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## **E-LEARNING APPROACH IN TEACHING COMPUTER SCIENCES**

*Annotation: In the present article questions of creation of an e-course under the basic computer sciences as an element of flexible environment of training are considered. Use of means of multimedia allows achieving more visualization and clearness of a studied subject, creates friendlier environment for the user, and network technologies give the chance remote access to information resources. Problems of more flexible modeling of the trained environment, adaptation of model to the concrete trainee, creation of nonlinear trajectories of process of training (curriculum sequencing) or instructional planning technology are studied as well.*

*Key words: applications in subject areas; computer-mediated communication; interactive learning environments; lifelong learning; teaching/learning strategies; computer sciences.*

### **1. Introduction**

Modern textbooks contain in the complete set of electronic support of a course. The possibilities given available nowadays by information technology are much wider than traditional linear representation of a teaching material in strict sequence of studied themes. Using means of multimedia allows achieving more visualization and clearness of a studied subject, creates more friendly environment for the user, and network technologies give the chance remote

access to information resources. Nevertheless, questions of more flexible modeling of the trained environment, adaptation of model to the concrete trainee, creation of nonlinear trajectories of process of training (curriculum sequencing) or instructional planning technology in many cases remain outside of available training courses under the basic computer sciences.

Problems of creation of an electronic course under the basic computer sciences as element of flexible adaptive system of training are considered in the present article. The structural model of a course, possibility of creation of the adaptive environment of training at its use is considered. The structure is offered and the maintenance of the electronic practical work included in the given course is studied.

## **2. Electronic course on the basic computer sciences**

### *2.1. Flexible adaptive systems of training*

Flexible adaptive systems of training are directed on personification of the environment of training, its adjustment for features of individual users. Support of adaptive methods in training systems appears rather useful when there is one system serving set of users with the various purposes, level of knowledge and experience. Thus, besides adaptation to the separate user it's considered still adaptations to sets of users allocating at computer training three hierarchical levels of adaptation to trainees [1]: adaptation to students as categories of users; adaptation to group of students; adaptation to the separate student.

### *2.2. Structure of an e- course*

The structure of an e-course is made by modules below. They contains teaching materials on all themes including practical tasks, projects, problems, materials of laboratory researches. The modules is supplied by the convenient

interface for viewing and a choice of educational resources. They serve for support of the trainee, carry out training monitoring, provide means of definition of a position of the student for training space. Modules contain verifying tasks, tests on the passed theme. The student has possibility of several attempts of delivery of the test. Thus, results of check, considering also a number of attempts, state an estimation of the student on the given theme. The given estimations being summarized with previous form a current vector of an estimation of the trainee which positions the student on an educational scale. By results of current check, the system gives out recommendations about the further tactics of training which includes as passed but undigested adequately themes, and an additional material.

Modules serve a final estimation of degree of mastering the course as the student. The total estimation includes as results of final testing at all course as estimations of the executed tasks, projects according to the curriculum. The total estimation includes the results of final testing received automatically from system, and also an estimation of teachers under the executed tasks and projects.

There is also module of adjustment which serves for adjustment of parameters of system. Such adjustment is carried out from the teacher conducting a training course. The teacher-user of an electronic course may form study trajectory for individual learner.

### *2.3. The structure and content of the electronic practicum*

The electronic practical work includes the following sections supporting themes, considered in a basic course under the computer sciences [2-4]:

- basic data types;
- algorithms;
- linear algorithms;

- conditional algorithms;
- loops;
- nested loops;
- strings;
- user functions.

The electronic practical work represents possibility to the student to check up work of algorithms considered in a training course in a real mode. Structurally electronic practical work is a package of the applied programs having the general user interface. Using package programs, it is possible to study algorithm work on various sets of the initial data.

The electronic practical work is an interactive program where the student has possibility to influence for work of the programs entering into a package. The system of the options developed for this purpose allows varying initial conditions of the program, data sets.

Basic structures of the data in an electronic practical work on C++ and Python are realized. In practical tasks offered for independent performance the student has possibility to use realization of these types of the data in the applied programs.

Undoubtedly, one of a key section of an electronic practical work is the section concerning sorting methods Algorithms of sorting of the given various data structures have an important value in preparation of the competent expert in work with the data. In a practical work various algorithms both internal and external sorting of the data are realized.

### **3. Conclusion and suggestions**

Problems of improvement of quality of educational services are in the centre of the reform of educational system of many countries. Thereupon such alternative modes of study as E-learning or Blended learning are rather

perspective. It was demonstrated during unexpected COVID-19 pandemic [5]. Such systems of training are widely applied in the world. As experiment of many countries shows using a correct combination of traditional and electronic modes of study leads to achieve more efficiency of education and training quality.

In this connection the researches connected with development of intellectual adaptive system of training are actual. Principles considered above for development of an electronic courses, particularly, the course on the basics of computer sciences can be applied for development of flexible adaptive training systems. Use of such systems for e-learning allows to get a flexible and an effective training system. Such kind of electronic courses considered above also can be used in distance education.

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