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PEDAGOGICAL-PSYCHOLOGICAL CONDITIONS ENSURING THE DEVELOPMENT OF COGNITIVE COMPETENCE OF FUTURE INFORMATICS TEACHERS

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Abstract

This article analyzes the pedagogical and psychological conditions that ensure the development of cognitive competence in future informatics teachers under the conditions of digital transformation. Based on the normative-legal documents of the Republic of Uzbekistan in the field of education — in particular, the "Concept for the Development of the Public Education System until 2030" and the "State Educational Standard of General Secondary Education" — the content of cognitive competence and methodological directions for its formation are discussed. The article examines the interrelation between the digital learning environment, the teacher's digital and pedagogical competence, students' intellectual potential, socio-cultural factors, and the influence of information and communication technologies on the educational process. The role of the subject "Informatics and Information Technologies" in developing students' cognitive competence is substantiated, and conclusions and recommendations are presented regarding the pedagogical and psychological conditions necessary for the preparation of future informatics teachers.

Keywords: Cognitive competence, intellectual potential, digital learning environment, future informatics teacher, information and communication technologies, pedagogical and psychological conditions, state educational standard.

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Introduction

BO‘LAJAK INFORMATIKA O‘QITUVCHILARI KOGNITIV KOMPETENSIYASINI RIVOJLANTIRISHNI TA’MINLOVCHI PEDAGOGIK–PSIXOLOGIK SHART-SHAROITLAR

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Annotatsiya

Mazkur maqolada raqamli transformatsiya sharoitida bo‘lajak informatika o‘qituvchilarining kognitiv kompetensiyasini rivojlantirishni ta’minlovchi pedagogik va psixologik shart-sharoitlar tahlil qilinadi. O‘zbekiston Respublikasi ta’lim sohasiga oid me’yoriy-huquqiy hujjatlar, xususan, “Xalq ta’limi tizimini 2030-yilgacha rivojlantirish konsepsiyasi” va “Umumiy o‘rta ta’limning davlat ta’lim standarti” asosida kognitiv kompetensiya mazmuni hamda uni shakllantirishning metodik yo‘nalishlari yoritiladi. Maqolada raqamli ta’lim muhiti, o‘qituvchining raqamli va pedagogik kompetensiyasi, o‘quvchilarning intellektual salohiyati, ijtimoiy-madaniy omillar va axborot-kommunikatsiya texnologiyalarining ta’lim jarayoniga ta’siri o‘zaro bog‘liq holda tahlil etilgan. Shuningdek, “Informatika va axborot texnologiyalari” fanining o‘quvchilarda kognitiv kompetensiyani shakllantirishdagi o‘rni asoslab beriladi hamda bo‘lajak informatika o‘qituvchilari tayyorlovida zarur bo‘lgan pedagogik–psixologik shart-sharoitlar yuzasidan xulosalar va takliflar ilgari suriladi.

Kalit so‘zlar: kognitiv kompetensiya, intellektual salohiyat, raqamli ta’lim muhiti, bo‘lajak informatika o‘qituvchisi, axborot-kommunikatsiya texnologiyalari, pedagogik–psixologik shart-sharoit, davlat ta’lim standarti.

Аннотация

В данной статье анализируются педагогические и психологические условия, обеспечивающие развитие когнитивной компетенции будущих учителей информатики в условиях цифровой трансформации. На основе нормативно-правовых документов Республики Узбекистан в сфере образования, в частности «Концепции развития системы народного образования до 2030 года» и «Государственного образовательного стандарта общего среднего образования», раскрывается содержание когнитивной

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компетенции и методические направления её формирования. В статье рассматриваются взаимосвязанные аспекты цифровой образовательной среды, цифровой и педагогической компетенции учителя, интеллектуального потенциала учащихся, социокультурных факторов и влияния информационно-коммуникационных технологий на образовательный процесс. Также обоснована роль предмета «Информатика и информационные технологии» в формировании когнитивной компетенции учащихся и представлены выводы и рекомендации по педагогическим и психологическим условиям, необходимым для подготовки будущих учителей информатики.

Ключевые слова: когнитивная компетенция, интеллектуальный потенциал, цифровая образовательная среда, будущий учитель информатики, информационно-коммуникационные технологии, педагогические и психологические условия, государственный образовательный стандарт.

In today's era of globalization and digital transformation, the socio-economic and cultural-political development of the country is determined, first of all, by the quality level of the education system and its improvement in accordance with the requirements of the times. The transition to a digital economy, the deep penetration of information and communication technologies into all spheres require new approaches from the education system. In particular, the development of the intellectual and cognitive potential of students, the formation of their cognitive competence are becoming a priority area of state policy.

A number of strategic documents adopted in the field of education in the Republic of Uzbekistan in recent years have strengthened the theoretical and legal basis of this direction. The Presidential Decree No. PF-5538 of September 5, 2018 “On Additional Measures to Improve the Public Education Management System” and the “Concept for the Development of the Public Education System of the Republic of Uzbekistan until 2030” based on it clearly define such priority tasks as the comprehensive spiritual, moral and intellectual development of the rising generation, the widespread introduction of innovative, electronic and interactive methods into the educational process, improving the professional skills of teachers, and equipping educational institutions with digital technologies. Putting forward the principle “New Uzbekistan begins at the school threshold”, this

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concept emphasizes the need to informatize education, form an electronic learning environment, develop a distance learning system, and form independent thinking, logical analysis, and a reflexive approach in students through the use of interactive platforms and digital resources. This requires a fundamentally new review of the pedagogical and psychological conditions that ensure the development of cognitive competence.

As one of the important normative bases for managing the quality of education, the “State Educational Standard of General Secondary Education”, approved by Order No. 406 of the Ministry of Public Education of the Republic of Uzbekistan dated December 17, 2021, is of particular importance. This standard provides for the formation of students' knowledge, skills and qualifications not only in a specific subject, but also in harmony with cognitive, creative, communicative and social competencies. The State Educational Standard clearly defines the goals and objectives of academic subjects, stages of learning, basic competencies, assessment criteria, and requirements for graduates, which are aimed at the consistent development of students' thinking, analytical thinking and intellectual activity. In these qualification requirements, the subject "Informatics and Information Technologies" is indicated as a leading subject in the development of the intellectual potential of students in the context of informatization of education. Since the content of the subject includes skills in working with information, programming, algorithmization, systematic analysis and solving problem situations, it is becoming the main didactic tool for the formation of cognitive competence. Therefore, in the process of training future computer science teachers, it is necessary to identify and implement in practice the pedagogical and psychological conditions that ensure the development of cognitive competence. Cognitive competence in a general sense means a person's ability to consciously manage the cognitive process, analyze, generalize, evaluate and apply information in real situations. In this case, such mental processes as perception, memory, attention, logical thinking, imagination, reflection and metacognitive control are manifested in a single system. In the context of digital education, cognitive competence is inextricably linked to the student's ability to work with digital resources, search for, process, analyze, critically evaluate, and create new knowledge, and is effectively formed through the content of computer science.

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President Sh.M. Mirziyoyev's words "School is a matter of life and death, a matter of the future… the fate of our future generation depends on respected teachers" encourage us to understand the role of the teacher in the education system more deeply. In today's digital education environment, the teacher is not only a provider of ready-made knowledge, but also a person who organizes the educational process, manages the cognitive activity of students, and directs them to independent thinking and digital thinking. In this sense, the professional model of the future computer science teacher should be formed in the image of a digital facilitator, a designer of cognitive processes, and a pedagogue who organizes intellectual cooperation.

Pedagogical and psychological conditions that ensure the development of cognitive competence are, first of all, closely related to the digital and methodological competence of the teacher. The teacher must be proficient in information and communication technologies, design an electronic learning environment, be able to systematically present educational materials in digital format, and be able to individualize the learning process of students. In this case, the teacher's communicative culture, patience, flexibility, creativity, initiative, and leadership qualities are manifested as a psychological factor that stimulates cognitive activity in students.

The pedagogical potential of the digital environment is that it allows students to search for information from non-traditional sources, work independently, conduct creative research, freely express their opinions through virtual communication, and argue. Electronic resources, online platforms, virtual laboratories, and simulation programs activate students' thinking, encourage them to solve problem situations, conduct experiments, and analyze results. However, certain psychological and didactic conditions are necessary to turn such an environment into an effective pedagogical tool.

First, the organization of the educational process on a person-centered basis is an important factor in the development of cognitive competence. Since each student has a different intellectual level, learning style, interests and needs, it is necessary to create individual educational trajectories in the digital environment, establish a system of differential and adaptive teaching. In this case, the future computer science teacher, taking into account the cognitive profiles of students, should identify their strengths and weaknesses, select appropriate learning tasks and provide the necessary psychological support.

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Secondly, the introduction of a reflexive and metacognitive approach in the educational process allows for a deep understanding of student thinking, self-control and a conscious choice of learning strategies. The digital educational environment expands the ability of students to review their activities, identify their mistakes, analyze them and correct them in the future. In such conditions, the computer science teacher must act as a coach who teaches students to "think about thinking," that is, to form metacognitive competencies.

Thirdly, the formation of a culture of information security is also considered an integral part of cognitive competence. The excessive flow of information in the digital environment, the influence of social networks, and the increase in virtual communication can have a positive or negative impact on the psychological state of students, attention and memory processes, and social adaptation. Therefore, a future computer science teacher must instill in students such competencies as the purposeful use of the Internet, protection from harmful information, protection of personal data, and adherence to digital ethics. This requires a set of psychological conditions that ensure cognitive safety in the educational process.

Fourthly, the intellectual level of the educational environment is of great importance in the development of cognitive competence. The experience of presidential schools, creative and specialized educational institutions, and innovation centers shows that digital technologies, interactive teaching methods, and an approach based on project and research activities significantly increase the cognitive potential of students. In such an environment, students not only acquire ready-made knowledge, but also develop new ideas, become interested in scientific research, and actively participate in intellectual competitions and startup projects. The DTS, approved by Order No. 406 of the Ministry of Public Education of the Republic of Uzbekistan, states that the purpose of teaching the subject "Informatics and Information Technologies" is to form a culture of working with information, logical and algorithmic thinking, creative thinking and skills in solving problem situations in students [10]. This goal, in turn, implies the following areas that serve to develop cognitive competence: developing knowledge and practical skills in receiving, processing and presenting information in students; forming the ability to compare, analyze and evaluate various sources of information; developing strategies for step-by-step solving problems based on algorithmic thinking; expanding students' digital thinking and encouraging them to engage in creative research.

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A modern lesson should be rich in content, flexible in form and methodically interactive. In lessons where information and communication technologies are used, the communication between the teacher and the student is not one-sided, but takes the form of a dialogue and polylogue based on cooperation. The student becomes not only a listener, but also an active subject who justifies his opinion, asks questions, argues, and provides evidence. It is precisely such pedagogical conditions that serve to form the main components of cognitive competence - analytical, critical and creative thinking.

The idea of President Sh.M. Mirziyoyev "We will build a new Uzbekistan together with ambitious youth" is directly aimed at the education system and requires the mobilization of all opportunities to improve the intellectual and spiritual potential of the younger generation, develop creativity, initiative and freedom of thought in them. The development of cognitive competence of a future computer science teacher is one of the main methodological directions that serves this very purpose. Because in the conditions of digital education, a computer science teacher teaches students not only software, but also a culture of digital thinking, strategies for working with information, and intellectual work methods. Thus, the system of pedagogical and psychological conditions that ensure the development of cognitive competence is manifested in the following main areas: creating a digital educational environment that is consistent with state educational policy and regulatory legal acts; harmonious development of digital, methodological and psychological competencies in the teacher; organizing the educational process on a person-centered, interactive and reflexive basis; ensuring information security and psychological stability; forming an intellectual educational environment that serves to reveal the intellectual potential of students. The theoretical conclusions and analyses presented in this article show that the development of cognitive competence of future computer science teachers in the context of digital education is not only a separate methodological issue, but also a strategic direction of the general education system. In further research, it will be relevant to create practical models of the formation of this competence, test them and develop best practices in the direction of integrating them into the digital education ecosystem.

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