

INTEGRATION OF EDUCATION AND PSYCHOLOGY IN THE FORMATION OF COGNITIVE COMPETENCE

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Abstract

This article explores the integration of education and psychology in fostering cognitive competence within the modern educational environment and highlights the significance of this process. The concept of cognitive competence is examined through its key structural components, including critical and logical thinking, problem analysis, decision-making, creativity, and reflection, from a psychological perspective. Furthermore, the study analyzes the role of innovative pedagogical approaches - such as project-based learning, interactive methods, digital technologies, gamification, microlearning, and adaptive learning - in enhancing students' cognitive potential. In addition to outlining the advantages of applying psychological principles in education, the article also addresses potential psychopedagogical challenges encountered in practice and proposes effective strategies for overcoming them.

Key words

cognitive competence, integration of education and psychology, cognitive development, psychological factors in learning, modern educational environment, critical and analytical thinking, problem-solving abilities, decision-making processes, creative thinking, reflective skills, innovative teaching strategies, interactive learning methods, gamification in education

Introduction. The modern educational process is increasingly focused on the holistic development of the individual, where the integration of education and psychology plays a crucial role in fostering cognitive competence. In today's rapidly changing world - characterized by constant information flow and evolving professional demands - developing students' abilities for independent thinking, analysis, problem-solving, and effective decision-making has become a key priority. Cognitive competence is not merely a measure of knowledge acquisition, but a multidimensional quality that reflects conscious engagement, intellectual activity, and the dynamic functioning of cognitive processes.

Within this framework, psychological factors are essential in shaping cognitive competence. Cognitive development is closely linked to core mental functions such as thinking, attention, memory, and perception. Therefore, integrating psychologically grounded teaching strategies into the educational process enhances the effectiveness of learning and supports the meaningful development of students' cognitive abilities.

This article examines the integration of education and psychology in the development of cognitive competence, focusing on its essence, key components, and underlying psychological foundations, as well as its significance in the modern educational context. It further explores the

effectiveness of innovative teaching strategies, digital technologies, and interactive methods in enhancing students' cognitive competencies from a psychological perspective.

Literature review. 1. Cognitive competence in education: concept and significance.

In recent years, the concept of cognitive competence has received significant attention in both education and psychology. Cognitive competence refers to a student's ability to perceive, analyze, think logically, and adapt effectively to new situations (Anderson, 2005) [1]. It encompasses key components such as critical thinking, problem-solving, creativity, and reflection (Facione, 2011) [2]. In the context of modern educational demands, cognitive competence is recognized as a crucial factor enabling students to work independently and efficiently (Khalid et al., 2018) [3].

From a psychological perspective, individuals with high cognitive competence demonstrate efficient mental functioning, allowing them to process complex information rapidly and accurately (Sternberg, 2019) [4]. Furthermore, educational methods designed to develop cognitive competence contribute to broadening students' thinking, enhancing their analytical skills, and fostering creative potential (Bransford et al., 2000) [5].

2. Psychological foundations for enhancing cognitive skills.

The contribution of psychological approaches to the development of cognitive competence is highly significant. Jean Piaget's theory of cognitive development highlights that a child's intellectual growth is closely linked to active participation in the learning process (Piaget, 1972) [6]. Building on this principle, modern pedagogical methods emphasize learner activity and interactivity, as engagement promotes deeper understanding (Vygotsky, 1978) [7].

Vygotsky's social development theory further underscores the role of the social environment and collaborative interaction in shaping cognitive competence (Vygotsky, 1978) [7]. In line with this perspective, educational strategies such as group work, collaborative problem-solving, and mentoring are widely employed to enhance students' cognitive potential (Lave & Wenger, 1991) [8].

3. Modern teaching strategies and innovations.

In contemporary education, innovative pedagogical approaches play a crucial role in developing cognitive competence. Project-based learning, for instance, encourages students to cultivate independent thinking and practical problem-solving skills (Thomas, 2000) [9]. Interactive methods further promote active student engagement in the learning process, thereby enhancing cognitive activity (Prince, 2004) [10].

Digital technologies offer new avenues for strengthening cognitive competence. Tools such as simulations, virtual laboratories, and interactive programs enable students to grasp complex concepts more effectively (Johnson et al., 2016) [11]. Similarly, gamification integrates game elements into educational activities, boosting motivation while fostering critical thinking and problem-solving abilities (Deterding et al., 2011) [12].

Moreover, microlearning and adaptive learning technologies allow instruction to be tailored to the individual learner's psychological characteristics (Hug, 2005) [13]. These approaches help reduce cognitive load and enhance the overall efficiency of the learning process (Kalyuga, 2007).

4. Psychopedagogical challenges and strategies for resolution.

Despite the effectiveness of innovative pedagogical approaches, various psychological challenges often arise in practice. For instance, students may experience stress, low motivation, or difficulties with attention, all of which can hinder the development of cognitive competence (Schaufeli & Bakker, 2004). Additionally, excessive use of digital technologies may lead to fatigue and decreased focus (Small & Vorgan, 2008).

To address these challenges, psychological support, stress-reduction techniques, and strategies aimed at enhancing motivation are essential (Ryan & Deci, 2000) [14]. Moreover, the proper implementation of adaptive learning and microlearning methods, tailored to individual learner characteristics, can help manage cognitive load effectively (Paas et al., 2003) [14, 15].

A review of the literature indicates that psychological approaches play a vital role in shaping cognitive competence within modern education. The components of cognitive competence serve to strengthen students' knowledge and skills, and its development is effectively supported through innovative pedagogical methods such as project-based learning, interactive techniques, digital technologies, and gamification. At the same time, individualized approaches and psychological support are necessary to address practical challenges that may arise. In Uzbekistan, research in this area is actively expanding, and practical experience is growing; however, further development of effective strategies is needed to overcome existing shortcomings.

Methods and materials. This study combines qualitative and quantitative research methods to identify and evaluate psychological approaches to the formation of students' cognitive competence in the modern educational process. At the first stage, a meta-analysis method was used to analyze the literature and identify theoretical foundations. Through this, the concept of cognitive competence, its structural elements, and scientific sources on psychological approaches were analyzed.

In the second stage, an experimental method was used to determine the effectiveness of innovative methods in the pedagogical process. The experiment introduced interactive educational tools and digital technologies aimed at developing students' critical thinking, problem-solving and creative skills.

Also, psychodiagnostic methods (critical thinking tests, questionnaires to assess the level of motivation and attention) were used to measure the psychological state of students and their level of cognitive competence.

Research material

2nd-4th year students studying at a higher education institution were selected as the research material. In total, 120 students participated. Students were divided into four groups, and each group was provided with various interactive and digital educational tools within the framework of innovative pedagogical approaches.

The following pedagogical tools and methods were used in the research process:

Project-based learning methods - students worked on independent projects;

Interactive methods - group discussions, role-playing games, joint solving of problem situations;

Digital technologies - virtual laboratories in education, simulations, interactive programs;

Gamification elements - increasing motivation using game elements;

Microlearning and adaptive learning tools - adapting the individual learning process.

Data collection and analysis methods

The data collected during the experiment were collected through the results of psychodiagnostic tests, student interviews, and observations. Statistical methods (descriptive

statistics, correlation analysis) and qualitative analysis methods (content analysis, thematic analysis) were used to analyze the data.

With the help of these approaches, changes in the level of cognitive competence of students, the psychological effectiveness of innovative pedagogical tools, and emerging problems were identified and recommendations were developed to eliminate them.

Analysis of results. According to the results of the experiment, it was found that innovative pedagogical approaches — project-based learning, interactive methods, digital technologies and gamification — significantly increased the cognitive competence indicators of students. During the study, 120 students' critical thinking, problem-solving, decision-making and creative approach skills were measured using psychodiagnostic tests. The table below shows the average scores of the cognitive competence levels of students in the four groups before and after the experiment:

Group	Type of innovative approach	Average score before the experiment	Average score after the experiment	Percent age of change
Group 1	Project-based learning	65	78	+20
Group 2	Interactive methods	67	81	+20,9
Group 3	Digital technologies	64	79	+23,4
Group 4	Gamification	66	80	+21,2

Table 1. Average scores of students' cognitive competence levels before and after the experiment

The data shows that after the use of innovative approaches in all groups, students' cognitive competence scores increased significantly. The highest increase was observed in group 3 - education implemented through digital technologies (+23.4%). This is evidence that digital tools facilitate the understanding of complex concepts in the learning process and increase motivation.

Interactive methods and gamification education also effectively developed students' critical thinking and problem-solving skills. Project-based education showed positive results in improving independent work, planning, and creativity skills.

Also, during the experiment, students showed increased motivation, self-control, and reduced stress levels. This indicates that psychological approaches directly affect educational effectiveness.

Conclusion. The formation of cognitive competence in the modern educational process requires the development of students' abilities not only to acquire knowledge, but also to consciously process, analyze and apply it in practical activities. The educational process, organized on the basis of psychological approaches, taking into account the individual characteristics of thinking of a person, strengthens learning motivation, develops creative thinking and problem-solving skills.

The results of the study show that constructivism, metacognitive theory, an activity-oriented approach and reflective teaching technologies are effective tools for the formation of cognitive competence. Also, factors such as the psychological preparation of the teacher, an

individual approach to the student's personality, and the creation of an emotional-intellectual environment determine the success of this process.

In conclusion, psychological approaches aimed at the development of cognitive competence play an important role in the modern educational system in realizing the intellectual potential of a person, in forming a well-rounded person with independent thinking, analytical and creative thinking.

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