Vetrov N.A., Vetrov A.N.
RF, Saint-Petersburg city
"The international banking institute"
"The Saint-Petersburg state electrotechnical university "LETI""

## THE APPLICATION OF THE EXPERT TRAINING SYSTEMS FOR THE AUTOMATION OF CONTROL OF THE LEVEL OF KNOWLEDGE BY THE SUBJECT AREAS

The informatization of the various spheres of general-human activity is carried out by the creating and introducing of the problem-oriented, highly-technological information and communication infrastructures, directly directed on the satisfying of the dynamically changing information needs of the modern post-industrial society.

In the present time teachers actively use such traditional methods of estimation of knowledge as tests, examinations, colloquiums, independent and control works, completing each from the passed sections (themes). This approach requires the significant expenditure of time, but does not always provide the adequate estimation of knowledge, as it depends from the experience of the teacher and the principles, which he guide at the making of marks, and also from such objective factors, as the impossibility to devote enough time to all students, the imperfection of the techniques (tests) themselves and etc.

The information technologies allow to optimize and automate the various information processes, which in recent years occupy the increasing place in relation to the various areas of social activity of the society, and their modern scientific-technical level is such, that they can be used for the reducing of the routine component of many processes of the processing of learning information. The use of information technologies in the education is the rational and promising response to the challenges of the XXI$^{st}$ century, since it allows: to significantly increase the efficiency of works in all kinds of educational activity, to receive the significant benefit at the same cost with the traditional approaches.

The controlling programs are designed for the control of the certain level of knowledge and skills of the examinee. It is known, that the control of the knowledge of trainees is one of the most important, and, at the same time, by the nature of organization and the level of theoretical research, one from the weakest links in the learning process. The main disadvantage of the existing forms and methods of control is, that in most cases they do not yet provide the necessary sustainability and invariance of the estimation of the quality of assimilation of the learning information, and also the necessary adequacy of this estimation to the actual level of knowledge. The improving of the control for the course of learning should focus around the nexus problem – the problem of improving of the reliability of the estimation of the formed knowledge, skills and generated-skills. This problem can be considered in the 3-ary aspect (in a narrow sense): firstly, as the increase of the degree of compliance of the pedagogical estimation with the actual level of knowledge of the trainees; secondly, as the creation and realization of such methodical methods of control, that would ensure the independence of estimations from the random factors and subjective attitudes of the teacher; thirdly, the psychophysiological condition of the examinee cannot be ruled out. The use of the appropriate packages of controlling programs for the current and final diagnostics will increase the efficiency of training and the productivity of work of the teacher, give to the control the required stability, the invariance and independence from the subjective attitudes of the teacher.

To the new tools of computer support of the learning process include the expert training systems (ETS), developed for the concrete subject areas (SW) of training. The mass development and implementation of ETS in the learning process is constrained due to the lack of a wide selection of tool means, providing the automation of designing of the main subsystems of ETS. The intelligent training systems allow to accumulate the statistical information by the several parameters and to analyze the performance of each student in dynamics; to improve the effectiveness of training, in dependence from the initial level of knowledge of the trainee, to identify the difficulties and to investigate the volume of the presented material, to evaluate the time, spent on the working out of the theme and etc.

For the building of the diagnostic system we oriented on the technology of rapid prototyping (TRP),- its iterative sequence ensures the parallel of processes of the developing of software tools and the formalizing of universal structures of knowledge bases taking into account the specifics of SW. At the stage of realization (within the context of TRP) the object-oriented paradigm was used in RAD environment of programming Borland C++ Builder in the language C++,- this environment of programming allows to achieve the high speed of visual development of the software product due to a wide range of instrumental capabilities and the productivity of multiply use of certain components.

The interface of product is developed so, that to maximally simplify the work of the user (not specialist in the area of IT) at the level of performing of any permissible action, up to the choice of language (Russian and English).

After launching of the developed software diagnostic means to the user is asked to do 3 steps (each step is illustrated by the flickering banners): to select the knowledge base corresponding to the certain SW; to pass the procedure of authentication; to select the mode of operating.

The developed program can be used in two main modes: the mode of designing of the sequence of question-answers dialog structures, and also the additional parameters of diagnostics and the mode of diagnostics of the examinee.

The mode of designing is intended for the specifying of the textual content of the question; the variants of answers (the choice of the quantity of the variants of answer is provided: 2-6); the graphic files (2-6); the type of selector: (1:N, N:M); the explanations (it is permissible to activate the given subsystem on the display in the case of incorrect answer of the examinee); the time limit on the current question (set in seconds at the discretion of the teacher, for example, taking into account the complexity of the task and the level of training of the group); the playback of multimedia file (for the subsequent playback at the representation of given question in the process of diagnostics); the setting of weighting coefficients (for the support of use of the score methods of estimation, for example, in the psychological techniques of testing).

In order, that the control to be effective, it must provide the objective integrated estimation of knowledge at the minimal expenses of time. The completeness and objectivity of this estimation determine the correctness of the making of decision about the possibility of studying of the new material or about the need of repeated consideration of the passed material. Therefore in the system provides the formation (filling) of two independent modifiable scales of estimation: coarse (based on the quantity of correct answers) and weight (based on the sum of scored points by the user), the quantity of levels and their names, the coefficients of sensitivity (respectively to each level).

In the process of forming of the algorithm of diagnostics, also it is possible the access to the results of diagnostics (the viewing of the quantity of correct, incorrect answers, scores, penalties, the names of values of estimations for each of the used scales).

The interface window in the mode of diagnosing is the intentionally not loaded at the element level, in the given mode the decisive device realizes the algorithm of diagnostic taking into account all the specified parameters of the mode of designing of the test. The appointment of all elements is intuitive understandable and it is possible to observe in the status window the results of diagnostics in the real-time. After the displaying of the textual content of the question and variants of answer, the graphic files and multimedia support, the analyzing of this information by the subject and the forming by him of the answer, it becomes active the button of confirmation of the answer (the effect of "sticking" of the keys is eliminated, for example, due to the accidental ingress of foreign objects on the devices of input). The documentation of the results of diagnostics is carried out continuously in the special database.

The obtained software product is only the tool with a certain amount of intelligence, and the quality of the test is determined by the selection of questions and, accordingly, the objectivity of estimation, obtained at the use of such test, largely depends on the experience of the teacher, compiled the scenario of testing. In addition, it should be noted that this work is very labor intensive, since the development of technique of the compiling of comprehensive tests for the obtaining of comprehensive estimation of knowledge of the students is the task, does not having a definitive-universal solution.