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The program complex for the research of the adaptive information-educational environment based on the cognitive models

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Recently emphasizes the attention of many specialists to the problems of creating of the automated information-educational environments (IEE), which allow to take into account the individual features of trainees: physiological, psychological, linguistic and others.

The proposed approach is directed on the creating, analysis and the improving in the efficiency of functioning of IEE with the properties of adaptation based on the parametrical cognitive models block, including the cognitive models of the subject (the individual features of personality of the trainee) and the means of training (a set of possible kinds and types of educational influences).

The difficulty of given complex scientific task initiates the consideration of a row of areas (physiology of analyzers, cognitive psychology, cognitive linguistics) and causes the necessary of development of the structure of the automated IEE with the properties of adaptation based on the cognitive models, the principles of functioning of its components (the adaptive means of training, the basic and applied diagnostic modules), the cognitive modeling technology (the techniques and algorithms), the parametrical cognitive models block, the complex of programs for the automation of the process of research of the information interaction of the subjects and means of training.

The new information technologies in the sphere of education allow to automate the various operations and to optimize the time costs at their performing at the all stages of the educational process, and also at the setting, conducting and processing of a posteriori data of research of IEE.

The developed complex of programs performs a row of functions: the adaptive means of training – realizes the individually-oriented model of training by means of the adaptive generation of information fragments based on the parametrical cognitive models block; the main diagnostic module – provides the testing of the level of residual knowledge of the contingent of trainees on the basis of the ball scale; the applied diagnostic module – allows to carry out the diagnosing of the individual features of trainees, acting as the values of parameters of the cognitive model of the subject of training.

The architecture of the program complex includes the three levels: the interface level – supports the work of users of various categories; the level of kernel – a set of special procedures, providing the execution of a row of functions; the level of data warehouse – contains a set of databases.

The interface level of the program complex supports the work of the several categories of users (trainee, teacher and consultant) in the various modes (the adaptive training, the diagnosing of the individual features of personality and the testing of the level of residual knowledge of trainees).

For the beginning of work of the user in the system it is necessary to go through the procedure of authentication, which is carried out by two main ways: the primary and the subsequent registration.

Immediately after the authentication of the user it is supposed to switch to the one of the modes of functioning of the complex of programs, realized by the certain structural component: the adaptive means of training – the modes of adaptive training and administrating of subject content; the main diagnostic module – the modes of diagnosing of the level of residual knowledge and the administrating of tests in the studied disciplines; the applied diagnostic module – the modes of diagnosing of parameters of the cognitive model and the administrating of tests of the individual features of personality of trainees.

The start of the certain mode of functioning of the program complex initiates the execution of the procedure of initial initialization and processing of events, causing the possibility of execution of a set of procedures, including in to the basis of the kernel of the system and providing the access to the data bank.

The level of kernel of the system includes the related set of components, performing the processing of data and the operations of the user: the adaptive presentation of information fragments processor of the means of training, the procedure of authentication and adding of users, the procedure of control of the process of diagnostics, the module of language support at the displaying of elements, the procedure of processing of the events of the user, the procedure of selection and analysis of the data of testing, the procedure of modification of the structure of the cognitive model of the subject of training, the procedure of modification of the structure of the cognitive model of the means of training, the procedure of administration of the subject tests, the procedure of administrating of the tests of individual features of personality of trainees, the procedure of checking of the correctness of data.

The procedures of providing of the access to the data and processing of requests provide the interaction with the data bank, including a row of databases: the database of users of the training subsystem, the database with the subject content of the adaptive means of training, the database of subject tests and the database of a posteriori results of research.

In purposes of archiving and backing up of data the architecture of the complex of programs provides the backup storage of data: the database of inactive users, the backup database in the studied disciplines, the backup database of tests of the individual features of personality of the trainee and the archive with the results of last years.

The practical use of the presented complex of programs was carried out in the learning process of "SPbSETU "LETI"" and "IBI", and the subsequent statistical processing of a posteriori data showed the increase in the resultativity of training of the contingent of trainees in the experimental groups.