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Article

Possibilities of Using Cognitive and Metacognitive Strategies in The Learning Process

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Abstract: This article studies the integrated role of cognitive and metacognitive strategies in increasing the effectiveness of independent learning activities. The interaction of these strategies in developing students' ability to self-manage the learning process and the methodology of their practical application are studied. The results of the study show that the integration of cognitive and metacognitive strategies raises students' independent learning activities to a qualitatively new level.

Keywords: Independent learning, cognitive strategies, metacognitive strategies, integration, self-management, reflection, educational methodology, pedagogical technologies.

1. Introduction

In the modern educational process, cognitive and metacognitive strategies are becoming one of the pedagogical tools that are not only studied theoretically, but also increasingly widely used in practice. They are of great importance in raising the student's learning activity from passive reception to the level of active search and self-management [1]. While cognitive strategies are mainly related to the methods of acquiring and processing knowledge , metacognitive strategies serve the student to plan, monitor and evaluate his own learning process . In this regard, their role in the educational process is to form the student not only as a "learner", but also as a "manager of the learning process".

Practice shows that the harmonious use of cognitive and metacognitive strategies enhances the student's ability to deeply assimilate knowledge, apply it in new situations, think independently and find creative solutions [2]. This is a key factor in increasing the effectiveness of independent educational activities. In modern pedagogy, the educational process is considered a multifaceted and dynamic system. In this system, not only the transfer of knowledge is prioritized, but also the intellectual, social and spiritual development of the individual. Therefore, combining cognitive and metacognitive strategies rather than using them separately is a modern requirement [3]. Because while cognitive strategies develop the student's deep assimilation of knowledge and logical thinking skills, metacognitive strategies teach the student to monitor his or her own learning process, realize his or her mistakes, and choose the right direction. Only when these two processes are combined can the student truly develop the ability to independently learn and self-manage.

In world pedagogical practice, great attention is paid to the harmonious use of cognitive and metacognitive strategies [4]. For example, in Finland, reflective diaries and thought maps are adapted to the lesson processes, through which the student simultaneously both acquires knowledge in a structured way (cognitive) and analyzes the process of self-learning (metacognitive). In the Singaporean education system, the “Problem-based learning” model is widely used: in this process, the student collects

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information from various sources to solve a problem, processes it (cognitive), then evaluates his solution process and makes the necessary changes (metacognitive) [5].

Memorization and repetition strategies are one of the most basic and most widely used forms of cognitive methods. These strategies serve to systematically organize the student's learning process in the educational process, to sort the information received and to firmly retain it in memory. As shown in pedagogical and psychological science, human thinking forms a stable memory structure through associative connections and repetition in the process of receiving and processing information [6]. Therefore, memorization and repetition strategies are the first step in the student's learning process - It serves the purpose of consistently gathering mental information, selecting the most important ones, and consolidating them through notes .

The importance of these strategies in the modern education system is that they prevent the student from mechanical memorization and direct him to the assimilation of information in its content. For example, by isolating the main idea from the text, the student focuses on the main meaning, not on each sentence; while the use of keywords helps to remember a large amount of information in a concise and structured way [7].

The school curriculum offers a wide range of opportunities for the use of memorization and repetition strategies in various subjects. Their peculiarity is that each subject requires different skills from students: for example, sorting out ideas and focusing on meaning in the mother tongue and literature, memorizing processes step by step in the natural sciences, chronological sequence and remembering key figures in history. In this regard, memorization and repetition strategies are adapted to the content of each subject and serve as a universal tool in the student's general knowledge acquisition process [8].

the subjects of mother tongue and literature, memorization and repetition strategies are particularly important.

in natural sciences is important in activating students' cognitive processes. In particular, the strategy of using keywords helps to master complex natural processes in a consistent and systematic way. For example, let's take the topic “Photosynthesis Process” from biology . During the lesson, the teacher presents the students with the main keywords: “chlorophyll” , “sunlight” , “carbon dioxide” (SO_2) and “oxygen” . These keywords act as signals that determine the main stages of the process [9]. The teacher suggests creating a consistent scheme of the photosynthesis process based on these words. For example:

sunlight is absorbed by chlorophyll in plant leaves ;

Carbon dioxide and water in the air are processed based on the energy of chlorophyll;

As a result, glucose is formed , which serves as an energy source ;

As a result of the process, oxygen is released into the air.

By using keywords, the student remembers the process step by step and makes logical connections between them. For example, when you say “chlorophyll,” you immediately associate it with “absorbing sunlight and converting it into energy,” and when you say “carbon dioxide,” you immediately associate it with “the main substance for photosynthesis.” This method not only increases memory efficiency, but also allows the student to apply the process to new situations [10].

For example, a student might answer the question, “Why are forests the “lungs” of the Earth?” by explaining the process of photosynthesis and emphasizing the importance of plants as a source of oxygen . In short, the strategy of using keywords in the natural sciences allows the student to understand the processes in context and connect them with real-life examples, rather than simply memorizing knowledge. This further increases the practical value of cognitive strategies in independent learning.

In the process of studying the topic “Development of science and culture during the Temurid era” in history , one of the strategies for memorization and repetition is the exercise of establishing chronological and spiritual connections based on keywords . For example, students are presented with keywords such as “Temur”, “Ulug'bek”, “observatory”, “scientific school”, “madrasa”. These words act as a signal for the student to establish logical connections between the main events and individuals in the topic [11]. During the lesson, the teacher uses these keywords to guide students to establish

connections based on a consistent historical order and spiritual content. For example, the word “Temur” reminds of the establishment of a centralized state in the country and its policy of supporting science and culture, while the name “Ulug'bek” is consolidated in memory as a great ruler-scientist who achieved great achievements in the fields of astronomy and mathematics. The keyword “observatory” refers to the scientific center built by Ulugbek in Samarkand, and the term “scientific school” refers to the community of astronomers and mathematicians that formed around this observatory. The keyword “madrasa” refers to the process of the spread of knowledge and spiritual maturity as the main centers of science and enlightenment during this period [12].

2. Materials and Methods

Through this, the student, rather than mechanically memorizing the main facts and processes on the subject, systematizes them based on chronological consistency and spiritual content and stores them in memory. Such an approach to studying history allows not only to memorize a list of facts, but also to understand the interrelationship of historical events and feel their spiritual significance. Thus, the exercise of making connections based on keywords in history develops the student's ability to think independently, analyze and generalize, rather than mechanically.

In general, memorization and repetition strategies form the student not just as a repeat learner, but as a subject who can extract the main idea from the text, make logical connections from key words, and consolidate knowledge in content. This is an important first step in the process of independent learning.

3. Result and Discussion

Association and visualization strategies are effective cognitive strategies that allow the learner to systematize information, understand the connections between them, and store them firmly in memory. Representing knowledge through schemas, mind maps, and clusters transforms the learner from a passive receiver into an active analyst [13].

The use of mind maps in the subjects of mother tongue and literature allows students to effectively organize the process of working with the text. If students are working on a work of art, a mind map allows them to understand the content and structure of the work as a whole. In this process , the title of the work is written in the center and the main branches related to it are separated. For example , heroes The main characters involved in the work, their characteristics and relationships are determined through the network. For example, in the epic poem "Farhod and Shirin", separate branches are allocated for the characters of Farhod, Shirin and Mehinbonu, and their characters and actions are written. A plot is constructed in a coherent manner through a chain of events [14]. This helps the reader to record events in chronological order and understand cause-and-effect relationships.

The main idea network serves to define the spiritual and moral ideas put forward in the work. For example, in Navoi's ghazals, ideas such as decency, patriotism, and humanity are highlighted. The author's purpose network helps to express the main reason for the creation of the work, the author's social and spiritual position. In this way, the reader is not limited to just reading the work, but also sees its internal structure, understands the relationships between the characters, and harmonizes the idea and content with the author's intention. This creates the opportunity to deeply analyze the literary text, draw independent conclusions from it, and most importantly, re-understand the work through personal reflection. Thus, the use of thought cards in literary studies serves as a cognitive strategy aimed at consistently understanding the structure and spiritual value of the work , not a mechanical process of memorization. This method develops the reader not only as a knowledge acquirer, but also as an independent analyst and creative thinker.

The use of visualization methods in natural sciences makes it easier for students to understand complex processes and phenomena. Because this method is based on presenting information not through words, but through images, diagrams, clusters or mind maps [15]. This allows the student to visualize theoretical knowledge, understand

the connections between them, and retain it in memory. For example, the use of diagrams is very effective in studying the topic “Circulatory System” in biology . Students are shown the path of human blood in a diagram, in which the connection of the heart with blood vessels, the movement of blood through arteries and veins, and the large and small circles of blood circulation are consistently depicted. In this process, the student not only memorizes the path of blood through text, but also vividly imagines it before his eyes. For example, the fact that the large blood circulation begins through the aorta and supplies blood to all tissues of the body, and the small blood circulation occurs through the lungs, is visually understood. As a result, the student will master a complex physiological process in a logical and systematic manner.

In geography , the cluster method is effective in the topic "Climate zones". During the lesson, the teacher identifies the main climatic zones on the basis of a map and represents their characteristic features through networks. For example:

e equatorial zone – constant high temperature, high humidity, flora and fauna of tropical forests ;

tropical zone – dry climate, deserts and saharas, specially adapted fauna such as cacti and porcupines;

mid-latitudes – four seasons, forest and field plants, various agricultural products;

polar zones – low temperatures, glaciers, tundra flora, and animals adapted to the cold climate.

With the help of such a cluster, the student can easily compare the characteristics of each climate zone and understand the differences between them. This process helps to assimilate knowledge through imagination and building logical connections, rather than mechanical memorization .

The use of visualization strategies in natural sciences allows students to perceive complex processes and phenomena in a simple, coherent, and structured way. This serves to deepen the understanding of knowledge and connect it with real-life examples during independent learning.

4. Conclusion

In conclusion, it can be said that while foreign experiences build the learning process on the basis of digital technologies and autonomy, local experiences combine it with spiritual and social education. The most effective way is to synthesize these two experiences.

The use of cognitive and metacognitive strategies in the classroom significantly increases the effectiveness of the student's cognitive activity. Through cognitive strategies, the student consistently perceives, sorts, consolidates in memory, and develops the ability to apply knowledge in new situations. Metacognitive strategies, on the other hand, create the opportunity to plan, control, and evaluate this process, forming the student not as an object of knowledge, but as a subject managing the process of self-learning.

The harmonious use of these two types of strategies in the process of independent learning ensures not only the effectiveness of the student's knowledge acquisition, but also his social and spiritual development. Because while cognitive processes are aimed at mastering the content of knowledge, metacognitive processes provide the opportunity to consciously control it and correctly apply it in life situations. As a result, the student develops such important competencies for the 21st century as independent thinking, responsible decision-making, critical analysis and creative approach. Therefore, the harmonious use of cognitive and metacognitive strategies is a key factor in organizing the independent learning process in accordance with modern requirements, and in forming the student as an active, responsible and spiritually mature person.

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