

# Role of Metacognitive Awareness in Enhancing Problem-Solving Skills

Daniel Okeke\*

Department of Psychology and Education, Lakeview National University, Enugu, Nigeria

## DESCRIPTION

Metacognitive awareness refers to an individual's understanding of their own thinking processes and the ability to regulate those processes during learning. In secondary school settings, this awareness becomes increasingly relevant as academic tasks grow more complex and require students to engage in structured reasoning and independent problem-solving. Rather than relying solely on memorized procedures, students benefit from recognizing how they approach problems, evaluating the effectiveness of their strategies, and making adjustments when necessary.

Problem-solving in academic contexts often involves multiple steps, including identifying relevant information, selecting appropriate strategies, and monitoring progress toward a solution. Students who lack metacognitive awareness may approach tasks in a rigid or unreflective manner, applying the same strategy regardless of its suitability. In contrast, those with higher levels of awareness are more likely to pause and consider alternative methods when they encounter difficulty. This flexibility contributes to more efficient and accurate outcomes.

One important component of metacognitive awareness is planning. Before beginning a task, effective problem-solvers consider what is being asked and determine how to approach it. This may involve recalling similar problems, selecting tools or formulas, or estimating the time required. Planning allows students to organize their efforts and reduces the likelihood of confusion during the task. Without this step, students may begin working without a clear direction, leading to errors or incomplete solutions.

Evaluation occurs after completing a task and involves reflecting on both the outcome and the process used to reach it. Students with strong metacognitive skills consider whether their solution is reasonable and whether their strategy was effective. They may ask themselves what worked well and what could be improved in future tasks. This reflection supports the development of more refined strategies over time.

Instructional practices play a significant role in developing metacognitive awareness. Teachers can model thinking processes by verbalizing their reasoning during problem-solving activities. For example, explaining why a particular method is chosen or how to check for errors provides students with a framework for their own

thinking. This explicit demonstration helps students understand that problem-solving is not only about arriving at an answer but also about managing the process.

Encouraging students to articulate their reasoning is another effective approach. When students explain their thinking, either orally or in writing, they engage in self-reflection and clarify their understanding. This practice can reveal gaps in knowledge and prompt further inquiry. Group discussions, where students compare different approaches, can also enhance awareness by exposing them to alternative strategies.

The role of feedback is closely linked to metacognitive development. Feedback that focuses on the process rather than just the final answer encourages students to reflect on their strategies. For instance, highlighting a step where an error occurred and suggesting ways to avoid similar mistakes can guide students toward more effective approaches. Over time, this type of feedback helps students internalize evaluative criteria.

Technology offers additional opportunities to support metacognitive skills. Interactive learning platforms often include features that prompt students to reflect on their answers or provide hints when they encounter difficulty. These tools can simulate the monitoring and evaluation processes, helping students develop habits of self-regulation. However, it is important that such tools are used thoughtfully, ensuring that they complement rather than replace active thinking.

Individual differences influence how students develop metacognitive awareness. Some students naturally engage in reflection and self-monitoring, while others may require more structured guidance. Factors such as prior knowledge, motivation, and confidence can affect the extent to which students use metacognitive strategies. Teachers need to recognize these differences and provide support that meets diverse needs.

Despite its importance, metacognitive awareness is not always explicitly addressed in school curricula. Academic programs often emphasize content knowledge and procedural skills, leaving less room for reflection on learning processes. Integrating metacognitive instruction into existing subjects can enhance overall effectiveness without requiring major structural changes. Simple practices such as asking students to explain their reasoning or reflect on their

**Correspondence to:** Daniel Okeke, Department of Psychology and Education, Lakeview National University, Enugu, Nigeria, E-mail: daniel.okeke@lnu.edu.ng

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work can make a meaningful difference.

## CONCLUSION

Metacognitive awareness plays a vital role in enhancing problem-solving skills among secondary school students. By enabling learners to plan, monitor, and evaluate their thinking, it supports

more effective and adaptable approaches to academic tasks. Educational practices that encourage reflection, provide process-oriented feedback, and model strategic thinking can strengthen these skills. As students develop greater awareness of their cognitive processes, they become more independent and capable learners, better prepared to meet the demands of complex problem-solving.