Fluency in Thinking

Part 1: The Journey Begins

The Student Work Study Initiative began in Avon Maitland District School Board in December of 2010. In the Fall of 2011 six schools were invited to participate in this initiative. Classrooms from four of these schools inform the content of this report. The remaining two schools will be integrated into the initiative during the second half of the current school year. Teachers were invited to be participants in the inquiries through Principals and were informed about the initiative through meetings with the Student Work Study teacher at the individual schools. In general, the observations, conversations and products that inform this study were derived from 100 minute sessions once a week in the participating classrooms.

John Hattie's words from the text, *Visible Learning,* resonate with me: "...the biggest effects on student learning occur when teachers become learners..., and when students become their own teachers."(Visible Learning, p. 2) These notions capture not only the Collaborative Inquiry journey of educators involved in the Student Work Study Initiative, but the supposition which is the journey's content.
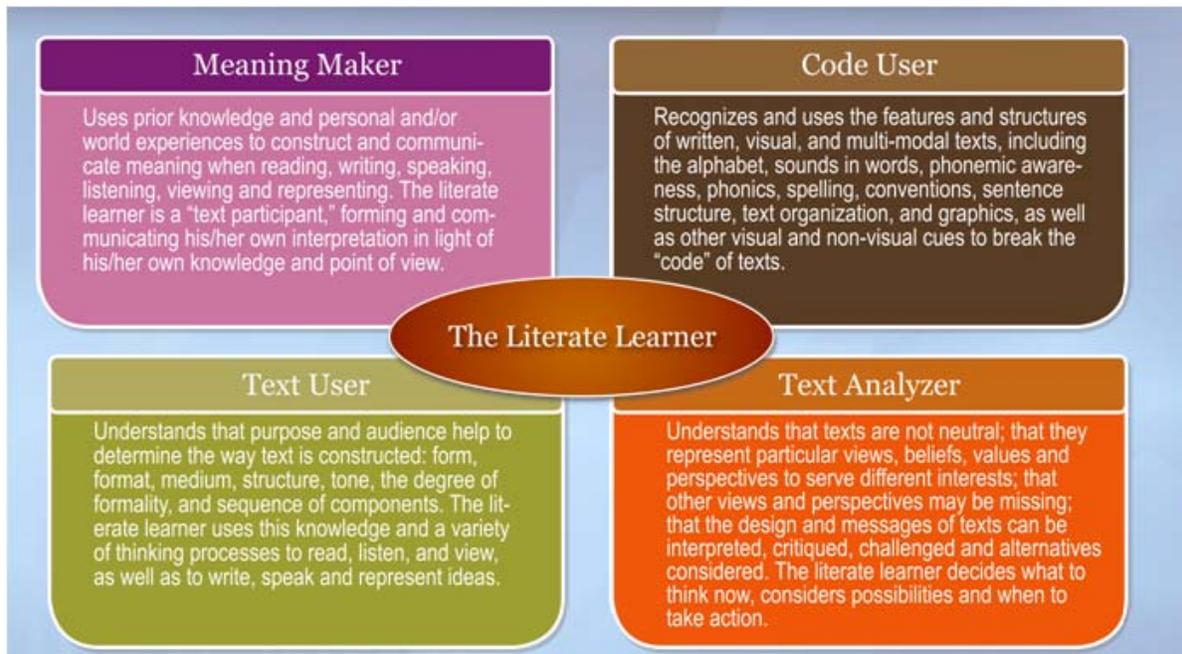
Part 2: What does the research tell us?

If students monitor the use of strategies , then they will develop a larger repertoire of strategies and use them more efficiently (flexibly/ with less effort).

Although this supposition will ultimately lead to discussions involving both reading and mathematics, it will be helpful to begin our journey into the literature by looking at a model of proficient reading or families of literacy developed by Freebody and Luke (1990).

> "Literacy in the twenty-first century involves not a single skill but a complex combination of skills and resources that the literate learner draws upon to make

meaning from texts of many types. One approach to understanding this complex process is offered by Peter Freebody and Allan Luke in their 'Four Resources Model' (1990). The four resources are also referred to as 'four roles' or 'four families of practice'." *Guide to Effective Literacy Instruction – Volume One,* 2006, p. 28

Meaning Maker	Code User
Uses prior knowledge and personal and/or world experiences to construct and communicate meaning when reading, writing, speaking, listening, viewing and representing. The literate learner is a "text participant," forming and communicating his/her own interpretation in light of his/her own knowledge and point of view.	Recognizes and uses the features and structures of written, visual, and multi-modal texts, including the alphabet, sounds in words, phonemic awareness, phonics, spelling, conventions, sentence structure, text organization, and graphics, as well as other visual and non-visual cues to break the "code" of texts.

The Literate Learner

Text User	Text Analyzer
Understands that purpose and audience help to determine the way text is constructed: form, format, medium, structure, tone, the degree of formality, and sequence of components. The literate learner uses this knowledge and a variety of thinking processes to read, listen, and view, as well as to write, speak and represent ideas.	Understands that texts are not neutral; that they represent particular views, beliefs, values and perspectives to serve different interests; that other views and perspectives may be missing; that the design and messages of texts can be interpreted, critiqued, challenged and alternatives considered. The literate learner decides what to think now, considers possibilities and when to take action.

This model, I believe, suggests that reading involves a number of different types of thinking. When you think of a proficient reader, as a code user, the reader is quite often unaware of the individual strategies that one is using to decode the alphabetic code as one reads. Breaking the code is a very fundamental component of reading. As readers, we use a number of different strategies; we look at all the individual sounds, we chunk sounds and blend them together. As a proficient reader we are often unaware of using these strategies because we are so practiced and efficient, that they have become automatic. However, as a proficient reader when we are confronted with unfamiliar vocabulary in a text, we may flexibly bring one or more of these strategies into our consciousness and apply it. (Samuels, 2004) Our attention and focus goes to where it is needed. If these very basic strategies are not used efficiently (with minimal effort, correctly and flexibility), quite often the impact is felt within the other three quadrants. In other words, if the code user is inefficient quite often comprehension of ideas within the text and beyond the text (Meaning Maker, Text Analyzer, Text User) are compromised. It is important to note that each one of these areas does not function in isolation within an individual or within literacy instruction but is a piece of the whole. Since the ultimate goal of reading is to comprehend or to extend one's understanding, then instruction/learning focus needs to be put in that area of highest impact

(precision). Some of the students of focus for this supposition appear to need to develop understanding of decoding strategies. This became their individual learning goal. It is important to note, as well, that instruction/learning was not isolated to this one area of the quadrant but included the other areas but this will not be addressed within the content of this report.

Mathematics might be viewed through a similar lens that the Four Resource Model provides. The National Research Council defines Mathematical Proficiency as,

Conceptual Understanding	Procedural Fluency
-comprehension of mathematical concepts, operations, and relations	-skilful in carrying out procedures flexibly, accurately, efficiently and appropriately
Adaptive Reasoning	Strategic Competence
-capacity for logical thought, reflection, explanation, and justification	-ability to formulate, represent and solve mathematical problems

Again this model underscores the importance of the notion that all realms of thinking are necessary to achieve proficiency. They suggest, "Instruction that aims to help students learn and master the basic facts (strategies), therefore, should aim to develop students' procedural fluency as much as it should aim to develop other strands of mathematical proficiency." (Crespo, p. 61) Again, it is critical to note that sole focus on one area is not what is suggested. Proficiency should be developed in all areas. It may be suggested however, that focus does not remain equal across all areas at all times but should vary according to the needs of the student (precision).

Another important component-fluency?

The research on this focus suggests the following:

 Hattie discusses the notion of fluency in his book **Visible Learning: A Meta-Analysis**. "A major aim (in achievement) is to develop "over-learning" or fluency of thinking. For example, most of us "over-learnt" learning to walk—we forgot the trial and error and pain that was involved when we first learnt to walk; but we can most certainly recognize that struggle when we have a major accident, and must learn this skill anew. We want a sense of fluency and over-learning of worthwhile activities...When a student attains a high degree of fluency on a topic, they have more cognitive resources to devote to another phase in learning..."(Visible Learning, p. 31). In other words, if one

gains automaticity over the basic strategies that allow us to gain explicit understanding of a text or mathematical operations, we have much more cognitive freedom to explore texts or mathematical problems from a critical, deep stance. It implies the opposite as well, if we do not gain automaticity over some thinking strategies, then we tax cognitive resources for other important aspects of learning.

The fluency monograph further suggests, "It is hard to pay attention to two aspects of a complex task at once. This is because of "working memory"...Readers need to **automate** their ability to identify words so they can direct more cognitive energy to constructing meaning …" (p. 1). It also suggests that automaticity plays a role in motivating students to read. Because students who develop automaticity ...." find reading less laborious, they are likely to read more. This lends to credence to the idea that feelings of self efficacy motivates learners to continue" (Capacity Building, p.2). This notion of efficacy is also suggested in the Mathematics proficiency model noted earlier and is described as having a "productive disposition".

How does one develop automaticity and efficiency of strategy use?

It makes sense that students must become proficient in the skills that are the precursor to the strategy. That is, if one is to become an effective user of the stretch it out strategy then one must have proficiency in knowing the letter sounds but also be able to blend sounds (phonemic awareness). Similarly, if one is to utilize the skip, read beyond and go back to make a substitution, one must be skilled in using meaning cues within the sentence or text. These must be explicitly taught/modelled and constructed with students. Secondly, they must know that the strategies exist and be named. Finally, through explicit use of scaffolding strategies, such as guiding and providing feedback, students will practice the application of the strategy.

Beyond that however, how do we ensure that students transfer this awareness -have access to a repertoire of strategies and are attempting to become efficient in their use independently? We must assist students with monitoring their own use.

As Hattie notes, "when tasks are very complex the quality of meta-cognitive skills ... is the main determinant of learning outcomes." Visible Learning, p.31) He suggests that the key difference "between experts and novices, is that it is deliberative practice rather than experience that matters—that is extensive engagement in relevant practice activities for improving performance…all this practice leads to higher levels of conscious monitoring and control that leads to more refinement, and more higher order understandings of surface and deeper level notions…to better understand how to monitor, self-regulate and evaluate their performance, and reduce errors." (Visible Learning, p. 34) Again, in our supposition it is our purpose to assist students in over-learning the basic strategies.

Perkins and Swartz formulate four levels to illustrate this journey (*from Strategies That Work, 2000,* p. 17) to "sophisticated meta-cognition".

> ***Tacit Learners****-readers who lack awareness of how they think when they read*

> ***Aware learners****-readers who realize when meaning has been broken down or confusion has set in but may not have sufficient strategies for fixing the problem*

> ***Strategic learners****-readers who use the thinking strategies to enhance understanding; and are able to monitor and repair meaning when it is disrupted*

> ***Reflective learners-****readers who are strategic about their thinking and can apply them **flexibly** and revise their use;*

There is another component that a proficient thinker utilizes and it is captured in the idea of the reflective learner. It is the idea that not only does one enact the strategies with automaticity but attends to them more closely when they are needed. A proficient, reflective reader thinks flexibly. One directs thinking to where it is needed and uses strategies automatically and without effort until the moment meaning is lost and then attention is directed toward the bank of strategies. In mathematics this might be the moment when meaning is lost, when one is confused about a calculation that does not make sense. This thinker chooses between/among the strategies and uses them consciously to construct meaning. Automaticity does not necessarily imply without conscious thought at all times, but may mean with flexibility.

In the end, the goal of this supposition is to assist students in becoming more aware of strategies through relevant practice; to reflect on the use of strategies, so that in the end, they can be employed with less conscious energy, with efficiency and enacted flexibly.

Section Three-The Process

If students monitor the use of strategies, then they will develop a larger repertoire of strategies and use them more efficiently (flexibly with automaticity).

Grade Range	Number of Students Involved	Number of Classrooms Involved	Number of Observations	Total Time in Classrooms
Gr. 1-6	20	4	24 sessions in total	2720 minutes

Evidence was gathered in a number of ways. These methods included: written observations/conversations (field notes), audio segments, photographs and videos. They were used to inform teachers as opposed to provide feedback to students directly (although this would be a worthy next step). Videos and audio recordings were played during co-analysis and were analyzed to provide evidence of strategies that students were using/not using.

Ongoing findings were shared though informal means (quick conversations whenever there was an appropriate moment) and through formal use of release time. This varied across schools and between teachers. At times we met each using a ¼ day by sharing supply teachers. At other times, we used full half days to discuss. Some principals participated in meetings to analyze student work with individual teachers and myself or as part of a school team. Curriculum staff provided direction in research.   Towards the end of 6 month period, most of the teachers involved in the project attended a group meeting to reflect on student learning to look for general over arching themes, to investigate the research that supported that theme, and to reflect on the inquiry process for themselves and students.

Section Four-Establishing the Context

If students monitor the use of strategies, then they will develop a larger repertoire of strategies and use them more efficiently (flexibly/ with less effort).

This supposition is based on observations, conversations and work samples taken from four classrooms. The Grade 1/2 and 2 classrooms provide the content for the Reading supposition. The Grade 4/5 and 6 focus on the Mathematics piece of the supposition.

Monitor-to be aware of the strategies being attempted, to verbalize the use of the strategy and to select another strategy if used ineffectively. The term self-monitor was purposely not used as this was a peer activity in one of the classrooms.

Students in the grade two used the following tool to monitor their own use of strategies. The students moved the strategy card to the clear sleeve as it was attempted. If unsuccessful, they would attempt another. Strategies could be used and should be used more than once. It is interesting to note that this also became a tool, in part, to provide specific feedback about specific strategies from teacher to student as they were independently reading.

Reading Strategy Cards used with Grade 2/3 students

Figure 1
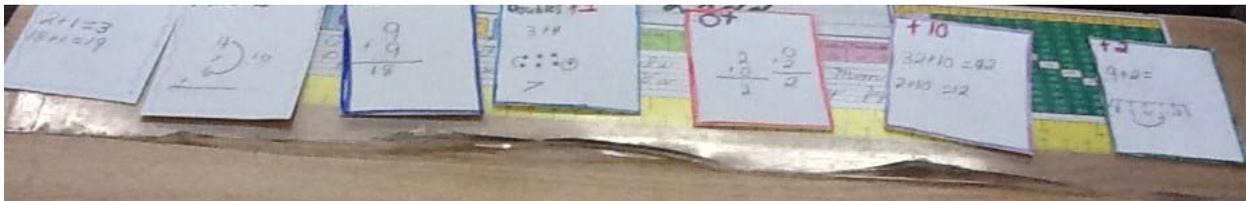
Individual Addition Strategy Cards (co-constructed)

Figure 2

The previous examples are student samples of individual addition strategy cards. It is interesting to note that the strategies are constructed with students and then the representation of the strategy on the card is represented by the student in a way that makes sense to them.

Strategies-a purposeful behaviour or thinking pattern used to solve a problem

The reading strategies focused on the following: use first letter, chunking, find the word somewhere else, stretch it out (visual cues), read return and used context cues (can be all three cuing systems), using syntax (is that the way we speak), use picture cues

The Multiplication/Addition strategies were taken from Elementary and Middle School Mathematics by Van De Walle, Karp, and Bay-Williams (2010). These included doubles, doubles plus one etc and can be found on page in Chapter 10, p. 167.

Efficiently- to use a strategy(ies) correctly (e.g. to decode/to visualize or find the sum/product) with minimum attempts. Efficiency in the end may include automaticity (used with less conscious effort) and flexibility.

Section Five-Examining the Evidence

As I watched, listened to students a theme seemed to emerge. It emerged not only within classrooms where the focus was literacy but in classrooms where our focus was mathematics, whether students were delving into deep problem solving tasks or reading with a peer or independently. It was the observation that some students do not have a large bank of strategies to draw upon. As a result, they seem to become lost in a task (lose comprehension of text; lose the thought process involved in the problem solving task). As students became more explicitly aware of the strategies, they had a means of monitoring their own use of the strategies, and a means to explicitly practice and then they became more effective users of the strategies.

Date: October , 2011 Context: Grade Two student Independent Reading Student has selected text from browsing box that contains self selected texts. In this observation I settle down beside " Jason " as he is reading *Star Wars Clone Encyclopaedia*. Running Records delivered by the classroom teacher and discussed/ reviewed with SWS indicate this student tends to perseverate and use only initial consonant sounds, shows inconsistent self corrections, and is generally a disengaged reader. SWST: Tell me about this book. Jason: It's about Star Wars. It has all the characters from the movie.	 This student seemed disengaged from the text. He was not attempting to construct meaning other than through the viewing

SWST: Can you tell me about this character? (pointing to a photograph) Jason: Um...he is in the movie SWST: What kind of character is he? Jason: A bad guy SWST: How do you know? Jason: I saw the movie. SWST: Tell me about what you have read about this character. Justin: I didn't really read it. I just looked at the pictures.	of pictures. Although he was interested in the content of the text, he seemed generally not vested in the task of reading. He may be thinking/reading at the tacit level of strategy use. The classroom teacher shared that this was an accurate perception about the student and reading.

This observation occurred late in the inquiry and is of the same student.

Date: January 11, 2012 Context: Independent Reading, Student has selected text from browsing box that contains self selected texts within independent reading level range, Grade Two student Learning Goal: To monitor own strategy use and to verbalize how it was used (R4.1) SWST to Justin: What are you reading? Justin: I am reading a story about dog slippers. SWST: Tell me about the book? Justin: It's about a dog that goes to the city and meets some friends. SWST: Can you tell me about your duotang? Justin: Ya..sure . It has the reading strategies. I use them when I read. Like...I came to this word "adjustable" and at first I said " ab" (pointing to the word	During this conversation, it appears that the student is developing some strategies to engage with the text. (enacting decoding strategies) He appears to show a willingness to discuss the use of the tool, his thinking and strategy use. He talks about the kinds of strategies he is using and how he is using them. He also articulates what he does when experiencing difficulty. (reflective thinking) This reader seems to have developed a real sense of efficacy about reading and thinking. He also seems to now be able to articulate a general summary of the story which he had difficulty doing at an earlier time. (making meaning from text)

adjustable). That wasn't right and then I went back"ad" j and thought-adjustable. That was right. SWST: I saw you move the stretch it out card. Why? Justin: I stretched out the word and so I moved the card over. SWST: Does that mean you can only use that strategy that one time? Justin: No...I can use it again, maybe the next time I come to a word I don't know and if it doesn't work then I can try a different strategy like reading on and coming back and thinking what fits. (I was sitting with a small group of students who where reading and I turned he asked me to look...) I was at this word..w/i/t/h/i/n and I stretched it out and it didn't make sense. (He says "wittin") So then I looked at the cards and picked "looked for little words in big words" and saw the word "in" so then I thought "within". The word is "within". (Student moves the strategy card over to the plastic sleeve.)	The student seems to be applying the blending of sounds strategy but more importantly is noting that at first it did not make sense then he returned for another attempt and recognizes that the text makes sense with his attempt (using strategies with some flexibility). He appears to be more aware of the strategies available for his use (building a larger repertoire) It was noted at other times that he was able to use "the reading on and return to substitute" strategy which indicated integrated use of all cuing systems It is suggested that this student has moved to being a strategic learner. He is monitoring and repairing meaning by using a variety of strategies. The classroom teacher and I were amazed at how this student was engaged and how articulate and aware he was of his thinking. It was amazingly empowering to us!

This transcript occurs in a whole group situation (Grade 1) as a reflection of partner reading and use of the strategies.

Date: January 16, 2012 Context: Grade 1 This observation is of a whole group reflection session after partner practice using the compliment of strategies. Students shared reading a common text between partners and reflected on the use	This observation shows students who are able to articulate use of a strategy. This provided an excellent example/model for all students. Focus students needed continued modeling of a number of strategies. General observations of focus students

of strategies by the partner reader. Jennifer: We were reading *The Magic Pot* and we came to this word (points to word "magic" within the text) and I said, "Oh that word looks familiar" and I was stuck and I remembered that word so I came back here… Allan: and it says, it was magic and it was here..and then she went like that (flips back to cover) and looked at it Teacher: Oh that is the "find the word another place strategy".	indicate the need to continue to build a repertoire of strategies, as well as conscious naming each strategy– strategic use of strategies. Teachers are continuing to provide specific feedback to individual students to scaffold use. It is interesting that Allan steps in to describe the way his partner used the strategy. The classroom teacher and I reflected that this was the initial phases of a peer providing "coaching support" to classmate using strategies. When this whole group discussion ended at break time, the classroom teacher and I were quite pleased with the level of dialogue that came from the students. It demonstrated a clear awareness of strategies and also that the students were able to articulate the use of these strategies.

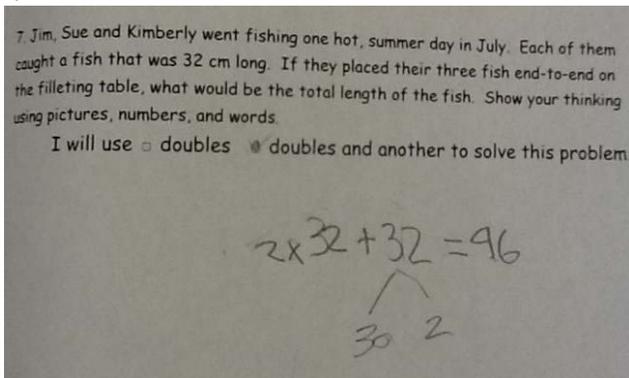|	
Date: October , 2011 Context: Independent Practice of Addition with regrouping. Grade 5 student As I watch over the students shoulder, I see her applying a mathematical algorithm after she has manipulated the concrete materials to find the answer. This occurs within the context of an oral problem solving task involving the number of paper bundles that will have been collected in a year. Student (Jane) writes the question 2437 +574 on a white board. She looks at 7 + 4 and proceeds to secretly count by touching her fingers.	This student was observed in a variety of situations. In situations involving an operation whether during problem solving tasks or simpler tasks, the student was consistently seen touching her fingers to her chin. After discussions with the classroom teacher, it was decided that she needed some bridge between using totally concrete materials and operating at an abstract level. The teacher expressed concerns that this student often seemed to become confused and forget which operation she should be completing mid task. Although this student is applying a conscious strategy (finger counting), it is ineffective. It might not represent

	procedural fluency if accuracy and efficiency are the criteria for success. She is beyond tacit understanding of the strategy but might not be described as strategic as she has a limited bank of strategies to draw on. Finger counting is her "go to "strategy and similarly to a reader who relies solely on visual memory of words, this strategy becomes less effective, the more complex the operations.

Date: December , 2011 Grade 5 Learning Goal: Solve problems using addition....using a variety of mental strategies Reflecting Process Expectation-p.77 Math Curriculum Context: It is important to note that this practice is short and focused and takes approximately 5 minutes during the initial math period. I watch as the student lays out the strategy cards (co-constructed) (Figure 2) for addition. It is interesting to note that each child has constructed a representation of the strategy that is relevant to him/her. The Classroom teacher precedes individual practice with a whole group warm up with an articulation of a strategy. Classroom teacher says "14 + 15=" What strategy would you use? The students hold up a card individually so the teacher can see which strategy they have used. Most hold up the doubles plus one strategy. (descriptive feedback to teacher)	Constructed representations might provide a stronger link for these students. They determined the way to represent the strategy. Students rehearse articulating the strategy with scaffolding and the teacher has enacted a means to give immediate feedback to students through the use of the cards.

Classroom teacher asks, "How did you use it?" Student responds, "I doubled 14 to get 28 and added one more." (After a few more warm up questions and talk describing strategy use, students move to independent practice.) I watched as the student begins to work on 10 simple, mixed addition questions (3+6). Her task is to tap the strategy she is going to use prior to completing the question. I watch her as she taps "Make Ten" and then completes 6+4. Again she taps "Plus one" as she completes 7 + 1. As she completes 9+8, I stop her to articulate her strategy: SWST: What strategy are you going to use? Jane: Doubles plus one SWST: How do you use it? Jane: I saw 8 and 8 and that's 16 and I added 1 more and that's 17.	This student is self monitoring the use of strategies with some accuracy. She is monitoring the strategies she is using and so is beyond tacit thinking as in the previous example. She may be beginning to use other strategies, more efficient strategies than finger counting. The journey continues…

Context Grade 6 January,2012 Students have been learning the strategies for multiplication. When this observation was taken "James" could articulate using doubles or doubles and another strategy. The full complement of strategies has not been co-constructed with students.	Although this is perhaps a low level problem solving task, the student is able to name the strategy he used and describe how it was used. This is certainly beyond a tacit understanding of the strategy. The classroom teacher spends about 5 – 10 minutes of most math periods

He completed the following problem solving question:

7. Jim, Sue and Kimberly went fishing one hot, summer day in July. Each of them caught a fish that was 32 cm long. If they placed their three fish end-to-end on the filleting table, what would be the total length of the fish. Show your thinking using pictures, numbers, and words.

I will use ☐ doubles ☒ doubles and another to solve this problem.

$$2 \times 32 + 32 = 96$$
$$30 \quad 2$$

SWS: What strategy did you use?
James: I doubled 32 that's 64 and added 30 that's 94 and added two more.

building an understanding of the strategy through reflective talk around a whole group questions. She guides the thinking of the group and then labels the strategy. Gradually, the strategies are being accumulated and practiced in a manner that the students need to select an effective strategy and name the one they use.

This student has begun the journey to building a repertoire but perhaps has not reached a level of automaticity and flexibility. I would suggest that he is becoming strategic in his use of the strategies.

It is important to note that the classroom teacher commented that, in general, students seemed to be more aware of their thinking when performing problem solving tasks. Articulating their thinking has built a sense of efficacy amongst students and they seem to be more on task during collaborative problem solving tasks.

Section Six-The Journey Continues

If students monitor the use of strategies, then they will develop a larger repertoire of strategies and use them more efficiently (flexibly/ with less effort).

The goal of this supposition is to assist students in becoming more aware of strategies through relevant practice; to reflect on the use of strategies, so that in the end, they can be employed with less conscious energy, efficiently, and enacted flexibly.

The Student becomes the Teacher:

When we look at the evidence in our transcripts, it would seem that students have only just begun the journey to reflective thinking. The first step is building awareness and this is a lengthy process. Some of the students appear to have moved to strategic use of the strategies.   Although we did not arrive at automaticity, flexibility and efficiency, we can propose that fostering monitoring of strategies through "deliberate practice" might also assist with the following:

- Seeds of success are empowering. When students understand the task, and what it looks like when done well, and have strategies to get there they become empowered and engaged in the learning process. This was a strong moment of learning for the classroom teacher and I regarding "Jason". He was a disengaged reader that transformed when given the tools to feel effective.

- Similarly, when students are involved in the construction of the meaning (uncovering of the strategies, development of the strategy cards), they seem more likely to remember and use the tools they have developed as in the Grade 4/5 classroom. Is this because they have translated their understanding into another format? Research suggests it (*Literacy Strategies for Improving Mathematics Instruction*, 2005, p. 21).

- Labeling thinking and naming strategies makes thinking visible to all so that it can be discussed and reflected upon and revised (as occurred in the Grade 1 classroom). Once again, the power behind this process lies in the talk, whether it is reflective talk that occurs externally within the classroom or within one's mind as one plans, enacts, and reflects. Talk is a critical element through which we develop, extend and revise our understandings. One teacher reflected that there seemed to be a transfer of an awareness of thinking in some of the students. Disengaged students were becoming engaged! Once the dialogue was started about thinking students seemed motivated to engage in that type of dialogue in other classroom situations. It is also invigorating to think- what these conversations can become when they involve some of the highest levels of thinking…

Co-conditions: The Context of the Classroom

Teacher as Facilitator: In order for the reflective conversations to occur teachers asked reflective questions of students (What strategy did you use? What was your thinking as you used the strategy? How did it help you? What did you do when it didn't work? How can you tell it was effective?). A sense of "learning community" was essential. This was a common condition that emerged across the classrooms.

Relevant practice is important: This does not mean "drill and kill". It does mean engaging in relevant practice activities that move a student to independent **thinking.**

It is the difference between giving students a page of addition facts and having them practice answering them until they have the facts memorized vs. having them practice the thinking strategies that result in quicker answering of questions. Similarly, it is the difference between having students answer a plethora of comprehension questions vs. having them practice thinking aloud using the thinking strategies. An accurate analogy would be, "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime." -- Chinese Proverb

Hindsight is 20/20

This was a lofty supposition. Perhaps, one that takes considerably more time than five months to implement and document. Time seems always a constraint. Teachers and I reflected on the impact of extending the journey to the full year would have been very powerful. Teachers are continuing their journeys, although my observations will be not be provided once a week but perhaps on a once a month basis.

Wonderings:

The curriculum expectations dealing with meta-cognition are perhaps the most challenging for one to think about and are perhaps the ones which cause teachers, me included, to be most uncomfortable. I wonder if we examined the type of instruction provided to students either at an individual level, small group or large group situation would it mirror the meta-cognitive needs of the students. For example, students at the tacit level of strategy use need explicit modeling of strategies. Students at the awareness level needed guidance/scaffolding of use of the strategies. It was new learning about this process from tacit to reflective learning. Do we, as teachers, document/use/assess this criteria as well as we should?

At some point in the learning, we reflected, that students need to stop labeling the strategies because this would seem to slow down their thinking. How do you know when one should withdraw the explicit monitoring and deliberate practice? Harvey and Goudvis would suggest that we do this when a strategy becomes a skill. "A skill becomes a strategy when the learner can use it independently, when she can reflect on and understand how it works, and then apply it to new (material) "(*Strategies That Work, p. 23*) What does this look like? What does this look like for higher order strategies? These are the reflections that classroom teachers and I wondered.

We also reflected on the process of this supposition. Inquiry with colleagues is a very powerful tool.   Teachers reflected with me about how this grassroots inquiry empowered them by validating practices but by also caused them to reflect on current practice. We wondered how we share our learning with others effectively. Meta-cognition is such a powerful component, as Hattie suggests, but perhaps the least

known. Professional learning is needed into deconstruction of all of the curriculum expectations that deal with this component of learning.

Final Thoughts:

 As John Hattie states, "When students can move from idea to ideas and then relate and elaborate on them we have learning—and when they can regulate or monitor this journey then they are teachers of their own learning." Indeed, isn't this when we truly empower our students?...when they become reflective learners or fluent thinkers.

But this is also true of teachers…When we, as teachers, have reached a deep understanding of the content/curriculum we teach, of the instructional strategies we employ, of the students under our care and we can think and act flexibly and fluently about all of these things, we are empowered and understand **our** task—to reach every student! **We** truly become fluent!

References

Baroody, A. J. (2006). Why Children Have Difficulties Mastering the basic number combinations and how to help them. *Teaching Children Mathematics*, *August*, 22-31.

Cameron, D. H.,Gauthier, G., Ryerson, R., Kokis, J. (2011). *Teacher professional learning from the 'inside out': Studying the student experience as means to teacher action and new knowledge.*

Crespo, S., Kyriakides, A., & McGree, S. (2005). Nothing Basic About Basic Facts: Exploring Addition Facts with Fourth Graders . *Teaching Children Mathematics*, *September*, 60-64.

Harvey, S., & Goudvis, A. (2000). *Strategies that work: teaching comprehension to enhance understanding*. York, Me.: Stenhouse Publishers.

Hattie, J. (2009). *Visible learning: a synthesis of over 800 meta-analyses relating to*

achievement. London: Routledge.

Keene, E. O. (2008). *To understand: new horizons in reading comprehension*. Portsmouth, NH: Heinemann.

Kennedy, Joan M., (2005). *Literacy Strategies for Improving Mathematics Instruction*, Alexandria, VA: ASCD.

Literacy and Numeracy Secretariat. (2010, March). Reading Fluency. *Capacity Building Series, Special Edition 12*, 1-8.

Ministry of Education. (2004). *Literacy for learning; The Report of the Expert Panel on Literacy in Grades 4 to 6*. Toronto: Ontario Ministry of Education .

Ministry of Education. (2010). *Thinking About Thinking: Setting the Stage for Independent   Reading*. Toronto, ON: Queen's Printer for Ontario.

Ministry of Education (2006). *The Ontario Curriculum, Grades 1–8:Language*. Toronto, ON: Queen's Printer for Ontario

Ministry of Education. (2005). *The Ontario Curriculum, Grade 1-8: Mathematics*. Toronto, ON: Queen's Printer for Ontario.

Samuels, S. (2004). Toward a Theory of Automatic Information Processing in Reading, Revisited. In R.B. Ruddell, & N.J. Unrau (Eds.), *Theoretical Models and Processes of Reading*(pp. 1127-1148). Newark, DE: International Reading Association.

Van De Walle, J. A. (2010). *Elementary and middle school mathematics: teaching developmentally* (7th ed.). Boston: Allyn and Bacon.

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