

THEORETICAL PRINCIPLES OF INFORMATICS TEACHING FOR UNDERGRADUATE STUDENTS BASED ON INNOVATIVE TECHNOLOGIES

Abdarakhmanova Dilbar Khudayberganevna

Independent researcher

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Abstract. *This article discusses the theoretical and methodical methods of teaching computer science for non-specialist students based on innovative educational technologies.*

Keywords: *informatics, pedagogy, non-specialist students, theoretical informatics, technical informatics, modern approach, principle.*

Introduction. Currently, pedagogical education in the science of "Informatics" is in the process of transformation, and its goal is to meet the new conditions and requirements of the State Education Standard and raise it to a new level of quality. In order to solve the tasks set for pedagogical education in the field of informatics, first of all, it is necessary to analyze the main aspects of the field of research in informatics, the structure and content of the field of science, and then to look for ways to improve the scientific training of students based on modern approaches.

K.K. Colin [1] states this in the article "formulation of computer science as a fundamental science and a comprehensive scientific problem". Currently, there are three main perspectives on the teaching and learning of computer science in the world and educational communities:

the first is classified as a comprehensive technical discipline that studies the methods and tools of automated processing in the teaching of computer science in the field of non-specialist education. Information transmission with the help of modern informatization tools, this point of view was formed due to the position of scientists;

the second - informatics is considered both as a fundamental exact science and as a complex field of practical activity at the same time. This point of view is related to the results of research in the field of the development of definitions of this field of computer science education for non-specialist students;

the third - "informatics is emerging as a new fundamental science, which is important not only for all non-specialist students, but also for humanities". This point of view is supported by Uzbek scientists Karlybaeva G.E., Mamanazarov M.E. reflected in his scientific research [2; 6].

Main part. During the development of "informatics" science as an independent scientific discipline, ideas about its structure and content have changed several times. The structure of the subject field. The teaching of computer science for non-specialist students includes three main segments - information systems, information processes and basic information elements. Academician B.N. Naumov proposed to distinguish the following three segments: "theoretical informatics" for non-specialist students - the field of studying the theoretical foundations of informatics; "technical informatics" - a field related to the study and development of technical and software tools of informatics; "practical informatics" is a field related to the study of problems and methods of applying informatics in various areas of social practice for non-specialist students. By the nineties of the last work, research scientist K.K. Colin proposed a new two-level structure of the field of science and identified three segments within them:

first degree - theoretical informatics;

second level - technical informatics, social informatics;

For non-specialist students, very important and sufficient definitions of computer science reflecting all the fundamental theoretical bases of this field of scientific knowledge are given [1; 2; 6].

The structure of computer science was presented in the national report "education and informatics" at the II International Congress of UNESCO and included four sections: theoretical informatics, information tools, information technologies, social informatics. Based on the above, we have developed the structure of computer science for non-specialist students (Table 1).

ASOS	THEORETICAL FOUNDATIONS OF COMPUTER SCIENCE			
THEORETICAL INFORMATICS FOR UNDERGRADUATE STUDENTS	<p>Information as a semantic feature of existence. Content, form, means of communication of general information theory. Methods of identifying information. Exact and imprecise information. Mathematical and informatics models. Stochastic methods in the computer field. Computing experience. Methodology of scientific research. Informatics and knowledge. Informatics is the semantic properties of informatization of intellectual processes. Information systems of artificial intelligence. Methods of presenting knowledge. Knowledge and creativity. Theory and methods of development and design of information systems and technologies.</p>			
INFORMATION TOOLS	Process/ information reception, processing and transmission		<p>Computers. Data entry/storage/display/transmission devices. Audio/ video/ multimedia systems. Networks. Communication tools. Computer telecommunication systems</p>	
	Software	Systems	<p>Operating environment and systems. Programming languages. Service Shells. User interface. Computer-to-computer communication. Software for computing and non-specialized information environments</p>	
		IMPLEMENTATION MECHANISMS	universal	<p>Text and graphic editors. Database management systems. Spreadsheet processors. Modeling of objects, processes and systems. Languages of information. Data and knowledge presentation formats; dictionaries; classifiers; thesauruses. Information protection programs</p>
			professional	<p>Automation of calculations, design, implementation systems of data processing technologies (planning, management, analysis, statistics, etc.)</p>

Information technologies	Data entry/storage/display/transmission/processing. Preparation of text and graphic documents. Integration and collective use of various information resources. Information security. Programming, design, modeling, training, diagnostics, management.
Precise informatics	Information resources, socio-economic and cultural development. The role of informatics in the educational system. Structure of computer science. Information security issues. Informatics knowledge. Mathematical-informatics concepts.

1-table. Structure of computer science for non-specialist students

The presented analysis of the structure and content of the field of informatics for non-specialist students makes it possible to distinguish theoretical informatics as the basis of scientific fundamental science, its conceptual and methodological apparatus, formalized mathematical, information-logical and logical-semantic models. reveals ways of exiting and exploring. The field of computer science education follows a unique principle of dualism, and this serves to improve both the subject and the activity, that is, the basic conceptual apparatus of the relevant science and the basic skills inherent in human activity in the studied field of reality [2]. From this point of view, it is possible to assess the contribution of theoretical informatics to the process of improving its training as a subject in the field of informatics for non-specialist students.

Today's globalization process aims to train qualified personnel in new directions and specialties of the development of the higher education system of the Republic of Uzbekistan on the basis of computer science. In particular, in the "Classification of Higher Education Areas and Specialties" approved by Appendix 2 of Order No. 311 of July 16, 2021 of the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan, "Field of knowledge: Education. Field of education: Education. The basis of our opinion above is the fact that training of personnel in mathematics and informatics has been started.

The goals and objectives of the research work carried out by us are directly devoted to the issues of improving the methodology of teaching computer science for non-specialist students based on innovative technologies.

We consider it appropriate to present the initial definition of the concept of "approach" while explaining the theoretical foundations of teaching computer science for non-specialist students and the analysis of modern approaches to it. It is recommended to understand the approach as a certain point of view that determines the organization of the process of teaching informatics for non-specialist students. In general, the term approach refers to a system of attitudes such as reacting to something, focusing on this thing, expressing one's objective opinions.

In the context of our research work, the term "education, approach to education" was used in many cases. The meaning of approach to education is:

- a) students who are considered non-specialists in computer science - a worldview that reflects the social relations of the subjects of education as a carrier of social consciousness;
- b) global and systematic organization and self-organization of the educational process, including all its components and, first of all, the objects of pedagogical interaction: the teacher and is a student problem [3].

In accordance with the requirements of the State Education Standard of Higher Education, the purpose of education is to satisfy the individual's need for professional self-development. Therefore, it shows readiness for non-specialist students to use relevant knowledge in the field of informatics, that is, it is necessary to improve information activities based on knowledge. Accordingly, according to this requirement, the educational process should be built on the basis of modern approaches to teaching.

A competency-based approach to teaching computer science for non-specialist students is not new in the field of education and is widely used in local pedagogy, unlike a knowledge-based approach. Competence-based approach is based on the definition of competences that do not negate the knowledge of knowledge, but are fundamentally different from them: from knowledge - by the fact that it exists in the form of activity, not information about it; from qualifications - transition to various objects of influence; of skills - awareness, allows students of non-specialist education to act in a non-standard environment.

In general, the issues of the competence-based approach have been shown in the researches of a number of local scientists (N.Muslimov, O.Koysinov). In particular, in these studies, opinions were expressed about some features of the competence approach, and it is called "a set of general principles for determining educational goals, choosing educational content, organizing the educational process, and evaluating educational results." confess [4; 5]. Also, these scientists try to interpret these principles based on the following rules:

The meaning of education in the teaching of informatics for non-specialist students is to develop the ability of students to independently solve problems in various fields and activities based on the use of social experience, the element of which is the students' own experience; educational content is considered a cognitive, reflexive, motivational, informative worldview, they rely on didactically adapted social experience of solving other problems;

The meaning of organizing the educational process of computer science for non-specialist students is to create conditions for the formation of experience of independent solving of cognitive, communicative, organizational, motivational and other problems that make up the educational content.

True, teaching informatics for non-specialist students is determined by the analysis of the level of education achieved by students at a certain educational stage in the evaluation of the results of the subject's mastery of the subject of the educational process.

Within the framework of the competence-based approach, it is not the student's awareness, but the mastery of the tasks set by the educational program, the acquisition of relevant knowledge, and the ability to find and apply the necessary solutions. The concepts mentioned in terms of educational content are methods of teaching computer science for non-specialist students, creative potential, experience of expressing personal position, all kinds of knowledge acquired by students in computer science, it consists in applying knowledge and skills, competences in their own experiences and in the process of creation based on this. This, in turn, leads to the conclusion that it is necessary to reflect, learn, apply in practice, turn into evaluation [4].

A competency-based approach is an approach that focuses on learning outcomes, and as a result, not the sum of learned information, but the student's ability to act in various problem situations. The type of these situations depends on the educational directions, that is, the type (specific features) of teaching computer science for non-specialist students. In other words, a competency-based approach is an approach in which learning outcomes are recognized as

important outside of the educational system. From this, we can conclude that the result of the new competence approach in analyzing the theoretical foundations of teaching informatics for non-specialist students is the student's ability to identify a problem, study it, and search for its possible solutions, which is known to all students and It is considered the ability to determine or find a way to evaluate the result, taking into account the ability to apply it in this situation. It also ultimately leads to improved competence. A competency-based approach to education helps not only to accumulate knowledge in subjects, but also to the ability to manage this knowledge independently, that is, the logic of learning consists of two complementary parts: computer science for non-professional students teaching; is to develop non-specialist students with the help of informatics.

Thus, the competency-based approach creates conditions for revealing and developing the student's personal qualities by improving the general educational abilities and skills of intellectual and practical activities on the basis of various methods and tools in the teaching of computer science for non-specialist students; ensures effective and purposeful unity of the educational process; promotes practice as a leading aspect, because it connects theory with objective reality, contributes to the development of increasingly new skills, creates impulses for the development of knowledge through various needs, unexpected difficulties, accidental discoveries, etc.

The next methodological reference term within our dissertation research is the activity-based approach. When it comes to the supporters of the activity approach, there is no doubt (L.S.Vygotsky, V.V.Davedov, A.N.Leontev, D.B.Elkonin, etc.) [1; 3] they understand the educational process as a set of implementation of various types of activities that occur in the process of formation and development of individual independence. They consider the process of creating conditions for the independent activity of a person as an organization of education in the process of learning a subject. However, it is not enough to involve the student in the process of cognitive activity, it is necessary to make this activity personally relevant for him, which will allow you to understand the concepts of acquiring new knowledge and clarifying the uncertainty of knowledge. For non-specialist students, they are able to master the knowledge of informatics by clarifying their internal characteristics, transferring this knowledge to their internal plan, their psyche in the environment of the acquired educational process [3]. We will try to explain another concept in the process of learning computer science for non-specialist students. The term we are all familiar with is "knowledge". In our eyes, knowledge is knowledge of the world, being, universe, society. It is to know theoretical, practical and meaningful information about computer science from the point of view of science. At the same time, using the term "knowledge", it implies the independent identification of new knowledge about computer science, which is still unknown to non-specialist students, using knowledge tools, actions and activities chosen by the subject [5]. The essence of the activity approach in teaching is "the direction of all pedagogical measures for the organization of intensive, increasingly complex activities, because only through their own activities the student learns science and culture, the ways of knowing and changing the world. develops, forms and improves personal qualities" [6].

As part of the activity approach, it is necessary to organize educational work so that students are the subjects of their activity. We explain the content of these educational works as follows:

for non-specialist students to understand and distinguish the problems of computer science by themselves;

that non-specialist students aim to study one or another issue of informatics;

non-specialist students to understand, clarify, improve the purpose, content, tasks related to the topic of computer science, study problems, and solve them; applying acquired and accumulated knowledge in practice.

Within the framework of the activity approach, the thesis is the main one: knowledge can be obtained only in the process of activity (cognitive activity). This shows that in the study of the student's cognitive activity, it is necessary to distinguish two component aspects: informational (perception, storage, transformation and use of information) and motivational (thinking determined by the person's interests and value orientations). activity and direction). Cognitive activity in the active process of studying informatics for non-specialist students is a unique alloy of information processes and motivation, it is a directed, selective activity of search-research processes based on information acquisition, storage, editing and processing" [3].

In the conditions of the activity approach, the methods of activity are an important part of the educational content and are the subject of special formation. Conditionally, two types of cognitive activity can be distinguished: reproductive (reproductive) and productive (creative). Reproductive activity is characterized by the perception, understanding and assimilation of knowledge in the same system and volume, as they are included in the source of educational information, that is, reproduction is carried out in the form in which they are mastered. Reproductive activity is a necessary stage of student work, but it ensures the improvement of stable knowledge and skills. The stability, functional flexibility, generalization of students' knowledge determines the extent of their transfer to other scientific activities, other tasks to the group, that is, they are necessary conditions for transferring knowledge and skills to the fund of general professional training of students.

To provide knowledge and skills of these qualities, the main types of effective activities should be improved. These are:

providing a deeper processing of transformative information, that is, improving knowledge, skills, professional competences in the program, as well as grouping and regrouping this material, collecting and placing information, comparing information, coding, decoding and transcoding;

organization of control, assessment and analytical activities based on judgments;

ensuring the development of heuristic problem thinking.

Conclusion. The emergence of one or another type of activity depends on the specific situation that forms the content of the activity. Management of the educational process of computer science for non-specialist students is therefore a management process associated with cases of mastering certain types of activities.

Thus, the logic of the development of informatics for non-specialist students is "subject to the general logic of the activity approach: it is the object of activity - information processes - as a generalized type of information activity, which was highlighted in the analysis of research results.

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