

# Investigating Content Area Teachers' Understanding of a Content Literacy Framework: A Yearlong Professional Development Initiative

**The use of the Question–Answer Relationship strategy led to a deeper use of cognitive strategies by teachers and students.**

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Literacy professional development leads to instructional improvement by bringing about a change in the participating teachers. This change can be evaluated in a variety of ways, including but not limited to tests of knowledge, personal evaluations, and analyses of the components of the professional development. The study described in this article examined teachers' metacognitive understandings of the strategy known as Question–Answer Relationships or QAR (Raphael, 1986) through the preparation of content area materials and reflective questions. The preparation of classroom materials included the development of explicit lesson plans incorporating teachers' descriptions of the strategy in open-ended questions and written think-alouds. Lesson plan components were evaluated by the principal researcher, Nance Wilson (first author), to examine changes in teacher understanding.

## Theoretical Framework

The study was designed around a yearlong professional development initiative aimed at helping secondary content area teachers incorporate the teaching of a literacy strategy (QAR) and content instruction to improve content area literacy.

For years there have been calls for an increased emphasis on content literacy (Biancarosa & Snow, 2004; Draper, 2008; Kamil, 2003; Richardson, 2008). This is the result of a recognition that students would benefit from having content area classes that are infused with reading instruction (Fisher & Ivey, 2005; Moore, Readence, & Rickelman, 1983; O'Brien, Stewart, & Moje, 1995). However, many secondary school teachers perceive literacy to be the responsibility of English teachers (Lester, 2000), or they have difficulty balancing literacy and content instruction. The problem, as identified by O'Brien et al. (1995), is that teachers often do not see a connection between literacy skills and content information, as these skills appear to be inconsistent with the traditional goals of the secondary curriculum. Thus, many content area teachers struggle to buy into the teaching of reading strategies (Lester,

2000), and it has been difficult to incorporate literacy strategies into the content areas (Fisher & Ivey, 2005; Hall, 2005).

Content area literacy, as defined by Draper, Smith, Hall, and Sieber (2005), includes the ability to meaningfully interact with content area words. Such specialized vocabulary, for example, *protists*, requires students to understand the concept represented by the word or image. Meaningful interaction with content area texts requires cognitive strategies, such as asking questions, in which the learner develops a cognitive approach to learning and a critical understanding of subject matter (Conley, 2008). Thus, it may be argued that successful content area literacy requires metacognition. Metacognition is the awareness and regulation of one's mental processes (Griffith & Ruan, 2005). In other words, successful content area learning requires students to be aware of their understanding of a concept and to adjust thinking to ensure learning. One of the teacher's roles in improving content area literacy is to help students use metacognitive processes to support understandings (Barton & Heidema, 2002; Posnanski, Mertzman, & Kean, 2006).

Content learning and metacognition are often carried out through interacting with text and other content experiences. Therefore, content area literacy instruction must include an understanding that students be taught to become metacognitive and active learners. Vacca and Vacca (2007) stated that when students who are active learners know the whats, whys, hows, and whens of strategic reading and thinking, they are metacognitive. Because the type of text and assignments in various content areas pose different problems for the reader to solve, students must be aware of the nature of the reading task and the way to handle it. The instructional strategies and techniques used are crucial because students learn to transfer metacognitive thinking when instruction in the general strategies includes informed training and opportunities for self-control (Brown & Campione, 1994).

This article presents lessons learned from teachers who participated in a yearlong professional development initiative initially designed to improve their knowledge and implementation of QAR and the think-aloud.

## The Professional Development Initiative

The yearlong professional development used theory, demonstrations, and opportunities for practice. The model was based on the idea that change is "primarily an experientially based learning process for teachers" (Guskey, 2002, p. 384), in that teachers need multiple exposures to and experiences with the techniques for learning to occur.

This initiative began at the schools through the identification of needs and applications for participation. The funding for this project was generated from a teacher improvement grant provided by the State Department of Education. Each school applying for participation agreed to send an administrator and a team of teachers who would be willing to work together. During the yearlong professional development, each session demonstrated research-based practices designed for improving teaching knowledge. Teachers read professional literature (Joyce & Showers, 2002), worked in small groups (Little, 1997), and viewed models of the metacognitive implementation of the strategy (Joyce & Showers, 2002; National Staff Development Council, 2001).

The literature included readings on questioning (i.e., Duke & Pearson, 2002; Fordham, 2006; Neufeld, 2005), on QAR (Cortese, 2003; Mesmer & Hutchins, 2002; Raphael, 1986; Raphael & Au, 2005), and on effective instructional practices (Clark & Graves, 2005; Dewitz & Dewitz, 2003; Duffy, Roehler, & Herrmann, 1988). Each article was intended to develop the teachers' understanding of QAR or explicit instruction. There was one reading that specifically focused on mental modeling of metacognitive strategies (Duffy et al., 1988), and the theories behind metacognition were discussed throughout instructional implementation of QAR.

Teachers participated in small-group discussions to talk about the readings, specifically aspects of QAR, and to create explicit instructional plans. The modeling, provided by the first author and professional development provider, gave teachers examples of the strategy to aid in implementation. Additionally, teachers worked in small groups to practice their mental models with peers and to discuss the sharing of metacognitive processes.

Each professional development session included all three factors discussed above and focused on the topics of QAR, metacognition, and explicit instruction. The three-day intensive workshop focused on learning about QAR, the role of metacognition, and the use of mental modeling in QAR. During the follow-up sessions the focus was on metacognition and mental modeling, with explicit instruction—particularly guided practice—on reading strategies that help students to answer questions and on students' creation of questions.

### Question–Answer Relationships (QAR)

QAR has been validated by practice and research across content areas and genres (Raphael & Au, 2005) since the 1980s. The QAR framework was chosen for the professional development initiative because a common practice in secondary content classes is for students to be asked to respond to questions in the text. QAR gives a framework for thinking about these questions and provides students with the tools and language for identifying the relationships between text and questions. Raphael (1986) identified two broad categories for finding information for answering questions: “In the Book” and “In my Head.” These two categories can each be broken down into two subcategories. Under the “In the Book” category, which indicates that an answer is found in a text, are “Right There” and “Think and Search.” A Right There question has a response that can be found directly in a text. A Think and Search question also comes from the text but requires that students put together information from multiple paragraphs or chapters. The “In My Head” category refers to questions that require students to use prior knowledge when responding to questions. This category includes “Author and Me” questions that ask students to connect prior knowledge with information in the text; and “On My Own” questions that do not require any reading of the text.

Teachers in this professional development initiative learned how the language of QAR could not only guide classroom reading discussions but also assist students in becoming more strategic, or metacognitive, in their reading.

### Teaching the Metacognitive Aspects of QAR

Effective strategy instruction, such as with QAR, requires teachers to demonstrate the metacognitive actions required to effectively implement the strategy through modeling the process for their students. These steps include a description of the strategy, or *declarative* understanding; how to use the strategy, or *procedural* understanding; and when and why to use the strategy, or *conditional* understanding (Hartman, 2001, p. 161).

The think-aloud (Wade, 1990), also known as mental modeling, is an effective mode of instruction for improving student comprehension of text (Kucan & Beck, 1997). The think-aloud strategy was modeled across all the professional development sessions and was expected as part of teachers' lesson planning. Therefore, when teachers did a think-aloud they demonstrated how they were, themselves, metacognitive in their use of QAR. They describe the strategy, they model and use the strategy, and they describe situations under which it is appropriate to implement the strategy.

### Method

This inquiry used qualitative research techniques to analyze the way in which teachers reflected on and planned instruction to demonstrate their conditional, contextual, and procedural knowledge of QAR. The data sources included lesson plans as well as open-ended questions given during the professional development sessions.

The 120 explicit instruction plans created by the participants were used to evaluate the planned use of QAR within teachers' content areas. The lesson plans included a focus, instruction notes, modeling, guided practice, independent practice, and data collection. A lesson plan was not expected to equal one day of teaching; but to represent the teaching of the QAR strategy within the content being presented. The lesson plans used the content as a vehicle for the teacher to demonstrate the thinking necessary for implementation of an aspect of QAR with opportunities for guided and independent practice. Thus, lessons often took more than one class period or day of instruction.

At the end of each professional development session, participants were asked a common question designed to assess their understanding of QAR and students' strategic thinking. The request to define QAR and describe how students will benefit from instruction in it led to responses that described the participants' thinking regarding the framework.

The data were analyzed as a single case. Data analysis was a recursive process in which the data were reviewed to determine the major themes and developmental patterns in the written responses and lesson plans. The themes that were uncovered in the analysis included the following:

- Teachers' understandings of QAR (developed from the teachers' responses to the open-ended questions)
- Teachers' metacognitive thinking about QAR (developed from the teachers' lesson plans)

The themes were analyzed with regard to the teachers' procedural, conditional, and declarative understandings of QAR. Declarative knowledge may be represented by a teacher quoting a definition. Procedural knowledge was broken into two categories; procedural general (in which the steps in the strategy are listed) and procedural task-specific (when a teacher describes the specific steps in the lesson/article/task). Conditional knowledge was broken into two categories as well: conditional benefits (the teacher states the benefit of using QAR); and conditional contextual (the teacher explains why a particular strategy was chosen in a specific instance).

Twenty-two secondary teachers from 11 different schools across a large state in the midwestern United States participated in the initiative and contributed to the three cases presented in the sections that follow (Table 1).

### ***Looking at the Group as a Whole***

Data were analyzed to determine the percentage of responses that demonstrated a particular understanding of QAR. For instance, in response to the request "Define QAR and describe how students will benefit from instruction in QAR," in November (middle time phase) one participant shared:

**Table 1**      **Participating Teachers**

Grade level	Years teaching	Subject area taught
6	12	Language arts
7	16	Language arts
7	11	Language arts
7–8	13	Science
7–8	8	Language arts
8	7	Language arts
9	22	Social studies/history
9–10	4	Biology
9–10	5	Science/biology
9–11	17	Spanish
9–12	0	American history
9–12	3	Science/chemistry
9–12	8	Biology
9–12	8	Biology
9–12	3	Social studies/history
9–12	3	English
9–12	5	Biology
9–12	3	Math
9–12	6	Sociology and psychology
10–12	6	English
10–12	7	Social studies/history
11–12	18	English

"Question–Answer Relationship. In the book—Right there, think and search. In My Head—author and me, on my own. Students will benefit from QAR when using it consistently when reading."

This idea unit was coded as an example of declarative knowledge, because QAR is defined and described; and as a conditional benefit, because a general statement was made regarding the benefit of QAR.

Lesson plan data was similarly evaluated for demonstrations of understandings. Each lesson plan provided an example of how the teacher might share his or her metacognitive understandings. For instance, the beginning of the lesson plans often contained the think-aloud, such as in the following excerpt from a plan:

I will read the first two paragraphs to you. I would like you to follow along as I read. At the end I will ask you three questions.

1. (In the Book) What native American tribe is the myth from? (Pueblo)
2. (In the Book) What did Sky Father place into the sky? (grains of corn)
3. (In My Head) What is a myth? (Answers may vary but revolve around a story that is not true but is used to describe how something may have happened.)

This idea unit was coded as an example of procedural general knowledge, because QAR is used and identified regarding questions; but the specifics in how the identifications were made were not included.

In other lesson plans, teachers demonstrated procedural task-specific think-alouds of the QAR strategy.

Here is an example of an “On My Own” question: Do you remember the first time you played baseball or softball? I know this is an “On My Own” question because I have not read the text, and I need to answer the question based on my own knowledge and background of what I have experienced when I first learned the sport of softball.

Let’s read the poem “How I Learned English”

Now that we have read the poem I have another question that pertains to this poem: Have you ever done something embarrassing like the speaker of the poem? This is an “Author and Me” question. I know this because in order for me to know what the speaker has done that is embarrassing I need to have read the poem. After I know what the speaker did, I can think about my own experiences and if I have ever done something embarrassing.

This sample think-aloud demonstrates declarative knowledge of QAR and provides procedural task-specific knowledge in that it describes the thinking steps necessary to respond to these questions.

### ***Looking Closely at Teachers’ Understandings***

Christina (all names are pseudonyms) is a high school biology teacher with four years of teaching experience. She participated in both the professional development opportunities as well as school meetings about the initiative. Christina describes QAR in the following way: “Question–Answer Relationships

benefit students by giving them guidance and tools to achieve.” Her response contains both declarative and conditional benefits. She is able to state what QAR stands for and give a slogan-like description of why it will assist students’ understandings. In her lesson plans, Christina tended to describe QAR to her students before giving them time to practice its use.

For example, Christina began instruction as follows:

I am going to carefully read each definition of QAR, starting with the In the Book concepts. A Right There (RT) is a question that you will find in your book. Sometimes when looking for RT questions you can even look for words from the question in sections of your textbook. I also know that RT works really well with vocabulary terms because there is always a fairly clear definition in the text when vocabulary is highlighted. So I will look for familiar words and bold or highlighted items in the text.

Christina continues to explain each of the categories in the same manner. Notice how she introduces the categories of QAR with definitions and examples. Her instruction is also declarative, in that she describes *what* to do rather than describing the steps of *how* to do it. This declarative understanding of QAR is translated into guided practice when she asks students to “Open your books to Chapter 1, page 14. Look at the section review. Question one should be labeled ‘In the Book’ because these are bold words that are clearly and carefully defined in the book.”

Andrew is a high school psychology and history teacher at a midsize suburban school with six years of teaching experience. Andrew’s instruction in QAR may be described as providing students with declarative and procedural understandings of QAR through his modeling and guided practice. In the following example, Andrew describes the tasks he performed when responding to a question regarding a reading on Stanley Milgram, the psychologist who studied participants’ willingness to obey authority figures when asked to perform acts that conflicted with their conscience.

We are going to look at the relationships between questions and answers. There are two basic types of questions: In the Book and In My Head. In the Book questions require the textbook and In My Head require



some knowledge from your mind that may not necessarily be found in the text. Let's take a look at the first question that I have created for the article. It says, 'Do you believe that Stanley Milgram's experiment was ethical?' I might ask myself, 'Can I answer from my mind without the text—or do I need the text?' It asks about this Stanley guy's experiment and this is knowledge that I, the reader, do not have, so I need to read the article, or parts of the article, to answer it. So, this seems to clearly be an In the Book question.

Notice how Andrew's description of the two broad categories tells about the strategy, but his modeling of how to respond to the question describes the processes that he engaged in when thinking about how to answer the question. He continues to share his thinking with students and to guide students in their own thinking when he instructs students on answering Author and Me questions.

Question number one asks, 'Explain why you agree or disagree with Dr. Zimbardo, that going to war to stop killing is more evil than good?' I might think aloud saying, 'I have an opinion on this topic and could make a case myself.' However, I probably don't know exactly what Dr. Zimbardo gives as evidence for his opinion, so I need to read the text as well as use what's in my head to answer this question. What type of question is this? Yes, it is an Author and Me question. Using our chart on the wall we are going to go through this process of thinking aloud and clarifying text/ideas as you travel through the article. This time, in addition to recording what QAR you think is being represented, you will also record your think-aloud and some of the clarifying questions you might ask yourself to improve your comprehension.

The difference between Christina's and Andrew's expressions of QAR in the examples provided allows us to determine that Christina has achieved declarative knowledge, and Andrew has clearly acquired procedural knowledge.

Elizabeth is a high school Chemistry teacher at an urban high school. Elizabeth's instruction of QAR included declarative and procedural understandings similar to those presented above, but Elizabeth provided her students with additional tools. Elizabeth modeled and guided her students in using QAR to get through multiple steps used in Chemistry problem solving, as in the following example:

Problem: What percent of calcium carbonate is calcium? Knowing that you need 1500 mg of calcium a day, how many 500 mg calcium carbonate pills would you have to take to get you 1500 mg of calcium? The first step in problem solving is organizing our data according to QAR categories:

For the Right There, we are looking for a number with a unit attached. The Right There data is: 1500 mg of Calcium, 500 mg Calcium carbonate pill.

For the Think and Search we are searching within the problem for more information. This information may not slap us in the proverbial face like the RT does but it is in front of us.

The Think and Search data is: We are looking for the percentage of Calcium in Calcium carbonate. When solving problems both Author and Me and On My Own are very important and often intermixed! This is what makes it so difficult.

For Author and Me, we are looking for information that requires previous knowledge. This means that if you have never been in school before and you have never in your life thought then you are sunk. But if you have some schooling and you have had at least one thought in your life, you should be OK. The problem is that you will have to both read and think.

For On My Own, we are looking back at previous knowledge. This includes how to do things, and basic facts.

Elizabeth continues to solve the problem in the same manner by demonstrating her thinking for the students using the QAR language. Throughout the process, Elizabeth scaffolds students' understanding the context of *when* to use the relationship between each question and its response. She guided students by providing them with tables that helped them in figuring out where to get information for problem solving. Elizabeth helped students to learn when it would be best to explicitly implement the QAR strategy by giving them declarative knowledge of the strategy, procedural knowledge of how to do the strategy, and the scaffold of the conditional knowledge so that students would understand when it is necessary to explicitly implement each part of the strategy.

## Findings

### **Theme 1: An Understanding of QAR**

The understanding of QAR developed predictably, as teachers learned about the framework. The manner in which they demonstrated their knowledge in reflections remained relatively stable, in that most responses indicated a declarative knowledge of the strategy. However, many teachers shared some descriptions of the conditional benefits of the strategy (see Figure 1).

Qualitatively, teachers' descriptions of QAR changed. In the beginning of the study, QAR was described simply as a strategy or by explaining the acronym as Question–Answer Relationships. This declarative understanding is representative of reciting a definition. An example of such a response is “a strategy to encourage metacognition in teachers and students regarding questioning and answering questions” (Nance’s field notes, July 2005).

As teachers saw additional demonstrations of the strategy and learned more about the framework, they were more likely to describe QAR as a framework that helps students with comprehension or improves metacognitive thinking. For instance, in May, Christina wrote,

A tool/strategy to be used to guide and focus students to help them ask questions about what they are thinking. This tool helps to guide students when writing questions, reading, etc. It aids in diversifying how students have their information portrayed so I can reach more students [and through] modeling reach even more students.

Although the coding scheme did not permit this statement to be coded differently from the initial comment, there is an obvious difference in the teacher’s understanding of QAR that moves beyond repeating information verbatim from the professional development presentations toward describing declarative and conditional benefits knowledge in his or her own way. The qualitative difference between these comments was consistent across the data set and indicates that there were changes in teachers’ understandings of QAR that were not reflected in the coding.

### **Theme 2: Sharing Metacognitive Thinking About QAR**

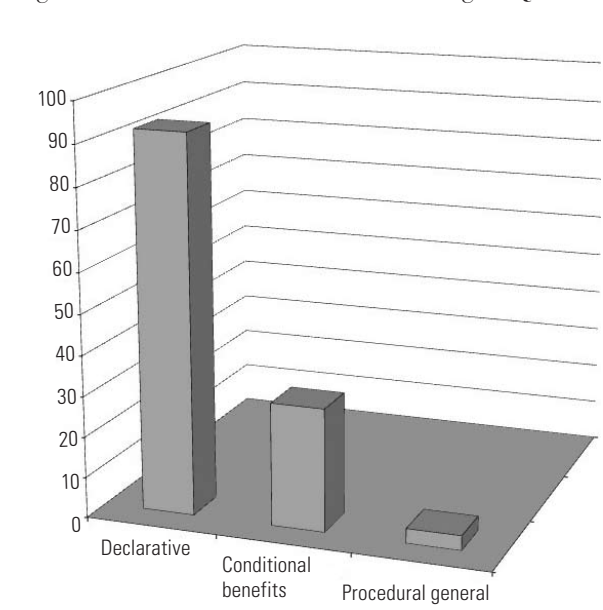
Teachers shared their metacognitive understandings of QAR through their lesson plans, which were analyzed as one idea unit representing each teacher’s understanding of the strategy (Figure 2).

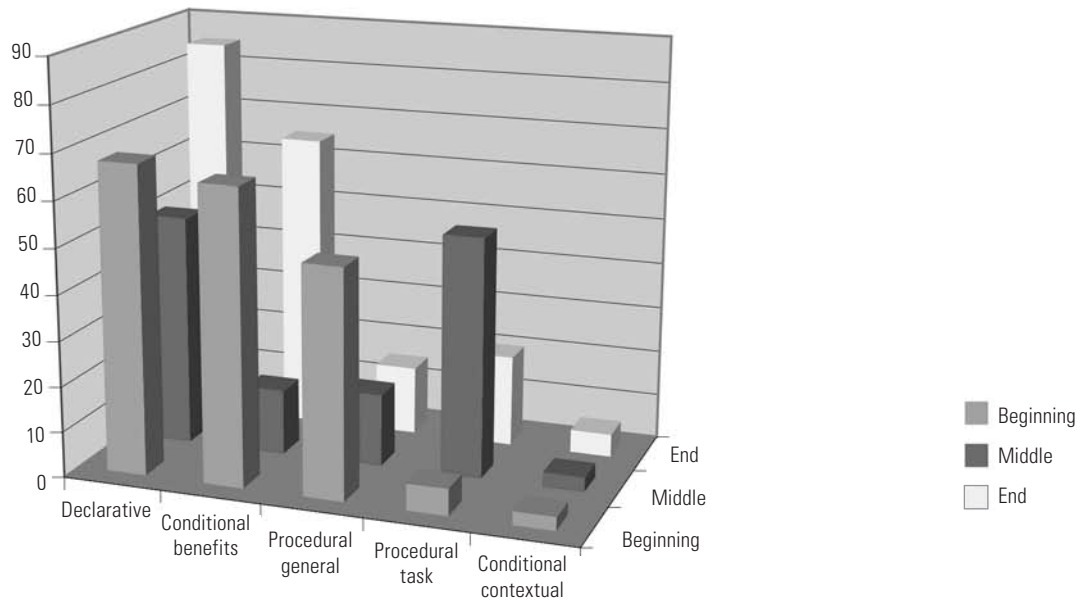
In all the lesson plans, the teachers were instructed to create a think-aloud describing the metacognitive processes they enact when implementing QAR in various circumstances. When teachers first created think-alouds, explanations of QAR included a description of the individual categories and why students should learn them (see the examples from Christina and Andrew above). Additionally, teachers shared the benefits of the strategy and the general steps needed for implementation. Participants would often describe their teaching actions, as in the following social studies example:

I’ll give the students 2 questions: 1) What are characteristics of sects? 2) What problems may develop in the sect as a result of the lack of focus on organization? I would explain how to find the information needed to identify the type of question and field guesses as to which QAR each question is and why the student believes it is this QAR.

As professional development proceeded, lesson plans reflected teachers’ deeper understanding of

**Figure 1 Teachers’ Understanding of QAR**



**Figure 2** Sharing Metacognitive Thinking About QAR

QAR. There was an increased emphasis on describing the specific procedural tasks necessary for implementing QAR. When teachers demonstrated this form of understanding, their lesson plans contained information such as the following:

When were protists first thought to have evolved? I look back at the article and skim for anything dealing with dates or protists. There are many dates and time markers mentioned in the article. Because of this I will have to look at the wording around these dates. As I continue to skim, I see 1.5 billion years ago, as I read it talks about evolution of protists. So, this is the date that I need to answer my question. Notice that this question was an “In the Book” question. The answer came directly from the text.

At the end of the study, participants predominantly shared their metacognitive thinking through a demonstration of declarative understandings and understandings of the conditional benefits of QAR. Although there were more demonstrations of task-specific procedural understandings than at the beginning of the study, the coding did not indicate a major shift in understandings. This may be because the teachers felt that students understood the procedures

needed to implement the strategy and did not know what to do next in the lesson planning. Additionally, the teachers may have internalized their conditional knowledge of QAR and may not have realized the necessity of explicitly instructing students. Elizabeth was one of the few exceptions to this.

Metacognitive understanding was not clearly developed by the participants in their conditional contextual explanations of why they chose to use QAR in a specific instance. This may be because of the format of the lesson plan or because this requires a deeper understanding of the strategy as something that is used flexibly and not during all activities around questioning. Additional research with a classroom observation component might settle this question more fully.

## Summary of Findings

Studies on professional development for teachers are relatively rare. Anders, Hoffman, and Duffy (2000) contended that less than 1% of research studies since 1965 have addressed professional development for teachers. In today's climate of professional accountability and scripted lessons, professional development



that is based on empirical data is vital to the increase of professional expertise for teachers. Although additional research with an observation component is needed, the findings of this exploratory study indicate that teachers' increased understanding of the QAR strategy, as demonstrated through reflective comments and lesson plans, illustrated metacognitive understandings over the yearlong professional development sequence.

Although teachers' reflective comments were limited to demonstrations of declarative understandings, contextual benefit understandings, and a few procedural generalizations, the reflective comments framework as applied in this study limited participants' responses to statements of fact and did not give them enough flexibility to describe how they used a particular strategy.

The lesson plans were also heavily laden with demonstrations of declarative understandings and contextual benefit understandings. The lesson plans gave participants some flexibility in demonstrating their understandings of the strategy, but lesson plans are not sufficient to inform researchers about what actually occurred in the classroom.

## Discussion

This study examined how teachers participating in a professional development initiative aimed at improving metacognitive teaching through the use of the QAR strategy improved their use of metacognitive processes with content area materials. The analysis implies that teachers demonstrate their metacognitive understanding of a strategy differently depending on the context. Although we cannot be sure that the lessons were taught as described, we believe that effective teaching depends on the instructional decisions that teachers make and that teachers' expertise plays a critically important role in these decisions.

The findings are significant because as reading professionals we know the following:

- Students need models of declarative, procedural, and conditional knowledge of strategies (Schraw, 2001).

- Helping students to become metacognitive with content area material will improve academic performance (Hartman, 2001).
- Content area teachers have difficulty implementing the instruction of reading strategies (Fisher & Ivey, 2005).

The results highlight that to achieve the desired results, teachers must first become increasingly metacognitive when problem solving with content area materials prior to helping students to become metacognitive.

The study was limited by several conditions that apply to educational research. First, although the professional development was both intensive and distributed (National Staff Development Council, 2001), which helps ensure that learning will be deeper, researchers were unable to observe teachers in the classroom to determine the actual application of the QAR strategy to content teaching. Second, this study was a small, exploratory study, similar to many in teacher education research.

Findings in this study are promising—for example, secondary teachers across the disciplines did employ a literacy strategy to assist their students to understand content area reading. The implementation led to a deeper use of cognitive strategies by teachers and students rather than simple teaching activities aimed at a generalist approach to instruction (Conley, 2008). This is similar to recent findings that have appeared elsewhere. For example, Fleming and her colleagues (Fleming, Merrill, & Grisham, in press) conducted Reading Institutes for Academic Preparation (RIAP) with secondary teachers across the content areas and an independent evaluation of the Institutes showed gains for high school students in reading comprehension. In another study, Wozniak (2008) demonstrated that secondary teacher candidates showed little or no resistance to the idea of using literacy strategies to assess students' reading and plan differentiated content instruction. Perhaps, the real lesson to be learned here is that secondary content teachers may learn to welcome effective teaching strategies provided they see that the learning of content, so important to middle and high school teachers, is the central notion of such teacher preparation and professional development, not merely "reading."

## References

- Anders, P.L., Hoffman, J.V., & Duffy, G.G. (2000). Teaching teachers to teach reading: Paradigm shifts, persistent problems, and challenges. In M.L. Kamil, P.B. Mosenthal, P.D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 719–742). Mahwah, NJ: Erlbaum.
- Barton, M.L., & Heidema, C. (2002). *Teaching reading in mathematics* (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.
- Biancarosa, G., & Snow, C.E. (2004). *Reading next: A vision for action research in middle and high school literacy: A report to Carnegie Corporation of New York*. Washington, DC: Alliance for Excellent Education.
- Brown, A.L., & Campione, J.C. (1994). Guided discovery in a community of learners. In McGilly, K. (Ed.), *Classroom lessons: Integrating cognitive theory and classroom practice* (pp. 229–270). Cambridge, MA: MIT Press.
- Clark, K.F., & Graves, M.F. (2005). Scaffolding students' comprehension of text. *The Reading Teacher*, 58(6), 570–580. doi: 10.1598/RT.58.6.6
- Conley, M.W. (2008). Cognitive strategy instruction for adolescents: What we know about the promise, what we don't know about the potential. *Harvard Educational Review*, 78(1), 84–106.
- Cortese, E. (2003). The application of Question–Answer Relationship strategies to pictures. *The Reading Teacher*, 57(4), 374–380.
- Dewitz, P., & Dewitz, P.K. (2003). They can read the words, but they can't understand: Refining comprehension assessment. *The Reading Teacher*, 56(5), 422–435.
- Draper, R.J. (2008). Redefining content area literacy teacher education: Finding my voice through collaboration. *Harvard Educational Review*, 78(1), 1.
- Draper, R.J., Smith, L.K., Hall, K.M., & Sieber, D. (2005). What's more important—Literacy or content? Confronting the literacy–content dualism. *Action in Teacher Education*, 27(2), 12–21.
- Duffy, G.G., Roehler, L.R., & Herrmann, B.A. (1988). Modeling mental processes helps poor readers become strategic readers. *The Reading Teacher*, 41(8), 762–767.
- Duke, N., & Pearson, P.D. (2002). Effective practices for developing reading comprehension. In A.E. Farstrup & S.J. Samuels (Eds.), *What research has to say about reading instruction* (3rd ed., pp. 205–242). Newark, DE: International Reading Association.
- Fisher, D., & Ivey, G. (2005). Literacy and language as learning in content area classes: A departure from “every teacher a teacher of reading.” *Action in Teacher Education*, 27(2), 3–11.
- Fleming, D., Merrill, M., & Grisham, D.L. (in press). With college in mind: Reading institutes for academic preparation. *Issues in Teacher Education*.
- Fordham, N.W. (2006). Crafting questions that address comprehension strategies in content reading. *Journal of Adolescent & Adult Literacy*, 49(5), 390–396. doi: 10.1598/JAAL.49.5.3
- Griffith, P.L., & Ruan, J. (2005). What is metacognition and what should be its role in literacy instruction? In S.E. Israel, C.C. Block, K.L. Bauserman, & K. Kinnucan-Welsch (Eds.), *Metacognition in literacy learning: Theory, assessment, instruction, and professional development* (pp. 3–18). Mahwah, NJ: Erlbaum.
- Guskey, T.R. (2002). Professional development and teacher change. *Teachers and Teaching: Theory and Practice*, 8(3), 381–391. doi: 10.1080/135406002100000512
- Hall, L.A. (2005). Teachers and content area reading: Attitudes, beliefs and change. *Teaching and Teacher Education*, 21(4), 403–414. doi: 10.1016/j.tate.2005.01.009
- Hartman, H.J. (2001). Teaching metacognitively. In Hartman, H.J. (Ed.), *Metacognition in learning and instruction: Theory, research and practice* (pp. 149–172). Boston: Kluwer Academic.
- Joyce, B., & Showers, B. (2002). *Student achievement through staff development* (3rd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.
- Kamil, M.L. (2003). *Adolescents and literacy: Reading for the 21st century*. Washington, DC: Alliance for Excellent Education.
- Kucan, L., & Beck, I.L. (1997). Thinking aloud and reading comprehension research: Inquiry, instruction, and social interaction. *Review of Educational Research*, 67(3), 271–299.
- Lester, J.H. (2000). Secondary instruction: Does literacy fit in? *High School Journal*, 83(3), 10–16.
- Little, J.W. (1997). Teachers' professional development in a climate of educational reform. In Fullan, M. (Ed.), *The challenge of school change* (pp. 123–141). Arlington Heights, IL: Skyline.
- Mesmer, H.A.E., & Hutchins, E.J. (2002). Using QARs with charts and graphs. *The Reading Teacher*, 56(1), 21–27.
- Moore, D.W., Readence, J.E., & Rickelman, R.J. (1983). An historical exploration of content area reading instruction. *Reading Research Quarterly*, 18(4), 419–438. doi: 10.2307/747377
- National Staff Development Council. (2001). *Professional development standards*. Retrieved February 11, 2008, from [www.nsdc.org/standards](http://www.nsdc.org/standards)
- Neufeld, P. (2005). Comprehension instruction in content area classes. *The Reading Teacher*, 59(4), 302–312. doi: 10.1598/RT.59.4.1
- O'Brien, D.G., Stewart, R.A., & Moje, E.B. (1995). Why content literacy is difficult to infuse into the secondary school: Complexities of curriculum, pedagogy, and school culture. *Reading Research Quarterly*, 30(3), 442–463. doi: 10.2307/747625
- Posnanski, T.J., Mertzman, T., & Kean, W.F. (2006). Project LESC: Blurring the distinction between reading, writing, and science instruction in teacher education. *Journal of Reading Education*, 31(3), 29–36.
- Raphael, T.E. (1986). Teaching question answer relationships, revisited. *The Reading Teacher*, 39(6), 516–522.
- Raphael, T.E., & Au, K.H. (2005). QAR: Enhancing comprehension and test taking across grades and content areas. *The Reading Teacher*, 59(3), 206–221. doi: 10.1598/RT.59.3.1
- Richardson, J.S. (2008). Content area reading: A 50-year history. In Fresch, M.J. (Ed.), *An essential history of current reading practices* (pp. 120–143). Newark, DE: International Reading Association.
- Schraw, G. (2001). Promoting general metacognitive awareness. In H.J. Hartman (Ed.), *Metacognition in learning and instruction: Theory, research, and practice* (pp. 3–16). Boston, MA: Kluwer Academic.

- Vacca, R., & Vacca, J. (2007). *Content area reading: Literacy and learning across the curriculum* (9th ed.). Boston: Allyn & Bacon.
- Wade, S.E. (1990). Using think-alouds to assess comprehension. *The Reading Teacher*, 43(7), 442–451.
- Wozniak, C. (2008, January 6). *Secondary teachers' self-perceptions as content literacy experts*. Paper presented at the Hawaii International Conference on Education, Honolulu.

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