FOSTERING TRANSFORMATIVE LEARNING FOR GRADE 3 STUDENTS
PREPARING FOR EQAO EXAMINATIONS

by

Erin Sheahan

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ABSTRACT

All Grade 3 students in Ontario are required to write standardized examinations in June that test their abilities in both language and mathematics. Test results from the 2011-2012 academic year of testing by the Educational Quality and Accountability Office (EQAO) of Ontario indicated that my students were weakest at explaining their thinking when solving word problems in mathematics. I made it a personal teaching goal to model to students how to be more reflective about their learning in hopes that it would increase their ability to state their chosen strategies and become more thorough when providing their solutions.

Transformative learning involves experiencing a deep, structural shift in the basic premises of thought, feelings, and actions (Maxwell, 2002, p. 18). Mezirow (1997, p. 7) describes transformative learning in these terms:

We transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based. We can become critically reflective of the assumptions we or others make when we learn to solve problems instrumentally or when we are involved in communicative learning.

Following Mezirow’s definition that transformative learning is “a process by which previously uncritically assimilated assumptions, beliefs, values, and perspectives are questioned and thereby become more open, permeable, and better validated” (Cranton, 2006, p. 2), I argue that transformative learning can be achieved in some meaningful way for any type of learner at any age. Some suggest that transformative learning, which
involves reflective practice and critical thinking, can only be achieved by adult learners. I believe that efforts to foster transformative learning for young learners are possible and should be developed in language that children can understand easily.

In order to foster transformative learning for my students, I designed five phases to collect data to monitor student progress throughout the Grade 3 math curriculum. Each phase focused on specific strategies where I attempted to ignite my students’ critical thinking abilities. In search of evidence that transformative learning was taking place, I was guided by Mezirow’s 10 phases placed alongside my students’ mathematics responses and my qualitative notes on student dialogue.
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Throughout my 4 years of study in the M.Ed. program at Queen’s University, I have been transformed as a student and as a professional. Learning and trying out new strategies in educating young minds undoubtedly has dual benefits for both the learners and the educator. I sincerely hope that through this project readers will share a better understanding of transformative learning and that educational improvements will occur for teachers of any age group.
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CHAPTER 1
INTRODUCTION AND RATIONALE

When I think about transformation I envision a caterpillar crawling to its place of choice in a tree, spinning a cocoon and changing into a butterfly. The butterfly emerges from its cocoon, when it is ready of course, and can never revert back to its caterpillar stage of development. Throughout my teaching career, I have come to see my students through this metaphor. Learners entering any new learning domain are, in a sense, like caterpillars about to enter the various phases of learning within a setting, and ideally they will feel transformed by their experience.

Transformative learning involves experiencing a deep, structural shift in the basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and irreversibly alters our way of being in the world. Such a shift involves our understanding of ourselves and our self-locations; our relationships with other humans and with the natural world; our understanding of relations of power in interlocking structures of class, race and gender; our body awarenesses, our visions of alternative approaches to living; and our sense of possibilities for social justice and peace and personal joy” (O’Sullivan, Morrell, & O’Connor, 2002, p. 18).

For some, this may seem like an overwhelming definition for any one learning experience, but portions of that definition are examined more closely as I examine Mezirow’s 10 phases of transformative learning in the pages to come, and refer back to this definition of transformative learning to illustrate how I plan to create a Grade 3
learning environment in which Mezirow’s 10 phases of transformative learning become more apparent to my students and guide my teaching practices as I plan to foster these stages for students who are preparing for EQAO testing in June.

McKeough, Lupart, and Marini (1995) contend that transfer of learning is universally accepted as the ultimate aim of teaching. In my opinion, if any student can justify that a specific concept being taught has no clear relevance to future or current skill development, I have difficulty seeing the value in teaching it. If a learner cannot make connections to respond to questions such as “Why is this important to know?” or “How will this help me down the road?”, then I feel it is my job to explain to students the importance of asking those questions and to emphasize how being constantly reflective of their learning will help them to develop more meaningful connections to their experiences.

As a Grade 3 French Immersion teacher in Ontario, I feel strongly about creating opportunities for knowledge transfer for my students. I attempt to develop learners who feel forever transformed by the content learned in Grade 3. I am realistic about my students’ motivation in certain subjects and their attention spans, specific needs and maturity level, but I feel that every student is capable of being a critical thinker if I consistently introduce and model reflective practice techniques. Although most of the literature alludes to adult learners being most able to reflect critically, undergo transformative experiences and engage in reflective practice, I believe that all three of those aspects are joined concepts of what effective teaching and transferable knowledge are and have no bearing on a learner’s age. One of the most valuable skills I have learned personally is reflective practice. In terms of reflective practice, Boud and colleagues
contend that “reflection is an important human activity in which people recapture their experience, think about it, mull it over and evaluate it. It is this working with experience that is important in learning (Boud et al., 1985, p. 19). I am fortunate to have felt transformed by many experiences in my life; as a professional teacher the revelation I experienced about the concept of reflective practice is the main reason to why I am developing this project. Embedded in this project are copious amounts of personal reflection that indicate how I plan to model strategies for my students in order that they will come to value the concept for themselves and their own learning.
CHAPTER 2
LITERATURE REVIEW

The Education Quality and Accountability Office

EQAO is the acronym used for the Education Quality and Accountability Office in Ontario. This office prepares tests of student learning at the end of their primary grades (Grade 3) and junior grades (Grade 6) in the areas of reading, writing and mathematics. “In 1995, Ontario’s Royal Commission on Learning recommended such tests for Ontario students. The Commission made this recommendation after consulting with parents, educators, students and others who wanted greater accountability and assurances of quality in the public education system” (EQAO, 2012, p. 1). In the Commission’s words:

It seems obvious to us that the public school system is responsible to the public, and owes it to the public to demonstrate how well it's doing with our children. It seems equally obvious that in learning, as in most other endeavours, your family is helpless to assist you to improve yourself unless you and they know the criteria for success and how close you come to meeting them. Finally, what holds for the individual holds for the system: its programs too must be assessed to determine if they're working properly. So we take a stand on behalf of close monitoring of every child's progress right from the earliest years, and of the system itself at every level, in order that both can learn to be even better (EQAO, 2012, p. 2).

Public Perspectives on EQAO

The survey of public opinion in September 2012 by the Ontario Institute for Studies in Education (OISE) indicated “continued and widespread support for EQAO’s province-wide testing program. Large majorities of the general public and of parents favour the
provincial assessment of all students” (Jackson, 2012, p. 1). In the article “In the Know with EQAO,” Marguerite Jackson claims that the results of both recent and past surveys indicate that parents across the province of Ontario have a high level of support for EQAO’s provincial testing program, and have done so for many years (Jackson, 2012, p. 1). “When participants were asked about the testing of elementary school students, almost two-thirds (64%) supported province-wide testing, with the majority (53%) favouring the assessment of every student. Testing all students was by far the preferred option and was selected more often than all other choices combined” (Jackson, 2012, p. 2). The survey also shows that the majority of the respondents are in agreement with the format of EQAO testing, only testing the areas of reading, writing, and mathematics “which are the foundation for all other learning”(Jackson, 2012, p. 2). Overall, the survey demonstrates a positive attitude towards EQAO testing. The findings from EQAO’s parent survey showed that 74% of parents thought that provincial testing results were being used to improve education and that 64% of all respondents agree that EQAO’s provincial testing program helps keep the education system accountable to parents and taxpayers (Jackson, 2012, p. 2).

That being said, as a Grade 3 teacher working with the students who write the EQAO exam, I have witnessed firsthand the *disorienting dilemma* my students express in the months of January to May as we prepare for the formatting of the exams’ questions, as well as the stress and anxiety my students have expressed the day before or morning before they write their exams. It is the attitudes of my students that have motivated me to make the best possible use of my teaching practice to foster their transformative experiences associated with the EQAO preparation and testing.
Transformative Learning

Mezirow (1997, p. 7) describes transformative learning as a process in which we “transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based.” My five years of teaching children ages 4 to 14 have shown me that some form of transformative learning can be achieved for any type of learner at any age. Every learner is involved in some form of thinking, whether it be basic, complex, voluntary, involuntary, relevant, irrelevant, memory-based or critical; learners of all ages process information. Therefore, I believe that any Grade 3 student can undergo transformative learning. It would take the application of a few of the strategies that are mentioned in this project, such as modeling how to work effectively in small groups, presenting options for metacognitive learning to take place (i.e., choice, self-evaluation, relevant discourse), and demonstrating how to be truly reflective about their learning, no matter what the content or context may be.

Based on a study of 83 women at the college level, Mezirow “initially described a process of personal perspective transformation that included ten phases” (Cranton, 2006, p. 20).

- Experiencing a disorienting dilemma
- Undergoing self-examination
- Conducting a critical assessment of internalized assumptions and feeling a sense of alienation from traditional social expectations
- Relating discontent to the similar experiences of others- recognizing that the
problem is shared

- Exploring options for new ways of acting
- Building competence and self-confidence in new roles
- Planning a course of action
- Acquiring the knowledge and skills for implementing a new course of action
- Trying out new roles and assessing them
- Reintegrating into society with a new perspective (Cranton, 2006, p. 20).

As Cranton (2006) summarizes Mezirow’s 10 phases in great detail, she gives multiple examples of how each phase could be experienced. At no point did I feel that any phase of Mezirow’s transformative process could not be applied to my Grade 3 students, and could be recursive in its nature rather than strictly linear. The language in the explanation of the transformative learning process would need to use vocabulary that is more child-friendly, but this would not negate the experiences throughout their learning process from fitting into this model. For example, a Grade 3 student could express a disorienting dilemma as “I don’t understand” or “I feel anxious or confused about...” I think it is fair to say that any self-examination being performed by a Grade 3 student could be expressed using “I-messages.” For example, “when I check in with myself about how I feel, I am...” or “I feel differently now because...” are statements that Grade 3 students could be prompted to use and give an accurate rendition of their feelings, assumption, perspectives and beliefs about a learning goal.

Mezirow describes a self-directed learner as “one who participates freely in dialogue in order to test perspectives against those of others and modify them accordingly” (Mezirow, 1985b, p. 17). Grade 3 students who can provide meaningful
dialogue that is evidence of transformative learning will then become more self-directed in their learning, a major goal of mine while teaching at the primary level.

For the purpose of my research, I planned to implement specific strategies in my classroom and assess my students prior to and after they write their EQAO exam in June 2013. They will be engaging in small-group discussions about their experiences. As my students complete their Grade 3 year, I am hoping to alleviate some of the stress regarding their EQAO testing and enhance their ways of thinking and learning to become more actively aware of their own capabilities for being critically reflective.

Facilitating Personal Transformations in Small Groups

One of the first strategies I feel would be important to implement in order to foster a transformation for my students would be to allow for small-group discussions about the EQAO process and any disorienting dilemmas they are experiencing about the content of the exam, or writing the exam in general. Boyd states that one of the firmest sources of data is the perceptions of the members (Boyd, 1989, p. 463). It would be during these small-group discussions that I would observe and record data about the students’ feelings, perceptions and goals. Fortunately, if these small-group discussions are productive, then I will be able to continue to implement them at various stages throughout the term and use the dialogue as evidence that transformative learning is, or is not taking place. Interestingly enough, Boyd questions that “if we accept these perceptions as evidence that the group is an entity that does impact its member, then we return to this question: How does the social system facilitate or obstruct personal transformations?” (Boyd, 1989, p. 463). I would then be tracking the students’ contributions to the discussion and compare the data to Mezirow’s 10 phases of a
transformation. I feel that it is important to state again here that Mezirow’s phases do not need to be experienced linearly in nature, and that any step of the transformative learning process can be recursive in its experience or even absent in the process (Cranton, 2006).

Boyd discusses the idea of “expansion of consciousness” and how it is to be seen as the mind frame where a learner reaches a highly reflective state (Boyd, 1989). During small-group discussions, I plan to praise those students who are exemplifying how to be “present” in the discussion while giving good insight about their experience with EQAO testing. Boyd also mentions the notion of “group pressure” (Boyd, 1989, p. 465). I feel as though small-group development calls for reflection on behalf of the teacher. When designing a functional group setting, it requires careful planning, including placing specific students in groups where they feel unthreatened to respond and placing non-dominant students in a group where the more dominant students would prompt conversations, not take over the conversation.

Boyd discusses several types of functional student group symbols, one being that of the “Great Mother” (Boyd, 1989, pp. 464-465). As a result of careful planning, it would have to be up to the teacher’s discretion to observe and decide upon whether or not the “Great Mother” leadership type is having a positive effect on the group dynamic or not. If it becomes evident that students are being competitive for the “Great Mother” role, or struggling with this type of leadership present in the group then it may be an indicator to rearrange the student groupings or use this as a teachable moment for how students need to work cooperatively in discussion. Conversely, there is the possibility that there are some individuals who desire to please the leader; and may say they accept what they
truly do not experience. Boyd states that in either case teachers are to “look for superficial accepting behaviours, contradicting behaviours, slips, and other such indicators that would reveal some difficulty” (Boyd, 1989, p. 465). The end goal of small-group discussion for this research would be to have the individual student become “increasingly conscious” about whatever it is that they are currently experiencing, so that I can gauge which stage of the transformative learning process they are undergoing (or not) using Mezirow’s model for transformative learning.

In establishing its identity, the group will work best through “the development of trust, then autonomy, followed by the initiative, and so on” (Boyd, 1989, p. 466) and that the small-group learning method operates on the “premise that members must take the responsibility for their own growth” (Boyd, 1989, p. 470). Most importantly, it is what Boyd describes as the “receptive phase” that demonstrates the “existence of personal responsibility for one’s own growth” (Boyd, 1989, p. 470). The correlation to Mezirow’s 10 phases of transformative learning is evident when Boyd explains that “the educational program begins by helping to bring an unresolved dilemma to awareness—the crisis that confronts the individual, and then helping the person to develop a personal project that directs attention and energies to the resolution of the dilemma” (Boyd, 1989, p. 473).

The disorienting dilemma faced by my Grade 3 students (EQAO) will be the beginning stage of Mezirow’s process, as long as my Grade 3 students respond to the notion of awareness about what they are experiencing. Some may argue that the maturity level may not be present for some students to articulate their feelings. However, if reflection and small-group discussions are modeled by teachers and used at various times of the school year, then I believe transformative learning can be achieved. Cranton
echoes Boyd’s concept of successful learning in small groups as one that is supportive and effective if there is

commitment to the group’s goals, conformity and protection of group norms,

loyalty to the group, acceptance and responsibility within the group, good communication among the group members, willingness to be influenced by group members, acceptance of others’ opinions, and willingness to endure frustration on behalf of the group.” (Cranton, 1996, p. 163-164)

Metacognition in Primary Schools – What Does It Look Like?

Metacognition refers to “cognition about cognition,” or “knowing about knowing” (Metcalf & Shimamura, 1994, p. 1). It is a theory that “learners have knowledge, awareness and control of their own learning” (Williams, 2004, p. 1). In my opinion, most successful classrooms are those in which students are metacognitive about their own learning. If there is evidence of metacognitive learning, then that is an indicator that students are more able and ready to commit to being reflective and practice articulating it properly. Judith Williams researched the notion of metacognition in primary schools at Monash University in Australia. She had interesting findings with regards to metacognition in the primary classrooms of the teacher candidates with whom she was working at the time. Williams and her teacher candidates interpreted data gathered from a random sample of about 70 primary schools in Melbourne and found that, in terms of metacognitive behaviours of children, many students were able to discuss what they are learning (i.e., how to spell dinosau) and how they are learning (look on the classroom chart of theme words to find the spelling of dinosau). Her findings included a long list of activities that students are capable of: self-assessment is often verbalized by younger
students, students were able to brainstorm ideas about their prior knowledge on a topic when beginning a new unit of work, students asked questions such as – what, why, how, etc., students had choice options throughout their learning day (i.e., choice of seating arrangement, where they would work for different activities, who they would work well with, where to keep their belongings, etc.), students had free access to resources in the classroom (making decisions about what they would use and when), students were finding answers to problems using only what was available in a classroom environment, students were creating and using self-help cards, students were making up their own math games (including rules of play), students made links between classroom activities and home experiences, students were investigating topics at home (on the internet for example) and bringing in addition resources to add to the classroom theme, students were using thinking journals, students were evaluating their own learning (Is it finished? How could it be improved?), students had share time at the end of an activity (reiterating what they had just learned), students used self-assessment sheets, students were verbalizing how to solve problems, students showed evidence of proper time-management, students knew how to use contracts of when to complete work, students were engaging in group homework tasks (when each member is responsible for their own contribution), and the students were announcing their own risk-taking (when the students announced risks that they took while learning or working that day) (Williams, 2004, pp. 1-2). All of these are sound examples of metacognition in primary classrooms. Knowing that my students demonstrate some of these behaviours already, I planned to implement more of these ideas in my teaching practice. I looked forward to modeling how to be metacognitive and then tracking the children’s discussions to gauge their phase in Mezirow’s model of
transformative learning as they prepare for their EQAO testing.
I chose to implement a set of strategies and look for evidence of transformative learning in a series of five phases. I decided to collect data at five different times over the winter term so that I could scaffold each teaching strategy and foster transformative learning with effectiveness. I spent time from September to December developing a strong rapport and becoming familiar with all of the needs and tendencies of my students, and this helped guide my teaching practice for this research. I knew ahead of time that my students progress best if I introduce one idea at a time to allow them sufficient time to process each new concept. I knew that I wanted to cause a transformation in the areas of language and mathematics for my students who are going to write their EQAO exam in June. In discussion with my principal, we decided that the greatest area of concern that was brought forth after analyzing our EQAO results last year was that the Grade 3 students were weakest on explaining their thinking when solving Math word problems. These problems are a combination of both written language communication skills and application of new math concepts. My students were already comfortable with using Exit Tickets as a teaching strategy; therefore I saw it best to have students complete Exit Tickets on a regular basis to collect sufficient data on their progress. Further, I took qualitative notes of student’s verbal feedback to record for evidence of transformative learning using Mezirow’s model.

The template below was used for developing the students’ Exit Tickets. The math problems chosen coincided directly with the unit of study that was being taught at that
time. In addition, the students and I developed together a checklist to evaluate each Exit Ticket. The students were given a copy of the checklist to evaluate their own responses before submitting them. I saw this student checklist as a way to promote critical and metacognitive thinking.

A Level 4 Math Response is given when:

- The student shows all steps leading to their solution.
- The student uses appropriate signs, symbols, and or pictures that make their chosen strategy obvious.
- The student has communicated his/her solution in a complete sentence, which demonstrates his/her understanding of the problem.
- The student’s solution to the problem is correct.
Here’s my thinking...

In math class today, I learned __________________________________________________________.

The problem that I worked on was: _____________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

My Strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using **words**.

__________________________________________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

I can also show that I understand by using **pictures and numbers**:

__________________________________________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

__________________________________________________________________________________

Name: ___________________________ Date: ____________________________

Figure 1. Basic Template for Exit Ticket
Data Collection

The purpose of Exit Tickets was to increase critical thinking in Math using their Language skills, and to provide evidence of Transformative Learning. None of these student questionnaires were used as summative assessment. The Grade 3 students were already familiar with the use of Exit Tickets as a means of formative assessment of their work. This type of questionnaire helped to guide my teaching, and acted as a means to highlight students’ areas of need for more instruction. When all the data were collected and entered onto the Levels of Achievement Grid (see Figure 2), they were labeled as Student 1, Student 2, Student 3, etc. to allow for the students to be de-identified.

Following ethical approval from Queen’s University and my school board, parents of my students were asked to sign a Consent Form to allow for the Exit Tickets to be used as exemplars for this project. Every parent gave consent and returned the signed consent form. The coded levels of achievement allowed me to display my students’ data in a bar graph. Further, I used criteria for transformative learning and metacognition derived from the writings of Mezirow as qualitative data to further develop and implement each phase.
The five phases were designed as follows:

**Phase 1: Baseline Assessment**

Students were asked to complete the Exit Ticket without explanation or teacher instruction. (This Exit Ticket was Blue).

**Mezirow’s Stage** – Students were experiencing a disorienting dilemma. The qualitative evidence that my students were experiencing at this stage was apparent in my field notes as I recorded student responses being, “can you tell me how to do it?” and “what are the lines for?” Students seemed very anxious, and were looking for prompts from me to
successfully complete their “Exit Ticket.” Although they were familiar with the concept of Exit Tickets they had never been asked to do one involving Math word problems. The students performed fairly poorly on their baseline assessment. I found that a small group of my students with advanced literacy skills achieved an average grade. Below is a table of how my class performed at each phase in my data collection. Look closely at the blue phase in the following graph.

![Achievement Level Bar Graph – Phase 1 Baseline Assessment](image)

**Figure 3. Achievement Level Bar Graph – Phase 1 Baseline Assessment**

**Phase 2: Modeling of Effective Partnerships**

Students were asked to complete the Exit Ticket after a formal lesson with explicit teacher modeling of what a “good” Math partner is and what a level 4 Exit Ticket looks like. (This Exit Ticket was Green).
**Mezirow’s Stage** – Students began to explore options for new ways of acting. The main goal of the lesson was to demonstrate clear expectations for how to engage in discourse with another student to discuss a chosen strategy or various strategies to solve a math problem. This gave students an opportunity to explore different ways to solve a problem and to become comfortable using the Math unit vocabulary with another student. The addition of a “Math Partner” provided comfort for many students who normally require prompts to begin working. Most interesting to observe were the words that my students began using with one another. Verbal communication between students was recorded as “No, I think there is a faster way to solve it than counting by 1’s, if we count by 5’s we will get to the same answer, so why can’t we try it that way.” Overall, the levels of achievement increased as I saw some of my first level 4 responses. Look closely at the green phase in the following bar graph.

![Figure 4. Achievement Level Bar Graph – Phase 2: Modeling Effective Partnerships](image)
Phase 3: Assessment of De-Identified Student Responses

Students were asked to complete the Exit Ticket after a lesson on the evaluation of anonymous student Exit Tickets themselves. Sample student responses were shown on my projector screen and students engaged in discussion to generate their own reasoning for why certain responses should be given a Level 4, Level 3, Level 2 and Level 1. The purpose of this learning activity was to encourage students to reflect critically about the expectations of “explaining their thinking” and help them see what was missing on certain responses that earned a level 2 versus what was evident on responses that earned a level 4. It became obvious to them what they now needed to provide and began to use the checklist along side them while they worked together on their problems (This Exit Ticket was Purple).

Mezirow’s Stage – Students were now trying out new roles and assessing them and undergoing self-examination. In this activity, the students got to play the role of the teacher and practice using the checklist on student work that was not their own. I believe that this in turn allowed them to evaluate themselves better before submitting their responses. What I had recorded in my field notes was that I witnessed a group of students editing each other’s Exit Ticket before handing it in. An example of student dialogue I recorded was “look at your picture of counters, you’re missing a row in your array, you need to change that.” The achievement levels on this phase were very evenly spread, however it was the first time I assessed a 4+ response. Look closely at the purple phase in the following bar graph.
Students were asked to complete the Exit Ticket after a lesson in Reflective Practice. The goal at this phase was to encourage students to double-check their responses with a different partner or partners that they have not worked with before. To achieve this goal, I developed a five-step model to support their critical thought processing to help them better evaluate the question that was being asked. (This Exit Ticket was Orange).

**Mezirow’s Stage** – Students were now acquiring the knowledge and skills for implementing a new course of action and building competence and self-confidence in new roles. It was interesting to see that not all students chose to work with their friends, but rather any available partner, which showed their level of comfort discussing their work with anyone not just someone they were used to working with over the past few
months. I used the teaching acronym CUBES, which is explained in Figure 6 below. This acronym was the model that students used to help them truly understand what the question wanted from them. It aided them to stop, think, and analyze the question in a way that they had not done before. They were encouraged to highlight specific aspects of the question to help them reflect critically.

It was at this stage that I saw the highest levels of achievement. Students were beginning to take their time and re-read questions more often. The dialogue evidence indicating the learning transformation was as follows: “Let’s underline the word change, because they’re asking for the difference in money so that means that we need to minus.” Many of my students were excited about Math and looked forward to the time in the day when they would be completing their Exit Tickets. Look closely to the orange phase in the bar graph in Figure 7.
Figure 6. The CUBES Strategy for Problem Solving
Phase 5: Final Exit Tickets

Students were asked to complete the Exit Ticket independently, after one final review of all strategies. (This Exit Ticket was Yellow).

**Mezirow’s Stage** – To conclude the data collection process, students completed their Exit Ticket without engaging in any kind of partner discourse and apply all of their acquired skills. My students were now reintegrating into society with a new perspective. In other words, I saw a learning *transformation* for my students who were now confidently evaluating word problems, using a checklist to verify their responses, and using complete sentences to explain their thinking. Removal of the “Math partner” did cause an overall negative effect on the achievement levels overall, and I suspect it is due to the areas of weakness still residing in terms of some of their reading capabilities,
or even a lack of confidence without engaging in discussion about the problem with their peers before answering. Look closely at the yellow phase in the following bar graph.

![Bar Graph](image)

**Figure 8. Achievement Level Bar Graph – Phase 5: Independent Exit Ticket**
CHAPTER 4
DATA ANALYSIS

Through the five phases of Exit Tickets I sensed that the majority of the students were enjoying the process, began to combine their acquired skills in other Math strands, and were applying the “CUBES” strategy effectively. For some students, however, problem-solving remained a daunting task because of their inability to evaluate and process the words in the problem correctly.

Far too often in my teaching I would model an algorithm, a formula or sequence of steps, and even use repetitive vocabulary to prompt a student to add, subtract, or multiply. I rarely allowed them to troubleshoot and decipher language in a question all on their own. As a result of this project, I now see the importance of modeling how to “think” instead of how to “do.” I see the value in teaching students how to reflect critically about what is being asked and troubleshoot to the best of their ability, versus modeling how to solve problems in a copycat format. An independent learner will only develop if shown how to evaluate, infer, predict and use helpful resources. It is unlikely that a learner will become independent if only exposed to the learning where they are consistently asked to regurgitate what the teacher has been saying and showing over a unit of study. Mezirow defines transformative learning as “a process by which previously uncritically assimilated assumptions, beliefs, values, and perspectives are questioned and thereby become more open, permeable, and better validated” (Brookfield, 2012, p. 142). I believe that, with the appropriate vocabulary and modeling, students at any age can analyze, predict, infer, and evaluate questions when allotted the correct amount of time.
and given the opportunity to discuss their ideas in small groups. Working in pairs not only minimized the amount of wasted time for my students who had difficulty reading the questions, but also energized the students to communicate orally and rationalize before putting a response down on paper. I choose three students and their work throughout all five phases to give a better picture of the quality of work I saw at the beginning of my data collection, and then towards the end of my data collection. It becomes quite obvious how some students still had trouble evaluating what they were to do to solve the problem, and the difficulties they had putting their thinking into words. By enlarge, I feel strongly that the students who performed poorly consistently throughout the 5 phases, were those who have difficulty in literacy comprehension tasks.

Phase 1: Baseline Assessment

Student 1’s baseline assessment involving time shows that he or she understood what the question was asking him or her to solve, but did not choose a strategy to aid him or her to solve the problem. He or she drew a picture of a clock that demonstrated no real understanding of how to subtract or count backwards from a given hour. The strategy chosen suggests that he or she used a clock, but requires further instruction on how to use it correctly. It was also evident that Student 1 requires further instruction on how to communicate his or her response clearly.

Student 2’s baseline assessment suggests that he or she understands how to count backwards by 5’s on an analogue clock but was incorrect in not noticing that 17 is not an increment of 5. He or she shows that he or she understood what the question was asking him or her to solve, but made an error in counting backwards or subtracting. He or she did not provide a picture that demonstrated any real understanding of how to subtract or
count backwards from a given hour, and also requires further instruction on how to communicate his or her response.

Student 3’s baseline assessment involving time shows that he or she understood what the question was asking him or her to solve, and made it evident what his or her chosen strategy was. Student 3 got the correct response and knew how to communicate his or her answer in a complete sentence. The reasoning behind this student achieving a 3- on the question is because counting back by 17’s is not the most efficient way to solve the problem, and the picture that student 3 is providing is of 2 clocks and not his or her chosen math strategy. This student has stronger literacy skills than Student 1 and 2, but still requires further instruction on how to explain his or her thinking fully.
Here’s my thinking...

In math class today, I learned how to read an analog clock.

The problem that I worked on was: When Milie Sheahan left OLMC, it was 4:30. What time did she leave OLMC?

My strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words and pictures and numbers.

I can also show that I understand by using pictures and numbers:

[Diagram of an analog clock showing a time between 4:30 and 5:00]

Name: [redacted] Date: [redacted]
Parent Signature: [redacted]

Figure 9. Baseline Assessment for Student 1
Here’s my thinking...

In math class today, I learned how to read an analog clock.

The problem that I worked on was: Mlle Sheahan left Olyc at 4:43. 17 minutes before 5:00 pm. What time did she leave Olyc?

My Strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

Mlle Sheahan left at 4:43

because I counted back by 5's.

I can also show that I understand by using pictures and numbers:

4:43

Name: 
Date:
Parent Signature:
Here's my thinking...

In math class today, I learned how to read an analog clock.

The problem that I worked on was: Mlle Sheahan left OLMC 17 minutes before 5:00 pm. What time did she leave OLMC?

My strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

Mlle Sheahan left OLMC at 4:43. I know because I counted back by 17’s.

I can also show that I understand by using pictures and numbers:

![Clock pictures]

Name: __________________________ Date: __________________________

Parent Signature: __________________________
Phase 2: Modeling Effective Partnerships

In Phase 2, I modeled what it meant to be an effective Math partner. Teaching the students how to engage in meaningful dialogue about the problem they are working on and explaining clear expectations for the process. This increased participation on the learning goal in Math class on a regular basis, as well as, engage students to think together and justify their reasoning to each other, which was unthreatening and helpful for students who were struggling through the current unit of study.

Student 1’s assessment in Phase 2 involving money shows that he or she understood what the question was asking him or her to solve, and is now choosing a strategy to aid him or her to solve the problem. He or she drew a picture of coins, which demonstrates that he can identify the specific value of coins to give a total of $5.60. Nonetheless, he or she did not provide the correct response regarding 12 coins. The strategy chosen suggests that he or she can count coins and represent their values but requires further instruction on how to do so when restricted on the number of coins permitted. It was also evident that Student 1 requires further instruction on how to communicate his or her response clearly.

Student 2’s assessment in Phase 2 involving money suggests that he or she understands how to count coins and represent their values. He or she shows that he or she understood what the question was asking him or her to solve, but made an error in his or her explanation (his picture did not match his words). He or she provided a picture that demonstrated any real understanding his skills in the money unit, but he or she requires further instruction on how to communicate his or her response.
Student 3’s assessment in Phase 2 involving money shows that he or she understood what the question was asking him or her to solve, and it is evident that the student has understood how to represent the coins values even when restricted to 12 coins. Student 3 got the correct response and knew how to communicate his or her answer in a complete sentence. The reasoning behind this student achieving a 3+ on the question is because the student did not articulate his or her chosen math strategy. It would have been a level 4 response had he or she provided his or her addition sentence ($2+$2+$1+$0.10+$0.10+$0.05+$0.05+$0.05+$0.05+$0.05+$0.05+$0.05= $5.60). This still requires further instruction on how to explain his or her thinking fully and show of the steps leading to his or her solution.
Here's my thinking...

In math class today, I learned how to count money.

The problem that I worked on was: Mr. C has 12 coins in his pocket that total $5.10. Explain what Mr. C’s coins are. (Draw Mr. C’s coins).

My Strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using **words**.

I know because I counted 10's and 50's.

I can also show that I understand by using **pictures and numbers**:

![Picture of coins]

Name: [Redacted]
Date: [Redacted]
Parent Signature: [Redacted]

Figure 12. Phase 2 Assessment for Student 1
Here's my thinking...

In math class today, I learned how to count money.

The problem that I worked on was: Mr. C has 12 coins in his pocket that total $5.60. Explain what Mr. C's coins are. (Draw Mr. C's coins).

My Strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

Mr. C's total is $5.60. I know because I used money and I counted by 5's and 2's.

I can also show that I understand by using pictures and numbers:

[Drawings of coins and money]

Name: [Blacked out]
Parent Signature: [Blacked out]
Here’s my thinking...

In math class today, I learned: **how to count money**

The problem that I worked on was: Mr. C has 12 coins in his pocket that total $.50. Explain what Mr. C’s coins are. (Draw Mr. C’s coins).

My Strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using **words**.

Mr. C’s coins are 2 toonies, 1 loonie, 6 nickels, and 3 dimes.

I can also show that I understand by using **pictures and numbers**:

![Diagram of coins]

Name: [Redacted]

Parent Signature: [Redacted]
Phase 3: Assessment of De-Identified Student Responses

In Phase 3, students were given the opportunity to play the role of the teacher. Using the checklist provided on page 11, the students collaboratively provided their reasoning for why certain student exemplars were receiving a level 1, level 2, level 3 and level 4. They were able to use the checklist to assess their de-identified peers and search for what was missing in a level 1 response, to what was clearly demonstrated in a level 4 response. This was a metacognitive strategy that I believe helped my student be more reflective about the work that they had been submitting thus far, and set goals for their future work.

Student 1’s Phase 3 response involving addition and regrouping shows that he or she understood what the question was asking him or her to solve, and is choosing a strategy to aid him or her to solve the problem. He or she provided the algorithm of an addition sentence, but did not show that he understood how to regroup values in the tens and hundreds place. He or she did not provide the correct response of 400 copies of CD’s and has demonstrated that he or she requires further instruction in how to align his or her digits while he or she adds. It was also evident that Student 1 still requires further instruction on how to communicate his or her response clearly.

Student 2’s assessment in Phase 3 involving addition and regrouping shows that he or she understood what the problem was asking and that addition was the strategy required to solve the problem. He or she demonstrates understanding that the alignment of digits and their place value will lead you to the correct response, but he or she requires further instruction on how to communicate his or her response. From an EQAO-testing
perspective, simply stating that he or she “added” is not the full-sentence response that should be provided.

Student 3’s assessment in Phase 3 involving addition and regrouping was much like the response given by Student 2. What helps in assessment is that Student 3 showed multiple steps in her addition, and his or her regrouping strategy was clear. Has Student 3 explicitly explained her strategy rather than provide an arrow to his or her work, the Exit Ticket would have received a level 4.
Here's my thinking...

In math class today, I learned

The problem that I worked on was: Len's music store has been selling the new CD "Wood, You Eat it" by The Termites. On Thursday, the first shipment arrived. He sold 90 copies on Friday, 130 copies on Saturday and 60 copies on Sunday. On Monday, he had 120 copies left. How many copies had arrived on Thursday?

My Strategy:
I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

280 copies came in on Thursday
I know because 90 + 10 + 0 + 9 + 3 = 18
and 1 + 1 = 2.

I can also show that I understand by using pictures and numbers:

90 + 130 + 60 = 280

280

Name: ____________________________

Parent Signature: ____________________
Here’s my thinking...

In math class today, I learned _____________.

The problem that I worked on was: Last music store has been selling the new CD "Wood You Eat it" by The Termites. On Thursday, the first shipment of CDs arrived. He sold 90 copies on Friday, 130 copies on Saturday and 60 copies on Sunday. On Monday, he had 120 copies left. How many copies had arrived on Thursday?

My strategy: I showed my teacher and friends that I understood the problem. I can explain it to you by using words:

"On Thursday there were 40 copies. It’s known because we added."

I can also show that I understand by using pictures and numbers:

\[
\begin{array}{c}
90 \\
+130 \\
+60 \\
+60 \\
\hline \\
409 \\
\end{array}
\]

Name: _______________  
Parent Signature: _______________  

Figure 16. Phase 3 Assessment for Student 2
Here’s my thinking...

In math class today, I learned...

The problem that I worked on was: Let’s music store has been selling the new CD “Wood You Eat it” by The Termites. On Thursday, the first shipment of 500 arrived. He sold 90 copies on Friday, 130 copies on Saturday and 60 copies on Sunday. On Monday, he had 120 copies left. How many copies had arrived on Thursday?

My Strategy:
I showed my teacher and friends that I understood the problem. I can explain it to you by using words:

400 copies were sold in all. I know because I added these numbers.

I can also show that I understand by using pictures and numbers:

\[
\begin{array}{c}
40 \\ + 220 \\ 280 \\
\hline
220 \\ + 60 \\ 130 \\ + 120 \\
\hline
400
\end{array}
\]

Name: [Blank]
Parent Signature: [Blank]
Phase 4: Modeling Reflective Practice

In Phase 4, students were instructed on how to use the “CUBES” strategy. This was an acronym developed in a Math lesson designed to foster reflective thinking while the students were analyzing their Math problems. “CUBES” refers to 5 steps that students were instructed to use in order to evaluate the question. The letter acronym prompted students to C – circle key words in the question (i.e., how many more, in total), U – underline the numbers (to avoid making simple calculation errors), B – box in math words (sum, product, change, estimate), E – evaluate the question (ask yourself what this question is asking you to find out), S – solve the problem (showing all of your steps). A copy of this acronym was given to every student and used along side the math solution checklist as the students completed the last 2 phases of my data collection.

Student 1’s Phase 4 response involving division shows that he or she understood what the question was asking him or her to solve, and is choosing a strategy to aid him or her to solve the problem. He or she provided the algorithm of division sentence, an array, and demonstrated that he or she understands that the multiplication sentence is in the related fact family. He or she did not provide the answer to the problem in a complete sentence, but did get the correct answer. Student 1 requires further instruction on how to communicate his or her response in words, not just his or her chosen strategy. It was evident that Student 1 was improving on how to show all of his or her steps while solving the problem.

Student 2’s Phase 4 response involving division had almost everything required for a level 4 math solution. He or she did get the correct response, showed his or her chosen strategy (array, algorithm). His or her explanation on how he or she arrived at this
answer was lacking in depth. Student 2 requires further instruction on how to explain what he or she knows, and how to prove that his or her answer is correct (i.e., that 24 can be split into 6 equal groups of 4, rather than just restating the algorithm).

Student 3’s Phase 4 response involving division had almost everything required for a level 4 math solution as well. Student 3 demonstrating their understanding of related facts, that 24 divided by 6 is 4, and that 24 divided by 4 is 6. But again, His or her explanation on how he or she arrived at this answer was lacking in depth. Student 3 also requires further instruction on how to explain what he or she knows, and how to prove that his or her answer is correct (i.e., that 24 can be split into 6 equal groups of 4, rather than just restating the algorithm).
Here's my thinking...

In math class today, I learned division.

The problem that I worked on was: Kathryn has 24 stickers. She shares them equally among 6 people. How many stickers does each person get?

My Strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

I know because I check my work by using a division and a multiplication sentence.

I can also show that I understand by using pictures and numbers:

\[
\begin{array}{c}
\text{24} \\
\hline
\text{6} \\
\text{4}
\end{array}
\]

\[
\begin{array}{c}
\text{4} \\
\hline
\text{6+4} = 10
\end{array}
\]

---

Name: [Redacted]

Parent Signature: [Redacted]
Here’s my thinking...

In math class today, I learned division.

The problem that I worked on was: Kathryn has 24 stickers. She shares them equally among 6 people. How many stickers does each person get?

My Strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

Each person gets 4 stickers. I know because 24 ÷ 6 = 4.

I can also show that I understand by using pictures and numbers:

24 ÷ 6 = 4

Name: [Redacted]

Parent Signature: [Redacted]

Figure 19. Phase 4 Assessment for Student 2
Here’s my thinking...

In math class today, I learned division.

The problem that I worked on was: Kathryn has 24 stickers. She shares them equally among 6 people. How many stickers does each person get?

My strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

Each person gets 4 stickers. I know because, 24 ÷ 6 = 4 and 24 ÷ 4 = 6.

I can also show that I understand by using pictures and numbers:

24 ÷ 6 = 4 and 24 ÷ 4 = 6

Name: ____________________________

Parent Signature: ____________________________
Phase 5: Independent Responses

In order to fully assess the culminating abilities of my students and their learning, especially since EQAO testing is administered in an independent test format, all students were now being asked to complete their Exit Tickets independently. Without a math partner to discuss possible strategies with, or read and evaluate the question with, the results lowered in achievement. I feel that some students were still struggling with reading and understanding the question. Others, however, were producing quality responses and using the “CUBES” strategy and checklist before submitting their work. Overall, I feel that all students were at least attempting to give level 4 responses; they were troubleshooting when they were not fully comprehending the wording, and seemed more confident in their abilities, a transformation I felt proud to have facilitated.

Student 1’s Phase 5 response involving a multi step subtraction shows that he or she did not fully understand what the question was asking him or her to solve, and is choosing a strategy to aid him or her to solve the problem, but gets confused in his or her steps while attempting to show all of his or her work. He or she provide steps, and sequenced them, but made multiple errors in his or her computation. Student 1’s explanation was unclear, lacked depth, and did not get the correct answer. Knowing that Student 1 has weak literacy skills, it was not a surprise that he or she was having difficulty when asked to work independently. Student 1 benefits greatly from working together in small groups, and requires further instruction on how read and evaluate the question.

Student 2’s Phase 5 response involving a multi step subtraction shows that he or she understood what the question was asking him or her to solve, chose the correct
strategy to come to an accurate solution, and is using the “CUBES” strategy in the question. Unfortunately, Student 2 made an error in borrowing so he or she did not get the correct answer, and when you look at his or her analysis of the question he or she is highlighting words like “books” and “about” rather than words like “left after” and the numbers. Therefore, Student 2 still requires further instruction on how to implement the “CUBES” strategy when evaluating the question. Student 2 did provide a strong explanation for how he or she solved the problem.

Student 3’s response involving a multi step subtraction shows an exemplary explanation of his or her response, which demonstrated thorough understanding, the correct evaluation of the problem (i.e., underlining words like “how many” and “left after”), and the right strategy in order to solve the problem. Student 3 made an error in borrowing in his or her first step, therefore not getting the correct answer. Student 3 still requires further instruction on how to double check and edit his or her work, and subtracting 3 digit numbers.
Here’s my thinking...

In math class today, I learned more about addition and subtraction.

The problem that I worked on was: Mr. C bought 893 books at the book store. He delivered 910 books to Miss Sheehan’s class, 254 books to Mrs. Hancock’s, and 384 to Mrs. Dillon’s. How many books does Mr. C have left after those deliveries?

My strategy:

I showed my teacher and friends that I understood the problem. I can explain it to you by using words:

There are 1945 in all. I know because I added and subtracted.

I can also show that I understand by using pictures and numbers:

\[
\begin{array}{c}
\text{893} \\
\text{257} \\
\text{384} \\
\hline
\text{1945}
\end{array}
\]

Name: [Redacted]

Parent Signature: [Redacted]
Here's my thinking...

In math class today, I learned more about addition and subtraction.

The problem that I worked on was: Mr. C bought 893 books at the book store. He delivered 396 books to Mlle Sheahan's class, 252 books to Mme Compeau's, and 384 to Mrs. Dillon's. How many books does Mr. C have left after those deliveries?

I showed my teacher and friends that I understood the problem. I can explain it to you by using words:

Mr. C still has 144 books. I know because subtracted 893 - 396 and 797 - 257 and 540 - 384 and it equal 144.

I can also show that I understand by using pictures and numbers:

\[
\begin{array}{c}
890 \\
-96 \\
794
\end{array}
\]

\[
\begin{array}{c}
797 \\
-257 \\
540 \\
\hline
144
\end{array}
\]
Here’s my thinking...

In math class today, I learned more about addition and subtraction.

The problem that I worked on was: 
Mr. C bought 893 books at the book store. He delivered 96 books to Miss Sheehan’s class, 257 books to Mr. Conayan’s, and 384 to Mrs. Dillon’s. How many books does Mr. C have left after those deliveries?

I showed my teacher and friends that I understood the problem. I can explain it to you by using words.

Mr. C has 162 books left over. I know because I subtracted 96 from 893 and got 807. Then I subtracted 257 from 807 and got 550, and finally I subtracted 384 from 550 and got 166.

I can also show that I understand by using pictures and numbers.

```
<table>
<thead>
<tr>
<th></th>
<th>893</th>
<th>- 96</th>
<th>797</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>-257</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-384</td>
<td>156</td>
</tr>
</tbody>
</table>
```

* What is the question asking me to find out?
* Solve

**Figure 23. Phase 5 Assessment for Student 3**
CHAPTER 5
DISCUSSION

The purpose of this research was to explore the perspective of transformative learning in a Grade 3 classroom by collecting data through my students’ work in the format of Exit Tickets and examine my students’ success on their Exit Tickets through various phases of my research in which I tried out new teaching strategies. My goal was to help students better explain their thinking while solving Mathematics problems, given that Mathematics was the area in which my students were weakest in EQAO testing last year. I linked the student scores on their Exit Tickets with my qualitative data, which were observational notes on students’ feelings, actions, and spoken attitudes, to seek evidence that transformative learning might be taking place, using Mezirow’s model of transformative learning. Upon completion of my 3 months of research, I now feel confident that the majority of my students did improve and wrote statements about their learning that lead me to believe that a transformation did occur for most of my students. Transformation involved their processing skills in the areas of language and Mathematics as well as becoming critical thinkers. It is no easy task to ask students of ages 8 and 9 to explain their reasoning in clear and concise sentences when they have not been shown how to be reflective in such a manner. Nonetheless, I conclude that it is possible to develop strategies that make it possible for reflective practice to take place. It was encouraging to observe the changes in students’ responses from “I know my answer is correct because I did the Math” to “I know the answer is 22 cm because finding out how much fencing is needed means that we need to find the perimeter, and perimeter means to add up all the sides of a figure, therefore 7 cm + 4 cm + 7 cm + 4 cm = 22 cm in all.” The
increase in observable critical thought amongst my students has generated a change in my teaching practice. As demonstrated in the improvements in students’ responses through the five stages, a more metacognitive classroom environment was developed through the use of new teaching strategies. These included the use of Exit Tickets as formative assessment, modeling strategies for effective partnerships so that students can engage in meaningful dialogue, demonstrating and prompting students to be reflective, and modeling how to properly evaluate the question in a problem. I am aware that not all students took to the strategies I used through the five stages of research, but there was a positive progression through most of my students’ Exit Tickets.

The data tell me that students perform better on word problems when given the opportunity to work in small groups, although I have also learned through this research that students need to be shown how to engage effectively in such discourse. I know now that designing groups where students are like-minded is ideal for fostering real discussion, and a gradual release of responsibility with regards to group work is the best course of action for my students. Reflective practice can be taught as long as it is introduced slowly and in language that students can understand. In turn, my focus shifted from students getting the right answer to evaluating students’ overall processing skills and the strategies they were choosing for solving problems.

I feel transformed by this research. I have strengthened my initial sense that discourse, reflective thinking and metacognitive processing can be achieved for learners of any age. In my opinion, the earlier that students are taught the value of thinking critically, the better. My overall goal as a teacher is to provide students with the tools to troubleshoot, by evaluating a question and analyzing it through a critical lens while
proving their responses are correct using language that articulates their chosen strategy. It is my job to provide students with the tools and to foster their confidence. In my experience, students prefer working in small groups, sharing ideas, and being shown clear and organized teacher expectations for assessment. I am excited to continue to explore these teaching strategies as I meet a new set of students next year.
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