PSYCHOLOGICAL ASPECTS OF METACOGNITIVE ACTIVITIES IN PHYSICS EDUCATION: WAYS TO IMPROVE ACADEMIC EFFECTIVENESS

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ABSTRACT

This article discusses the psychological aspects of metacognitive activities in physics education. Metacognitive activities involve the processes of awareness, control, and management of students' learning activities, contributing to the improvement of the educational process's effectiveness. The article examines various psychological factors of metacognitive activities and their impact on the learning process. It also provides a detailed description of the application of metacognitive activities in physics education and their positive influence on students.

Keywords: Metacognitive activities, Psychological aspects, Physics education, Learning process, Self-assessment, Learning strategies, Problem-solving, Motivation, Academic effectiveness, Learning outcomes.

INTRODUCTION

Metacognitive activity is an important part of a successful educational process in teaching physics. Metacognitive activities, i.e. recognising, controlling and managing one's learning process, help students to gain a deeper understanding of the subject and to achieve learning goals. These activities include reflecting on the demands one makes on oneself and how one copes with the learning process. In addition, metacognitive activities help learners solve complex problems and assimilate new information.

Metacognitive activities are important at all stages of the educational process, including physics learning. Learning physics often involves complex concepts and theoretical statements, so developing metacognitive skills in students is important for their success. This article discusses in detail the psychological aspects of metacognitive activities in physics teaching.

Understanding the psychological basis of metacognitive activity and its importance in physics teaching enables teachers and educators to develop effective strategies to improve students' learning process. This article elaborates on the various psychological factors of metacognitive activity, its impact on the learning process and how it can be applied in physics teaching.

Metacognitive Activity

Metacognitive activity is the activity of realising, controlling and managing the learning process. This activity is divided into two main parts: metacognitive knowledge and metacognitive control. Metacognitive knowledge includes a person's knowledge about themselves and their learning process, such as information about their strengths and weaknesses, learning strategies and resources. Metacognitive control includes planning, monitoring, and evaluating the learning process.[1]

Metacognitive activities play an important role in the learning process, as they help students to better absorb learning material, solve complex problems and assimilate new information. For example, students can gain a deeper understanding of their knowledge by observing their learning process, analysing learning strategies and evaluating results. In addition, metacognitive activities increase students' self-confidence and motivate them to learn independently.[6]

Metacognitive activities are used in a variety of learning processes, including physics teaching (Figure 1: Metacognitive activities). For example, in physics lessons, students are required to solve complex problems and understand theoretical statements. In this case, metacognitive activities help students to take control of their learning process, learn better and solve complex problems.

Metacognitive activity	Metacognitive knowledge	Important role	Metacognitive control	Application
Reading Comprehension	Advantages and disadvantages	Good assimilation of materials	Planning	Solving complex problems
Control	Teaching strategies	Solving complex problems	Control	Understanding the Theoretical Concepts
Control	Resources	Assimilation of new information	Grade	Control of the educational process

Figure 1: Metacognitive Activity

Psychological Aspects

The psychological aspects of metacognitive activity are important to understand its impact on the learning process. Firstly, metacognitive activity increases self-confidence.[8] Students can build self-confidence by monitoring and evaluating their learning process. This helps them to solve complex problems and learn new information.

Secondly, metacognitive activities reduce stress. Students can reduce stress by better understanding and controlling their learning process. For example, they may feel less stress when preparing for exams by better planning and assimilating study material. This helps to improve their academic performance.

Thirdly, metacognitive activities increase students' motivation. Students can increase their interest and confidence in learning by monitoring and evaluating their learning process. This motivates them to achieve learning goals.[9]

Psychological research shows that metacognitive activities increase the effectiveness of the learning process and improve learning outcomes.

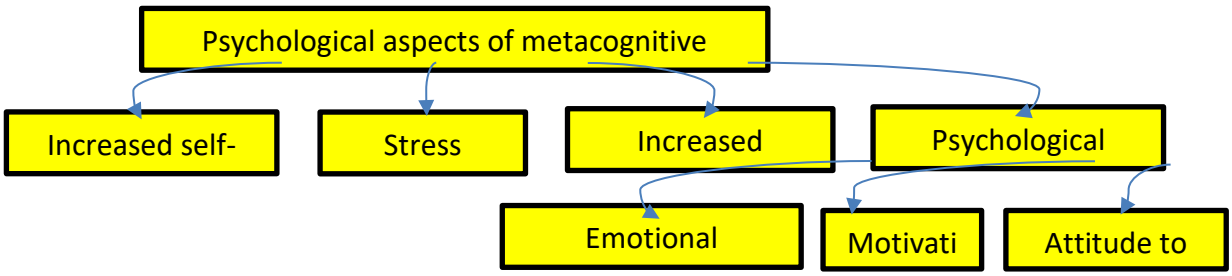

Figure 2: Psychological Aspects

Psychological Factors of Metacognitive Activity

Psychological factors of metacognitive performance are also important. They are related to the learner's emotional state, motivation and attitude towards learning. For example, a student's ability to self-evaluate and reflect helps to improve his or her academic performance.

Metacognitive Activities in Teaching Physics

Metacognitive activities are important in learning physics. Learning physics often involves complex concepts and theoretical statements, so developing metacognitive skills in students is important for their success. [5,7] Metacognitive activities help students to take control of their learning process, learn better and solve complex problems.

There are several effective methods of applying metacognitive activities in physics classes. Firstly, teachers can teach students metacognitive strategies. For example, students can be taught to plan, observe and evaluate learning material. This will help them to better understand and control the learning process.[10]

Second, teachers can organise various metacognitive exercises to reinforce students' knowledge, as shown in the diagram in Figure 3. For example, students can be required to analyse the learning material, solve complex problems and evaluate their results. This will help them have a deeper understanding of their knowledge and better control over the learning process.

Thirdly, teachers can train students to evaluate their learning process and conduct self-assessment. This will help them to analyse their learning outcomes and identify their shortcomings. As a result, students will be able to improve their learning process and achieve successful learning outcomes.

Figure 3: Metacognitive Activities

Additional methods of applying metacognitive activities in physics teaching include providing students with opportunities to apply various theoretical statements in practice, analysing complex problems using a problem-solving approach, and integrating metacognitive exercises into the learning process. These methods help to improve student performance.

CONCLUSION

Psychological aspects of metacognitive activities in physics learning are important for students' success. Metacognitive activities aimed at awareness, control and management of the learning process help students to learn better, solve complex problems and assimilate new information.

Understanding the psychological foundations of metacognitive activity, its impact on the learning process and methods of application in physics teaching enables teachers and educators to develop effective strategies to improve students' learning process. This, in turn, contributes to improved learning outcomes and successful learning.

In addition, metacognitive activities increase students' self-confidence, reduce stress and increase motivation, which increases their learning efficiency. As a result, metacognitive activities are of great importance in physics teaching and their application can improve students' academic performance.

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