From transmission to transformation: Re-framing teaching and learning for the 21st Century

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Midway through her Grade 8 year, our daughter was bemoaning the fact that she had to study for a test in Geography. This may sound like a typical response from a young teen – but consider the context. Nikita is a bright student with a curious mind. She works hard to excel in all that she does, and she displays a genuine love for learning. Yet when faced with another test as a measure of her learning, she sagely remarked, "I will spend all this time studying, I will do fine on the test and then forget most of the information in a couple of weeks. This is a waste of time!" Nikita's frustration was not in having to invest time in learning, but rather the investment of time that would lead to little enduring learning. To excel on the test, she had learned she needed to memorize vast amounts of information but was seldom called upon to use this information to create new knowledge or to solve meaningful problems. Nikita's angst, expressed by countless others in a myriad of ways, can be witnessed across North America as youth increasingly find traditional means of assessment and in fact targets of assessment disconnected from the digital and global world in which they live. Her comments reflect the inherent limitations of transmissive teaching – it often fails to engage and motivate and although some children demonstrate success at retaining information long enough to write a test, too often the learning has little transformative impact. The comments also underscore the premise that when students are engaged in learning through critical inquiry, education is far more likely to have a transformative impact.

Transformative Learning

What is meant by the term "transformative learning?" What is the role of the teacher in creating a transformative learning experience for students? Transformative learning occurs when the learner's thinking and perceptions of the world and their place in it are altered as a result of the acquisition of new knowledge. For this to occur students must integrate new knowledge so that it

becomes a part of themselves allowing them to make connections and use the new knowledge to deepen their understanding of themselves and their world. The Transformative Learning Centre at the Ontario Institute for Studies in Education describes transformative learning as “experiencing a deep, structural shift in basic premises of thought, feelings, and actions. It is a shift of consciousness that dramatically and permanently alters our way of being in the world…. transformative learning makes us understand the world in a different way, changing the way we experience it and the way we act in our day-to-day lives.” [1] For learning to be transformative, students must be willing participants with a vested interest in the learning process. This does not occur when they are fed mounds of information to be memorized and accepted without challenge. Teachers have a key role to play in creating a transformative learning experience. They must encourage discovery by problematizing the curriculum and inviting students to examine their personal assumptions, explore a range of perspectives and possibilities and test them all for validity. In so doing, teachers contribute to creating a community of thinkers in which inquiring minds are nurtured. Classrooms of inquiry help to ensure meaningful, transformative learning occurs as they engage students in the examinations of beliefs and assumptions and the formation of new ideas that emerge from the synthesis of new learning and past experiences. M. Carolyn Clark (1991) suggests that transformational learning involves three key dimensions: psychological (changes in understanding of the self), convictional (revision of belief systems), and behavioral (changes in actions).[2] Although it should not be presumed that students will be transformed each day by each lesson, when learning occurs through critical inquiry each day contributes to the transformative impact on the learner. The cumulative effect of engaging students in critical inquiry is to heighten awareness of oneself within a global context, one’s beliefs, and the impact of one’s actions on self, others and the world around us.

Transformative Learning Occurs When:

- students **integrate new knowledge** so that it becomes a part of themselves allowing them to **make connections** and use the new knowledge to deepen their understanding of themselves and their world.

- students are **willing participants** with a vested interest in the learning process
- students are **encouraged to engage in inquiry**
- critical inquiry contributes to a **heightened awareness of oneself** within a global context, one's beliefs, and the impact of one's actions on self, others and the world around us.

Nurturing inquiring minds in a digital world

Each successive generation looks with alarm upon the youth of society. Consider the familiarity of the following refrain: "*The young people of today think of nothing but themselves. They have no reverence for parents or old age. They are impatient of all restraint. They talk as if they alone knew everything and what passes for wisdom with us is foolishness with them. As for girls, they are forward, immodest and unwomanly in speech, behaviour and dress."* Although the phrasing may differ the essence of this statement has endured for centuries – in fact this quote is attributed to the ancient Greek scholar, Socrates! In many ways, the essence of childhood and adolescence has remained constant over time as have effective pedagogical practices. Yet, in some important and profound ways, children growing up in a digital world are different. Martin Westwell, Director of the Flinders Centre for Science Education in the 21st Century in Australia, succinctly captured the nature of change in the developing brains of children in his statement: "Are kids today different than kids 20 years ago? Well, yes, they are. Because the world is different, their brains have wired up in a different way".[3]

A few of the key differences in the brains of children who have grown up in a digital world include that they are:

- ✓ more visual than previous generations, learning better from visual sources than text-based information
- ✓ faster at switching tasks and more comfortable at multi-tasking
- ✓ great scanners - they learn to develop filters to sort out what is important and what is not
- ✓ part of a 'participatory culture' in which over 50% of teens create media content and over 30% share content - contributing to "distributed cognition"[4]

The advent of new technologies and the consequent impact on the wiring of the brains of children present educators with both new opportunities, and challenges. For example, although children are better than adults at using visual clues as filters to determine what is important or not, relying solely on visual clues may lead children to be misguided by savvy web designers - they need to be able to override visual clues and zoom in on key words to help them handle the massive amounts of information they encounter in a media-saturated world. Similarly, although children are more comfortable than adults at rapid task-switching, they too often believe they can effectively multi-task (juggle several tasks at once). Psychologist, Faith Brynie notes “Multitasking is not efficient, nor does it get more work done faster. Quite the opposite. One task interferes with another, so everything takes longer because the brain loses time--and accuracy--in repeatedly shifting its effort.”[5] Jordan Grafman, a cognitive neuroscientist echoes Brynie’s concerns: “The more you multitask, the less deliberative you become; the less you're able to think and reason out a problem and the more you're willing to rely on stereotypical solutions. You can't think deeply about a subject, analyze it, or develop a creative idea if you are constantly distracted by an e-mail message, a new site, or a cell phone call.” [6]

So, what do these changes mean for education? The core of good teaching remains constant - students being invited to uncover ideas, solve meaning problems, construct new knowledge, and, as Linda Darling Hammond notes in *Preparing Teachers for a Changing World*, ensuring high levels of "instructional discourse" that encourage students to ask questions, discuss ideas, and comment on statements made by teachers and other students.[7] What has intensified is; the need to ensure good teaching is provided to all children in an increasingly complex and global world; that classrooms both respond to and capitalize on the nature of the learner in a digital world; and, that schools prepare students to survive and thrive in a knowledge economy. Critical and creative thinking has always been a part of educational jargon but it has too often been poorly understood and generally reserved for students perceived to be academically strong. This very notion that some children will benefit from invitations and expectations to think while it is beyond others has been to the detriment of both children and society. In 1933, John Dewey challenged the idea of some subjects being more suited to academic rigor when he wrote: "It is desirable to expel...the notion that some subjects are inherently 'intellectual', and hence possessed of an almost magical power to train the faculty of thought... any subject ...is intellectual in its power to start and direct significant inquiry and reflection."[7] More recently, Nel Noddings stressed the importance of putting thinking at the core of all subjects: "We can give students opportunities to think well in any course we offer, provided the students are interested in the subjects discussed. Algebra can be taught thoughtfully or stupidly. So can drafting, cooking, or parenting. The key is to give students opportunities to think and to make an effort to connect one subject area to other subject areas in the curriculum and to everyday life."[9] it is now imperative that nurturing thinking move from one of many educational objectives to underpinning all that we do in schools. Don Tapscott, in his book *Grown Up Digital*, observes: "The ability to learn new things is more important than ever in a world where you have to process information at lightning speed. Students need to be able to think *creatively*, *critically*, and *collaboratively*." [10] If schools are to continue to be

the solid foundation upon which students build their lives they must embrace the challenge to re-think how teaching and learning take place so that students become active participants in inquiry, uncovering ideas, solving problems and working collaboratively to create new knowledge and novel solutions to old and new challenges facing society.

Why critical thinking is an educational imperative in the 21st century

Obviously, the idea that the goal of education should be to assist students in becoming critically thoughtful citizens is not new, but achieving the goal has taken on greater urgency as the complexity of the world increases. University of Toronto political scientist, Thomas Homer Dixon, has argued in his book *The Ingenuity Gap*, that as the complexity of the world increases, so to does the need for greater ingenuity.[11] He defines ingenuity as the application of skills and ideas to solve practical technical and social problems. Ingenuity, he contends, does not need to be solving problems through new or original ideas. The use of existing knowledge, skills or ideas in a new way to solve a problem is, by Homer Dixon's reckoning, ingenious. If we accept the relationship between increased complexity and the need for great ingenuity as suggested by Homer Dixon, then the need for schools to be incubators of critically thoughtful minds becomes obvious. Being able to identify, define, and solve important problems or issues which face humanity from a local to global level, will determine the extent to which our society will succeed in its response to the challenges faced now and those yet to come. Only by providing students with the intellectual tools to be effective critical thinkers can we move the phrase "life long learners" from the morass of over-used educational jargon.

Advocates for purposeful education, whose goal has been and is, to create critically thoughtful problems solvers and decision makers, stretch back many centuries. Swiss educator, Johann Heinrich Pestalozzi argued teachers must develop rather than to try to implant knowledge in children. In 1847, Canada's Chief Superintendent of Common Schools, Edgerton Ryerson, wrote: "If the mind of the child when learning, remains merely passive, merely receiving knowledge

as a vessel receives water which is poured into it, little good can be expected to accrue. It is as if food were introduced into the stomach in which there is no room to digest or assimilate, and which will therefore be rejected from the system, or [sit] like a useless and oppressive load upon its energies."[12] More recently Matthew Lipman (Thinking in Education, 2003) noted that traditionally in virtually all cultures, students are sent to school to learn basic skills and content, but are seldom encouraged to think.[13] Despite a spirited debate over the place of critical thinking in education neither its supporters nor detractors have been very clear on what exactly it means to think critically. As Roland Case (2001) has noted: "The idea of critical thinking is not new. For decades - no, for centuries — it has been recognized as an important educational goal by practitioners and theorists alike. Curriculum documents and learning resources in all subjects at every level of school recommend that students be taught to think critically. Despite this long-standing (and, at least, formal) commitment, the extent and manner of teaching for critical thinking is disheartening. Many studies document the enormous preoccupation with transmission of information and rote application of "skills", and how little of class time is devoted to thinking. It is a rather depressing irony: critical thinking is much valued and yet inadequately addressed."[14]

Despite decades of debate and numerous curricula that highlight the importance of thinking, classroom practice has not sufficiently embraced a paradigm shift in teaching and assessing that significantly improves children's capacity for thinking. Richard Paul (1990) offers this critique of the effectiveness of traditional teaching practices on nurturing thinkers:

> Didactic lectures, extensive coverage of content, and mindless drill combine with student passivity to perpetuate the lower order thinking and learning students have come to associate with school. When students do not actively think their way to conclusions, when they do not discuss their thinking with other students or the professor, when they do not entertain a variety of points of view, analyze concepts, theories, or explanations from their own points of view, actively question the meaning

> and implications of what they learn, compare what they learn to their experiences, tackle non- routine problems, examine assumptions, or gather evidence, they do not achieve higher order learning. They end their schooling with a jumble of fragmentary opinions, rigidly understood procedures, and undisciplined beliefs. They gain little knowledge or insight. They are at best trained, not educated, not critical thinkers or persons. As a result, their adaptability, their capacity to learn on the job and in their personal and civic lives, is severely limited. Their ability to mature intellectually and morally, their capacity and motivation to learn, is stunted.[15]

So, what is the research telling us? In essence, for schools to remain relevant in the 21st century and for societies to address the increasing complex challenges they will face, schools must focus on making learning a transformative experience with critical inquiry at the core of their work. When critical thinking is used as a methodology of teaching, students are more engaged, the learning is deepened and students are better prepared to survive and thrive in a rapidly changing world.

What is critical inquiry?

The uncovering of curriculum occurs only when students investigate purposeful questions that present meaningful problems or challenges to address. Although some students may enjoy gathering information, students' depth of learning and engagement are greatly enhanced when tasks require students to think critically at each step of the way. If we expect students to become critical thinkers and problem solvers then we must be sure that our classrooms challenge them to solve problems and embark on personally relevant journeys of inquiry. This is unlikely if students are fed mounds of information with little opportunity to pose their own questions and challenge their emerging conclusions. Even well planned, interesting, colourful and relevant lessons can fail to involve students in thinking meaningfully about the ideas. Active involvement requires that students digest and make personal sense of the ideas, and not simply listen and recite or read and record.

The term ‘critical’ inquiry has been used here to signal that inquiry is not essentially the retrieval of information but a process of reaching conclusions, making decisions and solving problems. Critical inquiry is an attempt to infuse a spirit of exploration throughout the curriculum. At the heart of critical inquiry is a provocative question or challenge that arises out of the interplay of asking, investigating, reflecting, creating and sharing. With these multiple entry points into inquiry, teachers are better able to differentiate instruction to meet the varied needs of their learners. For example, students may respond to a challenge by first reflecting on what they know, sharing initial thoughts and ideas with peers and then carrying out an investigation. Others may choose to investigate, share their preliminary findings, reflect on what they know and do not know, and then return to further investigation. Similarly, once students have completed their investigation, opportunities to share and reflect are integral parts of any creative process.

Building competencies, removing barriers

In a recent conversation with a colleague regarding teacher professional development, I suggested that we consider exploring how to support students in the various elements of inquiry to which he replied it was too much of a de-constructivist approach. As the conversation continued, the colleague proceeded to discuss that for students to engage in inquiry they first had to be able to ask good questions. Later he noted that students needed to be able to judge credible from less credible sources and eventually he sheepishly acknowledged that he had in fact de-constructed inquiry. This anecdote illustrates a common problem with teacher efforts to teach through what they believe to be an inquiry-based approach. For students to be engaged in meaningful inquiry they need to have the intellectual tools that support quality thinking. Expecting students to ask powerful questions, gather credible and reliable sources, analyze and interpret information and use information to draw conclusions, solve problems or render

assessments without a focus on developing thinking competencies both frustrates and hampers student learning. Much of the frustration teachers experience when attempting to engage students in critical inquiry stems from the fact that students often lack the required concepts, attitudes, knowledge, criteria or strategies – in short, they lack the tools needed to do a reasonably competent job. It is often assumed that mere repetition will improve students' reflective competence. No doubt some will improve by repeatedly trying to figure things out for themselves, but most will be more successful if they are taught the requisite tools for the task. Work by The Critical Thinking Consortium addresses this shortcoming by offering the notion of intellectual resources or “tools” to explain the development of good thinking.

Intellectual tools for quality thinking

Although the specific tools depend on the nature of the challenge facing the thinker, promoting critical thinking is largely a matter of helping students master an ever broadening repertoire of five types of intellectual resources:

- *Background knowledge:* knowledge of relevant information about a topic that is required for thoughtful reflection.
- *Criteria for judgment:* knowledge of the appropriate criteria or grounds for judging the reasonableness or merits of the options presented by a thinking challenge. To think critically is essentially to engage in deliberations with the intention of making a reasoned judgment. And judgments inevitably are made on the basis of criteria.
- *Critical thinking vocabulary*: knowledge of the concepts and distinctions that are needed to think about the challenge. Although other tools also refer to concepts, ‘critical thinking vocabulary’ refers to concepts that expressly address distinctions foundational to thinking critically—for example, knowledge of the difference between ‘conclusion’ and ‘premise’, ‘cause’ and ‘correlation,’ or ’cause’ and ‘effect,’ and knowledge of various informal fallacies.

- *Thinking strategies*: knowledge of procedures, heuristics, organizing devices, algorithms and models that may be useful when thinking through a challenge. Good critical thinkers draw upon a great variety of strategies to work their way through the challenges facing them.
- *Habits of mind:* commitments to the range of values and principles of a careful and conscientious thinker. Although more commonly described as dispositions, we prefer the term 'habits of mind' to refer to the intellectual ideals or virtues that orient and motivate thinkers in ways that are conducive to good thinking, such as being open-minded, fair-minded, tolerant of ambiguity, self-reflective and attentive to detail.[16]

Transformative assessment

Our assessment practices have the power to engage, inspire and support students in reaching their fullest potential – in short, used effectively, assessment can help to ensure teaching and learning is a transformative experience. For learning to have a transformative impact it must challenge students to examine their preconceptions, to explore multiple perspectives and to use knowledge to innovate. When assessment is used to punish, cajole, and intimidate it contributes to students becoming disengaged, disinterested and ultimately underperforming. Despite an overwhelming body of evidence from brain research that shows fear and intimidation shuts down learning, it continues to be too often used as a means to encourage students to complete their work. Let's be very clear – fear and intimidation are not motivators and do not provide the foundations for learning. When assessment is grounded in how we will punish students for lack of compliance, we fail to seize on the true potential of assessment to support student learning. To ensure learning is transformative teachers need to shift their assessment targets from the accumulation and recall of isolated facts and ideas that tend to stifle collaborative, critical and creative

thinking, to framing assessment around big ideas that transcend the particular topic and support students in understanding important concepts.

In August, 2007 Sarah Scott's provocative article "Do Grades Really Matter" in *Maclean's* highlighted the growing body of research that shows a disconnect between success in school and success in life. Building on the old saying: "School is a place where former A students teach mostly B students to work for C students" Scott cites numerous individuals who did not thrive in school but went on to become highly successful in life prompting her to question whether or not grades should matter. The answer is, of course grades matter, but only matter if what we assess matters. Scrambling to improve test scores when the test itself is flawed can lead to a great deal of wasted energy by teachers and undermine student confidence when they fail to excel in writing a standardized test. Assessing students' ability to recall information reflects an education system mired in the past. Definitions of literacy go beyond word recognition, being historically literate encompasses more than an awareness of past events and being mathematically literate requires learners go beyond the simple use of formulas. For children to thrive in school and beyond they must be able to access, understand and use information to solve meaningful problems. Our assessments need to focus on the discernment used to select information, the analysis used to understand information and the creative and innovative ways information is used to create new knowledge and offer novel solutions to complex problems. If grades are to matter to all learners, they must be more than an inventory of terms, facts and isolated ideas students have assembled. Only when grades reflect a student's ability to interact with ideas and solve meaningful problems in an authentic context, will grades carry the significance for all learners that we hope them to.

Assessment in a classroom of critical inquiry

Inquiry-based classrooms look and sound different than traditional classrooms. To begin with, the focus on student achievement shifts from the accumulation of

isolated bits of information to the use of information to create products or solve problems. At the heart of inquiry is the posing of engaging, relevant and meaningful questions. Through the use of problematic situations students are invited to uncover the curriculum as they respond to critical challenges. Assessment of student achievement in this context focuses on the ability of students to make reasoned and informed judgments. While a demonstration of a knowledge and understanding of key terms, concepts and events remains important, in a critically thoughtful class students need to show they can identify relevant and accurate information when responding to a critical challenge. An observer of an inquiring classroom would notice students engaged in posing questions, assessing the validity of sources, weighing options and making reasoned judgments in light of clear criteria.

Assessment for learning plays an integral role in nurturing critically thoughtful learners. The five intellectual tools discussed above support students as they develop the capacity for critical thinking and success at conducting inquiry. These intellectual tools provide a focus for what students need to know and how assessment plays out in a classroom of critical thinkers.

Differentiation and assessment in a classroom of inquiry

In effective classrooms, assessment drives instruction. Knowing what students are to achieve, and how they will demonstrate it, should be the basis upon which daily instruction is planned. Differentiated assessment ensures that students with varying learning styles, interests and aptitudes are given opportunities to demonstrate their learning. The key to differentiated assessment is establishing clear targets, and not confusing methods with targets. For example, assessment targets might include student understanding of the “big ideas and concepts” being studied, an ability to conduct research, to think critically, and to communicate their findings and conclusions effectively, considering purpose and audience. If these were the assessment targets (or objectives) then a variety of methods could be used to assess student learning. Students could write a report,

prepare a visual essay, create a bulletin board display with relevant images and captions, or deliver an oral presentation, and so on. Encouraging students to select the best method to demonstrate their learning is yet another way to shift the focus of learning from teacher to student directed.

Assessment tasks can further student learning and not simply measure it when clear targets are provided from the outset. Students receive frequent feedback, and they have opportunities to improve their work through revision, editing and polishing. Throughout these tasks, students need appropriate scaffolding to ensure success, and to encourage reflection on what they are learning. At some time this may require allowing students to “fail forward”. Learning from their mistakes can often provide very powerful and lasting learning. But to have the confidence to fail forward students need to know that their teacher is available to support them as needed and that failed attempts will not negatively affect their final grade. This requires that teachers embrace the concept of “*assessment as learning*” and that they provide feedback and guidance but do not grade students on the process of learning. Of course, at some point, students will need to demonstrate their learning through some kind of performance; and teachers do need to grade students on performances.

Conclusion

Critical thinking as a methodology of teaching creates a powerful learning environment for all students by placing meaningful, purposeful questions at the core of the curriculum. When students are engaged in critically thoughtful activities it changes the way they learn and the nature of evidence educators look for to assess achievement – there is a shift from the accumulation of isolated bits of information to the use of information to solve relevant problems, create products of value or to meet challenges. In fact, when both critical and creative thinking are properly understood, teachers and students see how ingenuity results from the application of skills and knowledge in a critically thoughtful manner. At the root of creative thinking is to create. Creativity is not a random

generation of ideas but rather is guided by a purpose. A creative solution finds ways to use existing knowledge and skills in new ways to arrive at a solution that meets established criteria. Believing that simply encouraging students to “think out side the box” is sufficient to engender creative thinkers is at best simplistic and at worst dangerous. Thinking outside the box with no criteria to guide their thinking does not help students to arrive at plausible, feasible or even relevant solutions to the problems and challenges they will face. If, however, students are invited to solve meaningful challenges the five intellectual tools (Background knowledge, Criteria for Judgment, Critical Thinking Vocabulary, Thinking Strategies, Habits of Mind) can provide a powerful means to scaffold student learning. Focusing on the intellectual tools allows teachers to provide focused and targeted formative assessment and allows teachers to effectively use differentiated instruction to support a variety of learners. Building curriculum around a critical thinking framework helps teachers to focus learning on meaningful inquiry that engages students and provides a effective means to support their learning in ways that create a transformative learning environment.

Endnotes

[1] The Transformative Learning Centre http://www.oise.utoronto.ca/tlc/ retrieved April 9, 2010

[2] M. Carolyn Clark, “Context and Rationality In Mezirow's Theory of Transformational Learning” in *Adult Education Quarterly*, Vol. 41, No. 2, 75-91, 1991

[3] Brain Blog, http://neuropsychological.blogspot.com/2007/06/brains-thumbs-and-great-attentional.html, retrieved March 31, 2010.

[4] Don Tapscott, *Grown Up Digital* (Toronto: McGraw Hill, 2009) page.113

[5] Faith Brynie, “The Madness of Multitasking” in *Psychology Today*, August 24, 2009

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[7] Linda Darling Hammond, *Preparing Teachers for a Changing World* (San Francisco: Jossey-Bass, 2005) page 6.

[8] Nel Noddings, “All Our Students Thinking” in *Educational Leadership*, February 2008 | Volume 65 | Number 5 Teaching Students to Think Pages 8-13

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[11] Thomas Homer Dixon, *The Ingenuity Gap* (Toronto: Random House Inc., 2000) Chapter 2

[12] Edgerton Ryerson, 1847

[13] Matthew Lipman, *Thinking in Education*, (New York: Cambridge University Press, 2003) page

[14] Roland Case and Le Roi Daniels, “Teaching Tools to Think Critically” in Roland Case and Penney Clark (eds.) *The Anthology of Social Studies* (Vancouver: Pacific Educational Press, 2008), page 77

[15] Richard Paul, *Critical Thinking: What Every Person Needs to Survive in a Rapdidly Changing World* (Rohnert Park, CA: Center for Critical Thinking and Moral Critique, 1990) page 45

[16] Roland Case, “Moving Critical Thinking to the Main Stage” in *Education Canada* (Spring 2005) 45(2) 45-49