TECHNOLOGY FOR THE DEVELOPMENT OF STUDENTS' CREATIVE INTELLECTUAL COMPETENCE THROUGH SOFTWARE-BASED TOOLS

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Abstract

The rapid advancement of digital technologies has significantly transformed the educational landscape, creating new opportunities for enhancing students' creative intellectual competence through innovative pedagogical approaches. Higher education institutions are increasingly expected to prepare graduates who possess not only professional knowledge but also creativity, critical thinking, problem-solving abilities, and digital literacy. In this context, software-based educational tools have become an essential component of modern teaching and learning processes, providing interactive environments that support individualized learning, collaborative knowledge construction, and continuous intellectual development.

This study proposes an integrated pedagogical technology for developing students' creative intellectual competence through software-based tools within higher education. The proposed technology combines constructivist learning principles, competency-based education, project-oriented learning, and digital learning environments into a comprehensive instructional framework. The research emphasizes the pedagogical design of software resources rather than their technical implementation, focusing on how digital platforms can facilitate creative thinking, independent inquiry, reflective learning, and collaborative problem-solving.

A conceptual model consisting of interconnected components—including pedagogical objectives, instructional content, software-based learning activities, assessment mechanisms, and expected learning outcomes—is introduced to guide the implementation of the proposed technology. The instructional process is organized through sequential stages that promote students' motivation, cognitive engagement, creative performance, and reflective evaluation. Various digital tools, including learning management systems, interactive assessment platforms, virtual collaboration environments, and AI-supported educational applications, are integrated to create adaptive and learner-centered educational experiences.

The study further outlines methodological principles for evaluating the effectiveness of software-supported competence development using qualitative and quantitative indicators. The proposed technology is expected to improve students' ability to generate innovative ideas, solve complex educational problems, make independent decisions, communicate effectively within digital environments, and continuously develop their professional competencies.

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The findings contribute to contemporary educational technology research by presenting a holistic pedagogical framework that integrates digital innovation with competence-oriented instruction. The proposed technology can be adapted across various academic disciplines and provides practical guidance for university instructors seeking to improve the quality of higher education through software-supported teaching and learning.

Keywords: creative intellectual competence; educational technology; software-based learning; higher education; digital pedagogy; competency-based education; digital learning environment; innovative teaching.

Introduction

The twenty-first century has witnessed unprecedented technological progress that has fundamentally transformed the philosophy, organization, and practice of higher education. Rapid digitalization, the expansion of artificial intelligence, cloud computing, big data technologies, and interactive educational platforms have reshaped traditional teaching and learning processes. Universities are no longer expected to serve merely as institutions for transferring knowledge; rather, they are responsible for preparing graduates capable of adapting to complex social and technological changes, generating innovative ideas, solving interdisciplinary problems, and engaging in lifelong learning [1]. Consequently, educational systems worldwide are increasingly shifting from knowledge-oriented instruction toward competence-based education that emphasizes creativity, critical thinking, collaboration, communication, and digital literacy.

Among these competencies, **creative intellectual competence** occupies a particularly important position because it integrates cognitive flexibility, independent reasoning, innovation, reflective thinking, and the ability to apply knowledge in unfamiliar contexts [2]. Unlike traditional academic achievement, creative intellectual competence reflects an individual's capacity to generate original solutions, evaluate alternative perspectives, synthesize information from multiple disciplines, and make informed decisions under conditions of uncertainty. These characteristics have become indispensable for professionals working in knowledge-intensive and technology-driven environments.

The emergence of the digital economy has significantly increased the demand for graduates who possess both advanced professional knowledge and highly developed creative competencies. Employers increasingly value individuals who can integrate theoretical knowledge with technological skills while demonstrating initiative, adaptability, and innovative thinking. Consequently, universities must redesign their educational strategies to ensure that students develop not only disciplinary expertise but also the intellectual flexibility required for continuous professional growth.

Software-based educational tools have become one of the most influential factors supporting this transformation. Modern educational software enables instructors to design interactive learning environments that encourage independent exploration, collaborative knowledge construction, personalized learning trajectories, and continuous formative assessment. Unlike conventional instructional materials, digital platforms provide immediate feedback, adaptive learning pathways, multimedia visualization, virtual

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experimentation, and real-time communication, thereby creating favorable conditions for developing higher-order thinking skills [3].

Recent advances in educational technologies have expanded the range of software available for teaching and learning. Learning management systems, online collaborative platforms, virtual laboratories, simulation environments, intelligent tutoring systems, gamified learning applications, and artificial intelligence–supported educational services now play an increasingly significant role in higher education. These technologies provide opportunities to organize student-centered learning environments in which learners actively construct knowledge rather than passively receive information [4]. Such environments stimulate curiosity, encourage experimentation, and promote reflective learning, all of which contribute to the development of creative intellectual competence.

Despite the rapid integration of digital technologies into higher education, many universities continue to use software primarily as a tool for delivering instructional content rather than as a pedagogical mechanism for fostering creativity and intellectual development. In many educational contexts, digital resources are employed mainly to distribute lecture materials, administer assessments, or facilitate communication, while their broader pedagogical potential remains underutilized. As a result, the implementation of educational technologies often fails to produce substantial improvements in students' creative performance or intellectual independence.

Another challenge concerns the absence of comprehensive pedagogical technologies that systematically integrate software tools into competence-oriented educational processes [5]. Existing studies frequently examine individual digital applications or isolated instructional strategies without proposing an integrated framework that connects pedagogical objectives, instructional design, software functionality, learning activities, assessment procedures, and expected educational outcomes. Consequently, there remains a need for a holistic model capable of guiding educators in designing software-supported learning environments specifically aimed at developing students' creative intellectual competence.

Theoretical perspectives from constructivism, socio-cultural learning theory, connectivism, experiential learning, and competency-based education collectively emphasize that meaningful learning occurs when students actively participate in knowledge construction, solve authentic problems, collaborate with peers, and continuously reflect upon their experiences. Software-based educational environments provide unique opportunities to operationalize these theoretical principles by facilitating interaction, collaboration, visualization, inquiry-based learning [6], and reflective practice. Therefore, the effectiveness of educational software depends not merely on technological sophistication but primarily on the pedagogical strategies through which digital tools are integrated into the instructional process.

The growing popularity of artificial intelligence has introduced new possibilities for enhancing creative intellectual development. AI-supported educational systems can personalize learning pathways, generate adaptive instructional materials, provide

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automated formative feedback, analyze learning behavior, and support individual creativity through intelligent recommendations. Nevertheless, these technologies should complement rather than replace human-centered pedagogy. Effective educational practice requires a balanced integration of technological innovation with pedagogical expertise to ensure that software functions as an instrument for intellectual development rather than a substitute for independent thinking.

This study addresses these challenges by proposing a pedagogical technology for developing students' creative intellectual competence through software-based tools. The proposed approach emphasizes the systematic integration of digital technologies, instructional methods, competence-based assessment, and learner-centered educational design [7]. Rather than focusing exclusively on technical aspects of software development, the study examines how educational software can be pedagogically organized to stimulate creativity, independent thinking, collaborative problem-solving, and continuous professional self-development.

The novelty of this research lies in the development of an integrated instructional framework that combines pedagogical theory, educational technology, digital learning environments, and competency-oriented assessment into a unified model. The proposed technology is intended to support university instructors in designing effective learning experiences that promote students' intellectual growth while simultaneously improving the quality and effectiveness of higher education [8].

Accordingly, the main objective of this research is to develop and theoretically substantiate a technology for the development of students' creative intellectual competence through software-based tools. To achieve this objective, the study pursues the following tasks: (1) to analyze contemporary theoretical approaches to creative intellectual competence; (2) to identify the pedagogical potential of software-supported learning environments; (3) to design an integrated instructional model for competence development; (4) to develop methodological recommendations for implementing software-based educational technologies; and (5) to evaluate the expected educational outcomes of the proposed pedagogical framework.

The results of this research are expected to contribute to the advancement of digital pedagogy by providing a scientifically grounded model that supports the systematic development of creative intellectual competence in higher education. The proposed framework may serve as a practical guide for educators, curriculum developers, instructional designers, and educational policymakers seeking to improve teaching quality through the effective integration of software-based technologies.

Literature Review

Theoretical Foundations of Creative Intellectual Competence

Creative intellectual competence has emerged as one of the most significant educational outcomes in the context of the knowledge economy and digital transformation. Unlike traditional conceptions of academic achievement, this competence reflects a learner's ability to generate original ideas, integrate interdisciplinary knowledge, solve authentic

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problems, and continuously adapt to changing professional environments. It is increasingly recognized that universities must prepare graduates who are not only knowledgeable but also capable of innovation, critical reflection, and lifelong learning.

The concept of competence has evolved from a narrow understanding of knowledge and skills to a multidimensional construct encompassing cognitive, motivational, behavioral, and social dimensions. Contemporary competence-based education emphasizes the application of knowledge in real-world contexts, where learners are expected to demonstrate initiative, creativity, and responsibility. Within this perspective, creative intellectual competence represents an advanced level of intellectual development in which analytical reasoning and creative thinking function as complementary processes [9].

From a pedagogical perspective, creative intellectual competence develops through active engagement in meaningful learning activities rather than through passive acquisition of information. Learners strengthen this competence when they investigate authentic problems, formulate hypotheses, evaluate alternative solutions, collaborate with peers, and reflect on the outcomes of their work. Such learning experiences require instructional environments that encourage autonomy, experimentation, and continuous feedback [10].

The growing complexity of contemporary professional practice has further reinforced the importance of creativity as an essential component of higher education. Professionals working in engineering, education, healthcare, business, and information technology frequently encounter situations that cannot be solved using routine procedures. Instead, they must combine disciplinary knowledge with innovative thinking and digital capabilities. Consequently, higher education institutions are increasingly expected to cultivate graduates who can transfer knowledge across contexts and respond effectively to uncertain and rapidly changing environments.

The integration of creativity into competence development has also altered the role of university instructors. Rather than serving solely as transmitters of knowledge, educators are now expected to design learning experiences that facilitate inquiry, collaboration, and independent thinking. This shift requires instructional strategies that place students at the center of the educational process and provide opportunities for exploration, experimentation, and reflection.

Within this educational paradigm, digital technologies have become indispensable instruments for supporting competence development. Software-supported learning environments enable students to access diverse information resources, participate in collaborative projects, visualize complex concepts, receive immediate feedback, and document their learning progress. These opportunities contribute to the development of intellectual flexibility, creativity, and self-regulated learning, all of which are fundamental characteristics of creative intellectual competence.

The theoretical understanding of creative intellectual competence therefore extends beyond individual cognitive ability. It incorporates motivational readiness, reflective capacity, communication skills, collaborative engagement, and the ability to use digital technologies effectively in solving professional and academic problems. Consequently,

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educational technologies should be viewed not merely as instructional aids but as pedagogical environments that facilitate comprehensive intellectual development.

Despite considerable progress in competence-based education, many higher education institutions continue to emphasize the reproduction of knowledge rather than its creative application. Assessment systems frequently reward memorization and procedural accuracy while giving insufficient attention to originality, innovation, and higher-order thinking. This imbalance limits opportunities for students to develop the intellectual qualities required in contemporary society and highlights the necessity of redesigning instructional practices around competence-oriented educational technologies.

Software-Based Learning Technologies and Creative Intellectual Development

The rapid expansion of digital technologies has fundamentally changed the ways in which knowledge is created, shared, and applied within higher education. Educational software has evolved from a simple instructional aid into a comprehensive pedagogical environment that supports collaborative learning, adaptive instruction, creativity, and intellectual development. Contemporary universities increasingly employ software-based learning systems not merely to digitize traditional teaching but to redesign educational experiences that encourage active participation, independent inquiry, and innovation.

One of the most significant developments in recent years has been the transition from teacher-centered instruction to learner-centered digital ecosystems. Within these environments, students assume greater responsibility for constructing knowledge through interaction with digital resources, peers, instructors, and intelligent educational systems. This transformation reflects broader changes in educational philosophy, where learning is understood as an active process of exploration rather than passive reception of information.

Software-supported instruction provides several pedagogical advantages that contribute directly to the development of creative intellectual competence. Interactive learning environments encourage students to investigate authentic problems, experiment with multiple solutions, and evaluate alternative perspectives. Digital simulations, virtual laboratories, collaborative platforms, and multimedia visualization tools make abstract concepts more accessible while simultaneously stimulating curiosity and intellectual engagement. Meta-analytic evidence indicates that simulation-based learning produces strong positive effects on the acquisition of complex skills in higher education.

Another important advantage of educational software lies in its capacity to support individualized learning. Students differ considerably in prior knowledge, cognitive styles, learning pace, motivation, and problem-solving strategies. Traditional classroom instruction often struggles to accommodate these differences. Modern educational software, however, enables adaptive learning pathways that respond dynamically to learners' individual needs. Personalized recommendations, intelligent feedback, and flexible learning sequences create opportunities for every student to progress according to his or her intellectual development.

Artificial intelligence has further expanded these possibilities. AI-supported educational systems are increasingly capable of analyzing learner behavior, identifying

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misconceptions, generating adaptive instructional materials, and providing personalized recommendations. These technologies assist instructors by automating routine instructional tasks while allowing greater attention to higher-order pedagogical activities such as mentoring, creativity development, and critical discussion. Nevertheless, the effectiveness of AI-supported learning depends on sound instructional design rather than technological sophistication alone.

Learning management systems have similarly transformed higher education by integrating instructional materials, communication tools, assessment mechanisms, collaborative workspaces, and learning analytics into unified educational platforms. Such systems facilitate continuous interaction among students and instructors while supporting formative assessment throughout the learning process. When appropriately designed, these digital environments strengthen students' autonomy, responsibility, and reflective learning.

Collaborative software represents another important category of educational technology contributing to creative competence. Cloud-based platforms, digital whiteboards, project management systems, and online discussion environments allow students to work collectively on authentic tasks regardless of geographical location. Collaborative learning encourages the exchange of diverse perspectives, negotiation of ideas, and collective knowledge construction, thereby enhancing creativity through social interaction.

Recent research also emphasizes the educational value of gamification. The integration of game elements—including challenges, feedback, progression systems, and achievement mechanisms—has been shown to improve student motivation, persistence, and engagement in online learning environments. At the same time, current reviews note that many gamified systems remain insufficiently grounded in learning theory, highlighting the need for stronger pedagogical integration.

Virtual and immersive technologies have introduced additional opportunities for creative learning. Virtual reality environments enable students to experience complex situations that cannot easily be reproduced in traditional classrooms. Through immersive interaction, learners develop spatial reasoning, creative exploration, and problem-solving abilities while engaging in authentic professional scenarios. Recent systematic reviews suggest that immersive technologies can positively influence creativity when integrated into well-designed instructional activities rather than used as isolated technological innovations.

Learning analytics has emerged as another influential component of software-based education. By analyzing learners' interactions with digital environments, educational institutions obtain valuable information regarding learning behaviors, engagement patterns, conceptual understanding, and academic progress. These analytical approaches enable instructors to identify students requiring additional support while simultaneously evaluating the effectiveness of instructional strategies. Emerging work also suggests that learning analytics can contribute to understanding and supporting creativity, although conceptual and methodological challenges remain.

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https://www.gejournal.net/index.php/IJSSIR

Although the educational potential of software technologies is widely acknowledged, empirical studies continue to reveal several persistent limitations. Many universities primarily employ digital technologies for administrative functions, online content distribution, or electronic assessment. Such practices improve instructional efficiency but do not necessarily promote higher-order thinking or creative intellectual development. Consequently, the pedagogical value of software remains underexploited.

Another limitation concerns the fragmented nature of existing research. Most studies investigate individual technologies—such as gamification, simulation, virtual reality, or artificial intelligence—in isolation. Comparatively fewer investigations propose integrated pedagogical frameworks that systematically combine software tools, instructional methods, competence-oriented assessment, and educational objectives within a single instructional technology.

Furthermore, many published studies evaluate short-term learning outcomes while paying limited attention to the long-term development of students' creative intellectual competence. Measures often emphasize academic performance or technology acceptance rather than examining sustained improvements in creativity, reflective thinking, intellectual independence, and innovation capacity.

These limitations indicate that technological innovation alone cannot guarantee meaningful educational transformation. Effective competence development requires pedagogically grounded instructional technologies that integrate educational objectives, learning activities, assessment strategies, digital environments, and continuous reflection into a coherent system.

Research Gap

A critical analysis of the contemporary literature reveals that significant progress has been achieved in digital pedagogy, educational software, adaptive learning, artificial intelligence, and creativity research. Nevertheless, several important gaps remain unresolved.

First, most studies examine creativity, digital competence, and educational technology as separate constructs instead of considering their dynamic interaction within a unified pedagogical framework.

Second, relatively few investigations propose comprehensive instructional technologies specifically designed to develop **creative intellectual competence** through software-supported learning environments.

Third, existing educational models frequently emphasize technological implementation while providing limited guidance regarding pedagogical design, competence assessment, instructional sequencing, and reflective learning processes.

Fourth, empirical evidence concerning the systematic integration of software tools into competence-oriented university instruction remains fragmented across disciplines.

To address these limitations, the present study proposes an integrated pedagogical technology that combines competency-based education, constructivist learning principles, digital instructional environments, software-supported learning activities, and continuous

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formative assessment within a unified model for developing students' creative intellectual competence.

Materials and Methods

Research Design

This study employed a mixed-methods pedagogical research design combining quantitative and qualitative approaches to investigate the effectiveness of software-based technologies in developing students' creative intellectual competence. The research was conducted within the context of higher education and focused on the systematic integration of digital learning tools into competence-oriented instruction.

The study was organized as a pedagogical experiment consisting of three consecutive stages: diagnostic, formative, and evaluative. During the diagnostic stage, the initial level of students' creative intellectual competence was identified using specially designed assessment criteria and indicators. The formative stage involved the implementation of the proposed software-based instructional technology, while the evaluative stage focused on measuring changes in students' competence levels and analyzing the effectiveness of the intervention.

Participants

The participants of the study were undergraduate students enrolled in pedagogical and technology-related educational programs at a higher education institution. Students were divided into an experimental group and a control group. The experimental group participated in learning activities organized through software-based educational technologies, whereas the control group continued learning through conventional instructional approaches.

Participation in the study was voluntary, and all students were informed about the educational purpose of the research. The selection of participants was based on their enrollment in relevant academic courses and their willingness to engage in digital learning activities.

Software-Based Instructional Technology

The intervention was based on an integrated pedagogical technology designed to develop students' creative intellectual competence through digital learning environments. The technology combined competency-based education, constructivist learning principles, project-oriented learning, collaborative activities, and continuous formative assessment.

The instructional process included the following stages:

- Motivational stage – stimulating students' interest in creative and intellectual tasks through digital resources and problem situations.
- Cognitive stage – organizing independent inquiry, information analysis, and knowledge construction using educational software.
- Creative stage – engaging students in project work, collaborative problem-solving, and the generation of innovative ideas.
- Reflective stage – encouraging self-assessment, peer feedback, and analysis of learning outcomes.

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Various software tools were integrated into the instructional process, including learning management systems, interactive assessment platforms, collaborative online environments, multimedia resources, and AI-supported educational applications.

Assessment Criteria and Indicators

Students' creative intellectual competence was evaluated using four interrelated criteria:

Criterion	Indicators
Cognitive	Analytical thinking, information processing, problem understanding
Creative	Originality, idea generation, innovative solutions
Reflective	Self-assessment, critical reflection, learning awareness
Digital	Effective use of software tools and digital communication

Each criterion was assessed at three levels: low, medium, and high.

Data Collection and Analysis

Data were collected through questionnaires, observation, project evaluation, digital activity analysis, and competence assessment tasks. Quantitative data were processed using descriptive statistics, percentage analysis, mean values, and comparative analysis between the experimental and control groups. To determine the statistical significance of observed differences, Student's t-test was planned for the final stage of analysis.

Qualitative data obtained from observations and reflective activities were analyzed through thematic interpretation in order to identify changes in students' creative behavior, intellectual independence, and engagement in digital learning environments.

Initial Diagnosis of Students' Creative Intellectual Competence

The pedagogical experiment was conducted during the 2022–2024 academic years in three higher education institutions of Uzbekistan: Kokand State University, Bukhara State Pedagogical Institute, and the International School of Finance, Technology and Science. The study involved **378 undergraduate students** representing teacher education and related academic programs. To ensure the reliability and validity of the experimental findings, the participants were divided into an experimental group (n = 193) and a control group (n = 185).

Table 1. Distribution of Participants in the Pedagogical Experiment

Higher Education Institution	Control Group	Experimental Group	Total
Kokand State University	50	53	103
Bukhara State Pedagogical Institute	62	61	123
International School of Finance, Technology and Science	73	79	152
Total	**185**	**193**	**378**

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The experimental study consisted of three sequential stages: **diagnostic**, **formative**, and **summative**. The present section reports the results of the diagnostic stage, whose primary purpose was to determine the initial level of students' creative intellectual competence before implementing the proposed software-based instructional technology.

The diagnostic phase played a crucial role in the research because the credibility of the final findings depended on the accuracy and objectivity of the baseline measurements. During this stage, a comprehensive assessment system was developed, including evaluation criteria, indicators, and competence levels. Diagnostic instruments consisted of open-ended questionnaires, expert observations, and competence-based assessment tasks that enabled participants to express their own understanding of creativity, intellectual competence, and innovative learning practices without being restricted by predetermined response options.

Students' Understanding of Intellectual Competence

The first questionnaire examined students' conceptual understanding of the notion of **intellect**. The findings revealed that only **25%** of respondents provided a comprehensive scientific explanation of the concept. The remaining students demonstrated fragmented or partial understanding, indicating that the theoretical foundations of intellectual competence had not yet been sufficiently developed.

Among the alternative responses, approximately **30.4%** associated intellectual competence primarily with specialized professional abilities, whereas **25%** emphasized non-standard thinking and the ability to solve problems creatively. Smaller proportions of respondents related intellect to positive personal characteristics (8.4%), rapid acquisition of new knowledge (5.8%), or high individual potential (5.4%). These findings suggest that students possessed isolated perceptions of intellectual competence rather than an integrated understanding of its cognitive, creative, and reflective dimensions.

Awareness of Creative Intellectual Competence

Students were also asked to explain their understanding of the concept of **creative intellectual competence**. The responses demonstrated considerable variation.

Approximately **34.2%** emphasized that university teachers should themselves be creative professionals capable of inspiring innovation among students. Another **12.5%** highlighted the importance of professional expertise, while **9.3%** stressed the necessity of encouraging non-standard thinking. Equal proportions (**9.3%**) referred to strong subject knowledge and effective management of students' learning activities.

Smaller groups of respondents identified additional characteristics, including readiness to answer diverse student questions (6.4%), competence in working with gifted learners (6.4%), commitment to continuous professional development (6.4%), and reflective professional practice (3.1%). Overall, these responses indicate that although students recognized several important characteristics of creative intellectual competence, their understanding remained incomplete and largely intuitive.

Students' Participation in Personal Creative Development

The survey also explored students' involvement in activities aimed at developing their own creative potential.

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The results demonstrated that **61.9%** of respondents reported actively participating in activities intended to improve their creative abilities. An additional **31.1%** indicated that they occasionally attempted to engage in such activities, whereas **17%** admitted that they paid little or no attention to their own creative development.

Although these findings suggest a generally positive attitude toward creativity, they simultaneously indicate that systematic institutional support for competence development remains insufficient.

Knowledge of Psychological Support

Students were asked whether they had received professional guidance from psychologists regarding the development of creativity and giftedness.

A substantial majority (**68.9%**) reported that they had never participated in such activities. Only a relatively small proportion of respondents had attended seminars concerning gifted students, temperament, multiple intelligences, or psychological aspects of creative development.

These findings demonstrate a noticeable gap between psychological support services and competence-oriented educational practice.

Awareness of Modern Educational Methods

The questionnaire further investigated students' familiarity with modern instructional methods for developing creative intellectual competence.

Most respondents (**85.4%**) identified at least one educational approach associated with creativity development, whereas **14.6%** acknowledged that they were unfamiliar with contemporary pedagogical methods.

Among the approaches mentioned most frequently were differentiated instruction (12.2%), project-based learning (12.2%), extracurricular clubs and academic competitions (9.8%), individualized instruction (9.8%), research activities (7.3%), diagnostic testing (7.3%), problem-based learning (4.9%), critical thinking strategies (4.9%), creative workshops (4.9%), distance education (4.3%), advanced problem-solving activities (2.6%), participation in competitions (2.6%), and mathematical tournaments (2.6%).

Although students demonstrated awareness of individual instructional strategies, their responses suggested limited understanding of how these methods could be systematically integrated into a coherent educational technology.

Need for Educational Innovation

Students were also asked whether changes in university teaching were necessary to support the development of creative intellectual competence.

Only **43.6%** expressed clear support for curricular innovation and proposed concrete recommendations, including stronger collaboration between university teachers and researchers, increased opportunities for extracurricular creative activities, expansion of interdisciplinary learning, and systematic identification and support of gifted students.

Conversely, **34.4%** were uncertain, **15.7%** agreed without providing justification, and **6.3%** believed that no substantial changes were necessary.

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These responses indicate that although many students recognize the importance of educational innovation, considerable uncertainty still exists regarding effective strategies for competence development.

General Findings of the Diagnostic Stage

Overall, the diagnostic results demonstrate that students possessed positive attitudes toward creativity and intellectual development but lacked a comprehensive understanding of creative intellectual competence and its practical implementation within higher education.

The findings also reveal limited awareness of software-supported pedagogical technologies, insufficient psychological support, fragmented knowledge of innovative instructional methods, and inadequate integration of competence-oriented educational practices into existing university curricula.

Consequently, the diagnostic phase confirmed the necessity of developing an integrated software-based pedagogical technology capable of systematically supporting students' creative intellectual competence throughout the educational process.

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