European Journal of Innovation in Nonformal Education (EJINE)
Volume 6 | Issue 5 | May - 2026 ISSN: 2795-8612

Methodology for Applying Cognitive and Metacognitive Strategies in Developing Independent Learning Activities

Boymanov Hoshim Isroilovich
Lecturer, Department of Primary and Preschool Education Methodology,
Faculty of Pedagogy,
Samarkand State Pedagogical Institute, Uzbekistan
Tel: +998 97 285 67 43
E-mail: boymanovhoshim1986@gmail.com

Abstract

This article analyzes the methodological foundations of integrating cognitive and metacognitive strategies in the development of independent learning activities. It examines the role of interactive methods, reflective approaches, and modern pedagogical technologies in enhancing the effectiveness of independent learning. In addition, the paper illustrates the didactic potential of implementing these strategies through practical examples from native language and mathematics education.

Publishing Co. All rights reserved. © 2026

ARTICLE INFO

Article history:
Received 15 Mar 2026 **Received** in revised form 10 Apr 2026
Accepted 30 May 2026

Keywords: independent learning, cognitive strategies, metacognitive strategies, teaching methodology, reflection, self-monitoring, interactive methods, pedagogical technologies, competency-based approach.

Introduction

In the modern education system, independent learning is expected to develop students not only as recipients of knowledge but also as active learners who are capable of planning, monitoring, and evaluating their own learning process. In this context, the integration of cognitive and metacognitive strategies has become increasingly important. Cognitive strategies facilitate the acquisition, organization, and retention of knowledge, whereas metacognitive strategies enable learners to plan, monitor, and evaluate their own learning activities. By combining these strategies, students simultaneously engage in two complementary processes: they acquire new knowledge while continuously monitoring and regulating their learning performance.[1][2]

For example, during text analysis, cognitive strategies help learners identify the main ideas and key concepts, while metacognitive strategies encourage them to ask reflective questions such as, “Have I understood the main idea correctly?” and “Is my conclusion accurate?” Consequently, the integration of cognitive and metacognitive strategies in independent learning enhances learning effectiveness, fosters critical and creative thinking, and promotes students' intellectual and personal development.[3][4]

Methodology

The need to integrate cognitive and metacognitive strategies into independent learning is closely associated with contemporary educational paradigms. First, the competency-based approach defines educational outcomes not only in terms of knowledge and skills but also in terms of learners' ability to apply them in new situations. This requires the use of cognitive strategies for meaningful knowledge acquisition and metacognitive strategies for monitoring, regulating, and refining the learning process. Similarly, the learner-centered educational paradigm places students at the center of the learning process, taking into account their individual characteristics, interests, and learning styles.[5][6]

The application of cognitive and metacognitive strategies has been widely investigated in both international and national educational research and has been implemented through various methodological approaches. Internationally, scholars such as John Dewey, Jerome Bruner, Barry J. Zimmerman, and Paul

R. Pintrich have established the theoretical foundations for integrating cognitive and metacognitive processes into independent learning. For instance, Zimmerman's model of self-regulated learning combines cognitive strategies, including text analysis, concept mapping, and association, with metacognitive strategies such as reflection and self-monitoring. Furthermore, educational institutions across Europe and the United States have increasingly adopted innovative tools, including online learning platforms, electronic portfolios, and intelligent tutoring systems, to support independent learning.[7]

In national educational practices, greater attention is paid to the moral, ethical, and social aspects of independent learning. Scholars such as A. Abduqodirov, N. Azizkhodjayeva, and Sh. Turdiyev emphasize the importance of enhancing students' cognitive activity through interactive methods (clusters, quests, and case studies), while simultaneously developing their ability to regulate their own cognitive processes and engage in reflective analysis through metacognitive strategies. Thus, while international practices primarily justify the integration of strategies from technological and methodological perspectives, national experiences combine these strategies with educational values, social responsibility, and national traditions. The synthesis of these two approaches contributes to improving the effectiveness of independent learning methodology.[8]

Results

The integration of cognitive and metacognitive strategies in the process of independent learning ensures a comprehensive and effective learning experience for students. Cognitive strategies involve organizing information through memorization, note-taking, schematization, and associations, whereas metacognitive strategies are closely related to monitoring the learning process, reflection, and goal setting.[10]

The effectiveness of integrating cognitive and metacognitive strategies can be demonstrated through the example of studying the topic "Direct Speech" in the native language subject. At the beginning of the lesson, students consolidate their knowledge by recording rules and examples. For instance, when the teacher explains the rule: "Direct speech is usually placed within quotation marks, and it can be followed by the author's words," students write down this information in their notebooks. This process represents a cognitive strategy, as it helps students acquire and retain knowledge.[11]

After that, students create their own examples based on the learned rule:

Alisher said: "I am very interested in reading books"

"Do not be late for the lesson," said the teacher.

Here, the cognitive process continues as students apply the acquired knowledge in practice. However, the most significant stage involves the activation of metacognitive strategies. Students engage in self-questioning and reflection by asking:

"Have I understood the rule correctly?"

"Have I used quotation marks and punctuation correctly in my example?"

"Does my example comply with the rules of direct speech?"

These questions do not limit students to simply memorizing knowledge; rather, they encourage them to monitor and regulate their own cognitive processes. If students identify mistakes in their work, they have the opportunity to review and correct them. For example, if a student incorrectly uses quotation marks or punctuation, they can revisit the rule, analyze the mistake, and make the necessary corrections. Thus, in the process of learning the topic "Direct Speech," cognitive strategies (note-taking and providing examples) and metacognitive strategies (reflection and self-assessment) are applied in an integrated manner. This approach develops not only students' ability to memorize rules but also their skills in applying them correctly and analyzing their own performance.[12][13]

Discussion

The process of solving mathematical problems provides an effective environment for the integrated development of students' cognitive and metacognitive processes. First, as a cognitive strategy, students organize the stages of problem solving and perform each operation in a logical sequence. For example, when solving a quadratic equation, students follow these steps:

Convert the equation into standard form.

Calculate the discriminant.

Apply the appropriate formula to determine the roots.

Verify the obtained result.

In this process, schematization and algorithmization function as cognitive strategies because they help students organize knowledge, retain it in memory, and apply it in practice. However, after finding the solution, the process is further enhanced through metacognitive strategies. Students ask themselves reflective questions:

"At which stage did I experience difficulties?"

"Which formula did I apply correctly and effectively?"

"If I used another method for this problem, would I achieve the result faster?"

"If I made a mistake, what was the reason behind it?"

Seeking answers to these questions represents a process of reflection and self-analysis. For example, if a student realizes that an error occurred while calculating the discriminant, they analyze the stage at which the mistake was made and practice again in order to prevent similar errors in the future.[14]

Furthermore, during metacognitive analysis, students can compare different solution methods. For instance, if one student solves a problem using a graphical method while another uses a formula-based approach, the learner can reflect on which method is more effective and which one better corresponds to their own learning style.

Therefore, in mathematical problem solving, cognitive strategies support the systematic application of knowledge and finding solutions, whereas metacognitive strategies contribute to evaluating the solution process, analyzing mistakes, and identifying more effective approaches for future tasks. As a result of integrating these strategies, students develop not only as problem solvers but also as individuals who consciously manage and regulate their own learning processes.[15]

Conclusion

The research findings demonstrate that the integration of cognitive and metacognitive strategies is an important methodological factor in effectively organizing independent learning activities. Cognitive strategies contribute to students' acquisition, organization, and practical application of knowledge, while metacognitive strategies develop their abilities to plan, monitor, evaluate, and improve their own learning activities. The practical approaches presented through examples from native language and mathematics education confirm the effectiveness of these strategies in developing students' independent thinking, problem-solving skills, and reflective analysis competencies. Therefore, integrating cognitive and metacognitive strategies into the educational process is considered one of the essential conditions for developing students' independent learning competencies and improving the quality of education.

References:

1. M. Flavell, Independent Learning and Personal Responsibility in Modern Education. London, U.K.: Routledge, 2005.
2. A. F. Hadwin and M. Oshige, "Self-regulation, co-regulation, and socially shared regulation: Exploring perspectives of social in self-regulated learning theory," Teachers College Record, vol. 113, no. 2, pp. 240–264, 2011.
3. J. Hattie, Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement. London, U.K.: Routledge, 2009.
4. P. Jarvis, Adult and Continuing Education: Theory and Practice. London, U.K.: Routledge, 1995.
5. D. Rakhmatov, Developing Students' Independence Skills Based on Creative Educational Technologies. Tashkent, Uzbekistan: Iste'dod Publishing House, 2020.
6. D. D. Rakhimova, Formation of Creative Independence of School Students in the Educational Process, Ph.D. dissertation, Tashkent, Uzbekistan, 2019.
7. J. H. Flavell, "Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry," American Psychologist, vol. 34, no. 10, pp. 906–911, 1979.
8. B. J. Zimmerman, "Becoming a self-regulated learner: An overview," Theory Into Practice, vol. 41, no. 2, pp. 64–70, 2002.

9. P. R. Pintrich, “The role of motivation in promoting and sustaining self-regulated learning,” International Journal of Educational Research, vol. 31, no. 6, pp. 459–470, 1999.
10. A. Bandura, Self-Efficacy: The Exercise of Control. New York, NY, USA: W. H. Freeman, 1997.
11. B. Zimmerman and D. H. Schunk, Eds., Self-Regulated Learning and Academic Achievement: Theoretical Perspectives, 2nd ed. Mahwah, NJ, USA: Lawrence Erlbaum Associates, 2001.
12. P. H. Winne and A. F. Hadwin, “Studying as self-regulated learning,” in Metacognition in Educational Theory and Practice. Mahwah, NJ, USA: Lawrence Erlbaum Associates, 1998, pp. 277–304.
13. D. H. Schunk and J. A. Greene, Eds., Handbook of Self-Regulation of Learning and Performance, 2nd ed. New York, NY, USA: Routledge, 2018.
14. J. Bruner, The Process of Education. Cambridge, MA, USA: Harvard University Press, 1960.
15. L. S. Vygotsky, Mind in Society: The Development of Higher Psychological Processes. Cambridge, MA, USA: Harvard University Press, 1978.