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PEDAGOGICAL CONDITIONS FOR IMPROVING TEACHING COMPUTER SCIENCE IN SECONDARY EDUCATION SCHOOLS

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Abstract
Teaching with the use of computers has a significant impact on all aspects of the learning process. The influence of computer-assisted instruction provides students with numerous opportunities, including a high degree of visualization of educational materials, the development of artificial intelligence, and the provision of extensive information to learners. The article explores the pedagogical conditions for improving computer science instruction in general education schools, addressing issues related to the use of new information technologies in transitioning from the industrial stage of societal development to the informational stage.

Keywords: Informatization, educational trajectory, cognition, management, opportunity, interaction, means.

Introduction

Integration into the global community, adapting the economy to information conditions from industry, and achieving the innovation-driven economic development are the primary tasks of the higher vocational education system. It aims to expand the competence and skills of specialists who can respond to the demands of the modern labor market. The modern higher education graduate is directed towards the model of competency, possessing high-level professional competencies that are significantly shaped and oriented towards essential professional competencies.

The continuous development of information and communication technologies is essential for various stages of the seamless education system, and numerous studies, including those conducted by A.A. Abdulqodirov [1], U. Yuldashev [5], and S.S. Gulomov [6], have been dedicated to creating educational materials and tutorials for these stages.

The advancement of information shapes a new era of factual information. The use of information in various fields of societal life is closely related to the fundamental nature of social progress. According to the research of I.A. Nogodaev, 64% of the use of information is attributed to intellectual competence, and information is utilized widely in all aspects of life, including the 16% contribution to material development, 16% to natural conditions, and 64% to intellectual capacity. Information usage in all spheres of life contributes to the global development, interdependence, and the emergence of a new form of information integrity in society, affecting significant social changes.

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Societal development is closely linked to preserving, collecting, and expanding the avenues of information. The accumulation of knowledge, embracing the material and spiritual qualities of generations, helps the cultural advancement of humanity and creates new opportunities for its development.

The establishment of the World Information Organization, the expansion of information into an economic category, and the development of various information technologies characterize the distinctive features of the current era. The activities and technologies of information are integrated into almost all aspects of vocational activity, becoming an integral part of various forms. Today, society is based on information resources collected across a wide range of fields. According to UNESCO , the most developed countries are engaged in information production and processing by more than half of the urban population, while in some countries, half of the national product is related to society's information activities.

The authors of the analytical review of UNESCO Institute of Information Development for the early 21st century highlighted the following main directions for transitioning to the educational paradigm:

- Fundamentalization of all levels of education.
- Implementation of an innovative and transformative education method based on information society living conditions.
- Development of the education system as a continuous learning process throughout a person's life.
- Introduction of innovative and transformative education methods based on the use of advanced information technologies.
- Enhancement of the quality of education through the modernization of distance education and areas using information and communication technologies.

The mechanism that influences all fundamental directions of improving the education system is considered to be its informatization, which is regarded as a necessary condition and the most crucial stage for the overall modernization of the country. To transition from the industrial stage of development to the information stage, new information technologies are considered the fundamental basis. Informatization of education provides effective utilization of the following key advantages of new information technologies:

- The opportunity to establish an open education system that caters to each individual's learning trajectory.
- Improvement of the organization of knowledge through systematic reasoning to facilitate its structuring.
- Creation of a system for effective management of educational information and methods.
- Effective organization of students' learning activities.
- Utilization of computer-specific features, including the most important ones: the ability to organize the educational process, support active learning in the learning environment, individualize the learning process, and utilize new cognitive tools from the ground up.

In addition, new information technologies provide opportunities to achieve new didactic goals:

- Organizing the study of complex phenomena and processes within micro and macro systems of the world using computer graphics and computer modeling.

- Conveniently and quickly mastering various physical, chemical, biological, and social phenomena and processes that occur at very high or very low speeds.

Moreover, the use of new information technologies allows for the creation of a variety of new didactic tasks:

- Creating educational materials and tutorials that utilize computer graphics and computer modeling.
- Enhancing the process of assimilating information through the creation of interactive and dynamic educational content.
- Developing self-assessment tools for students.
- Organizing laboratory exercises, simulators, and educational games based on imitational models, environments specifically oriented to the subject, and manufactured laboratory experiments.
- Establishing a continuous system for monitoring and assessing the level of knowledge and skills of students using computer tutorials, tests, and monitoring systems, as well as information databases and educational videos.

Information economy is associated with the strategic resource of society, such as the information industry, traditional material and energy resources. The entry of informatics into other spheres of human activity and its impact on society's progress are assessed by many researchers who characterize these areas as a new scientific and technical revolution. The development of thought, computer, and information technologies influences 90% of the population in developed countries, turning it into an information industry. In this way, humanity has entered a new stage - the information society.

The modernization of the education system is organized in the form of a "spiral" in teaching computer science in the general education school: the introduction to each studied direction (module) with the basics of getting acquainted, followed by improving the organization of it in the next stage, by entering new concepts, specifically related to this module. The hours allocated for teaching informatics in the general education school can be organized according to the concept of one or two such "spins." This provides an opportunity to thoroughly study the basic lines of the main content of the 5th-9th grades of the upper class in a systematic, detailed manner, as well as to personalize the main content lines of the basic informatics course of the general school in various directions, including strengthening the teaching of fundamental subjects. However, the learning process analysis shows that the main course is not taught everywhere in the 8th-9th grades, but mostly in the 10th-11th grades (65.6%) and is partially implemented in specialized education schools for computer science. The lack of inclusion of computer science in the "regional" and "school" hours of school management, especially the lack of necessary preparedness for computer science teachers, is associated with the management of the school.

The process of teaching computer science indicates that all educators must possess essential competencies and readiness not only for independent learning but also for enhancing their professional skills through continuous self-improvement and self-cultivation. The main reasons for this situation are the insufficient readiness of teachers in terms of subject and methodological competence. Additionally, the lack of personalized and synergistic approaches

directed towards individuals contributes to the inadequacy of developing students' personalities and their knowledge and creative abilities.

To conclude from the above, it is necessary for informatics teachers to have fundamental knowledge in the fields of "Information Modeling," "Information Systems," "Fundamentals of Management," and "Network Communication" to shape and improve universal teaching activities and develop students' personal characteristics. Furthermore, the teaching organization should focus on individualization of teaching, monitoring students' progress, and developing other competencies. However, computer science teachers may lack essential knowledge in the theory and methodology of computer science, psychology, and pedagogy [11].

In summary, teachers in general education schools who teach computer science need to acquire deep knowledge of the subject, fully understand computer technologies, master programming languages, understand HTML, and effectively utilize computer-based teaching and tools for professional activities. They also need to adapt to the challenges of problematic and project-based teaching methods, integrate personalized teaching methods, and acquire knowledge of interdisciplinary connections, individualized teaching methods, and other relevant areas.

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