JOURNAL OF MULTIDISCIPLINARY SCIENCES AND INNOVATIONS
VOLUME 04, ISSUE 10
MOPNTHLY JOURNALS
ISSN NUMBER: 2751-4390
IMPACT FACTOR: 9,08

DEVELOPMENT OF STUDENTS' INFORMATION COMPETENCE WITHIN A CREDIT-MODULAR EDUCATION SYSTEM

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Abstract: This article examines the issues of developing students' information competence within a credit-modular education system. It analyzes the psychological and pedagogical impact of computer technologies on the learning process, as well as challenges related to human-computer interaction. The significance of learner-centered approaches, the stimulation of creative thinking, and neuropsychological methods are substantiated.
Keywords: information competence, credit-modular system, computer-based learning, pedagogical technologies, psychological approach, learner-centered education, interactivity, motivation, modern lesson.

The inclusion of a third component in the communication system—the computer—introduces additional challenges in the communicative act. Sensor interface problems arise, meaning that human sensory parameters may conflict with the system, while these serve as active filters for information input in computer systems. On the other hand, intellectual interface issues occur due to the organization of cognitive processes and logical reasoning structures in the computer.
Factors complicating student-computer interaction include: the implicit imposition of facts and conclusions within a field, inadequate information transmission methods, and the difficulty of accounting for students' initial levels of knowledge, skills, and competencies. Such difficulties not only create inconvenience but can also lead to persistent inefficiency.
Psychological and ergonomic support for knowledge-intensive education has been studied, including the role of interface design in insufficient engagement in dialogic learning. The need to informatize education and the inability to fully achieve it through traditional methods highlight the importance of studying the psychological aspects of computer-based learning, which significantly affect the methodology and organization of teaching.
When designing information environments for professional education, it is essential to consider individual psychological characteristics. Both domestic and international research in this area has advanced substantially. Therefore, psychological principles are informed by studies on the psychological aspects of computer-based instruction and the development of educational computer systems.
The psychological and pedagogical aspects of Computer Managed Instruction (CMI) are among the most studied areas: students work directly with the computer, follow program directives, and generally seek teacher support only in external situations. In Uzbekistan, the psychological aspects of such computers have been studied by Mashbis Ye.I. [86].
Based on research by Russian and foreign psychologists in information education, the psychology of information systems from a learner-centered perspective is actively developing. Issues such as the formation of students' creative traits and heuristic learning within computer environments are discussed in the dissertations of Loktyushina Ye.A., and the studies of Khutorsky A.V., Mogilev A.V., and Sumin V.I. [30,116,33,49].
One condition for effective learner-centered computer education is the creation of a computer environment that meets the following psychological requirements:

1. Diagnostic assessment of students' knowledge needs and feedback mechanisms.
2. Opportunities for participants to express their individuality creatively.

3. Modeling of independent research and pedagogical situations conducive to personal development.
4. Integration of motivational and emotional support tools into the system.

Analysis of studies on the psychological aspects of computer-based learning indicates that potential psychological consequences and challenges have been carefully considered, and fundamental theoretical bases for effective methods and approaches have been developed. Currently, research in the psychology of computer-based education stimulates the development of psychological-oriented educational methods and techniques.

With the advancement of computer technology and its expanded psychological and pedagogical potential, new practical methods and approaches have emerged in technology-based education to influence students' cognitive processes. A key concern in our education system is the predominance of left-hemisphere (verbal-logical-analytical) thinking. Accordingly, the "psychological principle" of higher education informatization emphasizes using computer-based tools to develop right-hemisphere thinking. For example, teaching practices increasingly utilize computer geometry and graphics software to strengthen this aspect of learning.

The relevance of studying computer technologies for right-hemisphere development lies in their role in fostering and nurturing creative personalities. Thus, from a psychological perspective, educational requirements for computer technologies can be aligned with the principle of adequately using both hemispheres of the human brain.

Implementing this principle can be guided by holistic learning theory, which relies on the coordinated and integrated functioning of both hemispheres of the brain. This holistic approach is grounded in psychological, physiological, medical, and engineering research.

Another issue of concern is neuro-linguistic programming. The traditional "human-human" coding system is increasingly transformed into a "human-computer-human" system, where technologies such as voice recording and polygraph software enable the management of human states without detection.

Among relatively new methods of influence are sensor-based modalities. Neurophysiological studies show that specific eye movements correspond to open sensory channels. In simple terms, it is possible to direct certain visual trajectories to influence all sensory systems either directly or indirectly.

The rapid informatization of education raises numerous scientific challenges in the "human-computer" system, affecting various psychological processes, including cognition. According to the definition of thinking, the subject actively processes existing information to transition to new knowledge. Human cognition develops as part of intellectual activity and problem-solving processes. In practice, problem-solving in education serves as a key condition and tool for acquiring knowledge and skills, developing intellectual abilities, and fostering personal traits.

In modern educational processes, the use of information and communication technologies (ICT) and credit-modular systems provides an effective framework for developing students' information competence. Yakubov (2025) emphasizes that the psychological and pedagogical effects of computer technologies, as well as human-computer interactions, are complex and multidimensional. In this context, learner-centered and interactive methods stimulate students' creative thinking and independent reasoning.

Moreover, difficulties arising in computer-mediated learning, such as sensor interface challenges, the structure of logical reasoning, and inadequacies in information transmission, may hinder students' effective development of knowledge and skills (Mashbits, 1990; Sumin, 2014). Therefore, considering psychological and ergonomic aspects, as well as creating a computer environment tailored to students' individual characteristics, is essential (Loktyushina, 2017; Khutorsky, 2005).

The effectiveness of learner-centered computer-based education largely depends on several factors: diagnosing students' cognitive needs and addressing them appropriately, encouraging creative engagement in the learning process, providing opportunities for independent discovery and personal development, and incorporating motivational and emotional support mechanisms (Khutorsky, 2005; Loktyushina, 2017).

Furthermore, neuro-linguistic and holistic approaches in computer-based learning facilitate the development of right-hemisphere thinking, which plays a significant role in nurturing creative individuals and enhancing analytical reasoning skills. Modern ICT systems' interactivity and adaptability enrich the pedagogical process by supporting individualized learning approaches (Yakubov, 2025; Hamidov & Inoyatov, 2021).

The findings suggest that developing students' information and computer competencies is not limited to the mere use of technological tools. It requires careful integration of psychological and pedagogical principles, as well as learner-centered and interactive strategies. Therefore, based on the studies reviewed, credit-modular systems and personalized computer-based education should be considered mutually reinforcing components in organizing effective learning processes.

References:

1. Hamidov, A.A., & Inoyatov, I.I. (2021). *Information and Communication Technologies*. Tashkent: Fan va Texnologiya. – 256 p.
2. Nazarov, D.D. (2019). *Pedagogical Technologies and Pedagogical Mastery*. Tashkent: IQTISOD-MOLIYA. – 200 p.
3. Abdurakhmonov, K.Kh. (2020). *Computer Systems and Networks*. Tashkent: Innovatsiya. – 344 p.
4. Khutorsky, A.V. (2006). *Modern Didactics: Textbook for Universities*. Moscow: Akademiya. – 384 p.
5. Loktyushina, Ye.A. (2017). *Psychological and Pedagogical Foundations of Computer-Based Learning for Students* [Dissertation for Candidate of Psychological Sciences]. Yekaterinburg.
6. Sumin, V.I. (2014). *Human-Computer: Interaction Problems*. Moscow: URSS. – 220 p.
7. Mashbits, Ye.I. (1990). *Computer in Education: Psychological and Pedagogical Aspects*. Moscow: Prosveshchenie. – 256 p.
8. Khutorsky, A.V. (2005). *Learner-Centered Education: Methodology, Technology, Practice*. Moscow: Vlados. – 272 p.
9. Qodirov, A.N., & Karimov, S.K. (2021). *Information Technologies and Pedagogical Innovations*. Samarkand: Samarkand State University. – 210 p.
10. Anderson, L.W., & Krathwohl, D.R. (Eds.). (2001). *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. New York: Longman.