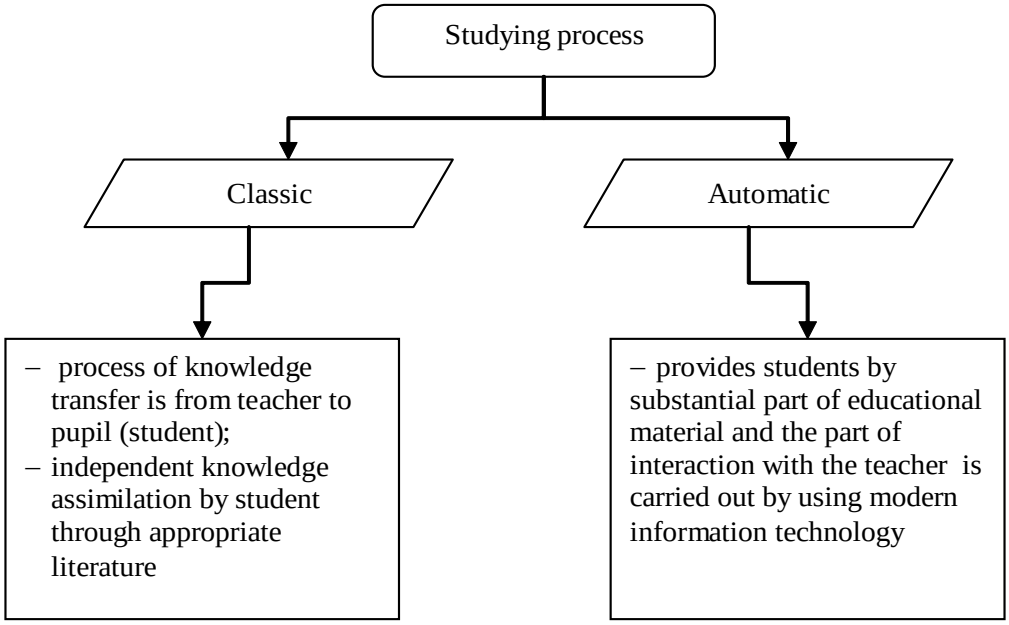

Fig. 1 Peculiarities of traditional and distance learning

Aspects of distance learning:

- avoiding psychological communicative barriers between student and teacher
- individualization of curriculum's schedule and tempo;
- quick feedback, on-line communication
- access to e-libraries, databases;
- the most modern ICT using in the educational process
- organization of cognition process

The scientific bases of future teachers' training are provided during studying linear algebra. [3]

This chapter of mathematics is one of the fundamental, promoting the development of computing technique, and tools which are widely used in solving tasks of mechanics, electricity and radio, and other fields of science and technology.

Historically, the first question of linear algebra was linear equations. Theory of equations' systems requires tools such as the theory of matrices and determinants, and naturally led to appearance a theory of vector spaces.

Teaching of linear algebra at HEI is based on psychological and educational theories and requires introduction of modern ICT, which should support distance learning technology. [3]

On the basis of Kherson State University Distance learning system (DLS) «Web-Almir» with supporting practical training of students on course of linear algebra was developed (Fig. 2).

System «Web-Almir» allows leading training and knowledge test to corporate networks and Internet, in addition, it can be used as a tool for traditional forms of studying.

System gives possibility the user to carry on active practical activity, which is cognitive, researchable, and use modern information technologies as the instrument of creative cognition process.[3]

One of the components DLS «Web-Almir» is the module "Tasks' solving environment" (Fig. 3). Using of program environment is possible only on condition that students know algorithms of linear algebra problems' solving.

At each step of task's solving the user does some converting of mathematical object: numbers, matrixes, systems of linear equations, vector. An important feature is the way out of "problem " when the user does not know what step should be the next. The system has subprogram "Expert", which follows the step of solving problems and helps. The "Expert" can step by step demonstrate plan of tasks' solving, starting from any moment up to the answer. When user solved a

problem and wrote the answer, he can turn to the "Expert" to confirm the correctness of his result. [3]

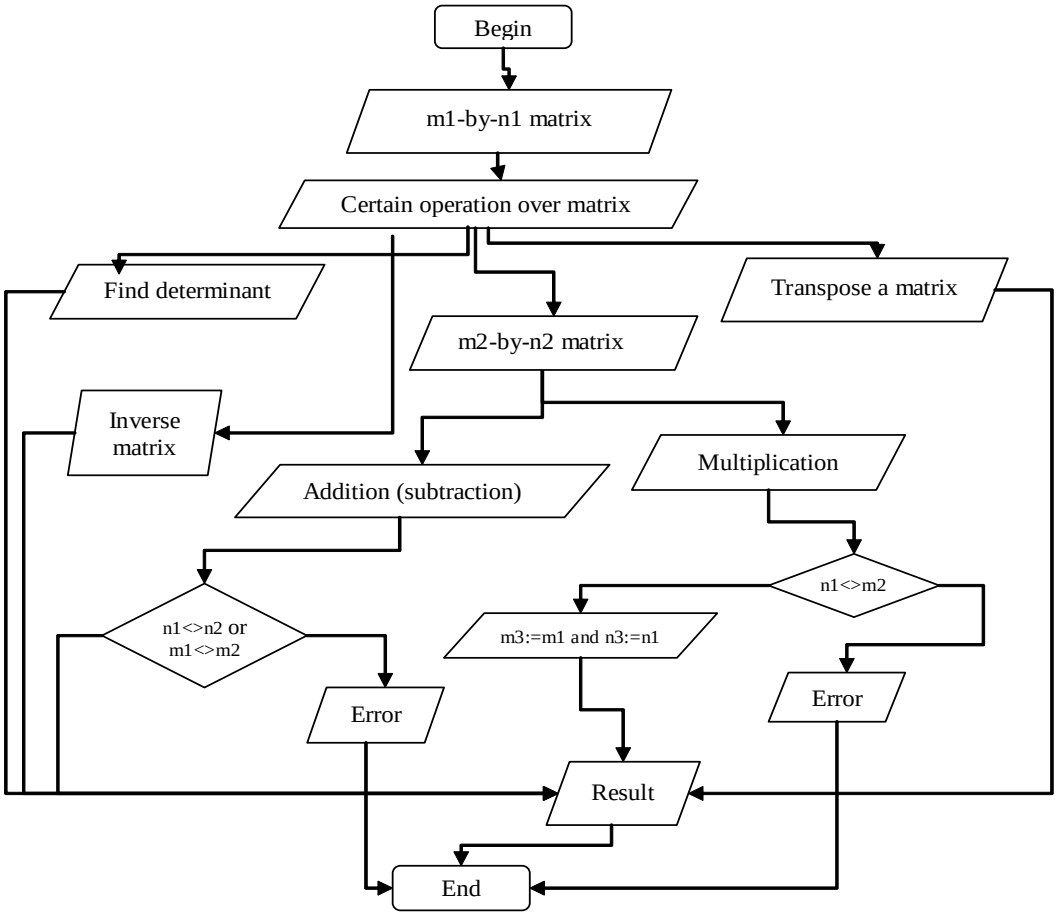

Fig 2. Some operation over matrix from course of linear algebra

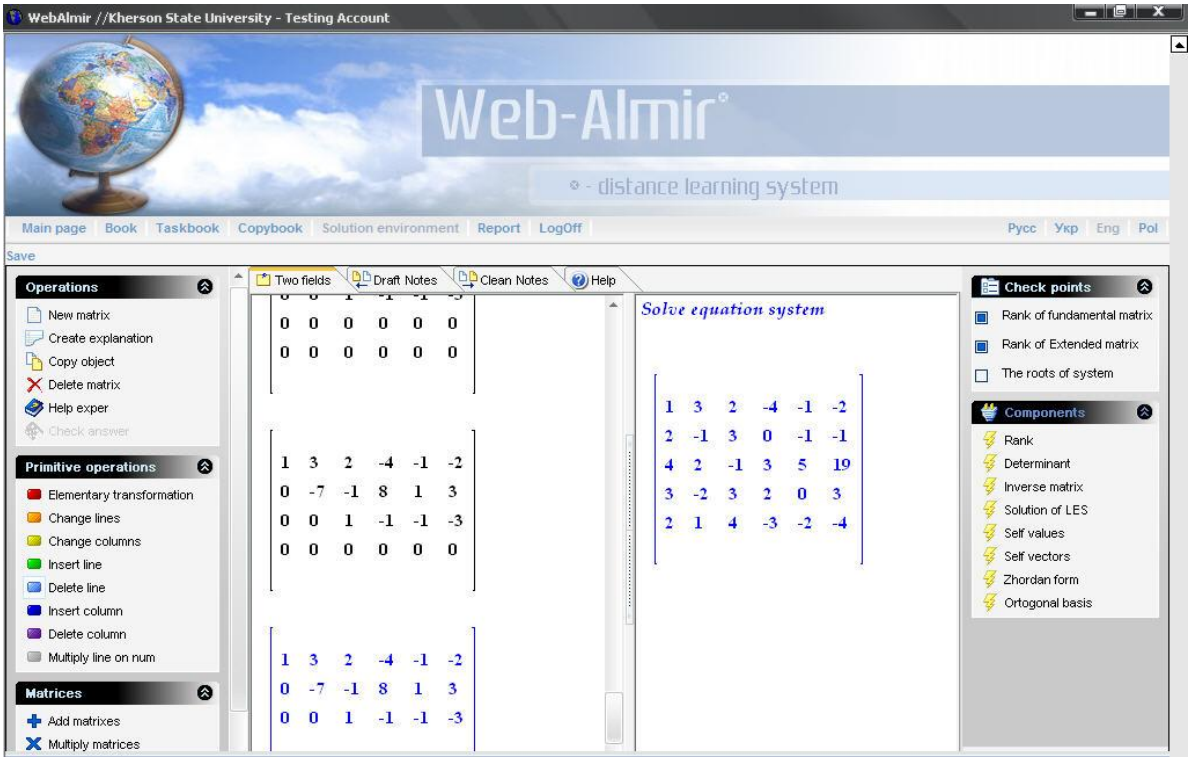

Fig 3. "Tasks' solving environment"

The main type of user's works is solving task of linear algebra. The process of solving task is a sequence of steps of mathematical objects' processing. User can focus on the algorithm for solving particular task, all routine actions environment are performed automatically.

Let's examine command system, which supports "Tasks' solving environment"(Fig. 4)

It's well known that tasks' solution of linear algebra is related with a large number of standard arithmetic calculations. Implementation of these calculations distracts students from important moments of algorithms' solving'.

Their complexity depends on many routine work and lack of time, and as a result – does not form the necessary knowledge and skills. Using educational software component "Tasks' solving environment" during the practical exercises for linear algebra will enable students to grasp the essence of investigated processes and phenomena. In addition, the environment helps teacher more effectively control students.

As it was stated above, «Tasks' solving environment» can be used as a method of traditional forms of learning.

During a lecture or practical classes teacher has an opportunity to observe students, working with the curriculum itself. You can also conduct a long and deep analysis, to observe the development of students' proficiency.

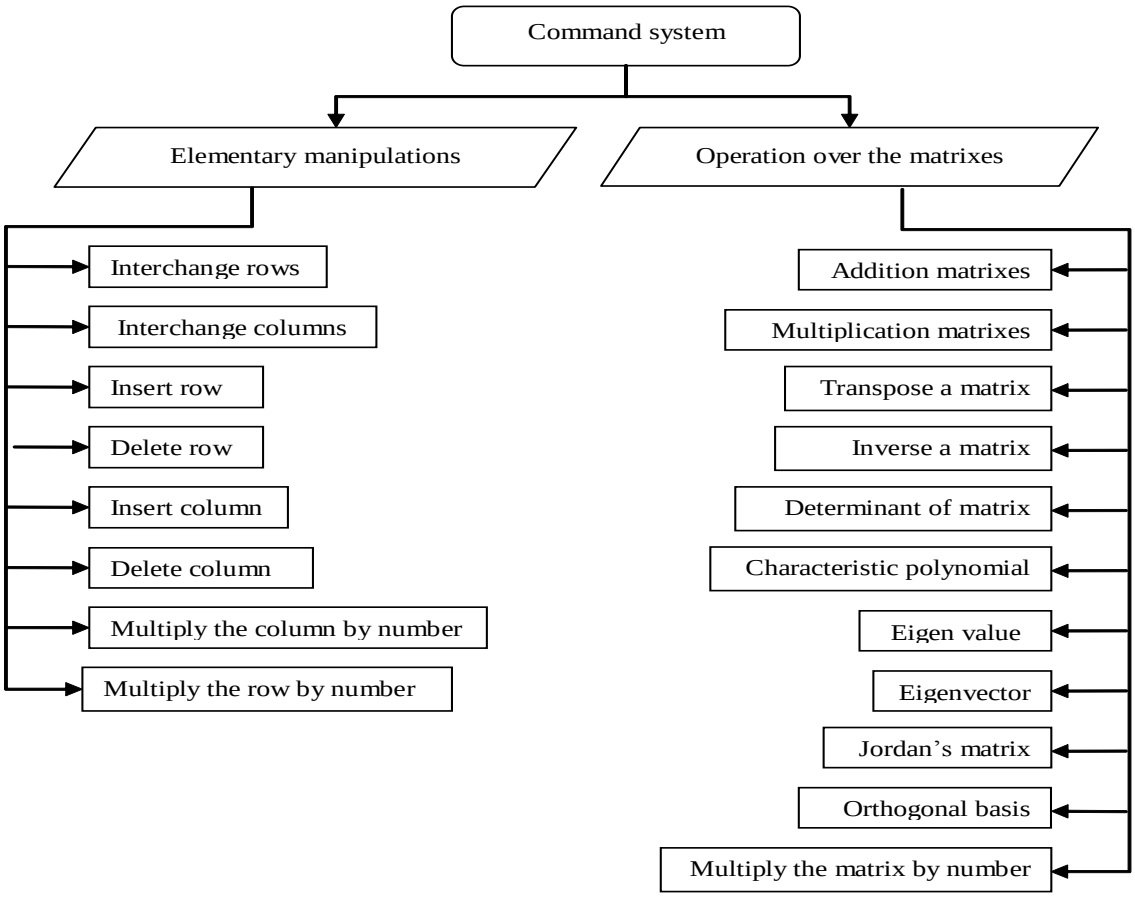

Fig. 4 Command system "Tasks' solving environment"

Conclusion

Information and communication technologies, being a very promising and the best solution, play special role in the learning process. Computer training programs allow you to individualize the learning process, enhance motivation to learning.

Students should have informative culture and knowledge, using new information technologies in their future professional activities. Computer using contributes to the creative students' activity. «Tasks' solving environment" is a very effective method of teaching linear

algebra course. It combines traditional techniques, allows the user to focus on the algorithm for solving the problem, and all routine actions environment are performed automatically.

We must find ways to optimize educational process for its efficiency and quality improving, as well as reducing of time wasting. Introduction of computer system can serve as objectives of educational process optimization.

New forms and methods of information technology use in linear algebra studying allow significantly reinvigorating this process, what has a positive effect on future professionals training in general.

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