International Journal of Formal Education
Volume: 2 Issue: 2 | Feb – 2023 ISSN: 2720-6874
http://journals.academiczone.net/index.php/ijfe

Teaching the Computer Science Through the Software Complex

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Abstract

The software complex consists of a set of educational resources (organizational, methodological, theoretical, practical, experimental, etc.). The software complex of an educational subject should consist of a set of educational and methodological materials representing all the didactic elements provided for by the state educational standard. The paper discusses a software package created on the basis of new information technology tools and its features.

Keywords: information technologies, information resources, software package, higher education, future computer science teachers.

All developed countries use their scientific, methodological, informational, technological, organizational and pedagogical resources for the formation and development of the information and educational environment. One of the important aspects of the informatization of education is the creation of information resources that help solve educational problems. It is possible to realize the idea of lifelong education and meet the needs of modern society only through the informatization of education, computerization and the creation of a high-quality information and educational environment. Under such conditions, it is necessary to make qualitative changes in the methods of teaching subjects, create computerized systems for teaching individual subjects and combine them into educational and methodological complexes. The creation and development of such educational and methodological complexes requires the fulfillment of a number of important tasks. The first task is related to the revision of the methodology of teaching subjects with the help of information technology (IT) in higher education institutions (HEIs). Traditional teaching methods and IT-assisted learning methods are very different from each other. The variety, lack of systematization and episodic nature of computer teaching methods determine the need for the creation of electronic educational materials aimed at studying individual subjects, their integration into educational and methodological complexes, and the development of teaching methods. presenting them to students. The second task is to prepare electronic educational materials and develop a methodology for

Volume: 2 Issue: 2 | Feb – 2023 ISSN: 2720-6874
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combining them into software and methodological complexes (software complexes), taking into account the specifics of the sciences, pedagogical-psychological, technological and ergonomic aspects. The third task is related to the development of a methodology for using software systems in individual subjects based on the types of training (lecture, practice, experience, self-study, etc.). The fourth task is related to the development of approaches and principles for integrating software systems into the information and educational environment of the university [1].

At the present stage, an important aspect of reforming the educational process is the change in professional requirements for graduates of higher educational institutions. The modern system of higher education should shape the future specialist and prepare him for professional activity. Only a coherent system, in which new rational approaches to eliminate its shortcomings, using all the achievements of traditional education, will be able to form a complex set of qualities that a modern specialist should possess.

Technical, methodological and ergonomic, created in a separate discipline, providing the acquisition of knowledge, skills and abilities that students must master based on the qualification requirements for the fields of education and the requirements established in the program of science, self-study and learning, and the implementation of control that allows developing creative student's abilities. A software package that meets the requirements is a universal tool for improving the process of using information technologies in teaching and mastering science, with the help of which real opportunities open up to perform the tasks of training full-fledged and high-quality specialists [2].

It is known that the method of teaching subjects should be chosen based on the nature of the subject. Also, the teaching methodology is based on the study of the history and development of the relevant field of knowledge, the purpose of the curriculum, the intellectual capabilities of students, age characteristics and how these characteristics manifest themselves in specific conditions. The chosen methodology should provide high-quality educational services and take into account the needs of society and the labor market [3]. The essence of the presented methodology is to visualize educational materials in the educational process and ensure a conscious perception of the course content. The analysis of the content of the subject and the requirements for educational areas and specialties set out in the paragraphs makes it possible to determine the purpose of the science "Informatics", the principles for the formation of its content, forms, methods and means of teaching, as well as an analysis of the results of the achieved level of mastery. It is known that educational goals should be set based on the requirements of the state educational standard. The following general didactic principles were used in the improved mastering of the content of the science "Informatics": [4, 5, 6, 7]

- the principle of consistency in the education system - a strict logical sequence is observed in the learning process, acquired knowledge and formed ideas are derived from previously acquired

Volume: 2 Issue: 2 | Feb – 2023 ISSN: 2720-6874
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knowledge, strengthen and deepen them and prepare the ground for the next educational process [8];

- the principle of linking education and practice - is associated with the application of the content of education in practice, in which the process of implementing education in harmony with life is considered; the principle of the unity of education and upbringing - ensures the harmonious development of students both intellectually and spiritually [9];
- the principle of holistic formation of educational activities in training - the process of evaluating the results of educational activities provides control over the attention of students, explaining to them the tasks, the necessary needs - activation of motivational states, assistance to activities, the formation of correction [10];
- the principle of visualization of learning - provides for the assimilation of knowledge on the basis of a living perception of the studied phenomena and phenomena.

The software complex has a hierarchical (tree-like) structure and consists of a set of pages located at several levels and interconnected by hyperlinks. The task of the main node of the hierarchical structure is assigned to the main page of the complex. At this stage of software development, the quality indicators of all software products aimed at educational purposes are studied. This:

- ✓ general quality indicators (correctness, reliability, usability, efficiency);
- ✓ software and hardware (adequacy to incorrect user actions, compliance with the operating instructions);
- ✓ pedagogical (scientific, adaptive, interactivity), ergonomic (age and individual characteristics of users), color characteristic, alphanumeric character characteristic);
- ✓ characteristics of the presentation of information on the screen; aesthetic (correspondence of the aesthetic design style to the goals and objectives of the software product);
- ✓ interface indicators (interface type, menu system, help system, etc.).

Methods aimed at improving the process of teaching subjects with the help of IT create additional opportunities for the full operation of these classical principles. An example of this is the teaching methodology aimed at teaching "Informatics" with the help of a software package. The expediency of using in the educational process a software package that combines educational and methodological materials in different formats on a specific subject is due to the fact that it serves to solve certain pedagogical problems and is a software product designed for both the teacher-teacher and the student.

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