The OSCAR PUBLISHING Services
International Journal of Pedagogics

VOLUME Vol.05 Issue12 2025
PAGE NO. 240-243
DOI 10.37547/ijp/Volume05Issue12-66

Components And Educational Opportunities Of Forming Cognitive And Metacognitive Activity Related To The Generation Of Ideas In Students

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Received: 23 October 2025; **Accepted:** 13 November 2025; **Published:** 18 December 2025

Abstract: This article discusses the main components of cognitive and metacognitive activity that activate the process of idea generation in students, as well as their educational and educational potential. The article analyzes the role of processes such as metacognitive control, self-analysis, and reflection in increasing the effectiveness of students' thinking. It also examines the mechanisms of creating new ideas through constructive thinking, and methods of verifying, substantiating, and developing ideas through critical thinking. The article emphasizes these three types of thinking as an important factor in forming a creative approach in students, developing independent decision-making skills, and ensuring the innovativeness of the educational process. The article provides methodological recommendations for teachers and attempts to reveal pedagogical conditions and effective didactic tools that serve to develop idea generation in students.

Keywords: Cognitive activity, metacognitive activity, idea generation, constructive thinking, critical thinking, creative approach, reflection, educational process, innovative education, pedagogical conditions.

Introduction: Idea generation is the process of creating innovative solutions to problems, developing new concepts, and putting forward original ideas, based on the synthesis of a person's thinking, experience, imagination, intellect, and existing information.

This process is based on, on the one hand, the individual cognitive abilities of a person, and on the other hand, the possibilities of social communication, collective thinking, and collaborative activity. Accordingly, idea generation is both a process of managing individual thinking and an active manifestation of collective intelligence.

From a scientific point of view, an idea is an intellectual activity aimed at creating a new combination of knowledge, reinterpretation of existing experience, or unknown solutions.

Idea generation is explained by a number of situations. They are:

- reinterpretation of existing knowledge and information;

- identification of unusual connections between facts;

- analysis of the product of imagination that arises through inspiration;

- expression of creative ideas in the form of theoretical and practical models.

It is clear that idea generation is the main mechanism of creative thinking and is the main direction of modernization of education.

The content of idea generation is explained based on the following principles.

Divergent thinking is a cognitive activity that involves developing many solutions to a problem in different directions. The famous American psychologist J. Gilford evaluated this process as an intellectual measure of creativity.

Creativity and inventive activity - ideas arise as a result of the direct creation of ideas or the discovery of the hidden side of an existing phenomenon. According to Einstein, “Imagination is more important than knowledge, because knowledge is limited.”

It is known that the generation of ideas is not only the product of scientific analysis. In most cases, it arises as a result of:

- intuitive intuition;

- imagination;

- emotional perception.

Subsequently, the cognitive activity related to logical interpretation is strengthened through activity. Within the framework of idea generation, the problem is assessed as an opportunity to provide a solution. The problems posed in the process of idea generation are manifested as an opportunity to create innovation.

Transformation - this activity is carried out by assigning new meaning to existing situations.

Idea generation, according to its pedagogical essence, allows:

a) to create unique ideas, thoughts;

b) to find solutions to problems based on systematic thinking;

d) to direct one's actions to improve things, objects;

e) to use existing tools for new purposes.

The process of generating ideas was originally studied in psychology because it is an important aspect of human thinking. Initially, it was explained in connection with the concept of divergent thinking. Research shows that divergent thinking is the ability to not be limited to a single, traditional or predetermined solution to a problem, but, on the contrary, to search for solutions in different directions, in many options, to develop alternative ideas, and to propose unusual products of thought. Such a thinking process expands the scope of students' imagination, encourages them to look for new approaches, put forward ideas, and allows them to achieve original results that are not observed in real life and practical activities.

The famous American psychologist Joy Paul Guilford assessed divergent thinking as one of the most important intellectual components of creativity. According to him, creative thinking, first of all, includes the process of developing various ideas in many combinations, using them, giving them new meaning, and integrating them with existing experience. According to Guilford's theory, creativity is not only about creating a unique product and achieving results, but also about the ability to demonstrate the ability to offer several alternative directions and solutions to technical, spiritual, social, or everyday problems. From this point of view, divergent thinking is an activity that involves looking at problems from the outside in an unusual way, giving them new meaning, and interpreting existing experiences in a new way.

Divergent thinking has pedagogical and psychological significance. Its psychological significance is directly related to the flexibility of a person's thinking, and is determined by a person's ability to think freely, free from stereotypes, quickly find unusual associations, accept abstraction, and think in conditions of uncertainty. The pedagogical essence of divergent thinking is manifested in enriching the content of education with innovative approaches, creating an environment of free thinking during the lesson, and encouraging the student to develop independent solutions. Divergent thinking frees students from stereotyped approaches, teaches them not to be afraid of uncertainty, and to find logical harmony between different opposing opinions.

From a pedagogical point of view, the significance of divergent thinking is manifested in several main areas.

Firstly, it serves as an internal mechanism for creative thinking and creative activity. Students who have such thinking skills approach issues not in a one-sided, but in a multifaceted way, create new associations based on existing knowledge, and can express their thoughts in a natural way.

Secondly, divergent thinking forms the competence of students to find complex solutions to problems, since real-life situations are often complex, ambiguous, and require several alternative solutions. The formation of such skills in the educational process serves to prepare the student for future professional activities.

Thirdly, divergent thinking supports a culture of dialogue, free communication, and diversity of opinions in the pedagogical process. Methods such as interactive communication between the teacher and the student, group work, mediation, analysis of problem situations, and project-based learning teach students to listen to each other, compare opinions, and develop a culture of debate. As a result, the student's assimilation of social experience becomes more effective.

The pedagogical significance of divergent thinking is incomparable, it increases the internal motivation of the student. It allows students to feel enthusiasm, interest and appreciation of their own opinion in the process of promoting ideas, arguing, and creative processes. A person whose idea is recognized is actively involved in education, perceives the learning process as his own personal activity. This is fully consistent with the principles of constructivist pedagogy. Constructive pedagogy is a theory that ensures that the educational process is organized on the basis of the active cognitive experience of the student, in which knowledge is not given in a ready-made form, but is independently “constructed” through the student’s personal experience, observation, analysis, drawing conclusions, individual communication and social cooperation. This theory was formed, first of all, on the basis of the ideas of cognitive constructivism of J. Piaget and the views of

social constructivism of L.S. Vygotsky.

Constructive pedagogy interprets students as active producers of knowledge, not passive recipients, as subjects of their own cognitive process. According to this theory, knowledge is not a finished product that is placed in the mind from the outside, but a dynamic construct that arises through the life experience, thinking and cognitive process of each student.

Constructive education:

1. Develops creativity and divergent thinking.

2. Turns the student into an active learning subject.

3. Connects education with life situations.

4. Serves to form metacognitive skills in students - skills of self-reflection, control, and planning of activities.

5. Creates the basis for independent learning.

Constructive pedagogy is based on the idea of shifting the quality of education from the center of the lesson to a student-centered approach. This is the main paradigm of person-centered education.

In the process of divergent thinking, students develop metacognitive skills in the educational process. Metacognitive skills, in turn, serve to formalize the skills of controlling the ideas that arise in them, applying the acquired knowledge in new conditions.

With the formation of metacognitive skills, students have the opportunity to understand, manage and control the essence of their thinking processes. They also master cognitive strategies, and are able to consciously regulate the processes of learning, mastering and finding solutions to problems. The concept of metacognitive skills was first introduced into pedagogical use by J. Flavell in the 70s of the last century. Metacognitive skills provide students with the ability to independently acquire knowledge, plan, regularly monitor, evaluate, and self-regulate their learning activities.

Metacognitive skills consist of the following components:

1. Metacognitive knowledge:

- Declarative knowledge (what do I know?).

- Process-related knowledge (how do I do it?).

- Conditional knowledge (when and why do I use it?).

2. Metacognitive monitoring and control. The student monitors his cognitive activity during the process, identifies errors, and assesses difficulties.

3. Self-regulation. Choosing a problem-solving strategy, deciding whether to stop, restructure, or continue the learning process.

These components of cognitive activity are integrative in nature and make students active subjects of the learning process.

Research shows that students with metacognitive skills:

- consciously choose learning strategies;

- use a divergent and reflexive approach to problem solving;

- accept mistakes as opportunities for development;

- evaluate learning as a process, not just a result;

- evaluate long-term memory and knowledge as a transfer mechanism or transfer to a new situation.

Metacognitive skills formed in students are the cognitive basis of critical assessment, creativity, independent learning and self-assessment competencies. In international educational standards, these skills are included in the “21st century competencies of student readiness”.

Metacognitive skills in students are formed through the use of certain strategies in the educational process. These are:

- keeping reflective notes and diaries;

- finding answers to monitoring questions (“why am I doing this?”);

- problem-based learning;

- analyzing learning strategies;

- working on metacognitive dialogue and question-and-answer scenarios;

- higher-level thinking exercises.

Metacognitive approach For teachers, it is not just about transferring knowledge to students, but also about developing and using questions that guide the creative use of knowledge, its application in new situations, and activating cognitive processes.

Metacognitive skills are the ability of students to understand the essence of their own cognitive activity and consciously manage it. These skills serve as a necessary basis for the reflexive development of students' minds, educational effectiveness, independent learning, and the formation of lifelong learning competencies. The metacognitive approach directs the educational process to students' assimilation of information, directing them to self-directed active thinking.

In a word, idea generation is a complex, multi-stage cognitive, educational process that occurs as a result of the synthesis of the student's thinking, imagination, social experience, knowledge, and social interaction. It cultivates responsibility, endurance, patience, and intellectual activity and responsiveness in students, along with creativity. Accordingly, the process of idea

generation is carried out through the integration of metacognitive management, constructive experience, and divergent thinking. This integrative approach serves to form the competencies of creativity, critical thinking, self-management, creative responsibility, and problem solving in the student. As a result of idea generation, the educational process transforms knowledge from a passive transfer into a process of active intellectual cooperation. Idea generation serves to justify its educational and educational significance as an expression of a pedagogical paradigm that meets the requirements of the 21st century.

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