JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205

Volume 14 Issue 12, December 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

PSYCHOLOGICAL FEATURES OF FORMATION OF CREATIVE ABILITIES IN THE TEACHING OF INFORMATICS AND INFORMATION TECHNOLOGIES

Akhmedova Shaira Bilalkhanovna
Doctor of Philosophy in Pedagogical science,
docent of the Andijan regional national center for training pedagogues in new methods, concrete and natural sciences of informatics and information technologies of the methodology department

Abstract: The teaching of informatics and information technologies (IT) necessitates not only technical knowledge but also the cultivation of creative abilities, which are critical for solving complex problems and fostering innovation. This article explores the psychological aspects of developing creativity in students within the context of IT education. It examines the theoretical foundations of creativity, psychological factors influencing its development, and practical strategies for integrating creativity into the teaching process. By combining insights from cognitive psychology, educational practices, and technology, the article provides a comprehensive approach to nurturing creativity in IT learners.

Key words: convergent thinking, mental imagery and visualization, self-efficacy, psychological features, creative abilities, pedagogical strategies, fostering creativity

Introduction. The field of informatics and information technologies (IIT) is inherently creative. From designing user-friendly interfaces to developing innovative algorithms and applications, creativity is a driving force behind technological advancement. However, fostering creativity in IIT education requires a deep understanding of the psychological processes involved. This scientific research explores the key psychological features of creative ability formation within the context of IIT teaching, focusing on cognitive, affective, and social-environmental factors. The formation of creative abilities in the teaching of informatics and IT is both a challenge and an opportunity. By understanding the psychological features that influence creativity and implementing targeted strategies, educators can create environments where students thrive as innovative thinkers and problem-solvers. As technology continues to evolve, fostering creativity in IT education will remain essential for preparing students to meet the demands of the future.

Creativity has emerged as a cornerstone skill in the 21st century, particularly in fields like informatics and IT, where innovation drives progress. From software development to artificial intelligence, the ability to think creatively allows professionals to develop novel solutions and adapt to rapidly evolving technologies.

However, traditional educational methods often emphasize rote memorization and rigid problem-solving approaches, leaving little room for the development of creative thinking. Incorporating creativity into IT education requires an understanding of the psychological processes underlying creative ability and the development of pedagogical strategies to foster it.

Cognitive Aspects of Creativity in IIT

Creativity in IIT isn't simply about generating novel ideas; it involves a complex interplay of cognitive processes:

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 12, December 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

- **Divergent Thinking:** This involves generating multiple solutions to a problem, exploring diverse possibilities, and thinking "outside the box." In IIT, this translates to designing alternative algorithms, developing different approaches to problem-solving, and exploring unconventional applications of technology. Divergent thinking is often assessed through tasks requiring fluency (number of ideas), flexibility (variety of ideas), originality (uniqueness of ideas), and elaboration (detail and complexity of ideas).
- **Convergent Thinking:** This focuses on identifying the single best solution from a range of possibilities. In IIT, this is crucial for selecting the most efficient algorithm, optimizing code for performance, and choosing the most appropriate technology for a specific task. Convergent thinking often relies on analytical skills and logical reasoning.
- **Problem Finding:** Before generating solutions, individuals need to identify problems. In IIT, this involves recognizing areas for improvement in existing systems, identifying unmet user needs, and anticipating future challenges. This requires critical thinking skills and a deep understanding of the domain.
- **Knowledge Domain:** Creativity isn't solely innate; it's heavily influenced by prior knowledge and expertise. A strong foundation in programming languages, algorithms, data structures, and relevant IIT concepts is essential for generating creative solutions. The more extensive a student's knowledge base, the more diverse and sophisticated their creative outputs can be.
- **Cognitive Flexibility:** The ability to switch between different perspectives, approaches, and problem-solving strategies is crucial for creativity. In IIT, this means being able to adapt to changing requirements, explore different programming paradigms, and integrate diverse technologies into a cohesive system.
- **Mental Imagery and Visualization:** The ability to mentally represent and manipulate information is essential for designing user interfaces, visualizing algorithms, and debugging complex code. Visualizing the structure and flow of a program aids in problem-solving and creative design.

Affective and Motivational Factors

Beyond cognitive processes, affective and motivational factors significantly influence creative ability:

- **Intrinsic Motivation:** Individuals who are intrinsically motivated—driven by internal rewards such as curiosity, interest, and enjoyment—are more likely to engage in creative activities. Creating a learning environment that fosters curiosity, allows for student choice, and celebrates effort rather than just outcome is essential.
- **Self-Efficacy:** Belief in one's ability to succeed is a powerful motivator. Students who believe they can generate creative solutions are more likely to attempt challenging tasks and persevere through setbacks. Providing appropriate scaffolding, positive feedback, and opportunities for success enhances self-efficacy.
- **Risk-Taking and Tolerance for Ambiguity:** Creativity often involves taking risks and

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 12, December 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

embracing ambiguity. Students need to feel safe to experiment, make mistakes, and learn from their failures without fear of judgment. Creating a supportive and encouraging classroom climate is crucial.

- **Curiosity and Openness to Experience:** Creative individuals are often curious and open to new experiences. Exposing students to diverse technologies, perspectives, and problem-solving approaches fosters creativity.

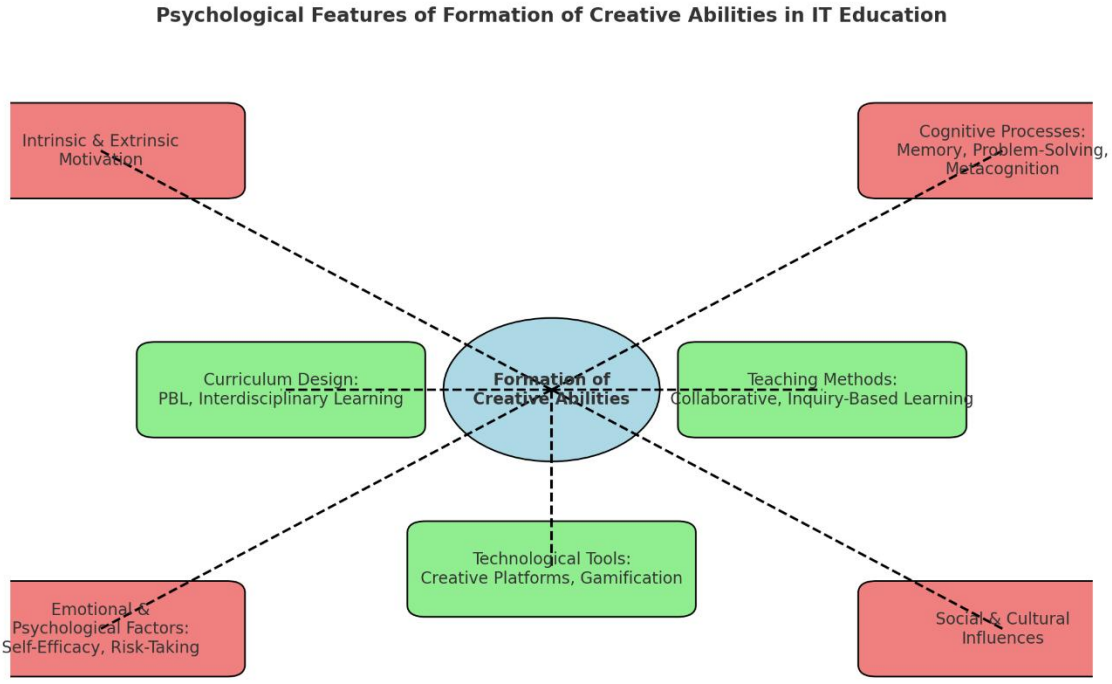

Figure 1. Psychological Features of Formation of Creative Abilities in IT Education

This figure illustrates the psychological features involved in the formation of creative abilities within the teaching of informatics and information technologies. The central component, "Formation of Creative Abilities," is connected to key psychological factors and educational strategies:

1. Psychological Factors:

Intrinsic & Extrinsic Motivation

Cognitive Processes: Memory, Problem-Solving, Metacognition

Emotional & Psychological Factors: Self-Efficacy, Risk-Taking

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 12, December 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

Social & Cultural Influences

2. Educational Strategies:

Curriculum Design: PBL, Interdisciplinary Learning

Teaching Methods: Collaborative and Inquiry-Based Learning

Technological Tools: Creative Platforms, Gamification

Social and Environmental Influences

The social and environmental context significantly impacts the development of creative abilities:

- **Teacher's Role:** Teachers play a crucial role in fostering creativity by providing appropriate instruction, creating a supportive learning environment, and offering opportunities for students to explore their ideas. Teachers who model creative problem-solving and encourage risk-taking inspire students to be more creative.
- **Peer Interaction:** Collaboration with peers provides opportunities for idea generation, feedback, and mutual support. Group projects, peer programming, and collaborative learning activities stimulate creative thinking.
- **Classroom Climate:** A supportive and inclusive classroom climate where students feel safe to express their ideas, take risks, and make mistakes is essential for fostering creativity. Encouraging constructive criticism and celebrating diverse perspectives are crucial.
- **Access to Resources and Technology:** Access to appropriate technology, software, and resources is essential for students to explore their creative ideas and develop innovative solutions.

Pedagogical Strategies for Fostering Creativity in IIT

Several pedagogical strategies can effectively enhance the development of creative abilities in IIT education:

- **Problem-Based Learning (PBL):** Presenting students with open-ended problems that require them to develop creative solutions. This encourages divergent thinking and problem-solving skills.
- **Project-Based Learning (PBL):** Engaging students in long-term projects that allow them to explore their interests and apply their knowledge in creative ways.
- **Design Thinking:** Using a design thinking framework to approach problem-solving, emphasizing user-centered design and iterative prototyping.
- **Game Design and Development:** Engaging students in the design and development of games, which inherently requires creativity, problem-solving, and collaboration.
- **Maker Activities:** Providing opportunities for students to build and create physical devices and applications, fostering hands-on learning and creativity.
- **Open-Ended Programming Assignments:** Assigning programming tasks with multiple correct solutions, encouraging students to explore different approaches and develop their own

JOURNAL OF APPLIED SCIENCE AND SOCIAL SCIENCE
eISSN 2229-3113 pISSN 2229-3205
Volume 14 Issue 12, December 2024
Impact factor: 2019: 4.679 2020: 5.015 2021: 5.436, 2022: 5.242, 2023: 6.995, 2024 7.75

creative solutions.

Assessment of Creative Abilities in IIT

Assessing creativity in IIT requires going beyond traditional methods:

- **Portfolio Assessment:** Collecting a portfolio of student work, demonstrating the evolution of their creative abilities over time.
- **Product-Based Assessment:** Evaluating the originality, functionality, and user-friendliness of student-created products, such as software applications, websites, or games.
- **Process-Based Assessment:** Evaluating the creative process itself, considering the student's approach to problem-solving, their ability to generate multiple ideas, and their perseverance in the face of challenges.
- **Peer and Self-Assessment:** Encouraging students to provide feedback on each other's work and reflect on their own creative processes.

Conclusion. Fostering creativity in IIT education requires a multifaceted approach that considers cognitive, affective, and social-environmental factors. By understanding the psychological processes involved in creative ability development and implementing appropriate pedagogical strategies, educators can create learning environments that empower students to become innovative thinkers, problem-solvers, and creators. Ongoing research into the specific cognitive mechanisms underlying creativity in IIT, coupled with the development of effective assessment methods, will continue to refine our understanding and enhance our ability to nurture creative talent in the field.

References

1. Runco, M. A. (2014). *Creativity: Theories and themes: Research, development, and practice*. Elsevier.

2. Guilford, J. P. (1967). *The nature of human intelligence*. McGraw-Hill.

3. Brown, T. (2009). *Change by design: How design thinking transforms organizations and inspires innovation*. Harper Business.

4. Barrows, H. S., & Tamblyn, R. M. (2009). *Problem-based learning: An approach to medical education*. Springer Science & Business Media.

5. Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, *11*(4), 227-268.

6. Bandura, A. (1997). *Self-efficacy: The exercise of control*. W. H. Freeman.

7. Sternberg, R. J. (2012). *Cognitive psychology*. Cengage Learning.

8. Resnick, M. (2007). *Sowing the Seeds for a More Creative Society*. International Society for Technology in Education.