

SHARING COMPLEX VISIONS FOR INCLUSIVE SCHOOLS

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Abstract / Résumé

We will use underlying notions that complexity theory provides as a window into seeing, without assimilating, the ecological metaphors evident in Aboriginal cultures of North America. Weaving together our theoretical understanding of complexity theory and Aboriginal cosmology and our narratives based on our personal histories as both school teachers and university professors, we begin to develop a notion of schools which is both holistic and inclusive. These narratives lead us to suggest ways that current educational thinking is now bringing us full circle to more holistic and inclusive understandings of ways of knowing. Based on these understandings we can begin to create schools that are learning spaces for all, regardless of cultural, economic and individual differences.

L'article a recours aux notions sous-jacentes de la théorie de la complexité pour observer les métaphores écologiques évidentes dans les cultures autochtones de l'Amérique du Nord, sans toutefois les assimiler. En établissant des liens entre notre compréhension théorique de la théorie de la complexité, la cosmologie autochtone et nos récits fondés sur nos histoires personnelles à titre d'enseignants et de professeurs d'université, nous commençons à élaborer une conception holistique et inclusive de l'école. Les récits nous portent à suggérer des moyens qu'utilise aujourd'hui le système d'éducation pour boucler la boucle et nous proposer une compréhension plus holistique et inclusive des méthodes d'apprentissage des connaissances. En s'appuyant sur une telle compréhension, nous pouvons créer des écoles qui sont des lieux d'apprentissage pour tous, quelles que soient les différences culturelles, économiques et individuelles.

Introduction

A factory model, namely, education for the masses, dominates the standard metaphor of education. An assembly line, in order to be efficient, must be linear and ordered. The learning that must occur in grade three must come after the learning that must occur in grade two. Curriculum documents are designed to suggest a scope and sequence of learning outcomes for all children. Teaching strategies, even those with a purported differentiation agenda, focus on sequences of recommended teacher behaviors. For example, first we activate, then we acquire, then we apply and then we assess (Manitoba Education and Training, 1996). We always do diagnostic assessment at the beginning of the school year and benchmark standards (or standardized) exams at the end of the year. Given the harsh criticisms of our standard vision of education, it is hard not to wonder whether contemporary education is premised on viable understandings.

Other metaphors are available to us when we wonder about viable models of education. Ultramodern theories of education tend to rely on holistic, ecological and non-linear understandings of learning, curriculum and schools. For example, complexity theory is a lens for observing educational phenomenon that deliberately questions linear assumptions concerning learning. Ancient wisdoms are also available as we wonder about education. In particular, Aboriginal understandings focus on community based holistic learning and teaching based on an interactive and connected understanding of the universe and all that is found in it. We can wonder how the ultramodern and the ancient might be viable metaphors for education.

As university professors, we came to wonder how the ultramodern and ancient might be viable metaphors for education. Paul, a White male scientist, was working with ultra current notions of complexity theory. Beverly, a White female social scientist, was working in areas of ancient, traditional Aboriginal cosmology and epistemology.

In this paper we will outline the features, salient to this discussion, of both complexity theory and Aboriginal thought. Noticing the commonalities in these two areas of ancient and current understanding will help us better understand the work of education, the task of teaching, and the spaces that can be created in our schools that are inclusive of all students. We are suggesting that the ultramodern is evidence that we have come full circle in recognizing the viability of ancient understandings as a metaphor for contemporary education. Ancient understandings have survived for over six thousand years and are viable even today. The ultramodern, such as complexity theory, finally provides the lens to see and recognize old wisdoms.

Curious Experiences

Our experiences have led us to question our understanding of how people learn. In particular when we look at the lack of cultural congruence in our work with Aboriginal students, we are left with many questions and a strong need for a different way of understanding. Some stories from our past tell the experiences which raised the questions.

Story One. A young Squamish mother comes into the counseling room. The principal has brought her because she is taking her two boys out of school. He wants to see if the counselor can help. He does not want to feel that "his" school did not or would not meet the needs of these boys. He wants them to stay, but he wants them to stay and fit in, so maybe a little counseling would help. The mother very politely agreed with the counselor and took her boys out of school

Story Two. Kwan was in grade four. His father was a well-known Aboriginal artist, his mother a musician. He had been brought to our school because he could not read or write. His previous school encouraged his art and his traditional dancing. An open-minded teacher helped him to be "up to grade level" within a matter of weeks. The two of them worked together to get the job done.

Story Three. Nick came from a reserve on the north end of Vancouver Island. He was going to school in the city because his parents were unable to care for him and his grandparents were in the city. He went "home" every holiday. At the age of twelve he knew that he was stupid, that he could not read and would never be able to read or do math or nothin'. After all, he did not have to work, the tests he took when he was six made it clear that there was something seriously wrong with him and he either believed that or used it as a way out of doing work that made little sense to him anyway. Okay by him – he would go home when he got old enough and fish with his uncle. Except he was so angry. At always being put down. At failing. He knew he was smarter than the tests had shown. But he was too old and already too broken to see his own glory. He was killed in a knife fight at 17.

Story Four. Randy is steeped in his own sense of being "Indian." He was doing his counseling practicum in a Band controlled school. He was working with a group of Aboriginal students who had been referred for bullying. Randy never used the words "bully" or "bullying" while working with these students. Rather, he facilitated healing using words such as "respect," "care" and "loyalty." The teachers reported greatly improved behavior.

Story Five. Bev went to a tipi teaching and was told that each pole represented a virtue. At the end of the day, someone in the tipi would gather listeners and learners around one of the poles for a story about

the virtue of that pole. The story may have been about ways in which some being had misused or abused that virtue. Listeners and learners were brought to reviewing their own behavior of the day: "Is it me you are talking about?"

Story Six. When Bev joined a Traditional Women's Group, it was a whole new experience. She felt lost, confused and did not know how to act. The women in the group nudged her along, never impatient, never critical. A soft word here and there, a hint, an understanding of ignorance and acceptance of rudeness. The women in the group brought extra items because she often came to Ceremony unprepared. She was enfolded into the group, and with time lost her need to get it right and to be perfect.

Story Seven. Jon is a traditional storyteller. In class he tells a coyote story. And then he sits down. As the others talk to make sense of the story, he nods and maybe looks wise. Everyone "gets it right."

The modern Western education system has been a remarkably successful model for teaching large numbers of people. Does it really need to change? Do we really need to change our perspective? If we talk about teaching to diversity and for diversity, we know that we cannot be satisfied with the linear reductionism of schooling as Western schooling is too often failing students who do not fit. We need to change the space so that diverse peoples find a toehold, a place of some familiarity and enough comfort that they can feel the chance of being successful in the educational endeavor. We fail to look at the strengths of learners, we fail to open the learning spaces, and we fail to empower learning through respect and compassion. The remainder of this paper is an effort to understand by re-looking at education with alternative lenses.

Coming Far Enough: Exploring Ultramodern Knowledge

Several contemporary scholars (e.g., Davis, 2003; Irwin, 2003; Luce-Kapler, 2003) have proposed alternative perspectives on education that are intended to challenge the dominant metaphors of the Western worldview. Dominant Western metaphors are predicated on assumptions of realism, universalism and objectivity. In contrast, the alternative and ultramodern metaphors challenge Western assumptions at the ontological, epistemological, and methodological levels by embracing holistic, emergent, plural, ecological and dynamic notions for describing knowledge and experience. The "post" discourses represent several examples of these ultramodern metaphors.

In this section, we will develop one particular ultramodern metaphor for education, namely complexity theory. In particular, we will illuminate complexity theory by building a metaphor based on the self-similarity

principle of a branch of mathematics known as Chaos Theory. Chaos theory has been used within complexity theory to generate an alternative geometry-based metaphor for understanding education. We use the notion of a fractal, the picture of Chaos Theory, as an alternative to Euclidean geometry. Euclidean geometry is identified with the dominant metaphor of education, whereas Fractal geometry is identified with a complexity theory metaphor of education.

Fractals

A fractal is a picture. This picture has a special property known as self-similarity. Self-similarity means that, at any level of magnification, the picture produced looks similar. For example, pictures of trees are fractals. Each branch branches, so that whether we focus on the main branch or a small twig, we still see a branching structure. The branching structure may have differences when we look in different places of the tree, but there is still the self-similarity of branching.

The branching of a tree represents an example of a geometry that is much different from Euclidian geometry. Euclidian geometry is premised by the study of regular shapes that are not self-similar. A triangle is a closed polygon consisting of three straight lines. In the definition of triangle, we see a reductionistic formulation – the parts of a triangle are three lines put together using a specific relationship. The Euclidean approach is reasonable when describing triangles, squares and parallel lines, but is not useful when describing trees. When looking at a tree, if we look for the parts of branches, we still see branches. Only if the tree were dead, so that more branches will not grow, can we see the end of branching and the possibility of looking for the parts of the whole.

Assuming that social reality is more like a living tree than a dead triangle, we are proposing that Fractal geometry is a more appropriate metaphor for understanding education than Euclidian geometry. In particular, Euclidian geometry seems to provide a metaphor that captures the predominant nature of Western notions of knowing and curriculum, whereas Fractal geometry seems a viable alternative metaphor to Euclidian geometry for understanding the nature of knowing and curriculum.

Using a Euclidian geometry metaphor, knowing is defined as a list of facts that the knower can recall. The parts of knowing are the specific items within a list of facts, and the mechanism for storing and retrieving items within the list. Education becomes the process of a teacher trying to get learners to assimilate a list. Curriculum is a written list of what must be assimilated, and suggestions for optimizing the storing and retrieving mechanism. Further, the process is well-defined, linear and

ordered. Each fact we must learn is clearly stated, we cannot learn fact #12 until we learn fact #11, and the path we must follow to learn each fact is clearly described. Despite calls for differentiated instruction and inclusive education, based on the diversity of student learning abilities and cultural backgrounds, respectively, curriculum is still dominated by a perceived universal, objective and ordered list of facts that every student must learn, which is rooted in Western metaphors concerning the nature of education.

Fractal geometry, on the other hand, generates a different image of knowing and curriculum. If we look at a section of a fractal, we still see a fractal, which is distinctly unlike Euclidean pictures where, for example, we see a line when we look at part of a triangle. We cannot reduce a fractal into parts and the relation between those parts. When a fractal picture is used as a metaphor for knowing, we no longer see a list of facts to be assimilated. Instead, we still see a fractal – this is a complex image that continually and eternally resists the separation of knower from what can be known. We cannot look at knowing through a fractal lens and see students as distinct from the facts they are expected to learn. Thus, knowing cannot be seen as the assimilation of a list of accepted facts. Knowing represents inseparability and interaction between knower and knowable. Further, curriculum is a fractal – what teachers and students do is engage together within a shared and becoming-shared body of knowing. Instead of teaching and learning as a one-way interaction between expert and novice, a fractal metaphor sees the classroom as an ecology of co-interacting and inseparable entities, including children, teachers and cultural tools.

Complexity Theory

In this section, we will more fully develop some of the underlying notions of complexity theory that operate in conjunction with a fractal metaphor. These notions are drawn from phenomenology and biology. We will first briefly describe the phenomenology of Merleau-Ponty as a description of experience that is consistent with a fractal metaphor. Then we will draw on the biological evidence of Enactivism (e.g., Maturana and Varela, 1987; Varela et al., 1991; Davis et al., 2000) to reinforce a fractal metaphor for knowing.

Merleau Ponty (1962) developed a phenomenology that represents a middle way between objectivity and subjectivity. The knower is simultaneously an object within the world and a world maker. We experience reality as if it is an objective phenomenon – this is how we organize reality. But, in organizing reality, we must create reality. On the other hand, when we create reality, we are experiencing a reality in which we

are embedded. In other words, knower and known are co-interacting and inseparable.

The phenomenology of Merleau-Ponty is consistent with a fractal metaphor. Objectivity and subjectivity, rather than viewed as separate poles of a dichotomy, are seen as a fractal. Any sub-image of the objectivity-subjectivity picture is still a fractal—we cannot look at a part and see only objectivity, or only subjectivity—there is always both as co-interrelated and inseparable elements of how knowers experience the world.

Enactivism is a theory of cognition that also finds a middle way between objectivity and subjectivity (Varela et al., 1991). Evidence from biology is used to suggest that the knowing of a knower is not uniquely determined by an external and independent reality. For example, Maturana and Varela (1987) have shown that the experience of color is not uniquely determined by the corresponding wavelength of a color. The process of experiencing a color emerges from an interaction between the biology and history of an organism and its surroundings. Thus, although we experience what seems to be an objective reality, our bodies embody that experience, so that subjectivity always must be evident. On the other hand, the coupling of knower and surroundings means that subjectivity is not unbounded, and experience is structured by reality.

An enactive approach to cognition is reinforced by a fractal metaphor (Davis et al., 2000). Cognition is no longer seen as the knower cognizing what is knowable. Rather, cognition is a co-interaction between knower and its surroundings, where knower and knowable are inseparable. A fractal metaphor would also see knower and knowable as inseparable as evident in the self-similarity property of a fractal – when we look at a fractal, we cannot separate it into distinguishable parts labeled knower and knowable.

Complexity Theory and Holism

Using a fractal metaphor to understand education is a call for a return to a holistic world-view. Holism focuses on the notion that the whole is greater than the sum of its parts. In particular, holism interrupts any view that separates social phenomena into parts. We will illustrate with three common separations evident in Western thought: (1) individual and community, (2) inner and outer, and (3) physical and metaphysical.

Complexity theory, using a fractal metaphor, proposes that individual and community are inseparable. This is more than a noticing that individuals play a role in shaping a community and that the community plays a role in shaping individuals. The fractal metaphor forces us to not distinguish between individuals and community. The individual extends

beyond the physical body and into the community, just as the community extends into the individual.

We are trying to describe a reciprocal interaction between individual and community—a co-constructing interaction (cf. Merleau Ponty). For example, Paul has been defined as a White male with a type A personality but who is also laid back and has a temper, among other personality traits. These are all descriptors borrowed from available psychological knowledge—the community defines Paul. On the other hand, as an individual knower, Paul has constructed subjective perceptions of his community by noticing the personality traits listed above but not others—Paul defines his community. In taking a holistic world-view, we have noticed this co-interaction between individual and community, which is an internal and subjective phenomenon constrained by the external community.

The notion of subjective experience is bound up in a distinction between inner and outer. Western epistemology is a search for an objective description of physical reality, which we label “outer.” The objective search tries to eliminate subjective experience, which comes from within, from “inside” who we are as individuals. In other words, Western epistemology is based on a separation of the inner from the outer and a suppression of the inner when making knowledge claims. But a fractal metaphor suggests that inner and outer cannot be separated. Using an enactive description of cognition, we get a sense of how our knowing of “outer” and “inner” are intricately tied and interacting. We can explore inner to find understandings of outer (e.g., spirituality), but inner understandings are shaped by what is outer (e.g., physicality).

The distinction between the physical and metaphysical is a common assumption in Western epistemology. The physical is around us and available via our senses, whereas the metaphysical cannot be touched and is only available via spirituality. It seems very reasonable, given our seemingly objective experience of reality, to distinguish between the physical and metaphysical. But a fractal metaphor suggests that physical and metaphysical are inseparable. Just as with the co-interactions between individual and community and between inner and outer, physical and metaphysical are holistically co-dependent. Our senses (the physical) give us access to the metaphysical during a spiritual moment, but our senses also limit/affect/play a role in what we have access to in the metaphysical realm (e.g., we experience visions as pictures—vision is the sense used to see pictures). Similarly, spirituality gives us access to alternative-to-science understandings of the physical world, but our spirituality also limit/affect/play a role in what we can understand in the physical world (e.g., what we believe inspires as well

as shapes our scientific theories).

The dichotomies of Western epistemology described above (i.e., self-community, inner-outer, physical-metaphysical) are seen as inseparable when using a complexity lens. In all three cases, a fractal metaphor forces a noticing of holistic co-interaction rather than reductionistic separation. In other words, dichotomies are transformed into reciprocities. The notions of holism and reciprocity are fundamental to Aboriginal thought.

Where We Came From: Searching for Ancient Wisdom

Currently our schools and our curriculum are linear, compartmentalized and rigid. We have described a very different view of schooling using the metaphor of fractal geometry, which is an example of ultramodern thinking that moves beyond the linear and objective reductionism into a world of holistic co-interaction. In this section, we will describe aspects of Aboriginal cosmology, using theory, to illustrate the compatibility between ultramodern metaphors (i.e., complexity theory and fractals) for educational issues and ancient Aboriginal wisdom.

Spiritual interconnectedness is a fundamental way of being/knowing within Aboriginal cosmologies. Graveline (1998) points out that "spiritual connections helps not only to integrate our self as a unified entity, but also to integrate the individual into the world as whole" (p.55). Thus, the community prospers when each member is "in alignment with the Earth and is a direct and sacred expression of Spirit" (Graveline, 1998, 55). Spiritual interconnectedness could be seen as the complex inseparability of individual, world and Spirit, which is understood using a fractal metaphor.

Community and ritual are grounded within spiritual interconnectedness. Courtney (1986) talks about the importance of the ritual performance as a linking agent between the cosmos, the spirit world, human existence, and all life. Community well-being is rooted in spiritual awareness and health. As Courtney points out, this sense of community is in stark contrast to life in the modern city, where one "must face the fact that what he does, in most instances, is of no significance to the others around him, and what is learned in school is often of no help at all" (1986, 50). Of course, in pre-contact days the responsibility for education lay with the community. Education was a part of life, for all of one's life. Life in a community was a life of learning and growing. An Aboriginal notion of community seems harmonious with the complexity notion of co-interaction, which is counterpoint to the isolated notion of individual within Western culture.

A basic teaching within Aboriginal cultures is the Medicine Wheel or the Sacred Circle. Regnier (1995) lays out the four directions represent-

ing the four races, the four aspects of humans, the four cycles of life, the four elements and the four seasons. Through the multiple dimensions of the four directions the people come to harmony and interconnectedness with all the parts of their world. The many layers and the circular interweaving of thoughts, actions and ceremony bring about the teachings and the ingrained quality of the learning. Again we see complexity, in terms of a holism of thought, action and ceremony, rather than the separation of thought and action evident within a reductionistic model of teaching. Aboriginal knowledge is derived from multiple and equally valued methods, including traditional teachings, observation and revelations (e.g., Castellano, 2000; Bobiwash, 1999).

Further, the processes and products of Aboriginal inquiry are non-dualistic, interconnected, irreducible and inclusive of all reality (Couture, 1991). Aboriginal epistemology is substantially richer than the blatant reliance on objectivity and rejection of subjectivity within Western epistemology. The inseparability of a fractal metaphor concurs with an interconnected and irreducible view of knowledge and knowledge creation. The rejection of Western criteria for knowledge within complexity again suggests compatibility between Aboriginal cosmology and complexity theory.

We close our theorizing with a story told by Thomas King at the beginning of each of the five Massey lectures he gave during 2003. The series was titled "The Truth About Stories: A Native Narrative." The story is (King, 2003):

The Earth rests on the back of a turtle. When asked what is under the turtle the reply is another turtle. And under that turtle? Another turtle. And under that turtle? Another turtle! And under that turtle?? Another turtle!! Really it is turtles all the way down.

We cannot help but see complexity theory. The self-similarity of a fractal means that at any scale of magnification, the same patterns are still evident. No matter how closely we look for parts in a fractal, it is still a fractal. It is fractals all the way down.

Coming Far Enough To Understand Where We Came From

In the introduction, we related a series of stories from our personal experiences. We left it up to the reader to understand. But for us, the question remains, how do we hear stories? We posit that our hearing comes from a culturally based understanding. We suggest visualizing "culture," hearing, and understanding as constants that are continually interacting; change in one necessarily meaning change in another, in a dynamic and fluid dance of growth. In our growth of understanding, we

have come to see the ultramodern in the ancient. We believe that our modern lenses blinded our vision and our hearing. We must try to at least temporarily remove our modern lenses, and don an ultramodern lens, if we are to see the potential reincarnation of Aboriginal thought within contemporary Western education. In this section, we expect to see Ancient Wisdom. We tell you two stories and ask you how you see and hear them. What sense do you make of them? How will you use them? Above all, how will they change you?

The first story is a retelling of Tafoya's (1995) telling of the story of the Coyote: The Coyote does not see the world very well through his own eyes. One day, he hears a rabbit singing a song about how the rabbit's eyes fly from her head and then return when called. The Coyote demands that the rabbit teach him this trick. Eventually, after much pestering over several days, the rabbit agrees to teach the Coyote the trick. After learning the trick, the Coyote brags about his new trick to the humans. But when the Coyote tries to perform the trick for the humans, his eyes do not return.

Miserable and blind, the Coyote wanders around wondering what to do. He meets a mouse who, taking pity, shares with the Coyote one of his eyes. But the eye is too small and does not let in enough light, so the Coyote continues to stumble around, almost blind and wholly miserable. The Coyote meets a buffalo, who also shares one eye with the Coyote. But the buffalo eye is much too big; it lets in too much light and everything looks twice as big as normal for the Coyote. The Coyote continues his journey, staggering and miserable with mismatched eyes.

The second story is a retelling of Wahl's (1997) telling of a story by Gregorc: There are four animals, the Beaver, Owl, Dolphin and Fox. The Beaver is an industrious and practical animal. Beavers build products (dams) by following rules to the letter. Many teachers are Beavers in their classrooms—ordered and predictable. Some Beaver teachers make use of hands-on and concrete information, but many rely on the order provided by worksheets. At their best, they are solid and reliable. At their worst, they are ruled by meaningless routine. Students can also be Beavers—they like structure and predictability, and need lots of encouragement to explore and experiment.

Owls, on the other hand, are not practical. They are wise and analytic, not distracted by emotions. Owl teachers emphasize logical thinking. They have lots of theoretical ideas, which don't always work out in reality. At their best Owl teachers promote problem-solving skills. At their worst, the emotional needs of children are ignored. Owl students need time to reflect and want to be challenged to get to the bottom of an idea. Owl students want to know why things work, and are not happy just

memorizing algorithms that just happen to work.

The third animal, the Dolphin, is much different from both the Beaver and the Owl. Dolphins are playful, imaginative and artistic. Dolphins care and tap into emotion and intuition. Dolphins are aliens in a society that is goal-oriented, time-organized, and money driven. Dolphin teachers are rare, mostly found in the early years where classrooms can be colorful and imaginative. At their best, they create warmth, color and honesty around them. At their worst, they are undirected and disorganized. Dolphin students want warm relationships and personal interactions. They want to know the personal side of ideas—who invented the idea, what they were like as a person, and how they came up with the idea. They are imaginative and intuitive, struggling with analytic and logical arguments.

Finally, the Fox is clever, adventurous, pioneering, innovative and entrepreneurial. Foxes enjoy risk, shoot from the hip and are multi-focused. They are bored by methodical approaches. To Foxes, regulations are meant to be stretched to fit differing situations. This is the antithesis of the Beaver, who follows the rulebook to the letter. Foxes find Dolphins too airy, Owls too studiously theoretical and Beavers too much like uncreative clones. Fox teachers are rare; perhaps turned off by the lack of creativity evident in teacher training programs. At their best, Fox teachers promote holistic and creative thinking. At their worst, they rebel against the standard rules and documentation required of teachers. The Fox student thrives on variety, surprise and risk. He can multi-task but needs encouragement to finish one task before starting another. The Fox student needs open-ended problems, unusual challenges, and options for assignments.

One of the above stories is from Aboriginal culture, while the other is Western. We will resist, for now, interpreting the meaning of each story, in respect for Aboriginal story telling. An Elder would tell a story, but then say nothing else, having made the necessary contribution. Learning then proceeds through the voices of learners, bringing forth their own interpretations, in community co-interaction that listens to and respects the many possible interpretations that would arise from the diversity of learners present. We encourage the reader to reflect on each story before reading further. Such a reflection by the reader may provide a baseline for understanding the text to follow. So, like our storyteller, Jon, in story seven above, we wait, allowing the reader to reflect. However, we will offer our interpretation.

The story of the Beaver, Owl, Dolphin and Fox is a Western story,

premised on categories for describing human personalities. Teachers and students are identified with one of the animals or perhaps a mixture of at most two animals. The labeling of students and teachers allows us to identify strengths and weaknesses and thereby generate educational recommendations. A similar trend is evident with learning styles, where people are slotted according to abstract, concrete, linear or spatial styles. Such a categorization has the power to organize teaching into well-defined tasks, according to the needs of each learning style.

Although categorizations like those described above are powerful organizational tools, they lack the flexibility to handle the complexity of people, schools, teaching and learning. When we look with the self-similarity of a fractal, we see how it is artificial to separate people into distinct categories. For example, when we look at ourselves, we can find all four animals. Sometimes we are a Fox, while other times we seem to be Beavers. In fact, at times, we find ourselves trying to be organized, rule following, practical, theoretical, imaginative, intuitive, holistic and creative all at once. This often happens when we are problem solving. When we find ourselves in novel situations—solving a difficult math problem, negotiating the pros and cons of an argument with another community member, deciding when and how to retire—when there is no obvious solution available, we begin to problem solve. We may try to be logical, but we make intuitive leaps and get emotional and creative while also remembering theoretical principles and practical consequences. We problem solve on the fly, not just generating an answer and moving on, but hypothesizing multiple answers and checking those answers against current and past experience. We often do not generate a complete, black and white answer. We often act with incomplete answers, which is foreign to the complete answers given in Western curriculum documents. This problem solving is similar to what Schon (1983) had in mind when he described the reflective practitioner. A categorical model of personality or learning does not adequately capture the full complexity of the human experience, especially in the most complex problem solving situations that we face, such as the in-the-class-every-day problems of teaching. We do not think a categorical model of personality or learning does justice to any teacher or student.

The tale of the Coyote is from Aboriginal culture, premised on narrative and the power of story to illuminate meanings. It feels natural to look at the Coyote story with a complexity lens. We see how learning is intimately bound with who we are and what we have available to learn with (e.g. language, concrete materials, past experience, peer and teacher relationships). For example, the eyes that the Coyote received from the mouse and the buffalo were different from his own eyes—he did not

know how to interpret these different ways of seeing. The Coyote could not balance the buffalo way of seeing with the mouse way of seeing. In Western thought, a contemporary idea in consciousness theorizing is to imagine what it would be like to be a bat (Papineau and Selina, 2000). A bat's perception of reality via sonar signals is qualitatively different from what humans see or hear. This difference makes it impossible for a human to imagine the consciousness of a bat. The understanding of humans depends on how we experience reality. What we can know is embedded in what we can see and hear, and also in the educational landscape around us. The educational landscape of Western schooling is dominated by linear tools (e.g. learn this first, then learn that), so it is not surprising that Western thinking is dominated by reductionistic approaches. The holism evident in Aboriginal cosmology is foreign, and even incomprehensible to traditional Western modes of thinking. And this is the crux of the problem.

Conclusion

As professors and teachers we have struggled with issues of diversity and inclusiveness. We have outlined a metaphor for looking at education from a very different perspective, thereby maybe creating schools so open in their vision of education that all who enter can fit. Bringing together the ultra-modern and the ancient has helped us visualize a rich, varied and respectful learning space for our students and ourselves.

However, we remain aware that the best of intentions are necessary but not sufficient. In particular when we develop cross-cultural and multicultural curricular recommendations, we must not forget our own ways of looking, lest we continue to colonize, rather than embrace inclusive educational practices. For example, if we introduce the Medicine Wheel we need to attend to how we interpret the core Aboriginal teachings. How Western are our lenses? Do we talk about the four quadrants and the four elements? Do we see a closed and easily categorized circle? Or do we see the Medicine Wheel as a spiral of never completely closed cycles, ever moving and changing in unpredictable ways? Or do we relegate it to the episodic celebration of feasts and festivals?

Where we work, there are "access programs" for northern and Aboriginal students. Lately we have been thinking about instituting some courses with Aboriginal content. We applaud the effort since it may be a step forward. But new courses have nothing to say to the process of education we are using, which tends to disadvantage our Aboriginal students. Better content may help, but we are dubious. It may just make us feel better without us having to change how we "do" education. We

are focused on content and evaluation. It is a small-scale model of the linear reductionism of our dominant western society, and it creates difficulties for many of the students who are "different."

It is time to come full circle, to use new lenses to help us understand ancient wisdoms. Through such complex understandings we can continue to create learning spaces based on respect for and faith in each person.

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