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DEVELOPMENT INTEREST IN PHYSICS IN GENERAL SECONDARY SCHOOL STUDENTS USING METACOGNITIVE SKILLS

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Article history:		Abstract:
Received:	11th August 2024	This article explores the importance of developing metacognitive activities in students during physics lessons in general education schools. The article provides a detailed explanation of the concept of metacognitive activities, their impact on students' learning processes, and methods to enhance these activities. Through metacognitive activities, students can improve their ability to monitor their own learning, self-assess, and think independently. This, in turn, plays a significant role in enhancing their success in physics. This article can be particularly useful for teachers seeking effective strategies to teach physics.
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INTRODUCTION.

The focus on the educational system in our country, fundamental reforms, the creation of organizational and pedagogical conditions and material and technical base of training, the provision of qualified personnel, the extensive use of international advanced experience, resulted in the widespread introduction of innovative educational technologies into educational activities. It is also felt that the physical science needs to put into practice teaching methods aimed at developing metacognitive activities. This further increases the need to improve students' metacognitive skills in teaching physics in general education schools.

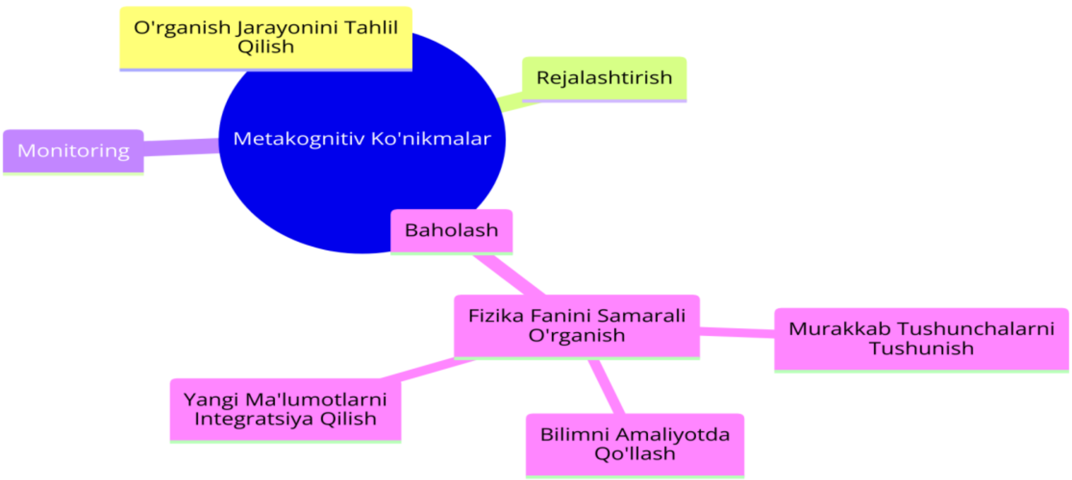
LITERATURE ANALYSIS.

The concept of metacognition has been extensively researched in the fields of psychology and pedagogy and has various theoretical foundations. These theories help to explore how students control self-awareness and learning activities. The following details the main theories related to metacognition and their applications in education. John Flavell is one of the main scientists who introduced the concept of metacognition into the scientific literature. By his definition, metacognition is the ability to perceive and effectively manage self-knowledge activities (e.g., one's own thoughts, knowledge levels, and learning strategies). Flavell divides metacognitive activities into two main parts: metacognitive knowledge and metacognitive control strategies. These two components are crucial in shaping students' ability to understand and effectively manage their learning activities. Ann Brown has placed great emphasis on the use of metacognition in teaching and learning activities in her work. He believes that metacognitive skills help students deal with complex issues, and that these skills should be taught intentionally by teachers. Brown's metacognitive strategies in understanding and remembering learning material [1, p. 906-911]underlines the importance of, for example, self-questioning, inference, and knowledge cross-linking. Among Lev Vygotsky's educational theories, his concept of a "zone of near Development" is closely related to metacognition. He believes that students learn best by completing tasks that they cannot solve independently, but at a level that they can solve with the help of others. This activity provides an opportunity for students to develop their metacognitive skills as they learn how to apply their knowledge and how to choose their strategies. Gregory Schraw and Dennison [2, p. 11] they proposed a metacognitive self-assessment model. They divide metacognition in their models into three main parts: self-Planning, monitoring and evaluation. This model is important in understanding how students perceive and effectively manage their learning activities. These theories are a valuable resource for a deeper understanding of the concept of metacognition and its role in education. Each theory helps students learn how to develop and apply their knowledge effectively. Metacognition is the ability to perceive and control one's own learning activities. The term is derived from Latin "meta" (i.e., mutual) and Greek "gnosis" (i.e., knowing), and refers to the study of one's own thought activity. Metacognition involves how an individual perceives, analyzes, and controls their knowledge, learning strategies, and learning activities.

RESEARCH METADOLOGY

Metacognitive skills are very important in teaching specific and complex subjects, especially physics. The pedagogical foundations for the development of metacognitive skills in teaching physics are based on various pedagogical theories and approaches. These theories and approaches help students develop skills to analyze their knowledge, use them effectively, and integrate new information into the existing knowledge system. The constructivist approach is based on the fact that students are conceived of knowledge as an active builder. In this theory, Students Form their own understanding by combining new information with their existing knowledge. In teaching physics, this approach helps students to master complex concepts and allows them to develop their metacognitive skills as students think about how they apply their knowledge and understand correlations. For example, when students study the topic of electromagnetic induction, they combine new knowledge with their previously learned knowledge and analyze their knowledge in this activity. This will help them understand electromagnetic induction more deeply. The cross-educational approach emphasizes that students work cooperatively with each other and build knowledge together. In teaching physics, cross-education can activate metacognitive activities because students listen, discuss, and evaluate each other's thoughts. This activity develops self-analysis and a deeper understanding of their knowledge. For example, students evaluate and correct each other's concepts when solving problems on mechanics in groups, which deepens their overall knowledge. The problem teaching approach encourages students to learn through specific issues or task solutions. In physics, this approach allows students to apply theoretical concepts through experiments and practical training. This approach helps students develop their metacognitive skills as they find ways to solve problems by Planning, monitoring and evaluating their learning activities. For example, when students study the laws of mechanics, they conduct experiments and analyze the results to put these laws into practice. This activity develops their metacognitive skills. Self-assessment and mutual assessment methods encourage students to evaluate their work and the work of their peers, for example, students strengthen their knowledge by evaluating their own solutions and analyzing other students ' solutions. The application of metacognition theories in physics education can help students gain a deeper understanding of their knowledge and develop independent learning skills. Through metacognitive approaches, students learn to effectively manage their learning activities, allowing them to delve deeper into more complex subjects such as physics. [3, p. 64-70] by understanding learning activities, students learn to analyze and evaluate their learning activities. For example, students may understand why they need to take a certain step while performing an experiment and the scientific connections between these steps. Through self-assessment and change, it allows students to regularly assess their knowledge and understanding. When teaching physics, students can constantly check their answers and solutions, identify and correct mistakes. This activity teaches students to see their knowledge with a critical eye and to refine their thinking activities. Through mutual education and collaboration, students work together to solve complex issues that develop mutual learning and expression of their thoughts for each student. For example, students evaluate and correct each other's concepts when solving problems in Group thermodynamics, which deepens their overall knowledge. By choosing educational strategies, students involve learning how to use a variety of teaching methods and resources effectively. Students can choose learning strategies that best suit them, such as using visual or hands-on materials, learning through problem task solutions, or using games and interactive activities to reinforce conceptual concepts. The link between metacognitive skills and the study of physical science is based on scientific research. Metacognitive skills, which include the ability to analyze, plan, monitor, and evaluate one's learning activities, play an important role in the effective study of physics. [1, p. 906-911] these skills help students understand complex physical concepts and use them in practice. The research conducted by David Hammer and Andrew Elby explores how students learn physics and how metacognitive approaches can help improve these activities [4, p. 53-90]. As they point out in their research, students can expand their knowledge by criticizing their concepts and combining them with new information. Hammer and Elby propose that course developments be provided that encourage students to regularly revise their views. For example, students revise their ideas and try new approaches when solving complex problems in mechanics.

Diagram structure:



1.2.1-official. Central node: metacognitive skills(Metacognitive skills)

Secondary node: effective physics Learning Networks emanating from a second-order node: 1. Understanding complex concepts (Understand Complex Concepts) 2. Application of knowledge in practice (applied Knowledge Practically 3. New data integration (Integrate New Information) Diagram elements: Central node (metacognitive skills): four main branches emerge from this node: "learning activity Analysis", "Planning", "Monitoring", and "Evaluation". [1, p. 906-911] Secondary node (effective study of physics): this node is connected by networks emanating from the central node, and three branches emerge from it: "understanding complex concepts", "application of knowledge in practice", and "integration of new information". David Hammer and Andrew Elby studies: these studies involve improving students ' physical learning activities and them with metacognitive approaches, as explained in the diagram.

CONCLUSION.

In physics classes, these approaches help students think over their own answers and solutions, as well as assess their peers ' work in a fair and constructive way. These activities develop students' self-critical assessment skills and enhance their metacognitive understanding. These theories and approaches are key tools in developing students' deeper understanding of physics and independent learning skills.

LITERATURE

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