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THE IMPACT OF INFORMATION TECHNOLOGY INTEGRATION ON THE DEVELOPMENT OF CREATIVE THINKING IN HIGHER EDUCATION

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Abstract: In modern higher education, particular attention is paid to the problem of developing soft skills, among which creative thinking occupies a key position. Traditional teaching methods are frequently oriented toward a convergent, passive approach, whereas the challenges of the digital economy require graduates to possess the ability to generate varied, original, and non-standard solutions. This article examines the main features of integrating information technology (IT) into the educational process of higher education, analyzes strategies for their application to stimulate creative student thinking, and explores ways to overcome cognitive barriers. Special attention is paid to the role of interactive digital environments and project-oriented tools in developing the fluency, flexibility, and unique originality of thought.

Keywords: information technology, creative thinking, higher education, cognitive flexibility, educational environment, pedagogical strategies, project-based learning.

In the modern paradigm of higher education, information technologies are viewed not merely as instrumental tools for optimizing the educational process, but as a special type of cognitive framework characterized by a high degree of interactivity, non-linearity, and representational capacity. Their function within the academic space extends far beyond the simple transmission of knowledge. Digital tools act as catalysts for innovative mental activity, presenting new models for conceptualizing reality and fulfilling pragmatically oriented educational objectives. Therefore, the integration of IT cannot be reduced to a formal transition of lecture materials into an electronic format; rather, it requires a comprehensive transformation of didactic discourse.

The cognitive aspect of IT integration involves restructuring the mental schemas that underpin the resolution of open-ended, imaginative tasks. The use of specialized software (for instance, interactive mind maps or generative simulations) prevents the student from moving along a strictly linear path. The interpretation of problem-based cases in a digital environment requires a transition from reproductive thinking to abstract conceptualization, synthesis, and lateral search. Transitioning the design process into flexible digital ecosystems represents a result of modulation, within which traditional algorithmic schemas are replaced by functionally variable search models that fuel creativity. Thus, a transformation is observed not only in the form of task execution but in the very architecture of creative cognitive activity itself.

The problem of IT efficiency in developing creative thinking acquires particular urgency in conditions of technological asymmetry within educational environments. The utilization of basic learning management systems (LMS) frequently demonstrates only the reproduction of convergent models (testing, fixing a single correct answer), which indicates the preservation of traditional, uninspired approaches. In contrast to this, open project spaces, cloud-based collaborative repositories, and simulation platforms indicate a shift in emphasis toward multi-variant ideation. This aspect illustrates the necessity of taking into account the didactic potential of specific IT tools to preserve and enhance the creative potential of learners.

A phenomenon of cognitive engagement gains special significance in the process of educational technologization. Project activities based on modern IT represent socio-cultural and professional concepts linked to the actual practice of innovative industries. In traditional lecture formats, such concepts often do not find an adequate reflection, which necessitates the application of adaptive learning strategies followed by the generalization of experience. The student carries out an intellectual and creative search aimed at maintaining an investigative function while working with the uncertainty of the digital environment.

A context-discursive approach allows for the identification of variability in the development of creative thinking parameters depending on the nature of IT integration. For example, the application of visual IT platforms functions as a metaphorical and spatial designation of the student's mental field. However, without systemic pedagogical support, the digital environment can be perceived superficially, leading to the fragmentation of knowledge and a decrease in the originality of solutions. Systemic work in interactive environments requires the generalization of mental operations, which testifies to the dominance of the creative component over stereotyped technical execution.

From the standpoint of pedagogical transformations, analysis of the educational process shows that when integrating IT, cognitive strategies such as flexible data restructuring, conceptual integration, generalization, and the functional replacement of physical prototypes with digital analogs predominate. Moving from drawing to 3D modeling demonstrates a reduction in routine operations while preserving and expanding the creative search function; the use of interactive simulators illustrates a cognitive transformation in which a theoretical attribute is replaced by a dynamic experiment. Working on interdisciplinary digital projects represents a functional system oriented toward achieving a synergistic communicative and practical effect.

The pragmatic equivalence of educational tasks to the real challenges of the industry serves as a key criterion for the adequacy of IT implementation. Open digital cases that do not have a single correct solution implement the function of positively stimulating risk and creative search. In this case, the educator resorts to facilitation and cognitive compensation, allowing the research intensity of students' activities to be maintained. Non-observance of this principle and the reduction of IT to the role of an electronic textbook leads to the leveling of the creative potential of the educational environment.

The discursive level of analysis allows for the inclusion of the professional specificity of the students' future activities. Working in modern IT environments functions as a prototype of real professional discourse characteristic of high-tech, creative sectors of the economy, and requires a corresponding development of mental flexibility. In this case, a pragmatic orientation toward the innovativeness and adaptability of the subjects of the educational process is preserved. Ignoring these parameters and replacing open creative assignments with reproductive digital tests leads to the loss of the search modality and a disruption of the developmental effect of IT.

The results of the conducted theoretical and empirical analysis confirm the advanced hypothesis that the impact of IT on the development of creative thinking is determined not so much by the fact of having technical means, but by the educator's ability to design the cognitive-discursive function of these technologies. Passive automation leads to a formally technological but functionally unsustainable outcome in the context of developing the creative abilities of the individual.

In the pedagogical dimension, the integration of IT in the direction of creative search represents an effective tool for forming holistic professional competence, as it requires the integration of technological, subject, and creative knowledge. Systematic work with open IT systems contributes to the development of analytical thinking, mental flexibility, and skills of non-standard problem interpretation.

Thus, the integration of information technologies in higher education should be viewed as a complex cognitive-discursive process within which a multi-level stimulation of creative thinking is carried out. The scientific novelty of the study lies in the justification of an integrative approach to the implementation of IT tools that takes into account their semantic, pragmatic, and developmental specificities. The hypothesis is confirmed that growth in creativity metrics such as fluency, flexibility, and originality of thought depends directly on the creation of open, interactive digital environments that transform the traditional educational model.

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