



METHODOLOGY OF USING SOFTWARE TOOLS IN PREPARING FUTURE ENGINEERS FOR PROFESSIONAL ACTIVITY

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Abstract

This article discusses the preparation of students for design, construction, research and professional activities using software, as well as in addition to the types of software tools and their types, the direction of education is studied software engineering for the creation of pedagogical software products.

Keywords: software tools, electronic resource, animation, software package, software product, professional activity, technology, project, construction.

It is known that the reforms in education require every teacher to regularly study the information related to his subject and the education of the mature generation, and to be able to use it consistently in his work.

Didactics in the environment of modern software tools, extensive use of educational activities aimed at the effective acquisition of knowledge through the active use of modern software tools, develops didactic thinking in this environment, the potential and capabilities of a person, and the skills and abilities to educate information culture. In the modern information society, it is envisaged to improve the organizational forms, methods, content and methodology of education and the development of the student's intellectual potential for the purposes of personal development.

Since the process of education and educational work is a complex process, it ensures integrity in the interaction of the team of the educational institution, the teacher and the students. Now this process is being combined with pedagogical software tools - official websites, literature in electronic format, audio and video materials, educational computer programs. In this situation, educational processes directly depend on the student's internal capabilities, intellectual potential, and the ability to receive and assimilate information.

Among the advantages of pedagogical software tools, one can include information aggregation, visualization, that is, the availability of various presentation options, the use of animations, the aspects of providing information suitable for the age and physiological characteristics of learners. Development of creative thinking,





educational skills and competences in students through pedagogical software tools, and the possibility of deep assimilation of resources in all aspects is of particular importance.

It should be noted that in education and training, electronic resources serve as a means of increasing the teacher's teaching capabilities, but it is natural that they cannot take the place of the teacher. It is known that pedagogical research focuses more on didactics, that is, on the basis of the content of the educational material, on the organizational forms and methods of teaching. The teaching process is based on didactic principles - the consistency and systematicity of the educational material, demonstrability, comprehensibility, scientificity. E-learning resources are also created based on the principles mentioned. They do not deny the sequence and consistency of traditional educational activities, but supplement its content based on modern computer technologies. For this reason, the process of introducing software tools into the system of educational and educational work of educational institutions has an integrative nature.

Based on the above-mentioned ideas, the use of pedagogical software tools in the educational process greatly contributes to the increase of the teacher's teaching opportunities, on the other hand, to the activation of students' creative activities, to the increase of their practical experience, to their interest in scientific innovations, and to the formation of their professional competences. In addition, it creates opportunities such as obtaining information about the level of their spiritual maturity, observing their dynamics, predicting, and making corrections in necessary cases. All this is aimed at improving the educational system of the educational institution and preparing students for professional activities.

In our opinion, the following can be cited as the main tasks of applying software tools to continuous education processes:

creation of the necessary material and technical base for the application of software tools to the educational process;

design, development and application of pedagogical software tools for the educational process;

formation of knowledge and professional skills of future engineers in the development of software tools;

improvement of professional preparation of future engineers on the basis of modern software tools.

In our country, engineers are developing pedagogical software products using Power Point, Macromedia DreamWeaver, Microsoft FrontPage, HTML editors and software





tools such as Adobe Photoshop, CorelDraw, Director, Macromedia Flash, programming languages such as S++, Visual Basic, Delphi, Python [134].

Currently, programs such as Crocodile Physics, Crocodile Technology, Crocodile Chemistry, Phet, Interactive Physics are widely used in educational processes in prestigious higher education institutions of Europe and America, including higher education institutions of our country.

In the countries of the Commonwealth of Independent States, pedagogical software such as "MARS", "Fizikon", "Repititor fizika", "Jivaya fizika" are additionally used in the educational process.

In Tashkent University of Information Technologies and its branches, lectures, practical and laboratory classes are taught using various programs, these programs (multimedia electronic textbooks, modeling programs, applied mathematical software packages) are as follows: Crocodile Physics, Crocodile Technology, Crocodile Chemistry from Crocodile-Slips. Crocodile ICT software, plus Beginnings of Electronics, Interactive Physics, WorkingModel, Electronics Workbench, Multisim, PhET Simulations, Pintar VirtualLab Wave, MathCad, MatLab, Maple, Mathematica software packages and other software tools.

Observations show that modern programming languages are not used in the education of technical higher education students, and at the same time, there are no works devoted to the methodology of teaching programming languages in the educational process, taking into account the professional activities of future engineers.

At the same time, education aimed at preparing future engineers for scientific research and design-constructive professional activities by teaching mathematical and natural sciences based on software tools has not been implemented. Although there is an opportunity to develop pedagogical software products that support distance education in the higher education system, the shortcomings in the development of such programs and the use of developed pedagogical software products in the educational process have not yet been eliminated.

So, firstly, by improving the methodology of teaching mathematics and natural sciences using software tools, secondly, by teaching students to develop pedagogical software products in programming languages and involving them in scientific research, project-constructive and scientific-research professional activity. preparation for types serves to eliminate the problems mentioned above.





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