USE OF ELECTRONIC TUTORIALS FOR FORMATION OF PROFESSIONAL CULTURE OF FUTURE PHYSICISTS

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In article methodical aspects of use of electronic educational resources are discussed when training future physicists. The role in formation at students of professional culture is noted them.

Key words: education informatization, training in physics, professional culture, information technologies.

The most important strategic direction of education modernization is introduction of information and communication technologies in educational process providing conditions for formation of new type of education, meeting requirements of progress and self-development of the personality in a new sociocultural situation. So it developed that the education became one of the main areas of the society informatization, urged to form new information culture of the person, able to work in the conditions of introduction of information technologies, informatization of all fields of activity of the person.

Now there are many pedagogical researches directed to the working of separate components of physics teachers' training system in the sphere of information technology usage. However, practically there are no researches systemically, from united positions covering the main components of vocational training of future teachers of physics in the sphere of information-communication technology usage (ICT) in educational practice in the conditions of education informatization [1]. Information and communication technologies (ICT) — a various set of technological tools and resources used for communication, and also for creation, distribution, storage and management of information. ICT is in the center of educational process [2].

These new reference points of an education system are shown in various directions of its development: in creation of continuous education system, emergence of alternative training forms, development of new approaches to formation of the content of education, creation of the new information and educational environment, etc. In such conditions the question of improvement of the methodical training content of future teacher of

physics receives more relevance. Besides, still there were unresolved problems reducing efficiency of introduction of ICT among which it should be noted, first of all, lag of the theory and practice of information technology usage in training from rates of development hardware and the software of computers.

The pointed factors confirm the need of improvement of the content of future teacher's training on physics, revision of existing technologies of its methodical preparation in the universities. Besides, modern approaches to the contents and the organization of the higher pedagogical education raise a new question of criteria of readiness of the personality to pedagogical activity. For work in new conditions of information society are required the experts of new type capable not only quickly to get into work, but also to develop science, the industry possessing high level of information culture which is understood "as ability purposefully to work with information and to use for its receiving, processing and transfer computer information technology, modern technical means and methods" [3]. Great responsibilities are required on education sphere on training of such experts and therefore education informatization is the most priority and perspective part of process of society informatization.

Functioning of system of professional education has two interconnected purposes: first, realization of interests of the specific personality in acquisition of a high skill level on the chosen specialty, secondly, satisfaction on this basis of requirements of society in a labor resource of this category. In preparation process of pedagogical personnel the special attention has to be paid to new opportunities of ICT in educational system, to pedagogical innovations, the psychology and pedagogical bases of their application, and also a technique of computer use in teaching and educational process [4]. It belongs to all areas of science, but to physics more. As it has to show to future teachers their application in education in particular.

Modern information preparation assumes that teachers of physics have to acquire knowledge of the basic concepts and informatics methods, work skills with information and various means of ICT. Besides, when studying physics in higher education institution computer modeling of objects, processes and the phenomena of the physical world have to be realized; physical and computer experiments, including such which can't be executed in a real mode of time; programs of calculation of experiment results, solution of educational practical tasks; visualization of educational information. The listed above possibilities of means of ICT can be realized in electronic editions [5].

Unfortunately, now computer education can be considered closed. The operating organizational structure coordinating enormous work on creation of new electronic editions isn't created and there is no open system of access to training courses, as in usual library to books. But, in process of education system development in this direction, difficulties will be eliminated naturally, and the field of knowledge becomes available to each future teacher wishing them to get [6]. In this regard, the problem of creation of electronic educational editions of physics is actual today for the higher school. Process of creation of the electronic edition the extremely labor-consuming. Expenses pay off that the full electronic edition on physics can serve as means of demonstration on occupations, the tutor for independent occupations in computer classes, means of independent training, the methodical instruction for performance of practical and laboratory

works at the computer, the examiner. But the electronic educational edition in order to carry out all these functions, it is necessary pedagogical skill of the teacher developing this edition and also the difficult methodical development considering specifics of the subject “Physics”.

Various operating modes of the electronic edition applied on classes in physics are listed below. On lecture classes the electronic edition is urged to help the lecturer intelligibly and visually to state a material according to its program which has to provide to the lecturer support both in carrying out lecture, and in its preparation. Besides presentation of a lecture material has to contain templates for the press of distributing materials which could be used in pure form or with the additions of the teacher for distribution to students at a lecture [7].

The following opportunities are useful:

— interactive presentation with possibility of transition to any fragment and return to a shot from which transition was made;

— viewing animation and video fragments, sound playing in presentation.

Separate management of a background and announcer's sounding, possibility of interruption and start from any logical fragment of an announcer's soundtrack. Increase in graphics at all screen and more with possibility of movement on the screen; lecturer’s possibility of a preliminary choice of a material according to the lecture program (the editor of scenarios). Tools of presentation creation with possibility of use of preparations and introductions of an additional material; it is separately possible to consider a mode of automatic representation of a material where the program completely replaces the lecturer and the pupil can suspend only a statement or repeat a necessary fragment (a mode of independent studying of a material). Thus, the teacher receives the instrument of student’s progress monitoring in real time (the conclusion to the image monitor from the chosen workplace is possible). The statistics of task performance also can gather on the screen of the teacher that will allow considering a difference in the speed of performance of students’ tasks. There is a possibility of refusal of the actions which haven't been connected directly with process of training (for example, from task copying from a board).

The electronic edition has to contain excess quantity of tasks that if necessary the teacher could give repeated tasks on the same subject. Use of automatic generation of tasks in those cases where it is required for example to replace only numerical values so that the «beautiful» answer turned out. In a mode of the solution of tasks an important problem is creation of such user interface which wouldn't demand separate training in its use, thus would give the chance to the student of Teacher training University to reduce to a minimum all insignificant actions.

Use of computers on a practical training allows to simplify significantly carrying out tests, collecting and the analysis of information on progress of students. There is possible to carry out instant tests in which repeatability of options and inaccuracies of an assessment are minimum. Use of «branched» system of estimates in which the tasks relating to several subjects are estimated by the corresponding quantity of the marks which are put down in various sections can become also significant. Thus, the teacher

will have a complete picture about students' progress and also about a material. If at the solution of tasks the student needs a lecture material, he shouldn't look for that lecture which was required to it in numerous menus; all transitions have to be provided, including logically connected subjects. If exclusively independent work (without training material) is supposed, the teacher has to assume possibility of shutdown of students' access to lecture materials. Offset at the passable course can take place also with use of the electronic edition. For its carrying out the same mechanism, as for the current tests is used. Software developers should pay special attention to protection of system of the account and a database of students' progress from breaking.

It is accepted to understand a kind of the questionnaire with several versions of answers to each question. The given system of an assessment of knowledge has essential shortcomings from the point of view of identification of the pupils' knowledge though it is very convenient for the automated check and doesn't demand writing of difficult programs of the analysis of answers. Nevertheless, in the course of training in physics the answer, is nor less important as logic of the solution of a task, and in the answer it is interesting not only number or expression, but also an explanation of this answer. Application of computer programs as the teacher's assistants at appropriate approach allows to turn group work partly into the individual. The computer not only carries out routine operations, but also allows to check the decision on steps especially as often in tasks there is more than one version of the decision.

The computer allows to collect and process in real time a huge number of information, and what benefit will derive from it the teacher — it only a question of submission of results of processing of collected statistics. The answer not necessarily contains only «yes», «no» or any unambiguous statement. The preliminary analysis made by the computer, will help the teacher to understand better that each of his students missed, misunderstood or, on the contrary that he doesn't need to explain. The electronic educational edition can become the powerful instrument of improvement of teaching quality and students' training in physics, but at first it is necessary to think over thoroughly each of its knots — as testing system, processing system, and design; everything has to be convenient and clear. When carrying out laboratory works by means of electronic editions it is necessary to remember that the virtual model displays real processes and the phenomena in more or less simplified, schematical form so clarification of a question that is actually emphasized in model and that stayed behind scenes, can be one of task forms. Such work forms can be performed entirely in computer option or to make one of stages in broader work which includes also work with natural objects and laboratory equipment.

In big degree, the possibilities of electronic editions are revealed during the students' work with it. There can be demanded all multimedia functions: animation and video, the interactive components involving students in educational process and not giving to it to distract, an announcer's voice and the picked-up music and all opportunities of a computer search engine. For all functions of the electronic edition connected with interaction on a networks, there is one important requirement needing the preliminary arrangement, expressed in the uniform standard on the format of data used for informa-

tion transfer between student's workplace and the teacher and for exchange of information about progress and training materials with an electronic network of educational institution.

So, when using electronic means it is necessary to consider their shortcomings and advantages in compare with traditional means and whenever possible to combine these means with the traditional. Thus, application of new information technologies, in particular electronic means, promotes improvement of practical skills of students, stirs up cognitive activity of pupils, individualizes training process, modernizes a lesson, allows to organize effectively independent work, increases to it interest and as a whole does physics as educational process more popular, and training process — more effective.

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ИСПОЛЬЗОВАНИЕ ЭЛЕКТРОННЫХ СРЕДСТВ ОБУЧЕНИЯ ДЛЯ ФОРМИРОВАНИЯ ПРОФЕССИОНАЛЬНОЙ КУЛЬТУРЫ БУДУЩИХ ФИЗИКОВ

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В статье обсуждаются методические аспекты использования электронных образовательных ресурсов при обучении будущих физиков. Отмечается их роль в формировании у студентов профессиональной культуры.

Ключевые слова: информатизация образования, обучение физике, профессиональная культура, информационные технологии.