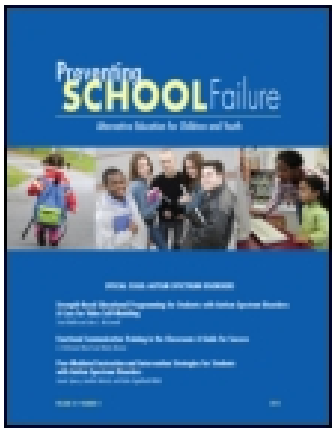

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Metacognition Needed: Teaching Middle and High School Students to Develop Strategic Learning Skills

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Metacognition Needed: Teaching Middle and High School Students to Develop Strategic Learning Skills

Nancy Joseph

ABSTRACT: Students' ineffective learning strategies are linked to poor metacognition, revealing that struggling learners have not developed the practical *figure it out* skills to succeed in academic challenges. Well-documented research has noted the positive effect of self-reflective learning on students' academic and personal development. Also, researchers have described that metacognitive awareness can be taught. The author explores these issues and presents practical suggestions that middle and high school teachers can use to help students develop metacognitive skills.

KEYWORDS: *critical thinking, metacognition, middle and high school students, self-assessment*

THE TEACHER EXPLAINS an assignment, presents examples, answers questions, and offers suggestions. Now it is time for independent classwork. Most of the students are busy reviewing the directions and starting the assignment; however, two students raise their hands to ask for assistance. The first student, moaning with frustration, complains to the teacher, "What are we supposed to do? This is confusing. I need help." The other student pauses for a minute and has a different response, "Oh, I just figured it out. I wasn't thinking about the list you gave us. I can do this."

Educators recognize that this situation is common in many middle and high school classrooms and acknowledge that a student's orientation to learning situations has a major effect on academic success. Some adolescents are confident and self-regulated learners who demonstrate introspective skills as they question their thinking and resolve confusions. By contrast, other students are passive and dependent learners who rely on the teacher or other students for assistance rather than on their own abilities to resolve difficulties.

When educators think about working with students, they ask themselves a few basic questions: "Why are some students successful with learning challenges, whereas others are easily frustrated?"; "How do students develop the ability to persevere with difficult tasks?" and, most importantly, "How can secondary teachers help students develop the practical intelligence needed for academic success in their content-area classes?" These questions relate to students' metacognitive awareness—the ability to reflect on their own thinking and develop and use practical problem-solving skills to resolve learning difficulties. Some students have the cognitive skills to recognize when they are doing well and when they are going in the wrong direction. Working independently, these perceptive students use metacognition to plan, regulate, and assess their learning. However, many other students lack the practical intelligence and accompanying confidence that comes from well-developed thinking and learning skills, and their unfocused attempts cause confusion and frustration. Ineffective learning strategies are linked to poor metacognition, revealing that struggling students have not developed the practical *figure it out* skills to approach classroom challenges in a confident, independent manner (Hacker, Dunlosky, & Graesser, 1998; Williams et al., 2002). These students are unable to reflect on their thinking strategies; this inability is a deficiency that puts them far behind learners who are able to reflect on their thinking strategies. The purpose of this article is to explore students' cognitive abilities and to present practical suggestions that content-area teachers can use to help middle and high school students develop metacognitive awareness.

Research on Metacognition

Well-documented research studies in the past 3 decades have described the significance of metacognition, noting the positive effects of self-reflective learning on students' academic and personal development. Researchers have conveyed that metacognition is vital to the social learning

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theory and personality development, indicating that appropriately focused metacognitive instruction increases practical intelligence, thus enabling students to gain greater insights into their learning strategies (Flavell, 1979; Lambert, 2000). Successful students at all grade levels are self-regulated learners who assess their knowledge and examine their cognitive processes, abilities that become more important as students move from elementary to middle and high schools. Because skillful students are able to think about their own thinking, they can track their progress and reflect on their learning. However, many struggling students fail to understand the learning process and lack introspective skills, resulting in unproductive approaches to their schoolwork. Through metacognitive instruction, these students become aware of their own thinking and learn to work through challenges without undue frustration (Hoyt & Sorensen, 2001; Lifford, Byron, & Ziemian, 2000; Peverly, Brobst, & Morris, 2002).

Metacognitive awareness can be taught with research emphasizing classroom methods such as practicing techniques for introspective learning and talking about reading and thinking. Becoming a strategic learner through metacognitive awareness is a developmental and instructional process influenced by teachers' methods and materials (Jacobs, 2003; Paris & Paris, 2001). Educators recognize that students need to learn higher level thinking skills of metacognition because cognitive demands become more complex from one grade to the next. Instruction in metacognition at the elementary school level increases because research has indicated that even young students are able to monitor and assess their own learning. At the secondary school level, studies of adolescent learning have revealed that metacognitive awareness prompts students to develop practical thinking skills to use in their coursework and in life (Moje, 2002; Williams et al., 2002). Through the lifelong skill of metacognitive thinking, students can be taught to reflect on their own learning processes while they complete learning tasks. It is evident that metacognitive awareness creates self-regulated learning, allowing students to develop greater intellectual maturity.

Metacognition and Teaching

Most teachers have well-developed metacognitive skills because their roles require insightful, highly conscious cognitive activity and practical intelligence. Consider the thinking processes that educators use to assess planning and instruction. Metacognitive awareness allows teachers to reflect on their work, prompting them to evaluate their instructional goals, methods, and outcomes. For example, educators may ask themselves the following questions after teaching a vocabulary lesson: "What objectives did I have in mind?" "What was I thinking when I decided to focus on the vocabulary words prior to the reading activity?" "Did the students understand my explanations?" "How could I make the information easier to understand?" and "Did I assess the students' learning appropriately?" These questions are typical of a teacher's mental processes, indicating that self-reflection is a natural part of teaching. However, a concern is that educators are not teaching students metacognitive awareness.

Educators recognize that students' metacognition may be overlooked in the classroom because most instruction focuses on the content rather than on the strategies used to learn the content. For many teachers—especially secondary school content teachers—thinking about the mental processes a novice learner needs to comprehend the subject-area material is not a natural activity (Schoenbach, Braunger, Greenleaf, & Litman, 2003). Another reason for neglecting metacognition is that instructional time is at a premium, with teachers responding to the pressures of state assessment testing and to the demands of local curriculum guidelines; therefore, the emphasis on learning strategies is limited. However, educators need to remember an essential question: What is more important than spending time teaching the critical thinking skills needed for independent learning? Encouraging students to practice reflective thinking does not add extra content; rather, it is a tool for mastering existing content. Many teachers have discovered that strategies for developing metacognitive skills can be embedded into traditional learning activities.

An important point to consider is that students' metacognition helps teachers understand student learning. Educators learn about themselves as teachers when they promote metacognitive awareness among their students because reflective thinking allows students to offer valuable feedback to their teachers regarding where their explanations were effective or confusing (i.e., students identify what they need as learners). The awareness of how students learn enables teachers to better focus the instruction and make better use of class time.

As educators know, some students are proficient and engaged learners who have developed metacognitive abilities on their own as they progressed from elementary to middle and high schools. With insightful knowledge about their learning styles, students independently recognize that they need to use a variety of problem-solving strategies to overcome learning challenges. However, most other students need focused instruction, practice, and encouragement to develop these abilities. Less proficient students miss the internal dialogue of metacognition, a deficiency that does not allow them to explore their thinking processes. For struggling adolescent learners, discussions about introspective thinking may cause confusion and anxiety because they have become comfortable with a passive and dependent approach to learning (Joseph, 2006). However, through guided instruction and practice over time, educators can

coach these students to develop effective learning strategies while breaking the habit of depending on others to resolve academic difficulties.

Classroom Practices

How can middle and high school teachers help students develop metacognitive awareness? Teachers can construct assignments that prompt students to practice new learning strategies in a supportive classroom environment, building their competence and confidence as learners (Vacca, 2002). Research has indicated that teachers should design lessons comprising three main components: direct instruction through teacher modeling, ongoing discussions about metacognition, and active classroom practice. In addition, teachers should use writing activities, such as reading logs and self-assessment checklists, to promote metacognitive growth because these exercises encourage students to reflect on their learning processes (Paris & Paris, 2001; Peverly et al., 2002). Educators should appropriately structure writing activities so that they are writing-to-learn activities, not just busy work. The following sections present classroom strategies for helping students develop metacognitive awareness.

Realistic Advice and Encouragement

Effective learning is based on good thinking and focused effort—a concept that many students do not understand because they believe that if they do not understand or "get it" the first time, the material is simply too hard for them to comprehend. This self-defeating attitude allows students to withdraw from learning situations. Some students lack confidence as learners, feeling that others are more skillful and smarter. Teachers should explain that successful learning develops through practice, concentration, and effort. All students benefit from thinking about their own thinking. Researchers have noted that less proficient learners make the greatest gains when metacognitive instruction is part of their classroom instruction, yet these students need the most support (Williams et al., 2002). To best assist struggling students, the following are recommendations for teachers:

1. Be aware of how students view themselves as learners and attempt to understand how they approach academic challenges.
2. Serve as a learning coach by working with students through each step of mastering new strategies for understanding their own thinking.
3. Encourage students to resolve their confusions and persevere with tasks, thus building their confidence as independent learners.

Thinking Strategies

Teachers should use mental modeling when working with students on reading assignments or problem-solving activities. Using this think-aloud technique, teachers can demystify the reading process by explaining the behind-the-scenes thinking required for good comprehension. Teachers could select a passage from the textbook and ask students to follow along while reading aloud. During this process, teachers should offer comments on the thinking strategies they use to work through the material. Through mental modeling, teachers can demonstrate how a skillful learner approaches a task, providing insights that are unfamiliar to many learners. It is important to remind students that problem solving or reading a text is not always a simple process; students may encounter confusion, distractions, and frustration. However, teachers should emphasize that the students' role as metacognitively aware learners is to find ways to resolve the challenges, explaining that students can be successful if they develop and apply a repertoire of comprehension strategies. Teachers have noted that pausing for explanations and teacher modeling brings positive results because the demonstration slows down the reading process and gives students time to reflect on their thinking, thus encouraging an understanding of independent learning strategies (Schoenbach et al., 2003).

Reciprocal-Teaching Activities

Reciprocal teaching helps students become comfortable with metacognitive thinking because it provides steps for exploring texts and encourages students to think about their comprehension strategies. Students can learn how to approach challenging texts through the step-by-step inquiry process of reciprocal teaching. Teachers should begin this structured activity by leading students through a think-aloud session to model four comprehension strategies of reciprocal teaching: generating questions based on the text, clarifying misunderstandings, summarizing, and predicting the content of the next section from the text. After showing the types of thinking needed for each strategy through the think-aloud activity, educators should ask students to work in groups to talk about the next passage in the text. Teachers should encourage students to move through the steps in the guided practice and to support each other as learners and thinkers. The goal is for the students to work independently through the steps of questioning, clarifying, summarizing, and predicting. With regular practice and careful monitoring, struggling readers can learn to apply the strategies of reciprocal teaching to their reading (Slater, 2002).

Discussions About Thinking

Teachers should use class time to discuss effective thinking techniques. Also, teachers should remind students that purposeful interaction with the text when reading means that they can hear the author's voice in their minds. Good readers can demonstrate this skill to their peers by reading a passage aloud and explaining the thinking processes that

they use to comprehend the material as they "talk to the text." Teachers may be surprised at what students say about their strategies. Teachers should provide opportunities for collaborative problem solving, encouraging students to discuss their approaches with their peers. Also, teachers should remember that metacognitive awareness may be second nature for successful learners, yet a new approach to learning for many other students. Spending class time to discuss metacognitive thinking strategies encourages students to understand themselves as learners.

Self-Assessment

Continuous student self-assessment—an important part of metacognitive awareness—encourages independent learning and prompts students to become more aware of their progress. Checklists, reading logs, and skills inventories are useful tools for self-assessment. For a self-assessment activity, teachers could select a few paragraphs from a class text and design a 5–10-min compare-and-contrast assignment. Teachers could instruct their students to read two paragraphs on different but related subjects and compare and contrast the material. After students complete the assignment, teachers could focus on the cognitive strategies they used to approach the content. Teachers should encourage them to reflect on their thinking behaviors by asking themselves a series of questions (see the Appendix).

Questioning

Through questioning, students can actively participate in their own learning and develop a wide range of cognitive processes. All students should be able to think, reflect, and question in an effective manner, yet questioning is often neglected because teachers feel the need to save time and move the lesson along at a pace that does not always allow much time for thinking and questioning. However, when students generate questions, their metacognitive skills develop because they must interpret, synthesize, analyze, and evaluate the material (Ciardiello, 1998; Penticoff, 2002). Students can demonstrate metacognitive awareness by reviewing their background knowledge before reading as they preview the material and by continuously asking themselves questions while reading. Teachers should use prereading activities to help students recognize the connections between their previous knowledge and new content.

Questioning is a powerful cognitive strategy because it prompts students to focus their learning by searching for the information they want to know, helping them focus and organize their thinking. Teachers should promote higher level thinking when introducing a new topic by requiring students to write five questions about the topic, beginning with the word *why*. Teachers should remember that asking students to generate questions does not follow the traditional teacher–student roles; therefore, some students may be uncomfortable with this approach because they prefer to take a less active role by having the teacher pose the questions.

Problem-Solving Activities

Teachers should use problem-solving activities to promote active engagement with the content. These activities require students to shift from the basic recall of facts to an analysis and application of the content to a specific situation. When challenged by problem-solving assignments, students learn to recognize what they know and what they do not know, which is a major step toward metacognitive awareness. The following example of a problem-solving activity requires a variety of thinking tasks including reading, researching, discussing, and writing. This activity can be modified as needed for students in middle and high schools.

> As a news reporter for *Science Today*, you are assigned to interview a scientist and write an article for the next issue of your magazine. Choose Madame Curie, Galileo, or Sir Issac Newton. Spend some time reading about your scientist and discuss your ideas with your group. Your task consists of three parts: (a) Prepare 6–8 questions for the interview, (b) Write one page of notes about the scientist's work and the time period in which he or she lived, and (c) Write a magazine article. The article should be 2–3 paragraphs and should focus on information that readers of *Science Today* would want to know about the scientist.

Conclusion

Educators recognize that integrating learning and thinking strategies into daily classroom activities on a long-term basis brings good results, helping students gain a better understanding of how successful learning takes place. Teaching students to monitor their cognitive processes by developing strategies for thinking, comprehending, and remembering is a valuable investment for their future. Through metacognitive instruction, students can practice these skills over time, increasing the chance that these valuable thinking strategies will strengthen their practical intelligence and become part of their repertoire as learners.

AUTHOR NOTE

Nancy Joseph is an assistant professor of English at Oakland University, where she coordinates the English secondary education program. She is also a reading specialist and literacy consultant for middle and high schools. Her areas of research include content-area reading, literacy education, and metacognition.

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APPENDIX
Self-Assessment Questions for Students

1. Did you understand the directions for the assignment?
2. What were you thinking when you worked on the assignment?
3. Did you feel confident? Confused? Frustrated?
4. How did you resolve any difficulties you experienced?
5. How would you evaluate your ability to concentrate on the assignment?