Teaching Metacognition

by Kelly Friesen

Kelly Friesen is a teacher in Rocky View Schools. She recently completed an M. Ed. degree at the University of Lethbridge

Abstract

This small project focused on the teaching of *Metacognition* in a grade 6 classroom. Students in two successive years were given instruction and coaching in five metacognitive strategies taken from the text, *Comprehension Shouldn't Be Silent: From Strategy Instruction to Student Independence* (Kelley & Clausen-Grace, 2007). Results show that most students in these two samples scored much higher on PATs in several selected areas of assessment than their counterparts from similar samples of grade 6 students who did not experience the metacognitive strategies.

Introduction

Many recent changes in Alberta's Program of Studies have brought increased attention to *metacognition* as one means whereby students acquire and apply a variety of learning strategies. Alberta educators are being challenged to realize that students of all ages and abilities must be given the different tools they need to succeed in class and in life. It is no longer sufficient that teachers simply stand and deliver information. Rather, they must learn how to help students become critical thinkers who have the skills necessary to take on the 21st century world.

Today's learners need to be innovative communicators who are both information and media literate. They must be able to think critically. As a teacher, I believe I have a responsibility to create opportunities for students to practice and use necessary skills in relevant and meaningful ways.

This project was based on the implementation of a metacognition and learning strategy action research project in one Grade 6 classroom. In two successive years, all students in the class received metacognitive strategy coaching, modeling, and instruction in five key areas. The assessment of text features, attributes, and clues gave students practice in *prediction*. *Questioning* exposed students to new ideas in both fiction and non-fiction texts. Students applied prior knowledge and experience to *make connections*. They practiced *visualizing* strong images through listening to stories, reading, and writing descriptively. Finally, *Summarizing* had students evaluate text for importance and meaning.

Students engaged in reflection throughout this project and, over time, they learned how to be more cognizant of their own thought processes.

Literature Review

Metacognition is the act of knowing about one's thinking. It includes awareness of when and how to use certain strategies for learning and problem solving (Metcalfe & Shimamura, 1994). Flavell (1985) and Yussen (1985) agree that metacognition includes awareness of one's own thinking as well as self-procedural understanding. Several authors (Anderson & Krathwohl, 2001; Borkowski, 2001; Kelley & Clausen-Grace, 2008) acknowledge that metacognition also includes an understanding of the strategies students use to assimilate knowledge; how effective they are at employing them; and various aspects of thought, reflection, and deliberation on a problem or situation. Metacognition has been recognized as a most relevant predictor of learning (Flavell, 1985; Veenman, Kok & Blote, 2005). Through the process of being reflective and metacognitive, learners develop yet another pathway to learning success.

The emergence of metacognitive skills generally begins between the ages of ten to twelve (Flavell, 1985; Veenman et al., 2005). It is a developmental process and, during this period, children learn to distinguish between what seems to be occurring and what really is happening. Their minds are focused on acquiring knowledge. They develop an ability to infer and are able to move towards thinking beyond what is visually represented into what is possible (Flavell, 1985).

Researchers generally agree that with explicit and deliberate strategies and skill instruction students will become more aware of their own thinking, as well as more knowledgeable about cognition in general (Flavell, 1985; Sprenger, 2005). According to Sprenger (2005), they will also discover how they learn and remember; in effect, they will become *metacognitive.*

Metacognition, one of the highest orders of thought, is not an innate skill for many students. In fact, Clarke (1990) contends that, for children to purposely refine their thinking skills or focus their abilities in a new domain, they must be asked to do so. In this regard, educators have a responsibility to help make students aware of their learning possibilities.

Instructional practices that focus on sense making, self-assessment, and reflection on what worked and what needs improving, are conducive to metacognition. Because metacognition often takes the form of internal dialogue, many students remain unaware of its importance unless teachers emphasize these processes explicitly and guide students towards the reflection that needs to occur (Bransford, Brown & Cocking, 2000).

It seems clear that awareness of metacognition and explicit employment of strategies should benefit a wide range of students. It is imperative that educators model different approaches, provide practice, give adequate feedback and offer students every opportunity to find success. Because self-regulated learning can take place wherever and whenever learning takes place, metacognitive strategies and awareness transcend the differentiated classroom into everyday life (Kaplan, 2008).

Metacognition in the Classroom

For this project, grade 6 students experienced direct teaching, coaching, modeling and reflection on metacognitive strategies in an effort to improve particular aspects of their learning. They engaged with the strategies through a process of planning, self-monitoring, reflection and the revision of tasks. This process was direct and linear.

Five metacognitive strategy units were taken from the *Comprehension Shouldn't Be Silent: From Strategy Instruction to Student Independence* (Kelley & Clausen-Grace, 2007). This framework, the MTF, provides a structured plan that breaks down the skills students will learn. However, the MTF goes beyond simply requiring teachers to coach metacognition through questioning (Kelley & Clausen-Grace, 2008). Students are specifically taught how to predict, question, make connections, visualize, and summarize.

This model has several benefits. For example, the necessary materials are readily available; students will delve deeper into strategy use through inquiry; strategy use is direct, routine and clear, and the instruction scaffolds learning. Additionally, strategies are easily differentiated, comprehension is facilitated, and both the teacher and the student develop a shared metacognitive vocabulary. By being able to speak the same language, students become more confident in what they are doing (Kelley & Clausen-Grace, 2008).

At times the MTF can be repetitive and can seem 'too easy' to the students. Such seeming easiness is particularly true after students have learned three or four strategies; boredom can result if students feel they already know everything and are not motivated by pedagogical "freshness." To combat such learning disinterest, I wove the MTF strategies into the broader language arts curriculum and, in this way, ensured that students stayed engaged.

Classroom Results

The following data have been drawn from Provincial Achievement Test (PAT) results attained by grade 6 classes all taught in successive years by the same teacher (the author). For the first two years, I did not use metacognitive strategies. For the last two years, all students experienced the five metacognitive strategies described by Kelley and Clausen-Grace (2007).

Table 1: *Social Studies*

Year	Average	Students Achieving *Standard of Excellence*	Students Achieving *Acceptable Standard*	Students *Below Acceptable Standard*
2007-2008				
Class	63.6%	20.7%	79.3%	20.7%
Province	67.8%	24.2%	77.4%	11.2%
2008-2009				
Class	69.9%	*Not Available*	*Not Available*	*Not Available*
Province	64.5%	*Not Available*	*Not Available*	*Not Available*
2009-2010				
Class	80.5%	39.3%	100%	0%
Province	67.8%	16.7%	70.9%	18.8%
2010-2011				
Class	71.8%	37.5%	91.7%	8.3%
Province	68.6%	19.0%	71.0%	18.9%

**2008-2009 Optional Year for New Curriculum*

Table 1 shows there was an increase of nearly 20% in the number of students achieving the Social Studies *Standard of Excellence* in this class following this action research project. As well, overall, the number of students reaching the Social Studies *Acceptable Standard* grew from below 80% to over 90% over the course of the project. The number of students who fell *Below the Acceptable Standard* dropped substantially. Before this project, over 20% of students (five-year averages) were typically *Below the Acceptable Standard*. Following implementation of MTF, the percentage of students in this category ranged from 0-8%. I believe this level of improvement can be attributed in part to the way most students were able to apply the skills and strategies of MTF to the Social Studies PAT.

Table 2: Science

Year	Average	Students Achieving *Standard of Excellence*	Students Achieving *Acceptable Standard*	Students *Below Acceptable Standard*
2007-2008				
Class	62.9%	21.4%	75.0%	25.0%
Province	66.2%	24.4%	74.3%	14.1%
2008-2009				
Class	65.8%	25.0%	85.7%	14.3%
Province	65.0%	25.2%	76.1%	13.0%
2009-2010				
Class	69.6%	32.1%	92.9%	7.1%
Province	66.2%	27.0%	76.6%	13.3%
2010-2011				
Class	74.3%	37.5%	91.7%	8.3%
Province	68.4%	25.2%	75.7%	14.1%

Results in Table 2 show the number of students *Below the Acceptable Standard* decreased dramatically, from 25% to 8%. I believe this was an indication of the extent to which more students were able to apply the knowledge and skills necessary to meet the *Acceptable Standard*. In addition, the number of students achieving the *Standard of Excellence* rose from just over 20% prior to implementation of the MTF to over 32% the first year and to 37.5% the second year. As with the Social Studies results, these numbers show improvement across the board for almost all students.

Table 3: Language Arts and Reading

Year	Average	Students Achieving *Standard of Excellence*	Students Achieving *Acceptable Standard*	Students *Below Acceptable Standard*
2007-2008				
Class	68.6%	41.4%	93.1%	6.9%
Province	68.8%	42.1%	88.9%	11.1%
2008-2009				
Class	73.6%	46.4%	96.4%	3.6%
Province	68.6%	41.9%	90.1%	9.9%
2009-2010				
Class	74.7%	46.4%	100%	0%
Province	68.8%	41.6%	91.2%	8.8%
2010-2011				
Class	77.0%	58.3%	100.0%	0%
Province	67.0%	41.3%	91.4%	8.6%

Table 3 shows the percentage of students reaching the Language Arts, Reading *Standard of Excellence* was maintained in 2009-2010 and rose 12% in 2010-2011. Of particular note is the fact that no students were *Below the Acceptable Standard* in both 2010 and 2011. Over 46% of the students met the *Standard of Excellence* the first year; this rose to nearly 60% in the second year. All students met the *Acceptable Standard* in both years of the research project.

Conclusion

The opportunity to teach metacognition in all aspects of student learning is available to every teacher. The results of this action research project indicate that the skills of self-awareness and reflection allow students to show growth in many areas, including those of reading comprehension and critical thinking. By teaching metacognitive strategies directly, teachers can give students opportunities to think differently about their learning, allowing them to gain confidence and remain motivated. As the students in this study became more aware, they showed greater appreciation for the value of being strategic, and the control they could exert over their own learning.

References

Anderson, L. W., & Krathwohl, D. R. (2001). *A taxonomy for learning, teaching, and assessing: A revision of bloom's taxonomy of educational objectives*. New York: Addison, Wesley, Longman, Inc.

Borkowski, J. G. (1996). Metacognition: theory or chapter heading? *Learning and Individual Differences*, 8, 391-402.

Bransford, J. D., Brown, A., & Cocking, R.R. (2000). *How people learn: Brain, mind, experience and school*. Washington, D.C.: National Academy Press.

Clarke, J. (1990). *Patterns of thinking: Integrating learning skills in content teaching*. Boston: Bacon and Allyn.

Flavell, J. (1985). *Cognitive development, second edition*. New Jersey: Prentice-Hall.

Kaplan, A. (2008). Clarifying metacognition, self-regulation and self-regulated learning: What's the purpose? *Educational Psychology Review*, 208, 477-484.

Kelley, M. J., & Clausen-Grace, N. (2007). *Comprehension shouldn't be silent: From strategy instruction to student independence.* International Reading Association.

Kelley, M. J., & Clausen-Grace, N. (2008). *R5 in your classroom: A guide to differentiating independent reading and developing avid readers*. International Reading Association.

Metcalfe, J., & Shimamura, A. P. (1994). *Metacognition: Knowing about knowing.* Cambridge, MA: MIT Press.

Sprenger, M. (2005). *How to teach so students remember*. Alexandria, VA: Association for Supervision and Curriculum Development.

Veenman, M. V. J., Kok, R., & Blote, A. W. (2005). The relation between intellectual and metacognitive skills in early adolescence. *Instructional Science*, 33, 192-211.

Yussen, S. R. (1985). *The growth of reflection in children*. Orlando: Academic Press, Inc.