International Conversations of Teacher Educators: Teaching and Learning in a Global World

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Dedication

This book is dedicated to my family. You inspire me to be my best. Zhanna

This book is dedicated to the memory of my mother, Lillian Elspeth (Campbell) MacMillan (1910-2013), my sister, Margaret Anne (MacMillan) Johnson (1935-2009) and my friend, Barbara Ann (Munroe) Rhynold (1952- 2011) – three women who demonstrated kindness, courage and inspiration throughout their lives. With the fondest of memories, Mary Jane

Part I

On Style

As we started to receive manuscripts from educators in various countries, there was a range of topics and approaches related to teaching in a today's world. In order to respect and honour the different cultures, disciplines and perspectives, we decided to maintain the original writing styles of the original manuscripts. This collection of chapters is divided into two sections and the authors address various aspects of teaching and teacher education and they contribute to ways to reconceptualise teaching and learning in higher education.

Introduction and Overview

Globalization is a powerful influence affecting educational systems in many countries. For teacher educators, an understanding of societal influences on teaching is an important component of teacher education. Thus, it is critical to develop a better understanding of the influences of globalization and the multifaceted role of teacher educators in a global society. In teaching there is always a great deal of uncertainty about what will happen next, but it is our responsibility, as teacher educators, to create spaces that can help us stay 'open to the mystery, open to wonder, open to questions' (Green, 1997, p.146).

This book evolved from our recent study on globalization and teacher education. The study explored teacher educators' perceptions, values and beliefs about the complexity and uncertainty education is facing in the era of globalization. As we explored the multifaceted role of teacher educators in a global society two key themes emerged from the data: 1) teacher education in the era of rapid change and 2) information technology and teacher education (Barchuk and Harkins, 2013). During our online conversations with teacher educators from around the globe, many of the participants mentioned their interest in submitting a chapter for an edited book. We agreed that this would be a great idea and were very excited to receive support from our home university for the formatting and publishing of an annual e-book. We did the following **call for papers** with the goal of publishing an edited e-book with peer-reviewed papers on the topic of teaching in a global world:

Working Title: ***International conversations with teacher educators: Teaching in a global world***

This is a **call for papers** with the goal of publishing an e-book with peer-reviewed papers on the topic of "Teaching in a Global World." Suggested topics include the following:

- Changing role of teacher educators
- Changes in the culture of teaching
- Influences of the social media on teacher education
- Teaching in a digital age
- Shifting student demographic trends
- Providing culturally sensitive curriculum
- Educational reform
- Other relevant topics

Part I

Education programs are entering a period of significant change in order to respond to the challenges, opportunities, and responsibilities before them. The forces driving change in teacher education today are many and varied. The first chapter, *Transdisciplinary Pedagogy and Learning* is written by our invited guest author Dr. Sue L. T. McGregor, an internationally recognized researcher on globalization. In 2012 the Board of Governors of the Academy of Transdisciplinary Learning and Advanced Studies named Dr. McGregor an ATLAS Fellow in recognition of her outstanding transdisciplinary achievements (promoting transdisciplinarity for the benefit of humanity) and in 2011 she was named *Marjorie M. Brown Distinguished Professor* (Kappa Omicron Nu) in recognition of the use of critical social theory in scholarship and research and for continuing to critically analyze concepts central to the field and calling for dialogue toward acceptance by the profession. McGregor contends that because the forces of globalization from the top down and the bottom up are changing the world at a phenomenal pace, we need to ask "How should we go about educating students so they can thrive in a globalized world?" They will be expected to deal with complex issues that *transcend* local, regional and national boundaries: poverty, climate change, pandemics, economic disparities and crises, environmental degradation, migration and population growth. This chapter proposes the idea of transeducation, and draws from the literature on transdisciplinary learning, learning approaches, mind habits, and pedagogy, as well as the new idea of transdisciplines. The intent is to elaborate on the idea of transdisciplinary-informed educational pedagogy, drawing specifically on Basarab Nicolescu's transdisciplinary methodology. His approach can be used to prepare citizens who are keen to cross and go beyond an assortment of boundaries to solve the wicked, complex problems facing humanity. The resultant deep education addresses the depth and urgency of the current state of the world, which requires a deep transformation of humans and of human society to ensure a sustainable future. Transdisciplinary-informed education helps prepare lifelong learners predisposed to work together to create intense knowledge that is alive, complex and deep, just like the problems facing humanity.

Recent advances in our ability to communicate and process information in digital form are reshaping the economies and societies of many countries around the world. Information technology (IT) has become ubiquitous and is a driving factor in the process of globalization. IT drives the innovative use of resources to promote new products and ideas across nations and cultures, regardless of geographic location. Creating efficient and effective channels to exchange information, technological advances have been the catalyst for global interconnectedness. Hamilton and Collister's chapter, *The Context of Teaching, Meaningful Work, and Engagement in Direct Knowledge of the World* addresses the 'changes in the culture of teaching' and the 'changing role of teacher educators' that have emerged, and are emerging, as the teaching and learning relationship embraces the digital age. They also explore the need for change in teacher education and professional development in higher education in what they describe as a liminal space, a space on the cusp of the old, and the new.

Davies and Price in their chapter, "*Spatial skills in Science: How mobile technology can enhance teacher pedagogical content knowledge*" demonstrate how digital technologies offer new and exciting opportunities for teaching and learning. Supporting the integration into schools, and teachers' use of these technologies however, is not straightforward. This article centres on a participatory-design project with pre-service teachers using smartphones to support spatial thinking in science. Through examination of the project, they explore the broader issues of how technology can be used in school, possible approaches to supporting teachers in their use of digital technologies and consider future implications.

Noel's research in *Teaching in a Digital Age* centres on the dramatic shift in the teacher's role from being the 'sole repository of knowledge' to the 'guide on the side' and more recently, that of collaborator. This chapter explores this shift and how it impacts on the method of instruction, the target group to whom the instruction is geared, and the impact it has on peers and parents. The writer also considers that male learners, who are more predisposed to digital technology than more traditional learning approaches, can be motivated to learn by the use of computer-aided instruction, and this could narrow the literacy divide. In her final thoughts, Noel questions whether policymakers in education have kept abreast of current trends and have created the space and support for their practitioners to function competently in this digital age.

Part II

Part II provides chapters written by authors with powerful insights into ways of addressing persistent challenges and building strengths in teaching and teacher education. Autobiography in education has rapidly grown to include scholarly research and publication in all forms of auto/biographical representation and narrative inquiry. Although there is diversity of perspectives, theories and methodologies, at the core of all autobiography is a way of organizing experience, defining values, capturing identity and defining a way of being and knowing in the world. Dean's chapter, *Teachers Reaching Lives and Not Just Merely Passing on Information* explores how both graduate students in an education class and an instructor respond to the questions: Why and how do I teach? What is my relationship to knowledge? And how has writing autobiographically affected me as a teacher? Autobiography is employed as a way to look beneath the surface of professional lives and offers teachers a path to a deeper sense of self and identity; it becomes a critical, self-reflective tool for teachers to examine their own subject positions, to identify possible biases embedded in their thinking and to reveal their assumptions about schooling and learning. Autobiography enables teachers to identify and to separate from conditioned patterns of thinking and institutional constraints as they begin to "reach lives and not merely pass on information."

Recognizing the importance of autobiography, Barchuk and Harkins interview Dr. Fatuma Chege, the first female Dean of Education at Kenyatta University which has the largest Education Department in Kenya. We discuss her educational journey as a young teacher, in a male dominated profession, to becoming an internationally prominent educator and researcher. Through her stories you will learn about the role of "tea politics" in her profession, how she empowers children through her research, and how she brings about teacher reflection and change through the writing of diaries.

Through her powerful, innovative writing style Carter, in her chapter, *Imagination: Hope for a Severed Curriculum* employs the metaphor of "phantom pains" as it applies to the state of the severed curriculum in Canadian schools. After tracing the possible reasons for issues such as school violence, student boredom, and so forth and then delineating the history of particular curriculum theories; this paper proposes that we must begin anew to create a flourishing school community/society. Kant's concepts of the transcendental imagination (Einbildungskraft) and between lands (Zwischenland) as well as the significance of emotion in relation to educational endeavors are discussed as possible ways to begin a process of self-understanding that will then lead to self-mobilization.

In the final chapter entitled M*editative Education: A Proposal for the Existential Renewal of Teacher Education in the 21st Century*, Kumar, drawing upon the profound insights of James Macdonald and Jiddu Krishnamurti conceptualizes a vision of a meditative education for the existential renewal of teacher education and school education in the 21st century. The core purpose of a meditative education is to encourage teacher educators, pre-service and in-service teachers, and their students to understand and transform their consciousness. A meditative education emphasizes the arts of listening and seeing to have a deeper perception into one's consciousness and one's relationships. It encourages the cultivation of the qualities of openness, aesthetics, and freedom in educational process. Viewed from a meditative perspective, education no more remains a problem of information transmission or means-end learning. On the contrary, it emerges as a space of freedom where the main focus of educational experience is to learn about oneself and one's relationships to people, nature, and ideas.

We would like to thank all of the authors of the chapters in *International Conversations of Teacher Educators: Teaching in a Global World* for their contributions, insights and collegiality. The conversations begun in May 2012 had educators around the globe cultivating a network of global scholars and practitioners and these chapters will provide a framework to advance the discussions well into the future.

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Transdisciplinary Pedagogy and Learning

Sue L. T. McGregor

Introduction

The theme of this collection is *teaching in a global world*. I would modify this so it reads *teaching in a globalized world*, understood to be a world that is now integrated along many dimensions: politics, economies, markets, finances, technology, ecologies, languages and cultures. How should we go about educating students so they can thrive in a globalized world? They will be expected to deal with complex issues that *transcend* local, regional and national boundaries: poverty, climate change, pandemics, economic disparities and crises, environmental degradation, migration and population growth.

Indeed, the forces of globalization from the top down and the bottom up are changing the world at a phenomenal pace. Globalization refers to the compression of the world and the intensification of our consciousness of the whole world. It encompasses cross–border interactions; frontiers and boundaries (real and virtual) between people and nations are disappearing or becoming blurred at an increasing pace. Globalization concerns the increased speed of time, space and relations due to technological innovations. Aspects of the world are becoming more accessible to all human beings. Not surprisingly, people's views of the world are changing as the world shrinks due to technological innovations and as potentials arise for sharing cultures and expanding one's views. Concurrently, there is a threat of cultural assimilation, erosion of cultures and languages, increasing corporate power and domination, and less power for national governments and marginalized citizens' voices. The globalized world is both a mechanism for socialization and for exploitation (McGregor, 2006; The Students Commission, 2001).

Education has to keep pace with these changes, even match and exceed them, if we hope to build a positive and sustainable future. I think education in such an integrated, boundary-less, ever-evolving (some would say degenerating) world must embrace the notion of *trans*—what I am calling *transeducation*. *Trans* is Latin *trare* for across, to zigzag back and forth, and to move beyond into another state or to another place. Educate also has Latin roots, *educere*, to lead out or bring forth (Harper, 2013). Put simply (which it is not), transeducation refers to leading people out of one state by bringing them forth and forward via the process of crossing over, moving back-and-forth, and moving beyond into another state or to another place. This new *transspace* would reflect the complex nuances of a globalized world, stewarded and nurtured via a *transdisciplinary-informed pedagogy*.

To develop my understanding of transeducation (because there are other interpretations, especially transgender identity), I draw from the literature on transdisciplinary learning, learning approaches, mind habits, and pedagogy, as well as the new idea of transdisciplines (see Figure 1). Most especially, this chapter is informed by Basarab Nicolescu's approach to transdisciplinarity. He conceives it as understanding the world and all of humanity by problem posing and co-creating solutions to complex wicked problems at the interface between disciplines in higher education and the rest of the world (1985, 2002). Nicolescu (2005) believes transdisciplinary thinking and knowing "engenders a new transdisciplinary education" (p.4). Others agree. "Modern curricula are mostly based on disciplinary thinking, carrying on the idea of strict frontiers among disciplines [while] *transmodern* curricula should be based on transdisciplinary thinking" (Drugus, Gherasim, & Cmeciu, 2003, p. 7, emphasis added). Tochon (2002, 2010) clearly states that education "must be reconceptualized in a transdisciplinary (TD) way that helps solve the destructive problems that humanity faces" (2011, p. 17).

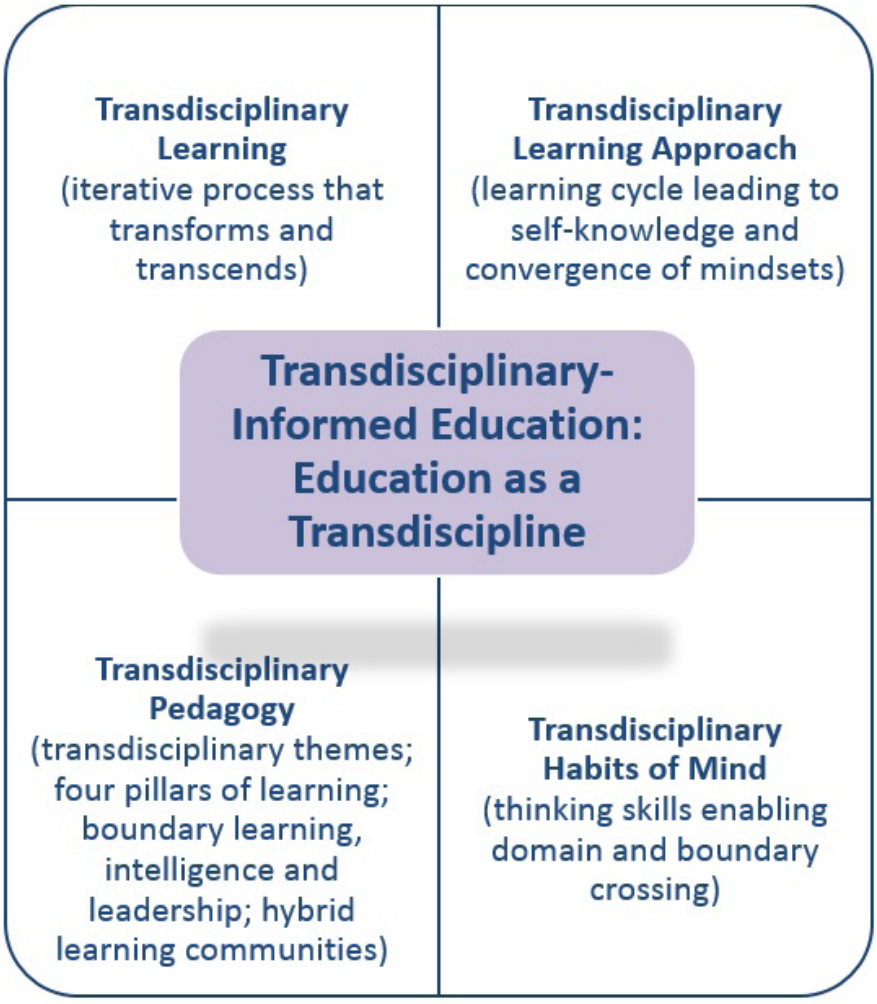

Figure 1: Dimensions of transdisciplinary-informed education

Deep Education

Because transdisciplinarity is about understanding the world, dependent on the unity of knowledge from disparate domains and sectors (Nicolescu, 1997), Tochon (2010) is convinced transdisciplinarity is the rationale for the deep approach to education. This assertion justifies a brief intellectual detour. Deep education is a philosophy of education related to deep learning and deep teaching. Deep education concerns the whole person, a deep sense of human identity and involves a reconceptualization of how people view reality. Deep learning and understandings lead to deep knowledge. Deep education "promotes a philosophy of curriculum that explains and addresses the current stakes and that requires a deep transformation of humans and human society in the direction of greater harmony" (Tochon, 2010, p. 5).

Nicolescu often speaks of the *transdisciplinary project*, focused on "the assimilation of an open mentality adapted to the challenges of our present world, a new humanism restoring the dignity of the human being and an ethical code based on rigor, openness and tolerance" (Dincã, 2011, p. 119). Tochon (2010) explains that students need a global view of *the human project* and that teachers need to engage in "the quest for a deeper sense of humanity and humanness" (p. 3, emphasis added). Transdisciplinarity and deep education are very complementary. Deep learning is actually predicated on the concept of *depth* (versus shallowness). Depth refers to complexity and profundity of thought (penetrating deeply), to incredible intensity, and to comprehensiveness of study. The mental acuity and tenacity inherent in deep education means it is "never fully achieved, it is always in the making" (Tochon, p. 2). Likewise, transdisciplinarity is never done, because the deep problems of humanity change as humans engage with them and the knowledge co-created during transdisciplinary initiatives is always in-formation, alive, what Nicolescu (2005) calls *in vivo knowledge*. The complex process of transdisciplinary-informed education is also alive and leads to transdisciplinary learning.

Transdisciplinary Learning

"Transdisciplinary learning is important" (Stahl, Cimorelli, Mazzarella, & Jenkins, 2011, p. 497). It draws together concepts, theories and approaches from parent disciplines and stakeholder's knowledge systems and lived experiences and then *transforms* these into new, TD knowledge, which is possible because boundaries have been broken down or transcended. TD learning is driven by the need for new knowledge creation to address complex problems of humanity (Park & Son, 2010). Transdisciplinary learning opportunities help students gain better understandings of how their perspectives, knowledge and values contribute to solving problems. In particular, if opportunities are provided for altering the perspectives, knowledge and values that are being examined, iterative learning is possible, leading to appreciations of how each actor's position on an issue can change as other's positions are brought to bear. As well, students learn that what they know can remain the same, but be viewed differently as different people's perspectives are brought to bear (Stahl et al., 2011). Embedded disciplines and stakesharers' knowledge systems will come into play as needed or desired throughout the process.

TD learning requires students to open their minds to an array of competing perspectives on how to solve problems (even on what constitutes a problem). TD learning is all about merging divergent perspectives to problem solve (McGregor, 2011). This inherent crossing back and forth, in and out, over and under each other's perspectives and positions opens 'newer learning' because it opens important questions about thinking and gives learners permission to question. Transdisciplinary learning helps students see problems in even more than three-dimensional *depth* because it mimics the complexity of the problems people experience in the real world (Davies, 2009). People "creatively move into, through, across [and beyond] disciplines in order to *open meaning* rather than be pinned down by [disciplinary] facts" (Davies, p.2, emphasis added).

Transdisciplinary learning also involves learners sharing their disciplinary-specific skills and experiences (via cross-training) so they can co-produce new knowledge with other people. Because the traditional boundaries between disciplines and between sectors are intentionally broken down, it is necessary to socialize learners to expect to create new, integrated intellectual frameworks (not just draw disciplinary concepts together). Effective collaboration presupposes at a minimum, a rough understanding of each person's values. Plus, everyone uses terms that can have different meanings in different disciplines, institutions or sectors (Müller, Tjallingii & Canters, 2005). Upon becoming familiar with each other's values as well as disciplinary and sectoral jargon and concepts (so they can really talk to each other and really hear what each is saying), learners can combine perspectives to build new transdisciplinary knowledge (Park & Son, 2010).

Wall and Shankar (2008) add further clarification of transdisciplinary learning. The work of any group engaged in transdisciplinary learning and problem solving is highly integrated and organized, informed by comprehensive constructs and methods that transcend (go beyond) disciplinary structures and conventions. Through increased levels of trust, blurring of disciplinary boundaries, and escalating valuing of each other's knowledge and perspectives, transdisciplinary learners become a *community of learners working for a common cause* rather than just a collection of people.

In more detail, "transdisciplinary learning is the exploration of a relevant issue or problem that integrates perspectives of multiple disciplines [and sectors] in order to connect new knowledge and deeper understanding to real life experiences" (Kompar, 2009, p. 1). Transdisciplinary learning "provides a perfect opportunity for students to realise that disciplines are constructed [by humans], are continuously changing and can be questioned" (Davies, 2009). Davies creatively presumes that "disciplines are opportunities to explore different ways of thinking" (p.1) rather than blocks of knowledge that are clearly delineated by boundaries. "Transdisciplinary learning focuses on working in and across subject areas in order to *open newer learning*" (Davies, p.1, emphasis added), much like transeducation and deep education.

With transdisciplinary learning, knowledge creation is "a social, negotiated and iterative process" stemming from "the integration of a diversity of disciplinary perspectives into the problem" (O'Reilly, 2004, p. 726). Students would be taught that this mode of knowledge creation is socially accountable and reflexive, meaning people take into account the effect of the personality or the presence of people on what is being investigated (O'Reilly). Indeed, transdisciplinary learning involves a multidimensional approach,

encompassing disciplinary knowledge as well as lay and local knowledge of those living the problem (Gibbons, 1997). This link between disciplines in the academy and civil society characterizes Nicolescu's (2002, 2008) approach to transdisciplinary learning.

In summary, Pohl (2011) maintains that transdisciplinary learning is characterized by four features: (a) it relates to socially relevant issues; (b) it transcends and integrates disciplinary paradigms; (c) it involves participatory research with those affected by, and living with, the complex social problems; and, (d) it entails a deep search for a unity of knowledge. Transdisciplinary learning assumes that common learning, in order to solve complex problems, is far superior to disciplinary rigour (Müller et al., 2005). The next section explores how these unique features of transdisciplinary learning inform the transdisciplinary learning approach.

Transdisciplinary Learning Approach

Müller et al. (2005) envision a transdisciplinary learning approach to help people from different disciplines and sectors work together to establish a common orientation to the issue at hand: (a) Each participant would articulate his or her position (including any limitations) and (b) all participants would accept the superiority of a common learning approach over disciplinary stances stemming from arbitrary, artificial boundaries. Common learning involves all participants engaging in both an integrating and a service role, leading to the convergence of mindsets into agreed-to, new TD knowledge.

Transdisciplinary Learning Cycle

Müller et al.'s (2005) approach to transdisciplinary learning involves a learning cycle with three steps, with learning occurring through continuous interactions between internal interpretations and external actions. The three learning steps are as follows. First, each participant comes to the table with his or her own purpose, concepts, knowledge and interpretations of the world. Second, informed by their internal perspectives, each participant poses actions, which have a series of expected and unexpected effects. Third, these actions and consequences are observed and described by each participant, leading to a convergence of viewpoints inspiring the creation of new knowledge, ideas and concepts. Each participant's interpretation of these shared data (including boundary judgements), their view of the problem, their chosen approach, and possible solutions might shift, which could lead to new ideas and concepts, and the TD learning cycle continues.

Müller et al. (2005) suggest this TD learning approach can best be represented using a spiral to illustrate that the cycle has no beginning nor defined end: one could start with interpreted knowledge, take action based on this knowledge, observe the consequences and interpret the results to get new knowledge, leading to another set of actions, which are observed and interpreted, and so on. They also describe the learning cycle this way, "the creative step [action] is a translation from the internal world of thoughts and feelings to the external world of forms; the descriptive step [observe] is a translation from the external world to the internal world; and the normative step [interpretive] is a translation from information to purpose [leading to the next act]" (p. 200). This TD learning cycle respects Schmitt's (2007) call for a trans-

disciplinary learning approach wherein people can "effectively communicate across disciplines and sectors, value other's expertise and knowledge, establish necessary relationships, ask important questions, integrate shared learning, and grow in self-confidence while successfully working [and learning] with others" (p.1). This cross-border work requires transdisciplinary thinking and transdisciplinary mind habits.

Transdisciplinary Habits of Mind

Transdisciplinary thinking helps people deal with the complex, wicked societal problems that require knowledge across all aspects of society: academic research disciplines, communities, civil society, industry and governments; that is, it involves the integration of knowledge from multiple knowledge systems or knowledge spheres. Thinking from a TD perspective means people have to (a) recognize and value the multiple interacting parties while (b) allowing themselves to reorganize during the perspective sharing and problem solving process (Apgar, Argumedo, & Allen, 2009). Mishra, Koehler and Henriksen (2011) identify seven habits of a transdisciplinary mind, cognitive skills they suggest any individual tends to use when creatively thinking *across a range of domains*. These TD mind skills are universal and employed by people who are inclined to integrate different solutions, viewpoints and perspectives. They include: perceiving, patterning, abstracting, embodied thinking, modelling, play, and synthesizing (see also Mishra and Koehler (2006) and http://tpack.org/).

First, *perceiving* is a two-layered process. People learn to observe using their five senses, and then they learn the process of *imaging* (calling to mind what they observed without any external stimuli). Second, *recognizing patterns* involves identifying a repeating form or plan in a seemingly arbitrary arrangement. Third, *abstracting* entails two processes: (a) people extract and focus on one feature of a thing to grasp its essence. Then, (b) they use analogies (comparisons between two seemingly disparate things) to explain the abstraction. Fourth, *embodied thinking* is also two-pronged. (a) Using kinesthetic thinking, people learn to 'think with their body,' learning how to use their five senses to know the world around them (e.g., how hard to hold an egg without breaking it). (b) Thinking with the body also involves putting oneself in another person's position (out of one's body into another body's experience) in order to understand them (empathize) (Mishra et al., 2011).

Fifth, *modelling* involves both abstractions, noted earlier, and dimensional thinking (space and time). When people model, they build replicas or use theories or formulas to represent and then study something. *Deep play*, the sixth universal TD mind habit, involves people intellectually playing with ideas, concepts, boundaries or processes so they can open doors to new ways of thinking via unexpected breakthroughs. Finally, *synthesizing* involves feeling and thinking coming together into many and new ways of knowing, which could not have emerged if everything had remained separate and disconnected. Through synthesis, people develop deep, empathetic, complex connections between each other and their attendant ideas and positions (Mishra et al., 2011).

Derry and Fischer (2005) also discuss transdisciplinary competencies and mindsets, arguing that learners need these as well as disciplinary-specific, in-depth knowledge. They propose three mindsets (hab-

its of the mind) that would bring disparate disciplines and actors together: knowledge about boundary objects, communities, and metacognitive skills that foster reflective community. First, knowledge exchange requires hosts (researchers, journals, bureaucracies, standards, stakeholders/stakesharers). These hosts are called boundary objects, features that cluster at the edges of borders, with the potential to connect ideas across people. They can impede and expedite transdisciplinary learning. Second, transdisciplinary learners need to have a commitment to the collective creation, expansion and building of knowledge through knowledge creation communities. Third, TD learners must be able to think about and monitor their thinking (metacognition skills) because this habit of the mind supports a reflective knowledge creation community. They must be skilled at reflecting on data, concepts and real world items, on the activities of the problem solving system/community, and on their modes of participation and inquiry.

Transdisciplinary Pedagogy

Transdisciplinary learning, transdisciplinary learning processes and transdisciplinary mind habits require a transdisciplinary pedagogy. As a caveat, the notion of transdisciplinary andragogy, not discussed in this chapter, has only recently emerged in the literature, an idea espoused by Elizabeth Saunders (2009, 2011).

As a reminder, this chapter is about transdisciplinary-informed education in a complex, globalized world. In fact, Barnett and Hallam (1999) characterize the globalized world as *supercomplex*. Three educational dilemmas are created through supercomplexity: understanding the world, self-understanding and identity in the world, and action in the world. They hold that supercomplexity demands transdisciplinary thinking, leading to transdisciplinary understandings and problem-solving dispositions. The nature of contemporary contexts challenges traditional disciplinary boundaries, especially since graduates are expected to "demonstrate transdisciplinary understandings…and problem-solving dispositions" (O'Brien, 2002, p.4). Consequently, transdisciplinarity requires transeducators to pay attention to pedagogical strategies (Thompson Klein, 1994).

Transdisciplinary thinking, in turn, involves deep philosophical shifts characterized by substantial epistemological dimensions (O'Brien, 2002). In more detail, the globalized world is rife with "instability, ambiguity, contestability and dynamic change" (O'Brien, p.5). This situation presents "complex implications for our theories of practice" (p. 6) intimating that transeducators need "sophisticated epistemologies and pedagogies" (p.7). Regarding a TD pedagogy, Kaufman, Moss and Osborn (2003) advocate teaching in such a way that students never lose sight of the whole because human knowledge is very holistic in its nature; consequently, learning should embrace a transdisciplinary pedagogy because it privileges the notion of a multi-faceted whole wherein each perspective and all disciplinary knowledge has the potential to inform the solution when integrated with others.

Derry and Fischer (2005) identify several dimensions of a transdisciplinary pedagogy. Transeducators can draw inspiration and insights from these observations as they ponder how and what to teach, when and why, to empower and inspire students in a globalized world:

- Communities of learning and communities of mutual interest are overarching concepts of a transdisciplinary pedagogy. In these *emergent communities*, people create common ground and share and generate new knowledge. In this middle space, people shed their resistance to truth informed by their limited reality and join many realities (perspectives and information) to generate complex, TD knowledge.
- Intelligence is not located in a single mind but is distributed among people that work together as well as being distributed across places, tools, time and distance. This complex, *distributed intelligence* emerges in the process of complex problem solving using an inclusive logic (rather than dualistic, exclusive logic that characterizes modern approaches to education). Educators employing a TD pedagogy will recognize this aspect of their collaborative interactions and work to bridge the distances.
- Through reflection while acting and reflection on the action occurring, people generating complex, emergent TD knowledge can *intelligently monitor* their collective work, which can become intense and conflictual due to varying perspectives that need to be integrated.
- Educators employing a TD pedagogy will appreciate that knowledge required to deal with postmodern, complex problems is never complete; it is always emerging into wholeness, often through a chaotic process. TD assumes that chaos is order emerging (just not there yet) rather than disorder due to disarray. Students would learn to take steps required to ensure that the flow of information, consciousness and relationships across many levels and perspectives is not interrupted, with one tool being the shared development of *boundary objects*, including: ideas, concepts, standards, principles, documents, products and designs. The crafting, use and adaptation of these boundary objects, tools which aid people moving across and going beyond boundaries, is imbued with politics, values, disparate viewpoints and ambiguities that must be managed and led.
- TD knowledge generation is best facilitated by *soft leadership*, which is demonstrated through humility, sensitivity to group dynamics, and the encouragement of collective knowledge building to solve complex, postmodern problems shaping a globalized world.
- Educators employing a TD pedagogy will buck the current trend of preparing students to leave school to get a job and instead prepare them for transformative, lifelong learning far beyond the formal school experience—*translearning*. This entails lifelong learners acquiring personal agency and a deeply entrenched sense of self-efficacy. Translearning also requires educators to teach for *collective agency*; that is, students learn they *can* make things happen through joint actions shaped by inclusive logic.

Nicolescu (1977) also discussed transdisciplinarity and education, linking it to Delors' (1996) four pillars of a new kind of education: learning to know, to do, to live together, and to be. Very briefly, *learning to know* refers to training in permanent questioning of assumptions and in building bridges leading to continually connected beings. *Learning to do* certainly refers to acquiring a profession, but doing so within a profession that authentically weaves together several competencies at the same time as creating a flexible, inner, personal core. The latter refers to always being an apprentice of creativity and of creating one's potential. *Learning to be with others* means not only do people learn to respect others but they learn a new attitude that permits them to defend their own convictions. This new attitude makes a space for both open unity and complex plurality, which no longer have to be in opposition to each other. Finally, learning to be does not mean the same thing as existing. It means people discover how they have been conditioned, determining if there is any tension between their inner self and their social life, and testing the foundations

of their convictions and to question—always question. People have to continually ask themselves "Where am I?" because things change and move and so do people.

Nicolescu (1997) considers transdisciplinarity to be the roof that connects these four learning pillars. He further argues that transdisciplinarity is the only defensible pedagogical framework for education in a postmodern, globalized world.

As a powerful example, the International Baccalaureate Organization (IBO) (2010) proposes an intriguing transdisciplinary pedagogy. Their approach reflects curriculum built upon transdisciplinary layers: (a) program of inquiry (five essential elements: knowledge, concepts, skills, attitudes, action); (b) units of inquiry (six themes); (c) central ideas; and, (d) concepts. In particular, their curriculum hinges on six transdisciplinary themes, which "are not derived from the traditional subject areas but, in their scope, they transcend them" (p.7): who we are, where we are in place and time, how we express ourselves, how the world works, how we organize ourselves, and sharing the planet. The IBO (2010) clarify that "the language used to define the themes suggests the learner actively constructs meaning through inquiry" (p.8). The themes and attendant inquiries allow students to acquire and apply a set of transdisciplinary skills: social, communication, thinking, research, and self-management. The themes intentionally promote awareness of the human condition and an understanding there is a commonality of human experience. Students are expected to learn to "think conceptually" (IBO, p. 10) and make connections throughout and across the transdisciplinary learning process. The entire IBO transdisciplinary pedagogical model is predicated on collaborative planning and learning processes that support lifelong learning and "a deliberate focus on understanding the present world" (p.1).

Akin to Delors' (1996) four pillars of learning, a transdisciplinary pedagogy would also teach students to learn, think, create and innovate (Ertas, 2000). They would learn how to find knowledge when it is needed, how to assimilate that knowledge, how to integrate that knowledge, and how to synthesize new ideas and solve problems using that knowledge. Respecting the dynamics of such knowledge creation, "the most significant characteristic of transdisciplinary education ... is the crossing of barriers to effective communication. These barriers or shells include not only technical issues, but also language, ethnic, and cultural issues. True transdisciplinary education must involve individuals from many countries, ethnic groups, cultures, and so forth" (Ertas, 2000, p. 15). To that end, transeducators would socialize students to respect the process of boundary crossing, made possible by the joint development of boundary concepts and the aforementioned boundary objects that enable connections across heterogenous groups and sites. Boundaries are characterized by ongoing tensions as well as permanency and passage. Because transdisciplinary problem solvers will be engaged in 'perpetual movement across thresholds,' they will need these conceptual tools (Nicolescu, 1993; Thompson Klein, 1994).

Given the boundary-crossing nature of transdisciplinary learning and knowledge creation, anyone employing a transdisciplinary pedagogy must appreciate that "transdisciplinary thinking (TD) employs perspectives and methods that transcend traditional disciplinary boundaries and engage both researchers and practitioners in addressing real-world problems…TD brings together academic experts,

field practitioners, community members, research scientists, political leaders, and business owners among others, to solve some of the pressing problems facing the world, from local to global…[This leads to] a globally inclusive community [diverse] in terms of geography, nationality, as well as scientific and cultural perspectives" (Aguirre, 2008, p. 238). Thompson Klein (1994) referred to these as *hybrid communities* that enable collaboration and integrative problem solving "at the boundaries and in the spaces between systems and subsystems" (p. 1). Any curriculum prepared from a transdisciplinary perspective would have to teach students how to function and thrive in these hybrid communities once they graduate.

Within these learning communities, students would learn several fundamental transdisciplinary learning processes, which entail revisiting and reconstructing their own and others' perspectives and contributions. Students would be taught that meanings are deliberated and with each iteration of engagement, people involved learn more about each other and their own contributions in addition to gaining a better sense of fellow contributors' knowledge and positions. Transeducators would teach students to expect transdisciplinary discussions to be extremely difficult because various stakeholders do not typically work together or even interact. Students would be taught that each participant must learn that their particular contributions are more or less far-reaching than they supposed. This insight leads to humility and a deeper respect for the messiness of transdisciplinary learning during the process of addressing wicked problems (e.g., sustainability) (Stahl et al., 2011).

Finally, referencing Morin (1999), Marinova and McGrath (2004) claim that "the goal of transdisciplinarity is the holistic understanding of the world and the unity of knowledge that is required for this understanding. The transdisciplinary pedagogical approaches could provide students not only with the tools to understand reality but also to confront changes taking place around them. It develops a new vision and a new experience of learning" (p. 3). As well, transdisciplinarity focuses on issues across learning areas (disciplines), between them and beyond them, for the emergence of new and broader perspectives and for deeper understandings of the interrelatedness of complex issues. Transdisciplinarity enables new possibilities and potentialities. Transdisciplinary learning (going beyond traditional subject or discipline areas) leads to transformation, meaning students go beyond existing forms and structures to transpersonal, transcultural, transreligious, transnational and transpolitical structures and perspectives (de Leo, 2006).

Education as a Transdiscipline

This chapter concludes with a discussion of transdisciplines, a very new idea that can be applied to education. The nature of the complex, wicked problems created in a globalized world (McGregor, 2012) requires that education (especially teacher education) become a transdisciplinary field of study—a transdiscipline. It has to continue to emerge and transform in response to human problems and needs as humans engage with each other, the natural environment and other species. Transdisciplines strive to create new, more complex and integral knowledge by working between, across and beyond multiple, separate disciplines (Tamayo, 2008). Corteś López (2005) pushes the concept further, explaining that a transdiscipline makes the complexity of the patterns of interactions among various world life spheres more visible.

It represents the unification of knowledge, stemming from complex thinking and holistic integration, especially the integration of culture, nature and tangible objects, which convey material life and ideas.

As a transdiscipline, education would reticulate other disciplines (form a network), transcending them, for purposes of approaching real interaction with real world problems (Mendoza, 2010). A transdiscipline "continuously undergoes transformation, going beyond disciplinary mind-sets into re-conceptualization of phenomena, problems, goals, and approaches. It accepts complexity and pays attention to dynamic interactions (in space and time) between natural and human-made systems. Participation of end-users is essential…Accountability to end-users becomes intrinsic to the process" (Peden, 1999, p.3).

Through the process of overarching synthesis and critique, those engaged in transdisciplinary work (within transdisciplines) transcend (go beyond the limits of) the fragmented scope of disciplinary cores leading to the active construction of knowledge, ideas and procedures—they mobilize the process of extending beyond something (Palaiologou, 2010). Fourez (2001) calls this *transversal mobilisation*. Through these creative processes, transeducators can socialize students to witness the emergence of new data and new interactions from the encounters between different actors. Everyone strives to be open to that which they share and that which lies beyond them, yet to be discovered (de Freitas, Morin & Nicolescu, 1994). At the heart of this process is the willingness to understand the language and underlying ideologies and philosophies of everyone (McGregor & Volckmann, 2011; Palaiologou, 2010). Transdisciplines fuse knowledge around complex domains and world issues rather than around disciplines or subjects. This integrated knowledge is adaptive, creating synergy that relates to local contexts as well as those affected by the problem at the global level (Palaiologou, 2010).

Ertas (2010) further explains that transdisciplines point to a *new way of organizing* knowledge generation and integration, a process that entails collaboration among diverse actors to develop and use integrated conceptual frameworks, tools, techniques and methodologies. On an interesting final note, a transdiscipline enables people to transcend the non-stop changes facing the world by prompting people to open their minds to look for links with other fields and spheres that are not necessarily next to them (areas, disciplines and contexts) (Corteś López, 2005). The possible fertility that comes from reflecting on global configurations and movements emerges if knowledge is allowed "to look around freely and sharply, over next and ancient, present and past, real and imaginary places" (Octavio Ianni as cited in Corteś López, 2005, p.5). Framing education as a transdiscipline paves the way for sustainable transdisciplinary-informed pedagogical innovations.

Conclusion

This chapter wove together transdisciplinary learning (including deep education), learning approaches, mind habits, pedagogy and education as a transdiscipline. The intent was to elaborate on the idea of transdisciplinary-informed educational pedagogy. "Engaging with the concept of transdisciplinarity forces a paradigm shift that moves most teachers out of their comfort zone…[it] is not business as usual" (IBO, 2010, p. 5). This philosophical and epistemological discomfort exists because "*transdisciplinarity*

concerns that which is at once *between* the disciplines, *across* the different disciplines, and *beyond* all discipline. Its goal is *the understanding of the present world*, of which one of the imperatives is the unity of knowledge" (Nicolescu, 1997, p. 3). Most educators are comfortable working within the confines of their disciplinary home (e.g., science, history, geography, mathematics) and seldom have the opportunity or inclination to bridge these subject areas in their curriculum.

But, if transeducators wish to socialize students to be caretakers of the human condition, in an increasingly supercomplex, globalized world, there is much to learn from transdisciplinarity. It prepares citizens who are keen to cross and go beyond an assortment of boundaries to solve the wicked, complex problems facing humanity. The resultant deep education addresses the depth and urgency of the current state of the world, which requires a deep transformation of humans and of human society to ensure a sustainable future. Transdisciplinary-informed education offers that promise because it helps prepare lifelong learners predisposed to work together to create intense knowledge that is alive, complex and deep, just like the problems facing humanity.

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The Context of Teaching, Meaningful Work, and Engagement in Direct Knowledge of the World

Karen Hamilton and Rupert C. Collister

Introduction

It is not news to many of us who work in education that "the single biggest problem bedeviling attempts to improve education is a profound misconception about what it means to *actually know something* [our emphasis]" (Caine & Caine, 2011, pp. 4-1). This is especially, but not solely, true for those of us working in the largely vocationally oriented sector of higher education such as in Canadian colleges. One of the authors, Dr. Rupert Collister, vividly recalls leaving College (in the UK), with his recognised trade papers, and entering world of work where he quickly found out that the skills and knowledge he had gained at college, whilst *technically* those required in the workplace, bore little resemblance to what was *actually* required. As it turned out, he and his peers were considered as, at best, workplace 'ready' but not workplace 'competent' (Collister, 2010, p. 34). The problem was, and to many still is, that despite, arguably 300 years of educational reform, much formal education (both compulsory and post-compulsory), still follows a largely transmissive approach[1]; and transmissive approaches to education "tend to equate knowledge *about* the world with direct knowledge *of* the world." (Caine & Caine, 2011, pp. 4-1). Unfortunately, as Dr. Collister and his peers (and generations of others) discovered, these are *not* the same thing.

If we, in post-compulsory education, are truly trying to prepare our students for the world of work we need to, not only provide *them* with real and deep opportunities for engagement in "direct knowledge *of* the world" (Caine & Caine, 2011, pp. 4-1), but we also need to prepare our faculty[2] so that they can create the conditions for such engagement. These are challenges whose time has finally come. College is a liminal space, a space on the cusp of the old, and the new. A space where the old may no longer apply, or may no longer work, and where the new is still unknown, to some degree. Many of our students find themselves in such a liminal space just at the time they enter our doors, but colleges too find themselves in such a place. The current emphasis on e-learning and innovation in teaching and learning engagement is another

[1] Of course there are exceptions to this rule, at all levels of formal educations but most of these would fall into the broad category of which might be described as 'transactional' learning rather than truly transformational.

[2] Professors, teachers, instructors, and tutors etc.

example of liminal space. The landscape of, not only formal education but also, global society is changing at a pace which is clearly exponential. Decontextualised transmission of an accepted 'canon of truth', whatever the subject area, can no longer be the sole source of content our students are exposed to. In addition, all teachers (in any context) would do well to remember the words of Zen Master Suzuki Roshi, who said "in the beginner's mind there are many possibilities, but in the expert's there are few" (cited in Chödrön, 2002, p. 1) and the philosopher and educator, Jiddu Krishnamurti, who said "a man who says he knows is already dead. But the man who thinks "I do not know," […] such a man is living and that living is truth" (Krishnamurti, 2000).

This chapter will address the 'changes in the culture of teaching' and the 'changing role of teacher educators' that have emerged, and are emerging, as the teaching and learning relationship embraces the digital age. It will also explore the need for change in teacher education and professional development.

Background

The genesis of this chapter occurred when one of the authors, Dr. Rupert Collister, was teaching a Masters-level educational administration course at an Ontario university. In that course he encouraged his students to engage in contemplation and journaling, reflective questioning, appreciative and action inquiry, and a process he calls 'collaborative conversation'[3] to continually explore: whom they are, how they exist in the world, and the effects that their attitudes, behaviours, actions, decisions, and values have on that world.[4] These questions were explored throughout the course in relation to the course content, the context in which his students were currently embedded or their aspirational context (if they weren't currently in a place to engage with the content experientially), as well as their past individual and collective experiences. This all occurred within, what Dr. Collister calls 'a framework of holistic thinking." See *Figure 1* on next page.

Many, if not all, of us live what Parker Palmer calls "a divided life" (2004, p. 4). He says, "I yearn to be whole, but dividedness often seems the easier choice" (2004, p. 4). Despite the interconnectedness of all things, life is a journey shaped by decisions and choices. Whether we acknowledge it or not, everything that is done or not done, every decision that is made or not made, every action that is taken or not taken, and everything that is said or not said, affects everything else, not only in our immediate context but also much more broadly (Collister, 2010). The dividedness Palmer describes is given more power when we do something which we know is contrary to our natural (but often submerged) way of being, or when we don't do something which we know, or feel deep down, that we should. Such dividedness takes a heavy toll on, not just ourselves, but also on all those around us, for faculty this includes their colleagues and students, not to mention their families and friends. As Palmer says:

[3] Inspired by the work of Palmer (2004) and Crowell, Caine and Caine (1998). 'Collaborative conversations' are rooted in the notion that, as Palmer says "we all have an inner teacher whose guidance is more reliable than anything we can get from doctrine, ideology, collective belief system, institution, or leader" and "[…] we all need other people to invite, amplify and help us discern the inner teacher's voice" (2004, pp. 24-25).

[4] This pedagogy was explored in depth elsewhere (Dencev & Collister, 2010) and has subsequently evolved as he has continued to employ it in a number of Bachelor of Education courses for aspiring teachers at other Canadian universities.

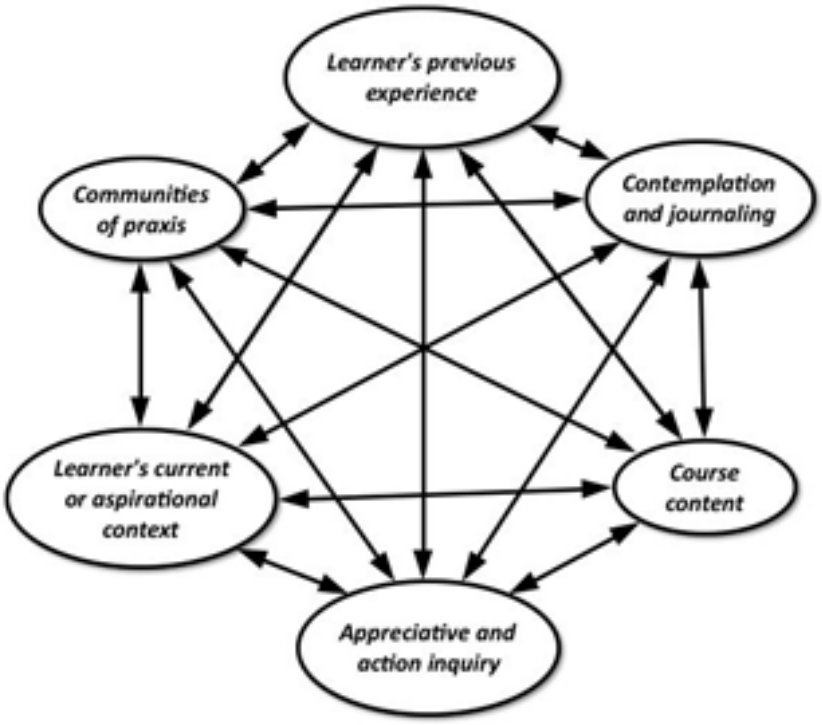

Figure 1: Dr. Collister's pedagogical approach.

> How can I affirm another's identity when I defy my own? A fault line runs down the middle of my life, and whenever it cracks open – divorcing my words and actions from the truth I hold within – things around me get shaky and fall apart. […] The divided life comes in many and varied forms. […] It is the life we lead when:
> • we refuse to invest ourselves in our work, diminishing and distancing ourselves from those it is meant to serve.
> • we make our living at jobs that violate our basic values, even when survival does not absolutely demand it.
> • we remain in settings or relationships that steadily kill off our spirits.
> • we harbor secrets to achieve personal gain at the expense of other people.
> • we hide beliefs from those who disagree with us to avoid conflict, challenge and change.
> • we conceal our true identities for fear of being criticized, shunned or attacked. (2004, pp. 5-6)

Dr. Collister underpinned his pedagogy with these understandings because he realised from his own experience that many, if not all of us, will do some or all of these things on a regular basis. We rationalize our actions in our own minds whilst at the same time we do not realise that we are slowly killing, not only our spirit and those of the people around us, but, almost certainly, our bodies. A phenomenon that can certainly be observed in the high levels of stress related illness and death in our society, not to mention in self-destructive behaviours such as addiction, self-harm, and suicide. Through this process of division, naturally communal and social human beings become insular and, what Dr. Ed O'Sullivan would describe as, 'Self-encapsulated' (1999). As we each take on this self-encapsulation, we bear a cost that Palmer again suggests is manifested in:

• The sense that something is missing in our lives and though we search for it we do not understand that what is missing is in us.
• The feeling of being fraudulent, even invisible, because we are not in the world as we really are.
• The belief that the light within us cannot illuminate the world.
• The belief that the darkness within us cannot be illuminated by the world's light.
• The way we project our inner darkness onto others, making "enemies" of them and making the world a more dangerous place.
• Being inauthentic and projecting in such a way that making real relationships is impossible which leads to loneliness.
• Tainting our contributions to the world (especially through our work) with duplicity depriving them of the life-giving energies of true-self. (adapted from 2004, p. 16)

Through the processes of engaging in contemplation and journaling, reflective questioning, appreciative and action inquiry, and 'collaborative conversation', across a number of courses in a number of institutions, Dr. Collister was able to connect a series of previously separate vignettes from his own experience to the overarching narrative emerging from his students. Briefly those vignettes were:

Vignette one: Instructors in the vocational education and training sector in Australia

The late 1990's and early 2000's were a time of change in the Australian Vocational Education and Training (VET) system. Competency-based training, though fairly well-entrenched, was undergoing a shift as a result in a change in Government policy. Instead of industry boards setting curriculum that instructors simply followed, using the transmissive pedagogies that had, arguably, been used for centuries, accreditation boards were shifting to an assessment outcomes based model where instructors were given guidelines on the range of skills and knowledge to be assessed and the conditions under which such assessment should take place. Focus was no longer on what needed to be taught, but what needed to be assessed and under what conditions.

Many of the faculty were industry-trained professionals who had shifted their focus to education in their field of professional expertise. Dr. Collister both experienced this situation himself and observed it in others. However, many of the instructors, who had largely been drawn to this role by the feeling that they wanted to 'give back' or to 'pass on their knowledge and experience to the next generation', found that they were not happy. Often they felt that their work was not a meaningful experience for either themselves or their students. Typically, the instructors loved the process and act of teaching, they loved the process of passing on what they knew to others, they loved the experience of engaging with students who perhaps hadn't previously enjoyed learning, and they loved the possibility that sometimes they were changing lives. Unfortunately they typically disliked the context in which they were embedded. They didn't like the increased regulation and reporting, the increased credentialisation requirements for instructors, or the increased casualisation of the instructor's contracts. They didn't like the seemingly constant changes in the

regulatory frameworks, nor the changes in Government policy. Finally, they didn't like what they perceived to be increased workload and responsibilities as well as increased stress; all to service, as they saw it, the institution's bottom line. On the whole, instructors seemed to feel that although they loved teaching they increasingly didn't like the 'context' being a teacher meant they were immersed in.

Vignette two: Faculty at a regional university in Australia

The university was a regional university well known for 'distance education' and for a range of programming originally focused in agriculture but more recently including education, law, and medicine, as well as the social sciences and other programmes. Dr. Collister's tenure corresponded with the transition from the University's traditional distance education model of largely correspondence-based courses, supplemented with audio and video resources, and more recently limited use of a learning management system, to a model where all courses had an online presence and there was a marked increase in blended and fully online courses and programmes.

However, a significant number of faculty, some of whom had been in their roles for decades, found that they were not happy. Some felt that their work was becoming less meaningful for both them and their students. Typically, the faculty loved the process and act of teaching, they loved the process of passing on what they knew to others, they loved the experience of engaging with students in research, exploration, and debate, and they loved the possibility that sometimes they were changing lives. Unfortunately, they typically disliked the emerging context they were beginning to be embedded in. They didn't like the increased casualisation of the faculty. They didn't like what they perceived to be a lack of professional freedom. They didn't like the seemingly constant changes in institutional policy and process. They didn't like the directives for increased use of technology, and they especially didn't like the seeming depreciation of pedagogy simultaneously with the elevation of technology. Finally, they didn't like what they perceived to be increased workload and responsibilities as well as increased stress; all to service, as they saw it, the institution's bottom line. Overall, faculty seemed to feel that although they loved teaching they increasingly didn't like the 'context' being a teacher meant they were immersed in.

Vignette three: Teachers, Vice Principals, and Principals undertaking post-graduate professional education

The cohort for Dr. Collister's Educational Administration course comprised teachers, Vice Principals, Principals, and related School Board employees from a single School Board west of Toronto, Ontario.

As was noted earlier, the process of contemplation and journaling, reflective questioning, appreciative and action inquiry, and 'collaborative conversation' revealed that although all the students in this cohort were at different stages of their careers, in different roles, and even in different schools, they shared a number of similar experiences. Typically, they all loved the process and act of teaching, they loved the process of passing on what they knew to others, they loved the experience of engaging with students in exciting topics and projects, generally they also loved being involved in school or Board-wide initiatives, and

they loved the possibility that sometimes they were changing lives. Unfortunately, they typically disliked the context they were embedded in. They didn't like the Governmental pressure on status and conditions. They didn't like the seemingly constant changes in Governmental and departmental policy. They didn't like the constant stream of new initiatives and particularly didn't like the lack of apparent follow through and funding for previous initiatives. Some didn't like the directives for increased use of technology, and many didn't like the lack of funding and resources to support the use of those technologies (amongst other things). Finally, they didn't like what they perceived to be increased workload and responsibilities as well as increased stress. Overall, this cohort seemed to feel that although they loved teaching they increasingly didn't like the 'context' being a teacher meant they were immersed in.[5]

Vignette four: Undergraduate students undertaking practicum experience as part of their Bachelor of education studies across two Canadian universities

People choose to be teachers for all sorts of reasons. Often because teaching runs in the family, because an inspirational teacher left a lasting impression on them, or sometimes because a person had a transformative experience that was rooted in learning and they want to give others that opportunity. That was Dr. Collister's personal experience and motivator, described more fully elsewhere (2010). However, whatever the reason they wanted to be a teacher and despite having spent much of their lives in educational institutions when the student-teacher commences their first practicum they often seem to experience a culture-shock.

Again through the process of contemplation and journaling, reflective questioning, appreciative and action inquiry, and 'collaborative conversation' it was revealed that although the B.Ed students were in different courses, in different universities, in different Provinces, they shared a number of similar practicum experiences. Typically, the teachers they encountered all loved the process and act of teaching, they loved the process of passing on what they knew to others, they loved the experience of engaging with students in exciting topics and projects, generally they also loved being involved in school or Board-wide initiatives, and they loved the possibility that sometimes they were changing lives. However, the students on practicum noticed that many of their schools were under provisioned with technology, that many teachers didn't want to engage with technology, that many teachers didn't like the seemingly constant changes in Governmental and departmental policy, that many teachers didn't like the constant stream of new initiatives and particularly didn't like the apparent lack of follow through and funding for previous initiatives. The students on practicum also noticed that many teachers felt the pace of change was too great. The students also noticed that in many cases they personally didn't experience a teaching and learning relationship with their

[5] This was equally true for the students who were no longer teachers.

host teachers, that teachers didn't necessarily collaborate well together, that some host teachers weren't willing to take suggestions from the students on practicum and weren't interested in their ideas. Overall the overarching theme that emerged from the B.Ed students practicum experience was that the teachers they had observed had workloads and responsibilities that were onerous and caused high levels of stress, sometimes creating a 'toxic atmosphere.' Overall, these practicum students seemed to feel that although their host teachers tended to love teaching they increasingly didn't like the 'context' being a teacher meant they were immersed in.

Although these vignettes take place over 15 years and two continents, there are recurrent themes, which are applicable to the nature and culture of teaching today. Empirically at least, it appears that the constantly emerging, and evolving context of education (often simply seen just as constant change) is causing feelings of a loss of meaning in the work of teachers and facilitating the divided life of which Palmer spoke. Making our way back from a divided life is often a journey that never ends.

Changes in the Culture of Teaching

There is no doubt the culture and context of teaching is changing, perhaps evolving is a better word since evolution is the never ending unfolding of possibilities. If we walk the halls of any college or university in North America today, how different would the various classrooms be from classrooms of ten, twenty, thirty or even a hundred years ago? Chances are some classrooms might not look that dissimilar. Those classrooms would have the teacher standing at the front lecturing to students who were sitting row on row, some attentive and some not. But in other classrooms though, we might see something quite different, more activity, a multimedia presentation perhaps, students using laptops, tablets or other mobile devices, and maybe even classrooms arranged with moveable desks in different configurations to facilitate collaboration. Of course, it's only fair to say, that just as in the traditional classroom where there may have been the inattentive student, in this newer version there could be the same inattentive student hiding, this time, behind a rather convenient mobile device or other technology.

However, in our walk around today's schools there is much we could miss. To truly see all of today's classrooms we would need to be able to see beyond the physical space of the classroom. The 'classroom', the teacher, and students might be just about anywhere. They could be online synchronously or asynchronously via a Learning Management System, live with a web conferencing tool, in a virtual world where everyone is represented by their chosen avatar, online visiting and engaging in a virtual event located half way around the world, or participating in a discussion on a social networking site like twitter by using a class-specific hashtag. Our digital world has provided us with the opportunity to create educational experiences anytime and almost any place. Indeed some children have already experienced lessons taught by teachers in space. For some faculty this is a blessing but for others just a thought of anything that is different from what they are comfortable with is a threat. Again the concept of a classroom in the 21st century is that of a liminal space.

If we walked the same halls of those colleges and universities, we'd find the administration and support staff still present, but if we had a look inside the faculty offices we'd see something different. In

the past we would likely have found faculty offices that were hubs of activity, with faculty huddled at their desks working, preparing, marking, talking on the phone, or perhaps meeting with colleagues or students. We might still see some of that today, but more and more the place where work gets done is not on campus and not just during typical working hours. A 2012 University of Toronto's Ontario Institute for Studies in Education (OISE) study of Canadian university professors, reports that on average faculty members are working more than 50 hours per week (Tamburri, 2012). So while it may appear that the faculty are 'missing in action' in fact they are often hard at work, but not necessarily at their notional or traditional 'workplace'. This visual difference can lead to false perceptions of teachers on the part of Government, administration, students, and parents, perceptions that can ultimately affect the flow of funding.

While in the past, collaborations between faculty were often local or community-based, today it may just as likely be that faculty members are engaged in collaborative exchanges on multiple social networks with peers from organizations and groups worldwide. In the past a group of faculty and individuals who were interested in like-minded topics typically, formed a community of practice. A lot of the activity took place in person or maybe through some other simple forms of communication. Today the community of practice has largely moved into the digital era as Personal Professional Networks or Personal Learning Networks (PLNs) where the communities are facilitated through social networking sites like Twitter, Facebook, LinkedIn, and YouTube and more recently through curation sites like Scoop.it and Pearltrees. Interestingly, even though the members of these PLNs may never have met face-to-face, the connections formed can be stronger and more meaningful than some of the face-to-face connections with people who may share the same office space. The reach of today's teacher can be felt as much outside an organization as within it. Indeed in Dr. Collister's recent teaching, his Canadian students experienced numerous opportunities to interact with faculty and other experts from the United States, Australia, and New Zealand because of his own Personal Professional Networks. In Personal Learning Networks an equalization occurs. Everyone is a learner and everyone can be a teacher, remember Suzuki Roshi and Jiddu Krishnamurti?

So what does this mean for the culture of teaching? In the past, teaching was straightforward. The teacher was hired for his or her expertise and their job was to 'teach' the students the requisite knowledge, (a predetermined canon) of a particular subject area (transmission). The teacher held a position of power granted by an institution. Students moved up through school systems that all worked the same, so when they got to college the same scenario was expected and accepted. The source of 'knowledge' and content was in the hands of a few. Teachers had the keys to that knowledge and if students wanted to access it, they needed to play by the rules, if they didn't, they were marginalised (Collister, 2010). As we know already, transmissive approaches to education "tend to equate knowledge *about* the world with direct knowledge of the world" (Caine & Caine, 2011, pp. 4-1). So generations of students have experienced an education that forced a wedge between them and their experience of the world. Textbooks were important because they often provided the basis for such a predetermined canon of knowledge, reading about something replaced experiencing something. Knowing 'things'—facts, figures, dates, formulae etc.—was a key function of edu-

cation and being able to provide the right answer to questions, was important when it came to taking tests and passing courses. Despite the 300+ years of educational reform noted earlier, the transmissive pedagogy seemed to go along unchallenged by those in mainstream education until the digital revolution.[6] The advent of the internet, search engines, and social networking sites made information that had previously been scarce, much more abundant. The power to create content and share information is no longer in the hands of the few. Now everyone can create, share, and repurpose information.

Today more and more educators question their place in a world where their students have access to as much, or more, information than the teachers themselves may have and in our information age, access to information equates with knowledge. Of course, in and of themselves, facts are of limited practical use. It is only when facts become contextualized and experienced in that context that they become useful. According to Samuel Arbesman, expert in scientometrics, because of the rapid change in our understanding of the world half of what we think we know might be wrong (cited in Bailey, 2013). Part of that relates to the rapid change in what the world knows to be 'true' at any given moment, and part is related to the point that we tend to cling to old knowledge even when it is no longer valid. This is simply a feature of the conservative tendencies within any worldview. "Our worldview is not simply the way we look at the world. It reaches inward to constitute our innermost being and outward to constitute the world. […] Worldviews create worlds" (Tarnas, 2006, p. 16). Such conservative tendencies maintain just enough of the status quo to allow for appropriate evolution (in order to ensure the worldview's longevity) without facilitating its complete obsolescence (Collister, 2010). But therein lies the problem, or maybe the teaching opportunity, with an over abundance of information available, how does one know which 'facts' are valid? Increasingly, the teacher's job is becoming less about facts but more about creating opportunities for engagement, discovery, action, and critical thinking. Howard Rheingold notes: "Basic information literacy, widely distributed, is the best protection for the knowledge commons: A sufficient portion of critical consumers among the online population can become a strong defense against the noise-death of the Internet" (2009). The context and content of teaching is clearly changing. Is it a wonder that the various students and teachers in the vignettes noted earlier had a love of teaching but were stressed by the context they were immersed in?

A report released in 2012 surveyed responses from over 20,000 full time faculty and some 3,500 part time faculty at US colleges and universities (Hurtado, Eagen, Pryor, Whang, & Tran). The report showed that although there is an increased use of more collaborative approaches to learning, 52.7% of male faculty and 33.8% of female faculty still make use of extensive use of lecturing. Some contextualization would help in understanding these numbers, but we can imagine that class size may be relevant here. While many teachers today are trying to innovate in their classrooms, change is not always easy. As ever,

[6] Of course questioning and critical thinking have long been a part of higher education, but the transmission of so-called knowledge has been, and is still being measured, as the primary form of assessment.

often the rhetoric (and budgets) do not match the reality in many of our educational institutions. Something that the faculty and students noted in the earlier vignettes also noted.

The same 2012 Higher Education Research Institute report (Hurtado, et al., 2012) looked at the most common sources of faculty stress. High on the list was institutional budget cuts. Over 80% of full time faculty at public universities and colleges were stressed over potential cuts to budgets and 71.3% were stressed about institutional procedures. Over 80% were worried about a lack of personal time and 60% were worried about their teaching load. Perhaps surprisingly, very high on the list was the stress of their own self-imposed high expectations at 84.8%. The budget cuts, the change in institutional procedures, workload, and lack of personal time make up much of the stress in the current context of teaching, as noted in the vignettes earlier. Another common stress includes the increasing number of non-full time faculty. There can often be the perception that fulltime faculty numbers are dwindling and the number of part time faculty is increasing. In addition, often these part-time faculty are expected to work longer hours than their full time colleagues, with little to no office space or support. Many work at more than one college or university running from location to location with much lower rates of pay and virtually no job security. We have a faculty divided. Each of these would significantly contribute to "the divided life" (Palmer, 2004, p. 4) but together they all but guarantee it, contributing to the lack of meaning that many faculty appear to experience.

Given the current emphasis on e-learning and innovation in teaching and learning engagement it is probably no surprise that much of the stress incurred in the current context can be related to the drive by organizations to implement e-learning and communication technologies, a point also noted in the vignettes earlier. While many would agree that these technologies might increase productivity, creativity and create a stronger connection to the academic community, there are clearly associated costs, not all of them financial. In the 2012 study *Digital Faculty: Professors, Teaching and Technology*, a large group of faculty reported that these technologies have increased their level of stress. Some 6% of faculty report receiving over 100 work-related emails a day, while a majority see between 11 and 50. In this study, 43% of faculty report creating digital teaching materials. Whilst 23% of these faculty reported that they are not being rewarded for it. Not surprisingly, administrators often have more positive views of their institutions systems and rewards. In this study some 65% of faculty say the number of hours they work has increased (Elaine, Seaman, Lederman, & Jaschik, 2012).

Another similar and related issue is the movement away from the strictly traditional face to face teaching model into various mode of engagement such as web-enhanced, hybrid/blended and fully online. For some faculty these new methods threaten the way they have done things for years. They question the validity of online teaching, and e-learning technologies. Why should they change the way they are doing things? Why do they need to have an online presence? They have been successful in the past. Isn't it about the pedagogy? Many want rules that say students are not allowed to use their digital devices in the classroom. There is a clear divide between faculty who are resistant to change and those who want to try new things. But the fact remains that students are using technology and mobile devices in their learning and

more and more they are demanding that technology be used in teaching. If they can see their grades online in many of their courses, why can't they see them in all of them? For the resistant faculty, this could be an added stress. Not only do they have the push to incorporate e-learning technologies into the teaching and learning relationship from their institution but they also experience a similar push from a number of their students. The more the institution pushes, it the more resistant certain faculty become. Finally, when faculty do adopt e-learning technologies, they often feel that the institution is not giving them the release time or the technical and other support they feel is needed.

The June 2012 report, *Conflicted: Faculty and Online Education*, noted that although administrators are keen to move more into online engagement in the teaching and learning relationship, faculty are more pessimistic than optimistic about such initiatives. About a third of faculty members believe their institutions are pushing online education too much. There is a clear divide between faculty perceptions and administration's perceptions. So we have a divide, faculty on one side and administration on the other. But in this study there is another divide. While many faculty are pessimistic about online courses and do not believe that the outcomes for an online course are equivalent to a face-to-face course, faculty with actual online teaching experience often have more optimistic views of online teaching.

While we do have much that divides the culture of teaching in North America, the strength we have comes from passionate faculty. The same study noted earlier, notes that in spite of the fact that Canadian university professors report working more than 50 hours per week, 75% report high job satisfaction. This number is comparatively high when compared to U.S professors where only 64% are highly satisfied and in Australia where only 55% are highly satisfied (Tamburri, 2012).

So what?

So what does all this mean for teacher education? It means that the context that our future teachers will be embedded within will continue to be exponentially complex, and that the initial training and ongoing professional development that our faculty undertake is largely ineffective in preparing them adequately for this context. Both of which mean their motivation in the workplace is adversely and progressively affected.

Daniel Pink points to three key conditions to increase motivation: Autonomy, Mastery and Purpose (2009). People want to have autonomy in their jobs. They want to feel that they are in control of themselves and their job. The factors that caused stress in the scenarios mentioned in the vignettes earlier and in the studies mentioned previously all result in a sense of loss of control in the individual and in the job. As educators, teachers are familiar with the concept of mastery. Mastery is the desire to get better, the willingness to experiment, the inquiring mind that seeks improvement, never exactly reaching but always seeking. Educators too are cognizant of the purpose that Pink speaks about—a transcendent purpose one that is greater than the self. This purpose is what drives all the teachers and educators mentioned in the vignettes earlier. They all loved the process of teaching and they loved the process of passing on what they knew to others and they loved the possibility that sometimes they were changing lives. This is a transcen-

dent purpose. The questions remain though- Do the latter two strengths of mastery and purpose outweigh the sense of loss of autonomy that is increasingly affecting some of the educators today? What can we do to change things?

Despite relatively high job satisfaction ratings (noted above), within this context it appears that it is difficult for our faculty to truly experience *Meaningful Work*. That is, to be engaged in activity which not only allows them to meet their full potential but also to do something which positively affects the contexts and communities within which they are exist. Molinaro believes that where this need exists it is expressed in:

> […] an inner desire to work in organisations that foster collaborative cultures instead of competitive ones. Organisations where the leaders inspire through respect, integrity and trust instead of through control and manipulation. Organisations that are socially responsible and where people share a compelling purpose beyond the relentless pursuit of the bottom line. We want experiences at work to be meaningful rather than empty. (1999, p. 13)

Meaningful work is any undertaking which allows a person to be their True Selves, which benefits the widest possible context within which they are situated, which does not harm any person (including themselves), relationship, or experience, and which encourages imagination and passion (Boverie & Kroth, 2004). Simply stated meaningful work, also described as soulful work or authentic work (Bethel, 2000), is both an expression of the soul in and of itself (Fox, 1994; Miller, 2000) and work which nourishes or enriches the soul (Miller, 2000). It is work that "we need to approach with attention, presence and a sense of mystery" (Miller, 2000, p. 45).

The adoption and embodiment of meaningful work requires constant self-examination and deep reflection by each of us into our moral, ethical, and spiritual self. Such examination and reflection necessarily explores the activities and work we are engaged in and involves asking questions such as 'what kind of work are we engaged in?' 'What is the effect of this work on me and my co-workers?' 'What is the effect on those who experience the output of my work?' 'What is the effect of my work on the environment both now and into the future?' 'Who makes decisions about the work that I do and its effects?' 'Whose methods, assumptions and values dominate in the workplace and in the provision and experience of its output?' 'Who does and who does not benefit from my work?' (adapted from a collaborative conversation with Goodman, 2006).

This constant examination, exploration, and reflection of the work that we engage in shows us that simply engaging in *any* kind of work is *not* ipso facto fundamentally better than having no work at all. It also shows that *any* kind of work cannot automatically be considered to be of benefit to the individual workers, our families, our communities within which our workplaces are situated, the wider society, the environment, or indeed the planet itself. Examination, exploration, and reflection of the kind noted above does not occur very frequently in our educational institutions because their structures and the structures they exist within do not facilitate the "critical examin[ation of] the depth and

breadth of human experience—qualities of becoming, qualities of being; qualities of knowing; qualities of participation and connection" (Oliver & Gershman, 1989, p. 55).

To that end we need to provide our aspirational faculty with the tools to be able to engage in examination, exploration, and reflection of the kind noted above. We need to approach teacher education and ongoing professional development in a holistic way. We need to foster deep communication and collaboration between student and professor, between students themselves, between students and content, between students and content and context, between students and external experts and professionals, between students and authentic assessment and evaluation experiences, and between students and ongoing contextually-specific professional and cultural experiences. Rather than theory being separated from experience, and knowledge being understood as the retention and regurgitation of facts, we need to provide our students with real and deep opportunities for engagement in "direct knowledge *of* the world" (Caine & Caine, 2011, pp. 4-1), so that they, in turn, can do the same for their students.

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Spatial Skills in Science: How Mobile Technology can Enhance Teacher Pedagogical Content Knowledge

Paul Davies and Sara Price

Introduction

Digital technologies allow students to learn in new ways and, because of this the potential for their use in schools has become important (Hammond, 2013). However, integration of these tools and appropriate pedagogies is problematic (Mishra & Koehler, 2006); and essential to the effective use of these technologies by students is effective teacher preparation and support, but this has been shown to be challenging (Muijs & Lindsay, 2008). In addressing the role of teacher development using technologies, this article draws on a project focused on the development of a smartphone application called *GeoSciTeach* that supports spatial thinking (Price, et al. 2013; Price, Davies & Farr, 2013). The project involved pre-service teachers (PSTs) who were training to teach high school science (11-18 years) and aimed to enable them to be involved in the design and production of an application that allowed students to collect, and make sense of biological data. We explore the process of PSTs as participatory-designers and the implications that their involvement in the project had on their pedagogical approaches using both spatial thinking and digital technologies with school students.

Digital technology in school science

The range of digital technologies available to both teachers and students in schools is great (Cox & Webb, 2004; Hammond, 2013). However, there is much evidence to show that use of this equipment is not widespread and that it is often used in limited ways (Webb, 2005; Yeung, Taylor, Hui, Lam-Chiang, & Low, 2012). Wellington (2004) argues that a useful way to think about the use of digital technologies in particular subject areas is to first consider the specific nature of the subject and then how technologies can enhance learning, rather than starting with the technology and trying to fit it into the subject. GeoSciTeach was designed to support aspects of knowledge and understanding of science. Science in schools draws on both practical and theoretical elements of teaching and learning and requires students to make links between these two domains; something which is often challenging (Abrahams & Millar, 2008; Wellington, 2004). There are obvious ways in which digital technology can be used in practical science, for example collecting and analysing data but it also has an equally powerful application in theorization through modelling and manipulation of the abstract world. Examples of the uses and

applications of digital technologies are summarized in Table 1 (for detailed discussions see: Webb, 2005; Wellington, 2004).

Table 1. Examples of the uses and application of digital technologies in science education (modified from Wellington, 2004).

Tool	Activity	Process
Word processing	Writing up investigative work	Planning and editing; publishing
Information gathering from CD-Roms and the Internet	Researching	Searching and selecting information
Data logging	Taking and recording measurements	Make comparisons between data collection methods; uploading and sharing data
Speadsheets and databases	Data analysis and manipulation	Sorting of data and statistical analysis
Graphical tools	Making sense of, and presentation of data	Producing charts and graphs
Simulation and modelling programs	Manipulating data and pattern seeking	Interaction with abstract world; explaining

Understanding science can be challenging and often requires conceptual change (Duit & Treagust, 2003), and digital technologies have an important role to play in both motivating students (Wellington, 2004), and providing novel opportunities for learning (Laurillard, Stratfold, Luckin, Plowman, & Taylor, 2000; Webb, 2005). In support of this, science education has been greatly influenced through research into pedagogic approaches which develop from a constructivist theory of learning (e.g., Gunstone, White & Fenshome, 1988; Tobin, 1993); although its use in teaching science is not without criticism (Matthews, 2002; Osborne, 1996), the central tenet of constructivism is that knowledge is constructed by the individual through interaction with the world (Driver & Erickson, 1983; Grabinger & Dunlop, 2000; Vygotsky, 1978). Constructivist approaches to learning shift the role of the teacher from one of a transmitter of knowledge to that of a facilitator. Typically an episode where learners are engaged in constructivist approaches would involve activities which elicit ideas about previous knowledge, present information that challenge current thinking and, through social interaction, encourage the learner to share their developing ideas (Bennett, 2005).

It is well recognized that children come to science with their own ideas to explain natural phenomena that they have observed and, in doing so, develop their own 'alternative conceptions' which are often very resistant to change (Driver, Rushworth, Squires & Wood-Robinson, 1985; Osborne & Gilbert, 1980). An important area where digital technology has been shown to be successful in challenging their

conceptions is through the use of modelling and simulations (Webb, 2005). For example, as long ago as 1978, Hinton showed that interaction with manipulation of variables has a powerful effect on students' understanding of certain physical phenomena; this has been further developed by using computer simulations to support understanding of the Laws of motion (Jimoyiannis & Komis, 2001). Beyond modelling, more recently, Van Rooy (2012) showed how, even with limited access to digital technology, teachers can design learning activities involving information gathering and interpreting, which challenge and support learners' understanding of genetic concepts.

Spatial thinking in science

A primary focus of GeoSciTeach was the use of spatial thinking in understanding science. Downs (2006) describes spatial thinking as knowledge about three distinct conceptual areas, see Table 2. Until recently, using spatial technologies and manipulating the data that these generate was restricted to professionals and scientists working in this field. However, the development of novel specialist technologies, including Geographic Information Systems (GIS) and Global Positioning Systems (GPS) mean that the ability to collect and manipulate data of this type is now much more readily accessible (Hagevik, 2011). This, coupled with the expansion of mobile smartphones use, and innovative Internet based resources, like GoogleEarth™, mean that many more people are using spatial skills in their daily lives which provides further important opportunities for teaching and learning in schools (Charlesworth, 2009).

Table 2. The three conceptual areas associated with 'spatial thinking' with details of the activities associated with the conceptual area and examples.

Conceptual area	Activity	Example
Nature of space	Measuring space	Using the units of distance and three-dimensional plotting
Representation of space	Producing two- and three-dimensional representations of spatial data	Layering of information
Reasoning about space	Making sense of spatial data	Using a map to navigate; predicting changes in space

Developing spatial skills in schools is advantageous, both from the point of view of increased understanding about spatial information (Kerski, 2008, MaKinster, Trautmann & Barnett, 2013) and because it supports the development and understanding of a range of other skills important in understanding science, for example, problem solving and inquiry (Audet & Abegg, 1996; Hagevik, 2011).

Certain areas of the science have obvious overlap with spatial skills, such as ecological investigative work, however the applications are much greater than this. For example, Downs (2006) discusses the use of these skills in a range of scientific areas including astronomy, such as understanding the structure and evolution of the Universe and biochemistry when investigating molecular structure. Additionally, it is well documented that spatial thinking supports a range of other, allied and important subject areas, including mathematics (Coulter & Polman, 2004), as well as promoting students' attitudes towards technology (Baker & White, 2003).

Teachers' beliefs surrounding using digital technologies

Teachers are often enthusiastic and motivated by the potential learning experiences offered by digital technologies and are keen to integrate them into their practice (Russell, Bebell, O'Dwyer, & O'Connor, 2003; Kay, 2006). However, as Cuban (2001) identifies, they are often underused by teachers for two reasons; first, teachers lack knowledge about how technology can be integrated into their teaching and, second, school systems have not been restructured to accommodate novel technologies. The use of digital technology has still tended to be for fairly 'low-level tasks,' such as word processing or presentations, with teachers most commonly using them with students for internet-based research (Ertmer, 2005). These 'low-level' teaching and learning uses tend to be, as Ertmer (2005) explains, associated with teacher-centred practices rather than student-centred learning. This approach is contrary to the constructivist learning approaches advocated by many and is a challenge because, when used well, technology use has been shown to encourage teachers to be more willing to learn with their students, give students greater choices in their learning and see benefits of independent learning, both inside and away from the classroom (Hashweh, 1987; Windschitl & Sahl, 2002).

Unsurprisingly, teacher confidence with using digital technology plays a key role in how technology is used by the teacher and students, and the frequency of use (Hennessy, Ruthven, & Brindley, 2005; Reynolds, Treharne & Tripp, 2003). It has been observed that new teachers, who have grown up in an environment that is technology rich, are much more comfortable with using digital technology than those who have not had these experiences (Russell, et al., 2003). However, there is still a lack of emphasis within teacher training programmes on using digital technology in the classroom and this is something that appears to be changing only slowly. When it comes to spatial technologies, there is evidence that many schools have purchased these technologies but they are underused, with a significant number of teachers claiming they would not use them at all or, having tried it once, have no plans to use them in the future (Kerski, 2003). As with digital technologies in general, the challenges that teachers face when trying to integrate geo-technologies in their practice can be great, ranging from technical issues of access to, and support with software and hardware, to having the appropriate knowledge and skills to identify curriculum opportunities where they can be successfully employed (Edelson & Moeller, 2004). Becker (2000) identifies four features central to the effective use of technology, in his case computers, by teachers. The first three: access issues, preparation, and freedom to use within the curriculum can, as Ertmer (2005) shows,

be considered changes that take place in an incremental way, as schools, teacher training providers and curriculum designers recognise and respond to the demands of the modern classroom. The fourth feature is centred around beliefs and attitudes and, in doing so, is much harder to respond to effectively (Garet, Porter, Desimore, Birman & Yoon, 2001); this is something where both Hagevik (2011) and Trautmann & MaKinster (2010) argue, effective professional development is central.

Teachers enter the teaching profession with models of teaching and learning based on those that they experienced as students (Borko & Livingston, 1989; Southerland & Gess-Newsome, 1999). As teachers pass through their training, their beliefs about knowledge and learning, that is their personal epistemology, may be challenged. This is particularly the case if the instruction they receive, or ideas that they are presented with do not match their epistemology; these beliefs can be very resistant to change (Jones & Carter, 2007). Despite this, research has shown PSTs to be more flexible in their beliefs about what makes good practice once they have had experience of teaching in schools (Skamp & Mueller, 2001). This is important because many PSTs have been shown to hold beliefs which are not aligned with constructivist practices (Jones & Carter, 2007) and yet, as discussed above, these practices have been shown to be important to effective learning in science. Supporting these changes is not easy (Jones & Carter, 2007; Trautmann & MaKinster, 2010), but it is encouraging that where teachers have had the opportunities to develop their skills and confidence in using new technology, they tend to report these to be beneficial to both them and their students.

Developing teachers' pedagogic content knowledge framework for using digital technology

Shulman (1987) argues that pedagogic content knowledge (PCK) represents the combination of content and pedagogy in a framework which can be used to explain a particular subject area to students with a diverse range of abilities. The integration of technologies into this framework has been conceptualised by Mishra and Koehler (2006) in their Technology Pedagogic and Content Knowledge (TPCK) framework. In this model the place of technology goes beyond the teacher's skill at using it but involves the teacher making decisions about the role that the technology can play in learning specific content. Development of this requires drawing on knowledge and understanding about teaching and learning from both science and technology (Niess, 2005) and, for it to be successful, teachers need to be given more than simple instruction about how to use various technologies but time to consider how best to employ these technologies in their teaching of specific subject content (Edelstein, Trautmann & MaKinster, 2008). Also, as Hagevik (2011) identifies, to be truly effective, professional development surrounding technology should involve the collaboration of teachers from the same subject, provide opportunities for active learning and provision for an increase in both content knowledge and confidence and skills (Supovitz & Turner, 2000). Equally important are opportunities for teachers to reflect on their beliefs and their learning to be situated within contextual experiences (Reys, Reys, Barnes, Been & Papik,1997). However, it is recognised that professional development of this type can be overwhelming for teachers so care must be taken when

introducing novel technology, and ongoing support should be made available for its integration into personal teaching strategies to be complete (Edelstein, et al., 2008; Ertmer, 2005).

The GeoSciTeach project took a participatory-centred design approach where the PSTs worked closely with the project team, from the design and development phase of the application through to the final workable prototype. This approach has been shown to be effective in Human-Computer Interaction (HCI) projects, and particularly when introducing new tools into current practices (Mueller, 2002). This design is beneficial because it supports four important factors associated with teachers' professional development: it helps to foster new approaches to teaching familiar subject domains; can support the development of clear links to the educational curriculum; engenders a sense of both ownership and belief in the benefits of the technology, and has been shown to enable deeper engagement and motivation (Mueller, 2002).

A useful way to conceptualise effective teacher development has been proposed by Clarke and Hollingsworth (2002). They consider teacher progression occurring through the dynamic interaction between four 'domains', the most effective development taking place when change is observed in one or more of these domains; see Table 3. They stress that for change to be long-term, then changes in teacher beliefs are central, but time is needed for these changes to be realised, something that is echoed in the work in of Trautmann and MaKinster (2010) and Wilder, Brinkerhoff and Higgins (2003). Using these models, the GeoSciTeach project was designed to foster teacher professional development in using digital technologies by providing opportunities for changes to take place between these four domains, details of which are in Table 3.

Table 3. Examples of how the GeoSciTeach project was designed to support the teacher professional development model of Clarke and Hollingsworh (2002)

Domain of Clarke and Hollingsworth	**How Domain was supported**
External sources of support	The project team involved experts in HCI design, programming and software design, science education
Teacher beliefs	PSTs were given opportunities to explore their ideas surrounding learning in science, the use of digital technologies, both personal and spatial thinking
Professional experimentation	The participatory-design approach meant the PSTs were responsible for the evolution of the application which they trialed at various stages and this was linked to the specific learning activities surrounding spatial thinking
Teacher values	In designing activities using the application, the PSTs were required to reflect on their beliefs and values surrounding teaching and learning

The GeoSciTeach project

The pre-service teachers (PSTs) involved in the project were studying for a nine-month postgraduate certificate in education that would equip them to teach general science to students aged 11-14 years, and then a science specialism (Biology, Chemistry or Physics) to students aged 15-18 years. 12 PSTs volunteered to be involved at the beginning of the project, but this number had reduced to seven by the time the application was being used with students. Unlike needing specific knowledge of authoring tools or programming skills (Ainsworth & Flemming, 2006; Hutchful, Mathus, Joshi & Cutrell, 2010) mobile applications foster more active learning experiences, empower student engagement, portability, instant communication, and flexible and timely access to learning resources. For teachers these tools, therefore, need to support customizable orchestration as well as customizable content. For this reason we decided to base the development of GeoSciTeach around a concrete example, with the intention that it would be customizable for different teaching contexts beyond this specific example.

Towards the end of their training, the PSTs were involved in a series of activities relating to teaching outside of the classroom, one of which was based at The Royal Botanical Gardens, Kew (Kew Gardens) which provided an authentic in situ context for thinking about how students could engage with spatial concepts and representations in science (for full project details see: Price, et al., 2013; Price, Davies & Farr, 2013). Basing the design on this concrete example of student learning activity provided a scenario to ensure that the application 'worked', and enabled the PSTs to think about the technology - where and why it might be functionally useful—whilst also linking this with spatial concepts. With this approach, once the application functionality has been created for the exemplary activity, the customisable aspect can then be developed; in this way, development ensures the end product is useable by teachers, alongside providing better insight into the application functionality before having to think about different activities to customise.

For logistical reasons, the PSTs were divided among groups with other students who had not been involved in the project; this provided the additional opportunity for project students to share their expertise with their group. The groups designed a learning activity for groups of around 20 11-12 year old students, which lasted approximately 50 minutes. The activities were centred within the Princess of Wales Conservatory, a glasshouse which is divided into different biomes (e.g., desert, tropical) with plants that are representative of each zone. Data were collected from the PSTs at various stages of the project following a mixed methodology, details of which are in Table 4.

Table 4. Details of the PSTs involvement in the GeoSciTeach project and data collection methods used.

	Stage 1: Introductory Workshop	**Stage 2: Trialing**	**Stage 3: Developing learning activities**	**Stage 4: Teaching**	**Stage 5: Reflection**
Details	PSTs worked in groups to brainstorm details about previous experiences using digital technologies and spatial thinking in science	PSTs used prototype GeoSciTeach in a park near to the university and then provided feedback	PSTs worked in their designated groups for Kew Gardens and designed learning activities	PSTs taught their lessons in four, 50 minutes sessions throughout the day	PSTs were interviewed at the end of the project and asked to reflect on their learning
Data collection methods	Semi-structured interview and field notes	Observations of application in use, field notes, focus group	Scrutiny of lesson plans and semi-structured interviews	Observation and video	Semi-structured interview

Teachers as participatory-designers of smartphone applications

In discussing the experiences of the PSTs in the GeoSciTeach project, we first summarise the results from all the project PSTs and then exemplify the learning journeys of the PSTs by focusing on three individual teachers: Simon, Jack and Alisha.

As shown in Table 5, the PSTs initial ideas (Stage 1) about how a mobile application could support spatial thinking in school science were dominated with data collection (e.g., light, temperature) with little reference to the relationship between these data and spatial thinking. This may not be surprising since most of their experiences of using digital technology within school was concerned with sensor and data logging equipment, a common use of technology in school science (Newton, 2000). Relating these ideas to spatial thinking was always at a fairly superficial level, with tagging collected data to specific locations. Having trialled the proto-type GeoSciTeach (Stage 2), the PSTs developed a greater understanding about how the application should support understanding science and spatially related ideas. For example, skills related especially to spatial thinking emerged, such as the idea of linking the camera to the application, tagging collected data to location in Google MapsTM and allowing for the layering of information. This level of spatial thinking is more complex and draws on a variety of theoretical perspectives of how spatial thinking might be realised (Price, et al., 2013). How these were integrated in the design of GeoSciTeach and how they could potentially be enacted are shown in Table 6; for a fuller discussion see Price, et al. (2013).

Table 5. Summary data of examples of PSTs' input in the initial (Stage 1) and developed (Stage 2) design about the requirements of GeoSciTeach and details of the final GeoSciTeach application.

Stage 1: Initial ideas for application functionality	**Stage 2: Development of the application with focus on teaching at Kew Gardens.**	**Final application details**
• Different sensors (pH, light, motion, temperature) could be attached • Ability to detect sound waves and act as an oscilloscope • Correlation needed between sensors and visualisation of data (plots in real time) • 'Google Goggles' for information on what the phone 'sees' • Data can be combined from different groups and uploaded and shared • GPS uses with: o Soil analysis o Measuring light intensity o Measuring atmospheric pollution o Measuring electromagnetic radiation	• Camera needs to be linked to the application • Better to have internal sensors or ways of individually recording data • Need notes pages for recording of ideas • Teacher needs control of the questions and guidance throughout the application to link to the task the students are carrying out • Teacher should be able to control which features are available • Need easy uploading of data back at school • Need links to external media (e.g., websites) • Tagging of data to maps	• Question area to guide task • Data collection area: o plant characteristics with leaf overlay o environmental data (temperature, humidity and light intensity) o video o camera o notes o plant zone in Kew Gardens information • Data file storage area • Data Sharing area • QR reader • Google Maps with tagging of data

Table 6. The relationship between geospatial theory and GeoSciTeach and the geospatial Skills it supports.

Geospatial theory	**Description**	**Sub-description**	**Procedural steps with GeoSciTeach**	**Geospatial functionality (of application)**	**Geospatial skill**
Descriptive	Location: Where entity is	Identification of absolute place	GoogleMap e.g. Kew (where you are now)	Representation of point locations within the model.	Understand and identify own location, and collected data location
	Environment measure	e.g. soil, humidity, temperature	Record ambient data and link to location (country)	Associate meta-data & multi-media resources with specific points or areas	Identify and label Capturing, preserving, conveying appearances
	Feature	Shape, color, size, texture	Take photo: Upload to GoogleEarth	Render data with specific location into viewable image	
Analytic Understand structure of objects and phenomena	Comparison Relationship Patterns	Spatial, features Behavior relations	Photo tagging: relationship of one place compared to another	Ability to render model projections from different points of view	Reasoning about data Calculate and define distance and route Seeing patterns in data
Inferential Functional Evolutionary The 'why'?	Integration with complex data Calculate relationships e.g. time or distance		Leaf overlay/silhouette	Ability to: Calculate relationships between areas, features and points Calculate properties of specific areas	Understanding structure of objects Space in 2/ 3D Giving answer to evolution and functions of objects Cartographic configuration showing relationships between places

It was here too that the PSTs began thinking about how the application could allow them to guide the students through the task with prompt questions, something the teachers would supplement with additional information. These developments suggest that both the PSTs' knowledge and understanding of spatial thinking, and confidence in using technology in teaching and learning science were developing and becoming more sophisticated. Details of the functionality of the final version of the GeoSciTeach are given in Table 5; see Figure 1 for typical screen shots.

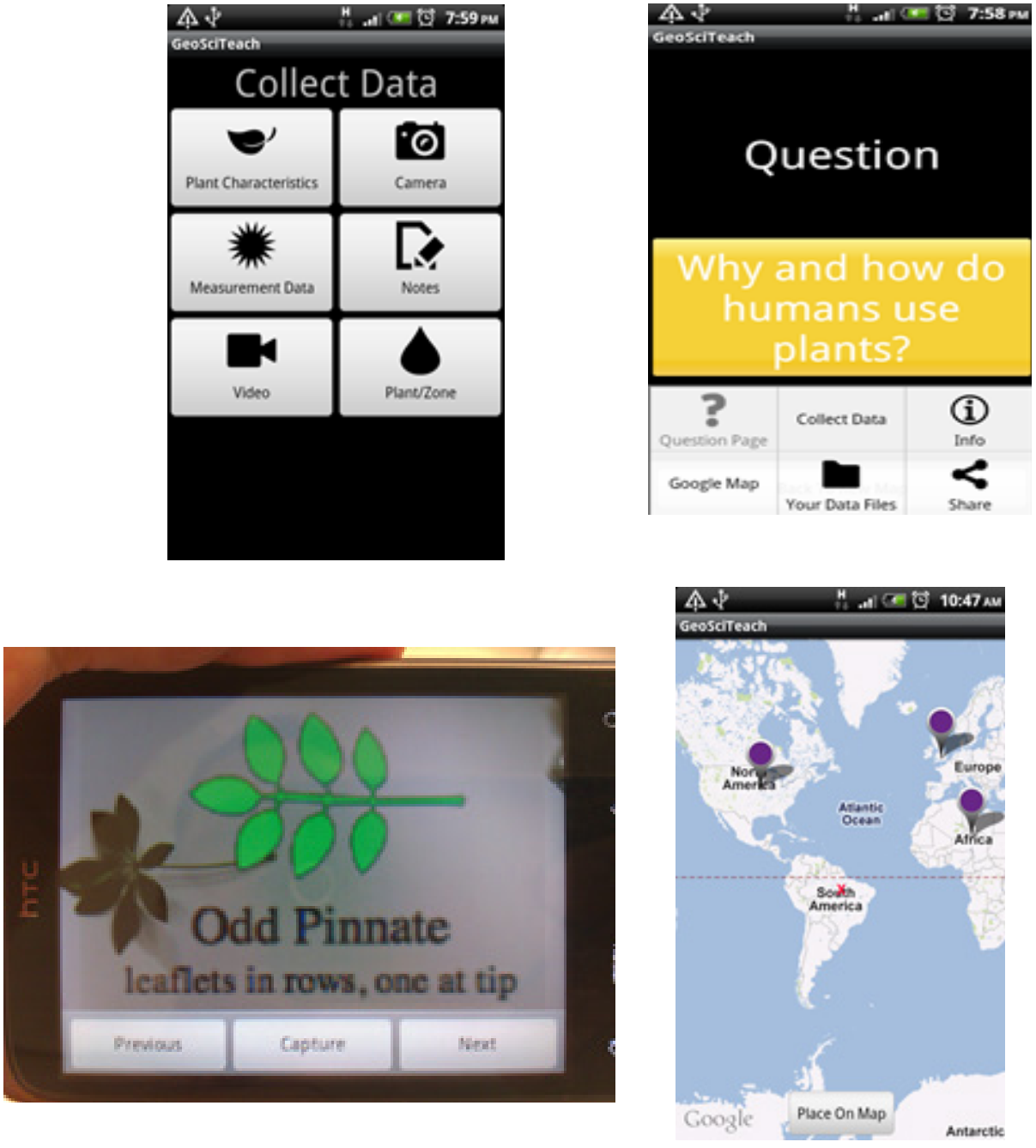

Figure 1. Screen shots of GeoSciTeach (a: Question section, b: Data collection section, c: Leaf Overlay facility, d: GoogleMapsTM with place pins)

Table 7. Background data initial ideas about pedagogical approaches to using GeoSciTeach from the three case study PSTs.

PST	Background	Experience of using digital technology	Initial ideas about pedagogical approach using the application
Steven	First degree in biochemistry. Training to be a biology teacher. Worked for two years in a variety of school settings.	Owned a smartphone used for communication, accessing media and a variety of applications that incorporated both GPS and augmented reality technology, including a star constellation finder. Had some experience of amateur programing	As many students as possible would need access to a smartphone, to promote students engagement with the application and feel they "had a voice". Technology very much as "supporting the role of the teachers", rather than "replacing it". Application not simply an "interactive worksheet" but allowing the students to do different things that they "couldn't do without the phone and app", including simple data manipulation, including correlation of the data and pattern seeking. Ability to share data amongst the students, either through the teacher or student-to-student. Data to be tagged and storage to be added to in the future, allowing the students to "act like real scientists working on a long-term project".
Jack	First degree in oceanography Training to teach biology. Little experience in schools.	Had recently purchased a smartphone for himself, which he was learning how to use it for communication and playing games but wanted to explore its other capabilities.	Needs to be simple for students and teachers to interact with. Needs touchscreen buttons with icons that look they the thing they do" and "as easy way to move through it, between different sections". Camera to be linked to the application directly. Could be a way of the camera showing layering of leaf architecture. Be able to record and tag variety of environmental data, including temperature and humidity, so students can feel and collect the data inside the glasshouses, at the same time.
Alisha	First degree and postgraduate qualification in chemistry. Training to teach chemistry. She had little experience in school settings although had spent some time working in schools during outreach experiences as part of undergraduate degree.	Did not own a smartphone and rarely using mobile devices. Most interaction with technology was through personal computers.	Should allow students to compare different ways of gathering information and be shown to reduce errors in measurement and allow the students to use different measurement devices. The application should not only store and tag data but allow real time presentation of the it, through graphs on the screen. Anxious that the smartphone itself might cause the students to be detached from what they are doing Application needs to be under teacher control. Should have prompts that directed the students through what they needed to do, rather than this be on a separate worksheet.

Individual learning journeys

As Table 7 shows, Steven, Jack and Alisha came to the project with a variety of teacher experience and varying degrees of familiarity with using digital technology. When designing the functionality of the application, the PSTs had different ideas about what was needed and how these features might be incorporated into their learning. Important to the PSTs was that the application was straightforward to use by both teachers and students, and that there should be the ability to collect, store and manipulate data. Alisha was concerned that the teacher should have governance over the application, either in its set up or during student use. Interestingly, she was less willing than Steven and Jack to allow participatory autonomy, something not uncommon when teachers are new to using technology (Ng & Nicholas, 2012). There is evidence that in these early stages the PSTs were beginning to consider the integration of spatial thinking in using the application; Jack for example was keen that data on the leaves could be layered (an important feature of spatial thinking) and all felt that tagging the data to specific locations was also an important aspect of what the student should be doing. The sophistication of their planned use of the technology to support general aspects of learning science and, specifically, spatial thinking continued to develop as the PSTs planned their final activities within their groups, details of which are shown in Table 8.

Table 8. Details of the planned and final realization of the learning activities at Kew Gardens of the three groups which containing the case study students Steve, Jack and Alisha

Case study group	Planned learning activity	Final realized activity
Steven	Students to gather data from individual plants that allowed them to be able to relate human use to where the plants were found to be natural living. Students should gather information about the climatic conditions of the plant's natural habitat and record and take "interesting photographs" of the plants Students should access additional information through external website via a QR reader. Data can then tagged to a mapping program which, when all the data that the students had collected was uploaded, would allow patterns to be observed about which plants grow in different parts of the world and how this might relate to the way they are used.	Students moved around the glasshouse and used GeoSciTeach to collect environmental data about temperature and humidity as well as images of important crop plants, which they tagged to Google Maps™. Some students also made text notes about other important characteristics and information. Steven designed a poster which showed images of some of the plants and their associated uses, and linked further information via QR codes which some of the students accessed using the QR reader feature of the application.
Jack	Students use the application to investigate specific adaptations and be able to link this to the structures and colours of various plants and the conditions where the plants were normally found growing. Students should be able to use the 'leaf overlay' feature to identify the different types of leaf arrangement and record these data. Students should collect data that is tagged to maps and then share this back at school.	Students focused on plant adaptations and had freedom to move around wherever they liked in the glasshouse and use the GeoSciTeach to gather information and pictures about colour of leaves and leave architecture, including using the 'leaf overlay' facility. The students were questioned by their accompanying PST about what they were doing and why. The PSTs also directed the students to external Internet links of short video clips showing some of the plants in their natural setting.
Alisha	Students should look at different types of plants found in desert and tropic regions and be able to think about how they might differ in distribution in relation to their adaptations but also what similarities they shared. Students should follow a trial, "something like a treasure hunt", where they would gather data about plants and tag this to specific locations, the teacher will then share these data back at school	Students visited the temperate, tropical and desert sections of the glasshouse and examined the different types of plant found there. On screen Teacher prompts guide them as they used GeoSciTeach to record environmental data about temperature and humidity and take a photograph. Students were also expected to make some notes, either through the application or on paper, summarising information about the plants provided by the Kew Gardens information boards throughout the glasshouse. The data were tagged to Google Maps™ for analysis at school

The learning activities for each PST group involved the students working in groups of 3-4 with a smartphone and an accompanying PST. A key theme across the groups was an emphasis on physical characteristics of plants: what they looked like, and their habitat. The Plant Characteristics and Camera features of the application (Figure 1) promoted careful analysis of this theme and was something that helped guide the PSTs' thinking about how to engage students with a topic which is often perceived as boring (Bowker, 2004). An important factor in these activities was that the PSTs encouraged the asking of "why?" questions, i.e. going beyond the descriptive and analytic to the inferential; something that technology has been shown to support (Hopson, Simms & Knezek, 2002); and see Table 6.

The PSTs made clear choices about which features of the application they wanted the student to engage with, for example the different environmental data collection tools (see Table 7). This type of decision-making suggests that participation in the project increased the PSTs creativity in terms of pedagogical content knowledge (Niess, 2005). The collection of these different types of data show that the flexibility of the application allowed the PSTs to better design activities which allowed the students to engage with specific scientific content, for example the effect of environmental factors on plant adaptation. All groups chose to use the camera to take photographs of the plants, something which, since a primary use of smartphones is to do this, may not be surprising (Judge, 2011), but GeoSciTeach exploited and enhanced this by tagging photographs and in doing so encouraged the use of spatial thinking in the students to support their understanding of science. Interestingly, as Steven commented, "other students used their own phones to take photographs." In allowing this, the PSTs showed a willingness to embrace the

technology to engage all students in the same way, so that the ones with the 'application phones' were not singled out, and points to a positive attitude towards student use of personal devices. The application was designed to foster constructivist approaches to learning, and facilitative approaches to teaching, something which Jack and Steven embraced as important features of student learning. For example, Jack allowed the students to explore the glasshouse at will, collecting data on plants that interested the students, and in doing so, allowed students to make individualized meaning in their learning (Bonwell & Eison, 1991) and take responsibility for their learning (Windschitl & Sahl, 2002). Similarly, the use of QR codes was an important feature for Steven who used them to provide quick access to external information showing graphs of the monetary value of coffee and cocoa, provision of which promoted inclusive learning. On the other hand, Alisha, was more reluctant to let the students 'take the lead' in their learning and, through teacher prompts, used the application as a tool for controlling learning and behaviour.

In all cases, the activities contained elements of spatial thinking. The tagging of environmental data recorded by GeoSciTeach to Google Maps™ was the most common and was used to encourage students to think about the plants' natural habitats. It also helped the students reflect on how commercial production of these plants would take place in different parts of the world. These environmental data are important for understanding the topic, suggesting that the application supported this thinking. In using the 'Leaf overlay' facility, Jack felt that this use of spatial thinking "helped focus the students on the architecture of the leaf and start to relate these ideas to scientific concepts of adaptation and evolution." Here we see an example of the technology providing new learning experiences that, in this case, promotes the deep-learning approach of reasoning and inference (Lublin, 2003).

Teacher reflections on GeoSciTeach

All teachers felt that their learning activities had been realized much as they had expected. They found the application to be useful in both motivating the students and in helping focus them on gathering data. Alisha commented that the students were "excited at the prospect of using the technology," something which has been shown to be a key feature of technology (Jones & Issroff, 2007). There was consensus that the students found the smartphone and GeoSciTeach easy to access and use; this contrasts with the views of some of the non-project PSTs who felt that "the students needed more time to learn how to use the app before they collected the data." This suggests that involvement in the project gave the PSTs a different perspective on how the technology was supporting learning as they moved from 'how the app works' to 'what the students will do with the app in their learning.'

The PSTs found that the students did not always use the application in the way they intended, either because they found other interesting plants to look at or because there were issues over "ownership" of the phone and "who controlled what it did." Considering the sharing of the smartphone itself, this is important to collaborative working since there are the practical issues of how many people can interact with the device at one time. This is significant because all the PSTs were keen to adopt a constructivist perspective in the design of their activities, so the role of pedagogical design in promoting effective col-

laborative discussion with the use of technologies is key. For example, Jack effectively orchestrated collaborative activity by engaging students in giving group presentations about the commercial use of coffee and cocoa where groups collected a rich variety of information on these plants: using photographs of their crop in situ and links supplied by the teacher e.g., the crop's country of origin, where it is usually grown, climate information, the process of growing, harvesting and production. These links gave students access to sources of information they may have been unaware of (e.g., global market sites on the cost per tonne of the crop, statistical information on crop distribution). The students then made a short presentation on their findings to make an argument for their crop's production. In rehearsal, one student interviewed another asking a set of questions in a journalistic style, while a third student directed/video recorded the presentation. The app and this process supported the students to work collectively in situ and to place the plant imaginatively in a new context, connecting issues of geo-spatial awareness with inferences concerning climate, finance and global marketing.

GeoSciTeach was also allowed for learner autonomy, for example where students explored the glasshouse themselves, with the application encouraging the purposeful gathering of data. Collecting data like these without the smartphone would be possible (for example with traditional thermometers and humidity sensors) but it would be more cumbersome and less integrated in the task; something which may promote detachment from the physical act of gathering the data and the inferential linking of the data to location.

Not all the features of GeoSciTeach were used as extensively as others. Steven, who had designed the QR codes, commented that "I think the photos and the data were much more useful than the QR codes" but recognised that some of the problems with using the QR codes related to sometimes inconsistent connectivity to the mobile Internet service the project team had provided; something which, as wireless infrastructure develops, will become much less important. The camera feature of the application, especially with the Leaf Overlay facility was a feature that the students found interesting and provided a new way of looking at physical entities in the environments. Of particular importance was that it encouraged the students to focus and look "carefully at a plant," something important in a glasshouse that, containing thousands of specimens can be overwhelming. Using this feature supported the students in thinking spatially as it promoted the linking of complex data to make sense of the architecture of the plant, the 'Inferential' aspect of the spatial thinking (see Table 6), something much more difficult or even impossible without the technology.

Having used GeoSciTeach, the PSTs involved in the project, and their peers within their specific groups, felt they were more confident in using technology in their teaching. Steven, Jack and Alisha reported that their involvement in the various stages of the workshop had been particularly useful for preparing for the work that they carried out at Kew Gardens as it helped them focus on what they really wanted the students to learn. For example, Jack was keen from the beginning of the project that it should encourage the students to gather measurable data concerning the environment, as well as "experience" the differences in temperature and humidity with "their own senses" and, as the project developed, he could

see how this might be possible through the integration of features in application that allowed these types of data to be recorded. Something that, once he knew this was going to be available within the final application, became a key feature of the "student experience" in his planning. Theoretical notions of experiential learning foreground the importance that such concrete experiences have in fostering meaningful learning, facilitating thinking about scientific phenomena at a higher level of abstraction (Dewey, 2001) and linking sensory experiences to iconic or symbolic representations of those phenomena in situ (Bruner, 1979). This may provide a sound basis for the development of more sophisticated thinking around the scientific phenomena in the classroom, for example see Rogers et al. (2005).

As these case studies illustrate, there is evidence that the three PSTs developed their skills in using GeoSciTeach to help develop the students' conceptual understanding of aspects of science, and had started to develop a more sophisticated and focused pedagogy surrounding the integration of digital technology in teaching and learning and, in particular, considering how the technology supported spatial thinking in science. When asked how the project had helped support their development, all the PSTs reflected that they felt more confident in their use of technology and how spatial thinking might be used to support learning in science. However, they were much less confident when thinking about how they might apply their new knowledge and skills to less familiar contexts. So, while they were able to talk about other science learning experience connected with the GPS facilities of the smartphones, not unlike those they listed at the start of the project (see Table 5), seeing beyond this functionality was much more challenging.

Discussion

Supporting teacher development in the use of digital technology in their practice is not straightforward and, in this project, we wanted to explore how the project design supported these changes. Typically, long-term programmes have been commonly developed to gradually give teachers confidence to use technology in their teaching and develop a sophisticated Technology Pedagogical and Content Knowledge (Mishra & Koehler, 2006). While laudable, this approach is not practical for many teacher training contexts, either pre-service, where courses are often short and involve the trainee teachers spending much of their time in schools, or in-service CPD sessions which are often one day in length. Though short, the GeoSciTeach project was carefully designed to provide the PSTs with a useful learning experience as participant-designers to support their understanding and use of technology in teaching and learning about science in new ways. Drawing on the models of good practice, the project was designed to provide a concrete context for the students in the form of the teaching experiences at Kew Gardens (Reys, et al., 1997). This not only made the development of the application more focused but also provided opportunities for the students to see how the learning experiences could be realised through drawing on ideas about teaching and learning in both science and technology (Niess, 2005). As participant-designers, the PSTs were not merely recipients of information about how to use the application in their teaching but actively involved in its construction and, in doing so, in a position to consider how the technology allowed students to engage with spatial thinking in science (Edelstein, et al., 2008).

Working in groups with other Science PSTs, both during the initial planning stages of the project and towards the end when planning for the activities at Kew was happening, gave the PSTs opportunities to share their ideas with other science specialists, something which was a strength of the workshop discussions (Supovitz & Turner, 2000). In addition, this approach also meant the project PSTs had the chance to share their knowledge and emerging expertise with non-project PSTs and, in doing so demonstrate how their thinking had developed. These opportunities provided the PSTs with the chance to reflect on their own beliefs surrounding the teaching and learning in science and how technology might support this (Hagevik, 2011) as well as consider the rationale for their decision-making; both essential features of effective teacher CPD.

Effective teacher development means change needs to occur, two important areas being in teacher values and beliefs (Clarke and Hollinsgworth, 2002). In the GeoSciTeach project, none of the PSTs came with expertise in using geo-technologies and few had much experience in the use of technology in learning science. At the start of the project, their ideas about using technology in their teaching were, unsurprisingly, significantly influenced by their previous experiences; these were limited to thinking about commonplace uses, such as data logging and some sense of augmented reality technology. As the project progressed, the PSTs grew in confidence in using technology, something possibly made more rapid as they were all recent graduates (Russell, et al., 2003), and sophistication of ideas about the integration of spatial thinking in science in their teaching and how the application could support this. This provides evidence of the PSTs developing a personal TPCK (Mishra & Koehler, 2006). For example, the shift in the ideas from simply tagging data to a mapping program to the layering of data in real time using the Leaf Overlay facility, and having inbuilt teacher prompts and questions to support the learners as they moved through the activity. All PSTs took a constructivist approach in their teaching and saw that the technology could support this but, as they engaged with the project, some were able to see how this might be realised and the greater opportunities that the smartphones may provide for the students to explore and construct their own meaning. Perhaps not surprisingly for beginner teachers, this release of control was also somewhat threatening and something some were resistant to relinquish.

Making these changes was not easy for any of the PSTs and a major problem that they faced was how to apply the knowledge they had developed in the project to other learning situations (Jones & Carter, 2007). So, whilst their ideas surrounding spatial thinking in the activities at Kew Gardens and how technology might support this, was seen to develop, thinking about the wider uses of spatial thinking was still problematic. While, on one hand, conceptualising the place that spatial thinking has in science education is not easy (MaKinster, et al., 2013) this does suggest that the contextualisation of the GeoSciTeach to Kew Gardens, while providing a concrete example, may have been something of a barrier to the PSTs in broadening their thinking.

Technology clearly has much to offer teaching and learning in science, and other school subjects, but to be fully incorporated into classroom practice, teachers need useful opportunities to develop their own skills and confidence in using it. From here, they are then better able to consider how best to employ

technology in their teaching and integrate it into learning, rather than as an add-on (Wellington, 2004). The most effective support for teachers may well be long-term programmes where time is available to experiment with resources, trial different approaches in the classroom and reflect on their effectiveness. The nature of teacher training provision and in-service support mean this model is problematic. Yet, encouragingly, when given even relatively brief introductions to using technology, through a participant-design approach, significant and meaningful changes can be seen to take place.

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Teaching in a Digital Age

Lynette Noel

The Past Role of the Teacher and Its Impact on Method of Instruction

In the 1900's, a teacher in the British Caribbean had to live up to two 'standards' that were set by the inspector of schools. These dealt with the 'performance and character of the work of the schools'- the 'standard of instruction' and the 'standard of classification' according to the school's performance in the three R's. The teacher had to measure up or be denied the capitation grant that was issued by the 'System of Payment of Results'. Emphasis was on success based on the achievement of these standards. The role of the teacher was to ensure that the school was well regarded and that the students received the essential instruction to succeed in the three R's of Reading, Arithmetic and Writing. They were forced to teach to the test or be debarred from functioning and receiving the grant (King and Campbell, 1991).

In Canada, too, the teachers were not well paid and the conditions were less than ideal, but it is written that they 'did the best job they could with little resources and support' (Encyclopedia.com, 2001). In America, the 'one-room schoolhouses' were the places for instruction where effective teaching was equated with 'memorization, drill and recitation' (Encyclopedia.com, 2001).Women formed the backbone of the teaching service in America in the 1900's and as schools became more developed, a lot rested on them to "solve society's problems." The teacher's role as educator included being a social activist for change. As society moved from the 'Industrial Revolution' to the 'Information Age' and to the 'Digital Age' or what Resnick (2002) refers to as the 'Creative Society', the teacher became less of a 'dispenser of knowledge' and more of a 'collaborator' for change, creativity and innovation.

The New Role in the 2000's and Beyond

The new century brought with it awareness that Reading was a serious concern and the problem had to be addressed to avoid further decline in that area. The disparity between the achievement of male and female students, especially those in the secondary schools, became more acute. In the United States, *No Child Left Behind* (2001), *Put Reading First* (2001, 2003) and other initiatives were implemented to allay some of the concerns associated with low reading performance, intervention and adolescent literacy. In the Caribbean, Centres of Excellence were established as an initiative of the *Summit of the Americas* (2001), and more emphasis was placed on students being the centre of the instruction with teachers per-

forming supporting and facilitative roles. They became the 'guides on the side.' Constructivist approaches, alternative assessments and authentic formative assessments were to be performed by teachers as they collaborated with their students. Assignments underwent peer, group, and self-assessment in schools. This was also practised in schools in Canada and the United States. This was possible to a large extent because of the implementation and adaptation of computer use and digital technologies.

Student Competencies and the New Challenges for Teachers

The vast range of tasks that are performed by the computer and other digital devices, such as the digital camera, multimedia projectors, webcams, camcorders, *smart phones* and *tablets*, are indicative of the new competencies that our students will display and which the proactive teacher ought to possess. These new literacies which have been renamed as *multiliteracies* are skills that the 21st century learner must have. In 2006, the National Council of Teachers of English (NCTE) formulated a framework (updated February 2013) to guide the student and teacher to positive communication in multiple media, in the 21st Century. The changing landscape of 21st century literacies, calls to duty the new teacher. This paradigm shift from strictly paper-based resources to digital devices and digital texts, reflects a new teacher of this millennium. Her/his students (most schools are staffed by female instructors) are asking a different question of teachers. It is no 'longer whether s/he knows the content, but does the teacher know how to use *smartboards*, *tables* or any of the new digital devices to 'drive' the content. Computer-aided instruction (CAI) is now deemed a pre-requisite for an effective, successful teacher. E-journals, blogs and wikis are the foremost communication tools for forging links across groups, cultures and countries. Globalization is driven by these digital technologies so the world is no longer a distant, unreachable territory, but is just a click away. A catastrophe in the Middle East is witnessed in the Caribbean simultaneously because of a digital camera or webcam. Digital story-telling has found its place in the classrooms of the 21st century and teachers use this activity to create multimodal texts and compelling stories in digital format. Visuals, electronic audio texts and live performances can stream from a student's laptop or *smartphone*.

Teachers must move beyond being repositories of information and seekers of information, to creators of digital resources with the technological tools at their disposal. Michael Resnick of the Media Laboratory, Massachusetts Institute of Technology posits: "…if we want to help people become better thinkers and learners, we need to move beyond these information-centric views of computing and learning." He advises people to be 'digitally fluent' with the technology. His experiment with technology to form *Computer Clubhouses* where 'members use leading-edge software to create their own artwork, animations, simulations, multimedia presentations , musical compositions, websites and robotic constructions' (Resnick, 2002) was an innovative experience for the teachers and students. With such students honing their software competencies in these 'Computer Clubhouses,' teachers must rethink what they do in the classroom, how they do it, how these activities will be assessed (by whom and when), and how these activities can be preserved for posterity and be used for future investigation and upgrade. Teaching in the *digital age* still places most of the responsibility for student learning and experiences on the teacher who collab-

orates with learners, plans, initiates and organizes the classroom experience for growth, inquiry, reflection, creation and authentication of resources. As the NCTE Policy Brief (2007) explains, "Effective instruction in 21st century literacies takes an integrated approach, helping students understand how to access, evaluate, synthesize, and contribute to information." Henry Giroux (2013), an exponent of critical pedagogy, in an interview with Global Education Magazine, decried the state of teaching and the predisposition of teachers to be "reduced to the keeper of methods, implementers of an adult culture, and removed from assuming autonomy in their classrooms." This kind of teacher will not find favour in the new classrooms of the 21st century where the student is also capable of record-keeping when using applications such as *Glogster Edu, Edmodo, Teacher Tube and Edutopia*. Although there are many examples of teachers operating from a new paradigm and adapting to their new role as "guide," Giroux still views teachers as "deskilled, largely reduced to teaching for the test…" This critical view of teachers can be upheld in some of the schools in Trinidad and Tobago where schooling has become very competitive and principals, teachers and students want to be celebrated as being in the First 100 honoured in the Secondary Entrance Assessment (SEA) Examination results. Even the Continuous Assessment Component (CAC) that is being piloted this year has been affected by this competitive attitude. An assessment in the Visual and Performing Arts (VAPA) that was expected to be formative and provide useful feedback for student growth in the particular subject area, is now being done because of expediency rather than as part of the process of continuous assessment. Once again, teachers find themselves pandering to the dictates of the political directorate rather than the educational needs of the students.

Teaching in Online Environments

Although there are many challenges faced by teachers in the traditional classrooms, there is an increasing appeal for teaching in on-line environments by students and teachers alike. Harvard University and Massachusetts Institute of Technology (MIT) have collaborated to produce edX Courses which are free for learners who want to avail themselves of this innovative method of being tutored by professors from established universities while remaining in their 'classroom' of choice. The computer, Internet access and sequenced instruction by experts, make the use of Learning Management Systems (LMS) an attractive option for learners. *Coursera, Udemy and Alison* are providers of this innovation in education. Varied technologies are combined to create informative, interactive, creative and collaborative learning environments for teachers and participants in the courses being offered. Certificates of participation are posted on-line for students to access and download, and this lends more credence to students' activities over the 4-12 weeks' tuition. The Organization of American States (OAS) through the Educational Portal of the Americas offers subsidized courses in English and Spanish for educators, using *Moodle* and *Web 2.0* applications for effective instruction.

The role of the on-line tutor is shifting as the platforms become more sensitive to the needs of the on-line learner. This learner operates in a blended/ hybrid learning environment or in one that is entirely on-line and which uses *netiquette* (rules for operating properly on-line), *social constructivism* (as conceived

by Martin Dougiamas of *Moodle*) and on-line collaboration and communication for effective interaction and learning. *Threaded discussions* help students keep track of the topic and guide their responses for meaningful experiences on-line, either synchronously or asynchronously. The teacher is designer, reflective practitioner, motivator, guide, assessor and observer. Unlike the operations in traditional classrooms, this is *technology-mediated instruction*. Teaching in this new and continuously evolving virtual or blended classroom, requires the teacher to abandon the *transmission model of education* which meant that the teacher was an expert disseminating information, and adopt a more collaborative role that "necessitates a shift in literacy instruction to emphasize students' active participation in meaning making and blurs the lines of power between teachers and students" (Gainer and Lapp, 2010. p.13).

The Need to Shift for Meaningful Learning Experiences

Teachers and students read and write in non-linear ways because the new technologies create the *spaces* for them to do so while maintaining meaning and adding value to their literate experiences. Books are in *e-format*, have interactive features and can be downloaded to one's *PC*, *laptop*, *iPad*, and stored there or on *Kindle Cloud*, *Kindle*, a *Nook*, another e-*Reader* or in *Dropbox* using *Whispernet* application. Teachers and students also realise that the dictionary, thesaurus and citation guides can be accessed easily while writing a research paper on-line or verifying the meaning of a word. Teachers need to revisit their views on *cell phone / smartphone* use in the classroom and instead, incorporate these innovative digital devices in their teaching so that more authentic and interactive sessions can take place, even in their absence. They need to accept these devices as 'tools of progress' rather than noisy distractions for adolescent enjoyment. Bromley (2012) in her article, *Using Smartphones to supplement classroom reading*, showed how this new device can be used to assist readers in having a deeper understanding of what is being read. She said "I synthesized what I read in the book and extended my connections to the world beyond the book."

Bromley integrated the original text of print language and visuals and the new technology of the *smartphone* to "more fully and deeply interpret and understand the ideas in the book." (Bromley, 2012, p. 342). To teach in authentic and meaningful ways to participants who are 'digital natives,' even though one may be a 'digital immigrant', is a challenging prospect that must be faced if we are to be 'participants in 21st century global society' and 'design and share information for global communities to meet a variety of purposes'(NCTE,2007). In this age of rapidly changing information and concepts, the 21st century teacher must be an agent of change to redesign, reshape and reconceptualise her/his praxis to meet the needs of the students and the community and 'digitalize' the classroom for new teaching and learning experiences. In many new 'classrooms', the teacher and students are 'avatars'—creatures fashioned by the new digital technologies producing new resources for learning and inquiry.

Support for Practitioners to Function Competently in a Digital Age

Professional development is a requisite in all institutions of learning so that the teachers can be updated on new techniques, strategies, ideologies and content. Many schools, however, still depend on having

face-to-face sessions done by experts or education consultants, and much time is spent in pre-planning arrangements for time, venue and availability of presenters. Those who see this as an opportunity for real advancement use the applications of video-conferencing and podcasts (which allow participants to be involved in real-time presentations or to choose convenient times for accessing the recorded presentations). Opportunities are created for participants to submit questions and responses and to receive feedback even after the presentation has been aired. *Coursera*, one of the providers of free on-line courses for professional development, has 388 courses that are run by 83 professional organizations and tutor more than 3,879,450 'Courserians' in English, French, Spanish and other languages. One may wonder how this is feasible, but their format includes *Video lectures*, *Discussion forums*, *Peer feedback* and assessment, *Course Wikis* and *Course Meetup* sessions. Their focus is *Mastery Learning* which involves a variety of ways to learn and express what they have learned, peer assessments so students learn from each other (Coursera.org). This 'crowd-sourcing' is critical for managing assessment issues in such a large on-line environment. Their pedagogy is underpinned by interactions between faculty and students, and between students and their peers (Coursera.org). Teaching at that level with an unlimited student population depends on the creative and timely use of the digital applications that are available.

The Changing Culture of Learning

As the 'culture of learning' changes, the demands on the teacher also take a different shape. Students are learning in 'wall-less' classrooms; the chalkboard has been replaced by the interactive *smartboards* and screens ranging from 17 inches to 3 inches of the *smartphones*; textbooks are on-line with *e-resources* to support the content and provide extended activities and *e-folders* are replacing book bags and heavy ring binders. The meaning of a word can be found easily on *Dictionary.com* or the Thesaurus on *Word* or more recently, on the smartphone applications. In this new dispensation where the roles of teachers and students are becoming more blurred and facts are updated even as they are being written, the spotlight is shifting from what is to be taught to how it is being learnt. The following is a description of an exploratory study that was done in an out-of-school programme and which was supported by computer-aided instruction (CAI).

Exploring Writing through CAI

In 2009, the author began an intervention called the Malick Intervention Programme (MIP), with two teenaged male students from a secondary school. These students had problems reading texts at their level, were not disposed to reading and writing in the classroom and because of a limited vocabulary in speaking and writing, they were not eager to participate in literacy activities in the classroom. One of them was two years older than the expected age for the class- 14 plus. An underlying philosophy of the MIP was that reading and writing should be taught simultaneously to maintain the reading-writing connection. The author used two laptops with Internet access to help them find important information about a particular topic and to source additional reading texts online. That day, after the Read-aloud, and their responses to

it, the author introduced a writing activity. Each student, after writing the date and their name on a new computer page, had to write five ideas/issues that concerned them. They prioritized them with one, being the most important. They wrote freely about this idea. The author conferred with each student to revise and edit his piece of writing on the computer. This was made easier because the red, blue and green lines under the words or phrases indicated that there was a mistake. The author chose to use the computer as the medium for writing instead of the usual paper and pen because they were familiar with computers at school (in the library) and the author saw this as employing an innovative tool to create new writing experiences. Since both students knew how to open a Word document and use some of the applications such as filing, saving, deleting and creating simple texts, they recognised their mistakes immediately and would draw it to the attention of this author: "*Miss, it wrong eh*?"

The student would then be guided to reread the sentence where the mistake was located and ask:

Does this make sense?
How could it be changed?
What other word could be used?

As the student supplied a new word or phrase it was inserted on the computer to replace the old one. Those three questions were asked again until their choice was grammatically correct and would be the best word in the context of the piece. They would read the entire piece aloud so they could hear how it sounded and if it made sense to them. After a more published piece was composed, the students would use *clip art* to insert a suitable picture or image to it so that a multimodal piece was created. Although they were shown how to add audio text to their story, and enjoyed music, they were hesitant to employ this feature. They were happy to have created their own interesting text when they always believed that they could not do so, and some of their teachers also shared that view. It was an enlightening experience to witness their elation as they appended their name to the piece as an author.

Because of the use of the digital technology that the author guided them to incorporate effectively, they were moved from reluctant readers and writers to willing and capable composers of multimodal texts. The author was able to take them through the steps of the Writing Process as we moved from *brainstorming*, *choosing a topic*, *free-writing/drafting* to the iterative stages of *revising* and *editing* and then to a *published* piece. The drafts that formed the pre-published stages of the writing experience were saved on a special folder on the desktop of the computer so that it was easily found and could be worked on independently where possible. Each new draft was saved and labelled as such with the relevant date so both student and teacher could note the progress made and how long it took. The changes for each stage of the process were written in a particular colour as the students wished.

Since it was important to maintain a link with their parents (in this case, the mothers)all the drafts and the final published pieces of writing were numbered and sent in a folder to their parents for observation and to get a sense of their child's journey to writing achievement. Since the parents did not have the use of computers at home, the author could not email the documents to them and expect to get their feedback online. By the end of the year of intervention using the Malick Intervention Programme (MIP)

with its computer-aided instruction (CAI), these students were more disposed to perform academic literacy assignments—mainly reading and writing—in their classroom and at home. Although this might be a simplistic use of digital technology when other students in many schools are using the technologies in more sophisticated ways, this method was significant in the life of these students. Their exposure to using the computer was for playing games, music and occasionally getting information for an assignment. They were not exposed to computer-aided instruction (CAI) to improve their writing, to create interesting texts and produce reading resources that were relevant, at their instructional level, and which re-immersed them into the literate community of their classroom.

Considerations for the Future

The boundaries of the classroom are changing and knowledge is being shaped and reshaped rapidly with the advance of new and creative digital technologies. The teacher is being taught by the student and the roles are reversed as we experience what Meredith Stewart (personal communication: New Literacies Initiative 2011, North Carolina) calls 'digital cross-training.' The 'new' teacher has to be prepared to be mentored by 'digital natives' whose innovations are fluid and not easily defined. Although the teacher is mainly responsible for professional development to hone her/his skills and expand the knowledge and skills bases, she/he still operates within the confines of the administrators in education and therefore is guided by the mandates of policy makers. Have these policy makers created the space for the technological advancement of their practitioners? Are there schools where the ratio of one student to one laptop or Tablet is an elusive dream? Are there schools where the computer labs are underutilised because of inadequate resources, limited manpower and inept tutoring? Is the Internet only to be used by the senior classes because of insufficient funding for its use? Is the cell phone or smartphone still being kept for out-of-school use only? Are we, as Prensky (2005) suggests, teaching "Yesterday's education for tomorrow's kids?" These are critical questions that the key stakeholders must address and teachers must pursue if teaching in this age is to advance exponentially and significantly.

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Part II

Teachers Reaching Lives and Not Just Merely Passing on Information

Ann V. Dean

Over twenty years ago, I completed a doctoral dissertation about teachers in Nova Scotia writing their autobiographies. One morning, during a PhD tutorial, my supervisor had remarked that my own autobiographical essay was not only colorful, but "delightfully Voltaire-like." He suggested I continue writing in that vein and one hundred odd pages later, the life story of my becoming a teacher emerged. Later, this work influenced my decision to work with teachers in the area of autobiography and education. I now teach a graduate course on autobiography and education. I also continue to excavate my life through writing; basically, I am living autobiographically (Eakin, 2007).

How has writing autobiographically affected me as a teacher? It is difficult to answer the question without reducing autobiography to the "recipe approach" to teaching. Autobiography must be fresh and inconclusive; it cannot be a finished product, for the true value of autobiography is found in the writing process. Making autobiography into a methodology goes against its power and potential to help us interpret and make meaning of our lives. Autobiography can move us from the certainty of knowledge into the mystery of our being; to transport us to new ground where it is possible to explore the elusiveness and uncertainty of life. We are all keenly interested in this relationship between subjectivity, consciousness, self and knowledge. And if it is true that it is vital to have a subjective understanding of knowledge, this leads, as Peter Abbs contends, to the use of autobiography in education, where, "as a literary and aesthetic form, [it can] lead students to understand the intimate relationship between being and knowing, between existence and education, between self and culture" (1974, 6).

Autobiography's structure makes it an endeavor less about how you report the factual truths of your life and more about how you define a way of being and knowing in the world; it is a way of organizing experience, defining values and capturing identity. Autobiography is about a sense of self. Writing autobiographically has enabled me to look beneath the surface of life, changing my relationship to knowledge. I now recognize the difference between accumulating facts and acquiring knowledge.

People are defined by their institutions and cultural environs and limited by those bounds…especially by the kind of language they use. How do they escape? By writing in clear language and expressing original ideas. Autobiography is to engage in a "highly constructed performance, drawing on a range of linguistic, literary and cultural repertoires, specially selected for a particular audience" (Kehily, 1995, p.28). This view of autobiography allows us to identify and weave together key themes from remembered events of our past and present lives and to practice the art of self-representation. There are many possible versions

of "self", and as we struggle to create a coherent picture of our lives as teachers, it is wise to conceive of self as "fragile and continually renewed by acts of memory and writing" (Stanley, 1990, p.63).

Writing about my life as a teacher in the process of becoming has allowed me to become a more open, courageous person. I have become more self-accepting, and as self-acceptance begets acceptance of others, my relationship with students has changed. My expectation of teachers in my classes has shifted dramatically as I have become a co-participant in learning in the classroom. Helping teachers to write about their lives and sharing my own writing with students enables all of us to confront new ways of seeing the world and our lives. A teacher in my graduate course reflects on the potential of autobiography in teachers' lives:

> Your autobiographical writing became a framework, a new model—it was honest—the instructor as participant opened the discussion, created a trusting space where no one was asked to do something the instructor was not comfortable with herself…I got a sense, through autobiographical analysis, of teachers in the process of becoming. (Dean, 1997, p.131)

This new autobiographical understanding supports my critical stance as an educator who dares to identify and critique the pitfalls of institutionalized education. However, my efforts at critique are sometimes met with resistance because teachers find it difficult to critique taken-for-granted assumptions about the nature of the public school system, which as their employer wields great authority in their lives and the lives of their students. Many teachers experience a sense of powerlessness and loss of human agency over the years as they must acquiesce to other people's expectations and perspectives; they often lose touch with their deep sense of self. For many teachers, the patterns of mental paralysis in response to such authoritarian control even carry over into graduate level education.

In the following example, a high school teacher writes about his experience of graduate level education courses; he claims, that in order to succeed, he had to learn to "…merely do the readings and pay close attention to the concepts that the professor seemed to favour." He writes about the oppressive school practices that can alienate any of us from ourselves and from achieving self-authority. First, he comments on old patterns of behavior that bring disengagement and shame:

> I entered this class, *Autobiography in Education*, as a refugee from another graduate course in which I was faced with trudging through more theory and methodologies and a syllabus that looked suspiciously like that of an undergraduate course I had taken with the same professor. All I had to do was to absorb what had been said in class and read the texts, most of which I thought were barely useful. Honestly, very little of what I have studied in college has been of use with real, live students. I can walk away with an "A" as long as I can determine what the professor is looking for and replicate it…the only trouble I had was <u>trying to appear</u> to believe in theories that I had no interest or confidence in. I am embarrassed by the way I earned those grades.

The only place from which to teach, in my view, is from a deep sense of self-authority, something this student obviously didn't feel. It certainly wasn't encouraged. Then he experiences something a bit different:

> I enrolled in this course with a simultaneous sense of curiosity and dread. This course held a different horror for me. It was obvious from the start that my previous strategies for success were not going to work. I could not fade into the crowd, emerging only to make statements that I was certain were correct. Even worse was the realization that I would be writing about the one topic I loathe: Michael Lewis. I have many interests from botany to carpentry and antiques. The one topic I avoid is me. I have never been of much interest to *myself*. Thus, when I faced this class, I did not know how to respond, yet I was thrilled with the idea of not being asked to parrot back some theory or methodology…

Autobiography invited him to articulate the "self" (self not defined as fixed and unchanging, separable from the web of human relationships, but self within which exists a strong sense of the individual, inner experience) he had been taught to avoid.

Besides offering teachers a path to a deeper sense of self and identity, autobiography can become a critical tool teachers can use to identify possible biases embedded in their thinking; if they are willing to risk examining their own subject positions and to expose their assumptions about schooling, learning and education they will be able to slowly separate from the possible institutional constraints and conditioned patterns of thinking. The path to such "critical consciousness" is a difficult and sometimes painful process.

While reading the dialectics of gender of women's lives in my graduate class, a teacher ponders the question: why did I enter the teaching profession? Her reasons, although complex, were traced in her autobiography to the early influences of gender and social class. Raised in rural Prince Edward Island, she was the first person in her large, working-class, farming family to finish high school. Although neither she nor her female friends were encouraged to continue their education, an older female teacher convinced her to attend university and to become a teacher. Looking back on that experience she writes:

> None of my close female friends in high school were encouraged to go on in education. This saddened me because most of the girls had lots of potential. I figured I could study and help the others who might feel they want to give up…
> so I decided to become a teacher.

My graduate students were taught to critique their own "stories" through the lenses of class, race and gender by reading feminist, Marxist and critical race theorists. These readings, combined with the teacher's writing about her life, deepened her critique:

> I used to think I could recognize sexism and that I could challenge it in my daily life. Now I feel like I have been living in the dark ages, because, although as a teacher I have lightly questioned gender roles, I have never questioned the politics of gender. ..I find it so hard to delve into issues such as sexism that emerge when I read my life story. But looking at forms of oppression through the historical framework of the course shed a bright light on oppressive practices for me.

She began to view school culture differently:

> All of a sudden (in my mind's eye), I see a set of books in a classroom (They have been there all along), books that promote certain careers such as scientist, doctor, dentist, and teacher.

> These are careers intended for men, except for the teacher…I hear Frank-- the grade eight teacher --tell a female student: "That grade on the math test was good, for a girl." A grade six teacher teases a male student about behaving "like a girl", while telling another male student to "act like a man."

Her insights about gender bias put her at risk; she feels she must practice "the art of diplomacy" if she is to confront the other teachers at the school. She feels she must proceed cautiously to "avoid their outrage":

> I am scared, scared that my balance will be shaken. Scared that I will have to take up the challenge in future conversations in the staff room, scared to rock the boat and in so doing alienate myself from the sexist and racist people who are my friends, co-workers and family. Hell, I've been called a "Lousy Feminist" for keeping my own name when I married…

But her enthusiasm about her newly grounded self-knowledge takes over as she designs a project for the graduate course:

> I first began thinking about the curriculum project when we were talking about stereotyping and gender socialization in schools. I was fascinated with the idea that schools are not isolated from what happens in larger society and also the embedded historical, patriarchal and hierarchical relationships in our culture. As I chatted with other teachers in the staff room about the topic I sensed their growing interest in learning how they might be unknowingly reinforcing sexist stereotypes in their classrooms. I began to envision a discussion group or an in-service to enlighten interested teachers. What a challenge!

The teacher had the courage to take up her idea and worked with another teacher to develop a highly successful in-service presentation aimed at exploring how sexism works in school practices, how teachers might unwittingly be complicit in those practices and how they might find ways to make changes in their school culture. Important dialogue was opened up; teachers learned about critical discourse and self-reflection and witnessed the empowered stance of their confident colleague who spoke from her newly found subject position of self-authority. To some she seemed to be advocating subversive thinking and action but the rewards of critical thinking far outweighed the risks for this teacher.

In conclusion, the value of autobiography for teachers who often question why and how they teach is captured in the following excerpt taken from another teacher's autobiography:

> To know ourselves and to share that knowledge is the teacher's gift to her students. If we simply relay information without reflecting on why we teach, what, to whom, we keep our students from developing the ability to think critically. If we look within our hearts, know what we value, perceive our lives as in the process of growing, we can, through compassion and caring, foster these qualities in our students…we must encourage personal voice and we must grapple with our own learning histories to better understand other learners.

Teachers must reach lives, not just merely pass on information whole to passive minds. Autobiography fosters growth, hope and understanding.

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Respectful Overcoming: An Interview with Dr. Fatuma Chege

Fatuma Chege, Zhanna Barchuk, and Mary Jane Harkins

Today we are talking with Dr. Fatuma Chege, the current Dean of the School of Education at Kenyatta University, Nairobi, Kenya. Dr. Chege has an extensive background in the areas of education and gender issues. Most of her work has been conducted in the Eastern and Southern areas of Africa. The research and work in which she is involved has been greatly influenced and inspired by many of Dr. Chege's personal experiences growing up in Kenya and working in a male dominated world. The main focus of her research is on the primary school years of education in Kenya and it is qualitative in nature. Her research and affiliations have taken her to many different countries and as a result Dr. Chege has developed a number of connections with various schools, organizations, and professional bodies including Hiroshima University, Women Educational Researchers of Kenya, and the League of Kenya Women Voters. Dr. Chege has also attended conferences in her local area and internationally as both a presenter and a keynote speaker. Because of her expertise in the area of violence against children, gender and education, her research is of interest to educators around the world. Over the years Dr. Chege has been engaged in multi-country research consortiums and has worked as a consultant with a range of organizations such as the United Nations Children's Fund (the Eastern and Southern Africa Regional Office); the Forum for African Woman Educationalist and The Norwegian Agency for Development Cooperation, and the UK Department of International Development. Dr. Chege has published widely in peer reviewed journals including *Comparative Education*, *Journal of International Cooperation in Education*, the *British Journal of Sociology of Education* as well as the *African Journal of Aids Research*.

In this interview, Dr. Fatuma Chege shares some of the challenges that led her to pursue her chosen career in education and how those challenges have helped her to build personal strengths as well as shaped her research. She also reflects on some of the most important and inspiring aspects of her research and the way in which she coordinates and organizes it. Finally, Dr. Chege shares her views on some of the ways in which teacher education is changing in Kenya.

MH: Dr. Chege, we are so pleased that you are able to visit with us. Your research will be the focus of this interview so perhaps we can begin by asking you to tell about your experiences that have influenced the work that you do. We are interested in hearing how you became so passionately engaged in the field of education and particularly about gender issues.

FC: Thank you very much Mary Jane, for that broad question. Let me just begin by saying that most of my research mainly focuses on basic education and in Kenya, that would be the primary school, the first eight years of education. This has been influenced by my own background as a teacher; I began as a teacher in primary school. I taught for about four years, and then moved onto secondary school. After two years in secondary education, I moved onto teacher training again for three years, and eventually moved onto university. The kind of research that I do focuses mainly on gender issues in education which is the background of my training as a researcher. My specialization is in gender and education and going by the experiences of my own upbringing, the schools that I went to, the schools in which I taught, and my training as a gender and education specialist have helped me to reflect back on those experiences and have made me committed to addressing those issues. One of the things that we find in my country and in many other countries in the other regions of Africa is the fact that the girls and the boys have had different histories of education, going back from pre-colonial era to the colonial era, to the post-colonial era, that has kept girls lagging behind the boys. Most of my work is around addressing those issues and asking the question behind the statistics. Because we have the statistics, the statistics are clear but mine is more qualitative in nature. I ask the question, why are the statistics the way they are? How have they become the way they are, and how can we address that? This takes me to qualitative research, which is my area of specialization in research. The other focus of my research is on issues of constructions of gender and, sexuality issues. Again, this goes back to the kind of cultural norms that people in our region have been socialized and have grown up in, and how that affects the way they engage with schooling, the way their parents engaged with schooling, and the way that socialization influences the investment that parents give in schooling. So again, a lot of my research explores that area, and looking at the issues of sexuality and how this affects girls' engagement with schooling. So that's another major area of my research.

MH: So your own experiences growing up in Kenya have impacted greatly on the type of research that you do. [Yes.] With the work that you are doing, have you seen changes in your research areas?

FC: Yes, I would say that it has brought changes. Changes that mainly I would attribute to the manner in which I conduct the research. One of the things that I bear in mind when I'm conducting or even designing my research is the fact that the Kenyan children, particularly in basic level, the family cultures and the communal cultures do not provide spaces where children talk for themselves and about themselves. Adults usually speak for them. Their parents speak for them. Teachers also tend to speak for them. So in the kind of research I do, I always put the children first, which has often put me into problems because schools in my region are used to actually deciding which child can participate in a particular research, and they want to choose for you. But all the time in my design, the children come first. I allow them to decide whether they want to participate in the research after I have explained it, and the teachers and the school administrators have found this very hard. Traditionally, researchers begin with the administrators and you interview them before any other person in the school. Then you go to the teachers and interview the teachers and ask them to choose students to participate. So mine is the other way around, because I

begin by empowering children to know that they have a right to their own space and voice. The issues I am studying are about them, and they are the experts about the issues that I am studying. So I give them that feeling of ownership, and I give them the power to direct the mode in which we are going to move the discussions. I always help them to understand that I depend on what they tell me, because I do not know the reality of their lives unless they agree to share it with me. This way, I empower the children to believe in their abilities to articulate their issues from their perspectives as experts. And for education to improve meaningfully my professional stand as an educator is that, the (children) have to let me and my research colleagues enter into their world, otherwise we would never understand or be able to help improve on their education. By the end of the research this approach ends up giving the children a feeling of belonging to the process of the research. They become interested, and when I go back to share the findings, they are able to identify—and sometimes they have corrected me and said, that is not really what we mean, "We meant it this way." Eventually, there is a sense of co-ownership of not only the research process but also of its outputs and outcomes which gives me an added sense of confidence in interpreting the findings. So I think that is one way of empowering children, and also gives the meaning of research to people who are not researchers; like children and parents.

MH: That's wonderful role modeling for the children and helps them to feel that they have a voice. [Yes.] I'm sure this approach has a huge impact on the children.

FC: Exactly. In my research work, it is only on a few occasions, I have researched at the university level because that's where I teach but there are many researchers who focus on that sector possibly because they find it more accessible. I continue to work with children as not many researchers have the requisite skills to work with children. But my emphasis is really focusing on the foundation years. The times I have focused my research purely on higher education, is when dealing with very difficult and sensitive issues, like issues of violence, sexual violence and corporal punishment because in my university, while teaching and training of educators I have to deal with issues in this area. I link my students with realities of the younger children they will be teaching in the future. There are times I have had to discuss topics around violence against children; one of the things that struck me is this topic would always spark a debate in class about the pros and cons of violence. There would be half of the class saying, children have to be beaten for them to perform. Others will say, "I would never have reached university if my parents didn't beat me, or teachers didn't beat me." And I thought, really, I need to get a way of researching into this area among my student teachers in a manner that will allow them to reflect on the effects of violence generally and violence against children in particular. One of the studies I would like to give as an example is the use of memories - to reflect back on childhood memories. I sampled a group of third year student volunteers, just before going for their teaching practice, and we addressed that issue through a systematic research process. First of all, we looked at how they defined violence, its physical, psychological nature and then asked them to write into their diaries every memory of violence that they could remember. There were 20 students and each divided their diary into six sections. First section was for memories of as far back as

they could remember before schooling years. Second section was for nursery or pre-schooling, then lower primary, followed by upper primary, and then secondary and final section was for university. Every time they would recall a violent incident, they would put it down and they would indicate whether they were observers of that violence, whether they were the perpetrators or whether they were the victims. After that they would describe how the particular incident made them feel at the time and at the moment writing the memory, and what decision they would make now, as teachers-to-be. And that I think had an enormous impact on the students. I have since found that addressing issues of violence using memories, particularly for teachers is very, very powerful in helping them to reflect and to start changing their attitudes towards violence, especially against children. (I actually included examples from this particular study in the chapter I co-authored with Claudia Mitchel of McGill University for the 2006 UN Secretary General's Study on Violence against Children.)

MH: Our own stories are just so powerful, and helping teachers to reflect on their memories would help them become more critical. [Yes, correct.] It appears to be a wonderful strategy for the teachers. The idea of critical reflection through diaries is fascinating.

FC: Correct and the fact that they had full possession and control of their diary, it was their personal confidante. So every entry would start like, Dear Diary, today I really want to discuss this with you. At the beginning of this research, particularly the men students, they could not write. They stayed two weeks not even putting a dot there. They said, "It's so painful, I don't want to put it down." But the moment they started writing, then they said, "We have to keep these diaries for the rest of our lives." So for my analysis, I requested to photocopy this and to give them back the diaries. For some of them, it was so powerful, so therapeutic... Because when I said, "How does it make you feel? What do you think now that you've written it down?" they would say, "It's great, for the first time I have brought this one out of myself. It makes me feel very light inside. I am happy that I have done it."

MH: So with that awareness change would begin. Their thinking would change, and this would impact on their behavior.

FC: Yes, and also the diary indicates if they were to be in the position of the perpetrator of the violence, the other bit of how they would change the situation was also documented. They [the students] would put the change process down explaining that if this violence were to be replayed, and if the student was in the position of observer, perpetrator, or a teacher in that situation, this is the way they would change the situation. I found that to be very, very powerful. We just have people talk about how they can change violent situations to make children safer than they usually are.

MH: Yes, and again an awareness of a perspective different from their own, would be so powerful for them. It must have been difficult to read at times, but then powerful to see that they could the view the situation differently.

ZB: Reflection is so important, and by reflecting on your own achievements, and where you are right now. What are some of the strengths and the challenges that you've experienced throughout your career?

FC: Throughout my career there were many challenges encountered and much strength that I have been able to derive from overcoming those challenges. One of the things I can say were key in building my career as a teacher is successfully getting to become a teacher at a tender age, when I was not even prepared to get into any career. I had done my primary school. The education system was different, so I had seven years of primary school and two years of secondary school. And at that point, just after getting very good results of my Kenya Junior Secondary Education Examination, my father said, "Okay, I have six children, you're the first born, I don't think I'm able to pay the fees for everybody. So you have to leave school, start working and help me." So, that is how I got planted into a career at the age of about 16 and a half. And it was really difficult for me to leave school. I even didn't know what it meant to go and work and he (my father) thought maybe I could become a secretary. And my mother (who had no say in my leaving school) thought I could become a teacher, and I thought my mother was the most convincing because she said, "You know, you love school so much, so if you become a teacher it means you will be with books for as long as you like." My head teacher was also devastated by that decision for me to leave school because I was a top-performing student. He called me to his office and told me he had talked to my father, and he had also talked to the District Education Officer to intervene. He said that my father had made a final decision for me to leave school. As I struggled with the bad news, the District Education Officer called me into his office and said offer me opportunity to study in a boarding school and leave my day school. However, my father declined the offer saying he needed me to begin working. The District Education officer, whose name I remember clearly to date encouraged me to comply and asked me what work I would really wish to train for. I remembered my mother's idea of teaching and said I wanted to become a teacher. He immediately said, "I'm going to give you a letter. If your father has decided that you must leave school, you will take this letter to a teachers' college—to Principal Kagumo Teachers College." So I went to the teachers' college and took that letter to the Principal. By this authority, I was admitted and I remember my father writing a cheque of 215 Kenya shillings for fees…That's about maybe 30 dollars, and he bought me an Oris watch. And about this watch, I will never forget it…He said, "A teacher needs to keep time." However, the fact that I left school young didn't go over very easily. I went to Teachers College and I did well as a very, very young teacher and attained top grades in teaching practice and was awarded the best *fine arts* student in my year.

I started teaching and by age 18 it was my first year of teaching, and I remember that year, one of the female teachers in the school called me and asked me, "Fatuma, how old are you?" I said, "Eighteen." She said, "My gosh, do you know how much you can do with your life at 18? And all you do is to come and sit with us and listen to us talking about our children and so on." And she took me as her helper on a life of mentoring as her project. She said to me, "Your salary is going to go to your own education. When you

are paid, you must register for your O levels." So she got this process going by getting close to me and into our family; she came home and talked to my mother telling her how important it was for me to continue with my education while I was still young even though I had to work and support my father to educate my siblings. And there I was. I started teaching and studying at the same time, and within three years, I made my first attempt and passed two sets of national examinations consecutively that qualified me to proceed for further studies. Before I knew it, I was already admitted for a diploma in education at the University of Nairobi just 5 years after I had been pulled out of school. I did the Diploma, graduated and the following year registered for the B.Ed. programme. I got a government loan for my B.Ed. at Kenyatta University; got on a Kenyatta University scholarship for my Masters and the story went on and I never stopped pursuing further education. The more I engaged with teaching, the more I just realized maybe this is what I was meant to be—a teacher and educator!

And starting teaching from the primary school and going through all the levels to teaching eventually in the universities, there were the various strengths I gained and the various challenges I had to overcome. At the primary level it was good because I was spoiled by those teachers, because they were like my mother's age. Secondary school level, I was on my own like everybody else already in my 20s. However, going into the university, that's where the major challenges were. A young female academic in an education department that is traditionally male dominated… that's the oldest department in Kenyatta University… It's the mother department. So the professors there are really senior…all male professors (to date I remain the only female in that Department with the title "Prof"). I do remember my first engagement in the staffroom where we served tea. And I have many, many stories about tea politics at the workplace. That was my first time in the tea room, and I do remember one of my senior professors telling me, "Now we've given you a job, we've educated you on a scholarship, can you serve me tea first because you're a woman, and a Muslim woman (who should know her place)." I just thought, "Oh my God." But I said, "I'm very sorry but I will serve you tea anytime as my teacher because I respect my teachers whether they are men or women, or serve you as an elder, but only on those grounds because I was taught to respect elders, I am sorry". So I had my tea, and it was a big issue, because all the men were saying, "You see, you educate the women, they grow horns." So I had my tea and left. The second day, I thought, "Do I go for tea? Yes, just go." So I went into the tea room. The same thing happened. And the third day, the notorious professor withdrew his remarks. He said, "Well, I decided, I will withdraw the remarks." And I said, "Yes that's fine and I can now serve you as my teacher and elder just like I can serve my female teachers and female elders." I knew from then onwards, if I wasn't going to be careful, I would not be able to engage successfully in what I had been employed to do. I needed to balance professionalism and socializing with senior colleagues without really being rude, but respectfully and still standing my ground and making my point. And that is the way it went, and I can say, I think I did well because in that department which is historically male, I was the first female to be its Chair after 30 years of its existence. I went all the way until now, whereby I am the first female Dean in the school that houses that department. So there are those challenges that have to do with the social environment within which we are working.

The other challenge was becoming a female academic on equal terms among male professors who had been my teachers at that time. And it's not a long time ago, but for some of you (my interviewers), it might be a long time ago. That was in the early nineties, and I couldn't get a house allowance because I had the initials Mrs. When I enquired the response I got was that I need to be housed by my husband. So we were five people employed at the same interview; two men (one single) and, three women (two of them single). And truly, only the two male and the two unmarried females got the house allowance. I was discriminated by the institution's policy then. I have now seen changes over time because today we all get house allowances regardless of marital status. So we have seen things change – especially gender equality throughout my career.

MH: It is amazing how making these everyday things such as the politics of tea problematic, helps people to become critically aware of what they are doing. [That's correct.] It's exciting to hear of how you are the Dean of the department where you once began with a request to serve the tea. So you did it in a very effective way. And from reading your CV, we're aware now that you've traveled internationally, and are well known in many countries as a prominent researcher. I'm wondering how traveling to these different country has influenced the work that you do?

FC: Oh yes, that's correct. The travel abroad has even increased since graduating with my PhD because of the issues that I have been studying and the innovative methodologies that I use. So I have traveled to universities in Asia, the UK, where I studied, and also a lot in the Eastern and Southern Africa regions mainly for training researchers in qualitative research. That is a strength that I think has been recognized. I also train community researchers and youth researchers in participatory methodologies. Usually, I would engage in capacity-building with my young colleagues as well as graduate students. These students would eventually assist me as I trained people who live in the community to work with me in studying their own issues. I prefer this approach, rather than bringing strange researchers to study the community issues whose realities are alien to most researchers. In some countries it's been quite a challenge because of the language problem. Normally, we research in English. In countries like Tanzania, for instance, I was required to teach qualitative research methods to community youth in Kiswahili. And in Rwanda, there were two languages, neither of which I could speak, namely French and Kinyarwanda. So I needed some go-between person who could speak both languages and speak English as well. So that has been my experience in research capacity building in the region outside the academia. In Asia, it has been mainly Japanese as we have a collaboration with Hiroshima University, and in that collaboration we have a major network that has 12 other Asian universities and 16 African universities, that include Kenyatta University. That has brought me into contact with all those universities and most of their countries. If I look at somewhere like Asia, we have universities I have had much contact with such as the National Institute for Education in New Delhi, India. We've got others, like University of Malaysia, the Philippines, and Vietnam as well as Kobe, Waseda, Nagoya and Naruto in Japan. Then we come to Africa, we have Ghana's University of Cape Coast, Nigeria's Universities of Lagos, Bayero and Ilorin, while others include Sierra Leon as well, and we had

Pretoria in South Africa, Ethiopia's Universities of Addis Ababa and Bahir Dar… We have all those universities my contact and all that has enabled me to be able to understand how in different contexts, people do education.

It's been of interest to me, for example, in Japan to see how basic education is done with their two levels. They have the basic six years and they have the junior secondary, which is free and compulsory. The practicality that is involved has been really striking, and I have been looking forward to a time when we are able in a country like mine, to be able to mobilize resources that would enable us to make basic education as practical as possible. I have also learned about co-oporative teaching, where teachers teaching the same level will work together to strengthen each other by lesson observations and peer feedback, popularly known as "lesson study." So if we are teaching the same grade and we are three, the two of us will come and observe your class and give you some feedback. When I'm teaching mine, you give me feedback, so that lesson observation and cooperative teaching is something that I think when injected into our own system could make a major difference. Going back into the UK where I've also worked with universities like my former university, Cambridge, as well as Oxford and Edinburgh University I have learned a lot about doing research and doing joint/team research. I have learned how to manage research teams and research projects, to continually sharpen my research skills, and to share knowledge from my own experiences with others. So that has really, really enhanced my work, both as a professional teacher and as a researcher.

ZB: We know that Kenya is now in the process of reforming its educational system. Could you talk to us about the reform and the changes that are happening right now, and probably some of the global trends that you've seen around the world now being implemented in Kenya?

FC: Kenya has been trying to review its education system for some time. One of the main things was to look at the curricula, particularly for secondary school, which was quite heavy for many years where students would have to sit for 13 different academic subjects. Now the maximum the students can do is seven subjects, which is not so bad. But a major focus that we had in the reform, in which I have participated by giving my input on behalf of our university and our School, regards the structure of the various levels. We've had eight years of primary, four years of secondary and four of university, as minimum. One of the things that we were suggesting is first of all, to bring in all children in the first two years in compulsory pre-primary and be included in the government-supported system, and that would be really good because it would force government to budget for that particular basic level. The other proposal that was very, very strongly put was to divide the primary years. Instead of having eight, we proposed to have six years of primary and then have two years of upper primary/junior secondary or even three years. Other people were suggesting a system of six-three for basic education, and then four secondary followed by a four year cycle for University. And when we thought all was going well, but eventually, the proposal was shot down again and were now back to eight years of primary and four of secondary and four for University. The argument was that it's very important to focus on these very basic years of primary school, and then the junior high school.

Further, in these new reforms, all the universities have been put under one Commission for University Education which will oversee quality compliance. Initially, we used to have a Commission for Higher Education that managed the affairs of private universities only. The public universities, including mine, were constituted under their own Acts of Parliament, had own individual Charters and Statutes. We were not externally regulated under any Commission. So, we developed our own curricula and used our internal statutes to regulate ourselves. Further, we decided what to teach, and managed the quality internally. So, I think these reforms are good, particularly for universities because now we are under one Commission and one University Act, the 2012 Universities Act, under which we have to operate. Before then, Kenyatta University operated under its own Act of Parliament of 1985, the University of Nairobi its own Act of 1970 and own Charters. So now we have our own individual Charters under the one Act and the one Commission, and that has kept us busy for the last few weeks preparing for compliance. As I travelled here from Kenya, I left the University evaluators going on appraising our conformity, and I understand maybe 12th or 13th of February 2013, we may get our Charters en masse… like a mass wedding. But the good thing is that our programs will be moderated, uniformly by one Commission. Because our activities will be moderated uniformly, I think that will be good because it will make it easier for students to move around to transfer to universities in the country without worrying about differentiation of standards. So I think it's good.

MH: We'll be interested to hear how it all turns out. We talked briefly about your hopes for teacher education in Kenya, and some of the changes that you are implementing. Could you tell us a little more about that, and how you're conceptualizing an education degree as more than classroom teaching?

FC: That is a question that is really at the heart of what I do. I've always felt that an education and particularly teacher education should not be just restricted to the classroom teacher or just for that person who is going to teach. It is really important for schools of education, and departments of education to start working across their own borders, and looking at other disciplines and asking how education can play a role and can strengthen other disciplines. How education can be used to broaden the opportunities of people who want to do education in areas that have been traditionally disconnected from education discipline. I want to give examples of disciplines like engineering, hospitality and tourism management that belong to different schools. That has been one of my assignments in the last several months. Kenyatta University had tried to bring the discipline of Education to offer its programmes to other non-traditional partners such as Engineering, Hospitality and Tourism. However, it seemed that politics of ownership of such programmes became the focus rather than the value added to the various disciplines involved with regard to the process of educating and development of educators. Hence, when I became Dean and the University offered me the opportunity to jumpstart the process of developing education programmes in non-traditional schools, I guided my team to begin to think about a discipline like engineering and how educators for engineering could be developed. I asked myself who teaches these disciplines? Are these people well equipped with pedagogical skills and philosophies of education? Do they have what it takes? And my answer was, perhaps not. So one of the things I did as a chair of the relevant curriculum committed was to try and talk with the

deans involved, and to convince them that it would make their disciplines even better if they could open up for education as a professional discipline responsible for imparting pedagogical skills, historical and philosophical understandings.

First of all, by developing capacity of teachers to teach in those respective disciplines, I began by guiding a discussion that interrogated the value added to the partnering disciplines. After deciding on where the program was going to be situated/housed, we have come to agree that a person, who wanted to become a professional teacher, would necessarily have their certificates given under the School of Education, as they would have chosen a profession of becoming a teacher. The students have also chosen a specialization in another school which happens to be Engineering, or Hospitality and Tourism or Applied Human Sciences. So I argued that the two other schools involved were helping one person who has made choices to belong to both schools. Our responsibility as Deans of the Schools is to give service to that university student to ensure s/he achieved their choices. So as we speak, we have accomplished developing four engineering courses in our program of Bachelor of Education in technical and vocational education, focusing on water technology, another one focusing on construction technology, and another two on electrical and electronics and then computers. When we go to the School of Applied Human Sciences, we have completed other two courses on food technology as well as fashion and design. For teachers who want to teach the courses, we'll have a Bachelor of Education in technical and vocational education, but focusing on food and dietetics, and also on fashion and design. Hence, anyone who wants to do a Bachelor of Science in Fashion and Design can go purely in that school while someone who wants to become a teacher of Fashion and Design, can have a Bachelor of Education in that specialization, and the same with hospitality and tourism and so on. So for me, that's a major achievement in transforming the discipline of education from its traditional areas of training graduate teachers for the Sciences and Humanities while avoiding the technology disciplines. Graduate teachers in Kenya will now have a wider area of choice in education as a profession and so they are not locked into just going to the classroom to teach geography, history, math, and other traditional areas. As we know, many professors in university also go to class to deliver lectures, and they do not have the know-how or the why of the way we do the things that we do in education. So I think this diversification which will provide space for added education courses for technology teachers is going to open up doors to other areas where we have professors that might need some pedagogical training and some philosophy and sociology of education, and which we can give them and certify them with diplomas that qualify them as professional teachers.

MH: That is very exciting to hear about, and thinking of students as global educators as opposed to teachers so that they can think much more broadly about the importance of the pedagogy of teaching. Thank you for sharing that.

ZB: We are also wondering how technology and mass media influence the educational programs in your university.

FC: The issue of technology is an issue that we are addressing seriously in my university. It's got its challenges because it involves costs for infrastructure. One of the things that our university did is to increase the fiber optic capacity. This took quite a big budget since we have had very low connectivity, and we can't talk of actually getting into Information, Communication, and Technology (ICT) with the low connectivity. The other thing is to actually equip the university community with adequate computers that students and staff can access. We have a relatively big computer lab for students, many more computers in the library and in staff offices we have at least one computer and connectivity to the internet. The University realized that unless it really pushes people and gives them no choice but to engage with ICT, then it will not happen voluntarily. And I think sometimes you just have to plunge people into the deep end, and that way they'll learn how to swim. Within our strategic plan there is an entire chapter focusing on ICT in which we have invested heavily on internet connectivity and installation of computers and development of computer labs in the last few years. Last year the university introduced the policy that every student in every department must take at least one e-unit which requires ICT use and which means students and lecturers have no choice but to engage with the e-technology learning. We have a department of Educational Communication and Technology, whose responsibility is to ensure that happens. But they cannot do it on their own unless we push the students and lecturers to also respond. So there is that policy, which means that every department will have several courses where a lecturer is expected also to engage with the students online in e-learning. I thought, it's a good thing, but when we give people a responsibility, I think we are also obliged to empower them to be able to do it. Thus, the students have a right to be facilitated to use ICT in learning, and the lecturers have the right to be facilitated in e-teaching. So for me, as an educator I saw an issue and kept wondering, fine, we expect this to be done, but then how? So in the last few months, I was engaging with our potential partners from Korea, because I know they are well ahead in technology for teaching and learning. We in KU like benchmarking with universities like yours, or Korean, and Hiroshima, who have done quite well, and we have something to learn. We realize that it's so critical to build the teacher capacity on ICT. First, we have different categories of students who need ICT skills. We have regular students, who are there on campus all the time, and we have those we call institutional-based, who come when we have closed the schools and we have open learning students who may have less ICT access. It is important to give all of them capacity in ICT. So in fact, for our planned partnership on ICT, we wrote a proposal and one of the things we wanted to see was the enhancement of ICT capacity and that cannot happen without infrastructure. So we built into that proposal, the need for infrastructure. We've got the funding, and now we are there waiting to agree and to sign the MOU and then begin that partnership. Hence, that one (e-learning) is something that we have no choice. That is the way to go, and we would want very much technology for enhancing teaching and learning. Of course, some of our students are well advanced, but the question is, how do we tap into that to make it part and parcel of the process of teaching and learning?

MH: I could see that with time, technology will make things more accessible and affordable. Kenya has a huge population so it will open up many opportunities once everyone has access to technology.

FC: That's correct. And for instance, for the institutional-based students, they come to university when the school is closed, for three weeks. So we give them a crash program, and we are saying, if we are able to enhance their ICT capacity, they can decide to take all the units without having to come to university. So it's cheaper. Eventually it will be cheaper for them because they won't have to pay for accommodations. Thus, in terms of time and money, it's going to be cheaper in the long run for everybody.

MH: The students develop skills that they'll need to work in the global world. [Correct.]

ZB: And share them with their colleagues, and their students.

FC: Exactly. We are looking forward, maybe sometime in the near future when our students and your students could be working on similar topics across the globe.

MH: This would be wonderful. So it's very exciting and provides lots of opportunities. We're wondering if there's something we didn't talk about that you would like to share with us?

FC: I think you've covered almost all the things I would have expected you to cover regarding my work. But I do also think that this kind of sharing is so critical for the globalization of our institutions; the globalization of the content that we teach; the globalization of the way that we teach, and in my view, I think we should reach a point where we can actually share some of the content. For example, you are asking about our reform of the education system, and I think it will be really good for Kenyans to also hear about the Canadian educational system. Does it go by province or is it national? So I think in terms of globalization, this is really, really important, about the kind of things that we are doing. You have no idea how many things I'm picking along the way as we are moving around in your city. I'm seeing how the infrastructure is done, how you organize your courses, and the kind of students you have in the classes. When I think of class size, my mind tells me, class size may never go down for us Kenyans, but I'm just thinking maybe you would give me some ideas of how to deal with a large class size of several hundreds. Maybe it's something to think about. So I think as we move around, I see things that we can implement, others we cannot. So there is a lot to learn, and I've learned a lot. I really appreciate this visit, and I think by the time I'm leaving, I will go back more informed and wiser. So thank you very, very much and you are welcome at Kenyatta University.

Imagination: Hope for a Severed Curriculum

Mindy Carter

Introduction: Phantom Pain

A) Phantom Pain

"How 'da body?" is the greeting which the men and women of Sierra Leone ask one another as a North America equivalent of the daily "How are you?" To this question, a regular and almost immediate response is: "Da body good/Body be fine" in lieu of "I'm fine." Interestingly enough, this question and response is oftentimes delivered between two, smiling faced individuals who also happen to have a missing arm or leg (consequence of the Sierra Leone 9-year civil war (1991-2000). This image: of a smiling person saying "Brother da body be fine" while teetering on two crutches with a leg & an arm severed (getting ready to play a game of soccer) is more than ironic.

My own grandfather lost a leg in the 2nd World War courtesy of a land mine in Italy at the age of 17. After being given large quantities of cigarettes and morphine, he spent a few months "healing" in an English hospital before returning to Canada. He eventually received a wooden leg that as a child I took for granted, as I begged him to play catch or tag with me in the back yard. It wasn't until years later when working on a high school project about prosthetics and watching the Star Wars clip when Luke Skywalker gets his own artificial arm that I asked my "Grandpa Carter" about his stump. He told of how he would still (over 50 years later) occasionally wake up in the middle of the night, groggily rubbing his eyes as he got up to go to the washroom, feel his nonexistent leg. Not until he attempted to stand with this phantom limb, did he realize that the appendage wasn't there, but a pain was.

Ramachandran and Blakeslee (1998) have described this phantom pain in a clinical study:

> I placed a coffee cup in front of John and asked him to grab it [with his phantom limb]. Just as he said he was reaching out, I yanked the cup away.
> "Ow!" he yelled. "Don't do that!"
> "What's the matter?"
> "Don't do that", he repeated. "I had just got my fingers around the cup handle when you pulled it. That really hurts!"
> Hold on a minute. I wrench a real cup from phantom fingers and the person yells, ouch! The fingers were illusory, but the pain was real—indeed, so intense that I dared not repeat the experiment. (Ramachandran & Blakeslee, 1998, p.43)

B) Phantom Pain and the Canadian Curriculum

Someone expressing severe pain in a place on his or her body in which there is no limb is almost impossible to believe. To imagine smiling faces engaging in regular daily activities with painful severed body parts is ridiculous! And yet, when asked about my own past experiences as a Canadian high school teacher, and my daily engagement with the mandated curriculum, I cannot help but to reply that I feel pain about something that is missing from/no longer in schools. The sentiment that something is painfully wrong with our schools in North America has been echoed in various ways by numerous authors Abbs, 2004; Eisner, 2002; Greene, 1995; Pinar, 2004; Ross & Gibson, 2007. And while perhaps the diagnosis of the exact educational or curricular problem sways slightly based upon who is writing, the fact that severe problems exist isn't being disputed.

So how can we try and understand this "phantom pain" in our schools? And if we can carry on with smiling faces despite whatever has been severed from the curriculum should we bother to try and understand what is missing or broken at all?

Well, thinking back to the example of my grandfather, I would have to say that though his prosthetic leg was not a substitute for his real one it did allow him to live a life which he would have been unable to without it. And did it matter to me that he could only dance in one circular direction at weddings because of his leg? Not at all; it just mattered that he could dance.

And so this is my wish: that students, teachers, parents, administration, curriculum developers, governments and others apart of the Canadian Educational Project will learn to: accept what the missing & painful pieces of the curriculum are; in order to entertain the idea that the imagination might act as an anesthetic during this time; so that eventually we can transform and move towards a curriculum of wholeness.

C) Defining Curriculum

In *The Educated Mind*, Egan (1997) outlines the models upon which the current curriculum has been fashioned. He suggests that the three traditional ideas/reasons for the curriculum are: 1) to socialize and prepare children as adequately as possible for the lives they are going to eventually lead; 2) (based on) Plato's idea that implies initiating students into disciplined knowledge (focusing on familiarity with the accumulated literate Western traditions); and 3) (congruent with) Rousseau's idea that the curriculum should be aimed at the fullest development of each individual's potential (p. 206). While Egan suggests that a combination of these three approaches to the curriculum are used most often in today's Western society, he also writes that the focus on socialization attends too much to current social conventions (leading to narrow mindedness). The Platonic curriculum tries too hard to secure an idea of reality for students (at the expense of wisdom, compassion and skills relevant to today's society). And the Rousseauian curriculum is insensitive to how far individual development is a social matter and how far intellectual skills are tied in with disciplined knowledge (leading to a superficial confidence) (Egan, p.207). He then proceeds

with the overall purpose of this book—to suggest that by developing a new set of intellectual tools we will be able to revitalize our educational system.

As Egan outlines the historical reasons for the ways in which the curriculum has been shaped in schools today, intimations of something other than a set of courses and their content is made. The 'canon' part of the curriculum it seems is created (presumably provincially) and then handed down to teachers who must then deliver the relegated information while helping to socialize students and encourage them to do their very best. Though not articulated as such, this description appears linked to currere or the infinitive form of curriculum which links the curriculum to the running/actual lived experience of the course that students and teachers experience and co-create (Pinar & Grumet, 1976).

Such a view of the curriculum is echoed in Chapter 27 of *Curriculum in a New Key* Aoki in Irwin & Pinar (2005) where the question "Why is it that we seem to be caught up in a singular meaning of the word curriculum?" (p. 72) is posed. This question speaks to the tension between seeing the curriculum as something that is the same or planned 'by' and delivered 'to' rather than viewing it as an ongoing lived experience (Aoki, 2005, p. 417). It also necessitates asking: What is curriculum? This question is of importance especially since the assertion that something within the curriculum has been severed and is thus causing pain has earlier been made.

To answer: "What is curriculum?" Aoki's idea that it is many things must be underscored so curriculum as a set of courses or content is not the only idea that comes to mind when an answer is given. Instead viewing it as a word/idea/ "highly symbolic concept" as Pinar, Reynolds, Slattery, and Taubam (1995, p. 847) do, becomes necessary in order to allow for "curriculum" to take form in new and unexpected ways.

Curriculum as a complicated conversation (which focuses on collaboration and experimentation) as Pinar (2004) articulates in *What is Curriculum Theory*? does not simplify the idea of either 'curriculum' or 'conversation.' Instead, all involved and invested in education, schools and students are included and encouraged to explore "what curriculum is" in order to contribute to its living-breathing evolution. Thus, conversations are encouraged to take place not only amongst administrators and policy makers but between stakeholders of all ilk.

D) A Historical look at Curriculum Studies

If conversations about the curriculum as a lived and co-constructed human experience are not to be had, the curriculum becomes nothing but something that must be covered/endured/gotten through. When this is the case for a teacher and his or her students, sitting down and just digging into whatever text is already available becomes the sad reality of schooling. Images of bloated students filled to excess with 'empty' words, dates, formulas and verbatim texts ingesting whatever is put before them is like a 'fast-food' version of education and knowledge acquisition…forgotten as quickly as consumed.

But how has such a state been reached? In order to understand a bit about how the idea of 'curriculum' has evolved, the work of Franklin Bobbitt, a member of the Faculty of Administration at The University of Chicago, who introduced curriculum theory through *The Curriculum* in 1918 will be touched

upon. Bobbitt in this work proposed analyzing various educational activities within specific subject areas in order to consider purposes/objectives underlying these activities into curriculum design. Such steps towards organizing and assessing what would/should be learnt allowed for the study of curriculum to take place.

The work of Ralph Tyler then notably emerged and emphasized the idea of curriculum as a mechanical/scientific/production—like process in the 1940's. Outlined in *Basic Principles of Curriculum and Instruction* Tyler's (1949) 'rationale' for approaching curriculum in an assembly style manner directly affected the political and economic landscape during the 50's and effects of this production and standardized oriented model for approaching and delivering curriculum continues today.

Though at times it may appear to be difficult to challenge the ways in which "curriculum" (was/is) defined and studied, theorists such as Freire (1970), Grumet (1988), Van Manen (1990), Pinar (2004), Aoki (2005), Fels & Belliveau (2008) and many others have and continue to conceptualize the curriculum as dynamic, autobiographical, experiential, reflective and personal rather than fixed, prescriptive and standardized. Their work gives us all hope that through the provision of nourishing and sustaining words, ideas and knowledge (which once engaged with) can lead to substantive and mind-expanding conversations, readings and writings.

E) The Severed Parts of the Curriculum

Perceiving the curriculum as a lived, dynamic, constantly becoming meaningful journey allows for the inclusion of teachers, students, policy makers, text book writers, publishers and their readers, administrators, the public, parents, governments and economists to all be considered as invested stakeholders in the curriculum. Signifying that when one person or part of this system is severed, the entire curriculum is affected. Thus, being a part of this whole requires that all individuals equally contribute to the health and wellbeing of the larger entity that is the curriculum.

Part 1: Understanding the Severed Pieces

Increasing school violence (Gallagher, 2007), child poverty and bored students…there is a not-so-phantom pain in our classrooms. Greene (1995) describes this state by drawing upon DeLillo's image of a noxious cloud that is invisible and filled with a dangerous chemical that settles a top of a town. The men and women of the area then simply wait for the effects of the cloud to occur. This description is used by Greene to encourage the development of critical thinking in schools so that students do not become passive victims of 'whatever is going to befall them.' While one may agree that the phantom which moves within our lockers and hallways does so undetected (at first), is the pain which sets into the once laughter-filled spaces really going to be alleviated simply by students being able to think about what is going to inevitably happen? Or must we first understand that something that was/is in each of us has been taken away in order to find a way to live with the pain and to collectively grieve what has been lost so that nunca mas (never again) can this happen. Perhaps it is only once this individual and collective acknowledgement of loss and pain has occurred that together we can imagine a way to create a new future.

A) Economic & political cohesiveness: The noxious cloud of neo-liberalism

Neo-liberalism has been one of the noxious clouds, which has adversely affected and contributed to the current climate in education. This shift from Keynesian economics, a time when the government took responsibility for maintaining full employment and the generosity of the welfare state to the themes of neo-liberalism are defined by Martinez and Garcia (2000) in Ross & Gibson (2007) as:

> a set of economic policies that have become widespread during the last 25 years or so. Although the word is rarely heard in United States, you can clearly see the effects of neo-liberalism here as the rich grow richer and the poor grow poorer…Around the world, neo-liberalism has been imposed by powerful financial institutions like the International Monetary Fund (IMF), the World Bank and the Inter-American Development Bank…the capitalist crisis over the last 25 years, with its shrinking profit rates, inspired the corporate elite to revive economic liberalism.

Neo-liberalism entered Canadian public discussions before 1984 (the year Brian Mulroney became Prime Minister) (McBride, 2005) and the necessity of shifting and restructuring politically to neo-liberalism is suggested to have happened because of the country's economic needs and commitment to globalization. However, there are some who would suggest that neo-liberalism "involved political action aimed at reducing or removing impediments to market forces" (McBride, 2005, p. 99). Thus, implying that globalization is more of a consequence of political change than the reverse. Regardless of the importance of this chicken or egg line of questioning, it is the finality of the effects that this "current version" of how a few of the wealthy have tried to restrict the rights and power of many has had on educational reform and the curriculum in the past two and a half decades.

Specifically, the effect of neo-liberal policies on education (aimed at K-12 schools and Universities) has been to: "…emphasize opening up the educational services market to for-profit educational management organizations…reduce educational costs, often through economies of scale (by) closing school libraries, reducing the number of special needs teachers, increasing class size (and) expanding online learning programs…(and to) focus on (the) creation of curriculum standards (where the state defines the knowledge to be taught)" (Ross & Gibson, 2007, p. 4). This description of neo-liberal education reform can be described as puppetry. Or, an ongoing control and tension between the political and economic powerhouses 'from above' dictating and regulating the exact and precise actions of those teachers, students, schools, programs, curricular documents etc. that are being forced to move in a pre-fabricated way 'below' (Carter, 2008).

This educational nightmare that is the present, to borrow William Pinar's phrasing (2004), seems structured to manufacture students who can simply recall specific information at specific times for specific ends; teachers who are complacent and content delivering pre-prescribed subject matter; or a public who continually re-elects governments who care less about creative growth and individual imagination than the cost of textbooks and heating schools. To put it bluntly: joy, excitement, awe, love, emotion, dreaming, imagination, poetry, dance, warm breezes and siestas have been severed not only from our children's scholarly curriculum but, from the daily pulse of our collective life.

B) Agency: Teacher/Student/Administrative connection

> Reducing teachers to postal workers, carrying other people's mail (prepackaged, teacher-proof curriculum) and bullying those who prepare them (the education professorate) will only distort the "market" and thereby intensify the problem.
> (Pinar, 2004, p. 219)

Current high stakes standardized testing practices and outcome driven educational initiatives remind us that we are not moving towards a catastrophe in education/curriculum but rather, that we have somehow arrived here. New teachers are graduating with an understanding, that they must be creative only so far so as to still cover curriculum that is tested on provincial tests and that prescriptive individual educational plans are not quite as individual as one might imagine, when students are labeled and sorted into specific categories with specific ways of managing said behaviors or learning exceptionalities to begin with.

But, what is the alternative? Is this current situation simply one to be endured for a period of time before something else comes along? Or does being a participant (willing or otherwise) in a hegemonic institution or position, cause the individual to either find a way to adapt and become a part of the institution or position even if they believe that they are conscious of choosing to play a role to do this or to revolt and be unable to be a part of said organization which may take the form of collapsing into the self and withdrawing from the social sphere or by trying to upset the current balance of power through violence in a variety of forms (Carter, 2008)?

In either case, change or the retreat from changing can only occur on a personal level and one must therefore understand and grapple with a political, social or other type of issue, in a deeply personal way, in order to actually find a way to move oneself from complacency to action in order to understand what direction they believe is the right one to be moving in, despite the forces which try and control the individual. Buddhists suggest that one must find personal enlightenment (or wisdom) before being able to lead others to discover it for themselves. In some ways, the sense of fully being oneself/having self-awareness is necessary for one to act with agency and to also contribute to the re-building of a healthy curriculum in communion with others.

C) The great community: Safety, love & trust

> Thinking of those spectators as participants in an ongoing dialogue, each one speaking out of a distinct perspective and yet open to those around, I find a kind of paradigm for what I have in mind (Greene, 1995, p.156).

> Being cannot be anything but being-with-one another, circulating in the with and as the with of this singularly plural coexistence (Nancy, 1991/2000, p.3).
> To open up our experience (and, yes, our curricula) to existential possibilities of multiple kinds is to extend and deepen what each of us thinks of when he or she speaks of a community (Greene, 1995, p. 161).

> …most people don't do much of it (develop abstract ideas/theoretic thinking) unless supported by a community such as a school…(Egan, 2005, p. 163).

When contemplating how various situations affect the individual and the ways that they are either moved to take personal action or to stay silent, the role that community has to play in such encounters is powerful. In *Being with a/r/tography*, Irwin (2008) writes explicitly about communities of a/r/tographic practice by first focusing theoretically on how "there is no such thing as a single being for we are positioned with, among, beside and between positions (or dis-positions) that leads to an understanding that all appearance is co-appearance" (p.71) before acknowledging that "we are singular plural beings that are part of the whole of being singular plural" (p.72). The suggestion that we are simultaneously beings on our own (really only truly capable of being when with others) (since being is relational to being positioned among, beside, with etc.) harkens memories of Dewey's ([1927], 1954) Great Community and Greene's fertile interchange of an ongoing dialogue where an individual's unique perspective is essential for the growth and flourishing of a community.

It is such a community where one is "being-singular—plural" that also questions its own legitimacy (in order to avoid becoming a site of negative social reproduction) (Irwin, 2008) that people can come together to begin to imagine a curriculum sans impediments and have a complicated, ever-unraveling-never-ending conversation about education.

Part 2: The Imagination: Dualisms, Mediation and Bridges

> For all their appalling experience, they ached for the deeper experience of imagination (Barker, 1989, p. 65)

A) Defining Imagination

> One of the most general descriptions of the function assigned to imagination by Kant is that of mediation: imagination mediates between many of the dualisms that Kant employs throughout his work-including those between concepts and intuition, thought and sensibility, spontaneity and passivity, subject and object, and, somewhat more indirectly, nature and freedom. As a capacity to bridge gaps in cognition and experience this mediating function of imagination marks the finitude and, at the same time, the open ended nature of human cognition. Imagination is, in this sense, the capacity of a finite, discursive intelligence to work up the material of experience from its diverse elements into something which can be known and judged (Gibbons, 1994, p. 2).

Dualisms. As mentioned above, Kant (2007) employs them throughout his work explicitly to develop his inward turning theory (specifically in Critique of Pure Reason) and later in the Critique of Judgment in which the human mind is seen as a creative agent and the transcendental imagination (Einbildungskraft) as one of the elements that bridges (on one side) sense data and intuition with concepts and categories (on the other). Kant suggested that by dwelling within this constructive connecting middle that occupies a Zwischenland (between land) possibility for change and play allowing any object the po-

tential to be in constant becoming can occur. Theoretically, in this 'third space' seemingly harkening Homi Bhaba's (1994) hybrid location of perpetual tension, and pregnant chaos the imagination has free reign to explore any concept, idea, role or conceptualization free from societal conditioning. However, there are some notable deviations between Bhabha's third space as described by Barrera and Kramer (2005) and Kant's Zwischenland. Specifically, while Bhabha's third space describes holding two or more divergent and even contradictory views (even dualisms) in one's mind at the same time, without forcing a choice between them (and presumably allowing for a new hybrid creation to spring forth); Kant is more focused on the Zwischenland as a space where the mind does not need to hold any views or ideas at all and instead sees this space not as an overlap between any previously held ideas or beliefs but, truly as a space of unknown potential where the imagination mediates between a pre-hatched idea/intuition and something completely unknown.

As Kundera (1985) discusses in *The Unbearable Lightness of Being* dualisms specifically lightness and weight are presented in relation to Parmenides' sixth century division of the world into opposites: light/darkness, fineness/coarseness, warmth/cold, being/nonbeing. While Parmenides further divided these opposites into negative (darkness, coarseness, cold, nonbeing) and positive (light, fineness, warmth, being) poles, Kundera questions these differentiations (pp. 5-6). For Kundera, differentiating dualisms as positive or negative can be seen to be problematic; however, consider the dualism of pain/non-pain. If one is in pain where nothing but that pain is present in ones life, does one not become this pain since their being in all states (mentally, physically, emotionally, spiritually) is in severe distress and unable to function in any capacity that is pain-free? One might tend to agree with this syllogism (and to also conclude that pain is negative) except that for some masochistic people pain is actually pleasurable and for others it leads them to appreciate the simple taken for granted moments of life that were routine before pain prevented them from easily occurring.

This discussion does not even address the potential of trying to focus the mind elsewhere when in a painful state to help and alleviate the body's frustrations or to engage in physical activity in order to quiet and focus the mind. It does however suggest that the imagination can help one to overcome even the most extreme physical and mental anguish.

> And as imagination bodies forth
> The forms of things unknown, the poet's pen
> Turns them to shapes, and gives to airy nothing
> A local habitation and a name
> A Midsummer Night's Dream (Shakespeare, 1993, v. 1)

> The role of the imagination is not to resolve, not to point the way, not to improve. It is to awaken, to disclose the ordinarily unseen, unheard and unexpected (Greene, 1995, p. 28)

Mediator. Imagination as a mediator between dualisms is a common reoccurrence for Kant as well as for many other authors who have written about the imagination. For Shakespeare, the imagination is a creative force that allows men or women to name their world(s) and to move beyond thought to action,

while Greene (1995) sees it as something, which can help one to see what was unseen or hear what is normally unheard. In practical terms, the imagination as a mediator is employed when one develops a new image of schools and schooling, as Eisner ([1979] 2002) suggests we do in *The Educational Imagination*. Thus in an educational and practical context, the curriculum which has been acknowledged as existing with a 'phantom pain' can be imagined in another way. In any other way, in fact for those who are singular plural beings in communion with one another can fathom.

> Everything is possessed except the imagination. (Barker, 1989, p. 23)

Bridge. Imagination as a bridge which unites and awakens what was once un-seen, un-heard or un-expected brings with it a sense of rebirth and renewal. It is as though hiding away just below the surface of our conscious minds, deeper and long ached for potential experiences can come-to-be when the power of the imagination is employed. The imagination is a hopeful way to contemplate the curriculum in that so long as we can imagine things other than they are, we can do the impossible and not only endure what has been severed but rebuild and flourish in unbelievable, unheard of, incredible, rich, luxurious and ecstatic ways.

B) Emotions

> "She is very sensitive" is not usually a compliment (Naess, 2002, p. 52)
>
> One reason for the comparatively low standing that emotions are still accorded in society at large is that people ascribe to them little or no value as knowledge (Naess, 2002, p. 53)
>
> It is often pedagogically useful to say, 'Pretend that you are…' Emotions swing into action, and in many cases we can attain a three-stage process: imagination-positive feeling-learning (Naess, 2002, p. 72)

I fear it impossible to have a discussion about the imagination without at some point at least also making mention of emotions. Emotions, as Naess states, are indeed given little press when it comes to being a valuable way to gain knowledge. And in the sense that we sometimes feel things before we 'know' them, I would suggest that the imagination also has an important role to play in reifying the under represented relationship between "knowing and feeling" in today's educational system. If the imagination can help to break the domination of our ordinary everyday habits of conception then it is the emotions, which lead one oftentimes to use the imagination for 'changing what is' into 'what could be.'

For Spinoza, people are not born free but rather through experience and training can come to freedom. Insight into one's own negative feelings (passive) (and their detrimental effects) can lead to their replacement by positive feelings (active) (Naess, 2002, p. 80). It is only through the active (rather than the passive) emotions which promote feelings of community and friendship that a peaceful and harmonious society and its systems can emerge. Self-realization (which is equated with happiness) is thus for Spinoza a personal self-engagement with the active emotions and even more than this a part of man/women's ess-ence.

C) Imagination, Emotion and Education/Curriculum

> …the imagination is tied in complex ways to our emotional lives…successful education does require some emotional involvement of the student with the subject matter (Egan, 2005, p. xii)

> For all possibilities reach us through the imagination (Dewey, 1962, p. 43)

> Taming the imagination reduces the creative power of humankind (Naess, 2002, p. 71)

In *Stupidity and Tears* by Kohl (2004), there are a number of important remarks made about teaching and learning in the educational world that are related to imagination. In this book, Kohl concentrates on the imagination as a powerful tool for students in the classroom, because he sees the imagination as something that is redeeming and nurturing that can reach beyond the forbidden and the unspoken allowing people to play with possible truths and transcend everyday reality so that they can begin to define and understand their own values and selves (p. 94).

For Kohl, the study and promotion of the imagination and its creative expression is an essential tool within the classroom. He has worked with students who have survived the experiences of refugee camps, poverty and abuse by hiding inside their own imaginations and expressing their feelings through artistic play. Kohl issues a plea for the creative, compassionate and social imagination because he believes that:

> we cannot afford to allow people to become so small that they can dream only a world of violence, greed and joyless competition. Teachers and parents and all the rest of us need to be as imaginative as our children, to nurture their imaginations as well as our own, and to keep on, no matter the circumstances, dreaming and acting for a more decent, compassionate, and equitable world. In hard times, this is one of the finest gifts we can provide for our children, for other people's children, and for ourselves. (pp. 98-99).

Kohl (2004), Egan (2005), Greene (1995), Dewey (1962), Naess (2002), and Eisner (2002) are just a few of the educational based philosophers who have time and time again made the connection between the importance of encouraging and fostering the emotions and imaginations of students young and old through engagement with the curriculum. It would seem that since this connection and its importance has been and is continually articulated as sacred and significant that there would be a course within the written curricular documents for children and youth on the "subjects" of emotionology and imaginology rather than simply suggesting as Egan does that all subject areas should be infused with the imagination. Perhaps attempting to complicate the curricular conversation with those who make such policy and course-content by dialoging on this topic in the sort of language which adequately convinces them that developing such skills for the marketplace are actually not incongruent with a global economy and workforce but, rather complementary and need to take place.

D) Imagination & Multiple Intelligence's

> In Norwegian schools for example, there is still a lack of practice in developing the imagination. "What would have happened if Napolean had won the Battle at Waterloo?" "What if America was 'discovered' three hundred or five hundred years later?" "What if Hitler won?" One does not learn to ask such good questions. (Naess, 2002, p. 71)

Perhaps one way to establish a connection between the curriculum and emotional and imaginative development is through Gardner's (1983) infamous multiple intelligence theory. Fels & Belliveau (2008) suggest doing just this as they promote the adoption of a 'performative-imaginative' intelligence to Gardner's theory in *Exploring Curriculum* (in order to aid in the legitimization of role drama and performative inquiry in learning). This connection and addition seems to be a logical and necessary one as it enables the 'performative-imaginative' intelligence to be grounded theoretically and subjected to the same process of refinement that other theories have been. One might suggest that it is indeed necessary to 'legitimize' imaginative and emotional learning in order to then teach for imaginative and emotional development and knowing as one would math or science.

E) Learning to teach and learn with/for the Imagination & Emotion

> Where imagination has died, education cannot live (Fettes, 2005).

Egan (2005), Abbs (2004), Naess (2002), Greene (1995), and Eisner (2002) encourage incorporating music and art as catalysts for the release of intense feelings that make lasting impressions upon students immediately. They do not think that it is necessary for any stamp of approval to be given before infusing the curriculum with such forces. Shakespeare in King Lear also echoes this call and reminds us that we must "Speak what we feel, not what we ought to say" (V. III, 378), rather than adding to the complacent repetition of 'empty and trivial truths' (Arendt, 1958, p. 5) that turn their back on authenticity. But how?

Abbs (2004) uses his own educational experiences in "Against the Flow" to describe the loss of emotional development in schools explicating that: "Never once did my tireless and well-meaning teacher engage my feelings, the latent energies of my aesthetic and existential responses" (p. 9). Should it be seen as an atrocity that students do not feel as though their feelings and questions are being addressed adequately and that teachers are asked to put aside their own creativity, emotions and feelings in order to educate and focus on the 'curriculum'? Or is this the main part of the educational project that has been severed and in need of repair? If the goal of education and learning is to create "insignificant sleepwalkers drifting through the dark night of prescriptive education…where the schools that exist…have become no more than corporations run by managers for the collective standardization of life" (Abbs, 2004, p. 27) then engaging emotions and feelings is not the answer for the schools and those who work in them. However, if we are to promote the growth of the individual and ultimately the growth of a democratic society where people care about one another, then schools and the curriculum's "soul" or "…daily battle to enlarge, en-

rich, and make more abundant the experience of children", stimulation and regular use of the imagination (Egan, 2005, p. 212) must be practiced.

Whether on a practical note teachers turn to the work of the Imaginative Education Research Group (www.ierg.net), Egan's (2005) practical "and imaginative approach to teaching" or their own imaginations as their start, any step to reigniting and fanning the flames of the emotions and imagination are sure to be of benefit.

Part 3: New Directions

> We must dare to learn how to dare in order to say no to the bureaucratization of the mind in which we are exposed to every day. We must dare so that we can continue to do so even when it is so much more materially advantageous to stop daring
> (Freire, 1998, p. xviii).

> For all the world's sake something must be done. Those who have these disturbing thoughts must begin to do some of the neglected things. Even if it just be anybody, by no means the most suitable person. There is no one else at hand (Rilke in Abbs, 2004).

> Imagination brings the severed parts together (Woolf, 1976).

> …where teachers experience a mismatch between what they imagine an educational situation will be like and the real experience…some sort of transformation has the potential to occur (Fettes, 2005).

> After self-understanding, comes, self-mobilization in the service of social reconstruction (Pinar, 2004, p. 201).

There can never be a return to the nostalgic perfection of yesteryear. Nor can there be any psychic or metaphysical movement towards an ideal of any sort so long as one is stuck in the cycle of laying blame upon something or someone for past wrongs. People cannot create a completely perfect new whole from something that has been severed. However, through the imagination or even imagining in new ways, we can lay aside the props which are tenuously holding up the current educational and curricular façade and allow the leaks and real pain that exist in this system to be fully felt. Only then can we bring to our growing communities our dreams of what 'could' be.

Conclusions

A checklist that must be covered in order to proceed with the social and personal reconstruction of the curriculum cannot exist. This work is real and messy and personal. It is about sitting in classrooms with second graders and listening to them dream about painting butterflies on their classroom walls (because butterflies make everyone happy); or hugging a grade 10 student as he sobs in your arms because his best friend has committed suicide (despite being warned that physical contact between students and teachers is 'wrong'); it is being challenged at the University to come up with your own questions and reading lists for

essays and being permitted to think rather than speak when the time for silence and thought is in season. It is trusting that we each possess within us the beauty of the morning sun and the passion of the crashing waves…The ingenuity of creating an airplane that can fly…Or the ability to elegantly work through a mathematical proof. We are and we will be…

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Meditative Education: A Proposal for the Existential Renewal of Teacher Education in the 21st Century[i]

Ashwani Kumar

Introduction

Education is essentially a subjective phenomenon. That is, education is for students and teachers—who are human beings not machines—and, therefore, it requires their engaged subjective participation and engagement. However, when the primary focus of education becomes centered on the transmission of information, as it is predominant in most schools, it loses sight of the subjective consciousness of the participants for which education should be primarily intended. The ever present rave about curriculum documents, lesson plans, curriculum outcomes, evaluation procedures, behavioral objectives, examinations, and standardized testing in education parlance—that systematically efface the relevance of the active presence of teachers and students in the process of education—are evidence of a complete denial or negligence of the significance of the study of subjective consciousness in educational experience.

Consciousness is an essential aspect of human life. It is an existential movement in each one of us. It is a constant movement of desires, memories, experiences, fears, anxiety, suffering, pain, beliefs, images, conflicts, and aspirations that each one of us experiences within ourselves on a daily basis. It is also our consciousness that lies at the very base of our thoughts, actions, and feelings (Krishnamurti & Bohm, 1986). In spite of the enormous presence of consciousness in our life and its influence on whatever we do, our schools seem to pay little attention to the significance of understanding and transformation of the former. Education in most schools happens as if it is meant for "machines" rather than human beings who possess consciousness that is a living, complex, and ever changing phenomenon.

Given the centrality of consciousness in human life and due to practically a total absence of any consideration of it in most contemporary schools, I would like to argue that a central purpose of education should be the study of one's consciousness and one's relationship to people, nature, and ideas. An education that encourages teachers and students to study themselves is basically a meditative education.[ii] Needless to say, meditative education is not only necessary for the growth and development of the individuals but also for the transformation of society.

Due to the significance of meditative education for students and teachers, I also want to propose that meditative study of one's self should be a central dimension of teacher education. From a meditative perspective, teacher educators are not mere instruments whose purpose is to prepare pre-service and in-

service teachers to "creatively" implement the state-mandated curriculum. On the contrary, in light of a meditative perspective, the role of teacher educators becomes very profound where they allow themselves and their students time to engage in deeper conversations about themselves and how the latter is related to true teaching, learning and above all living.

This extraordinary significance of consciousness and the importance of its study and transformation are at the core of the writings of two educators—James Macdonald (1925-1983) and Jiddu Krishnamurti (1895-1986)—whose ideas provide background material for conceptualizing the fundamentals of a meditative education. While coming from different backgrounds and standpoints, both men consider consciousness as the key element of human life and therefore education.

James B. Macdonald, the "great curriculum theorist" (Pinar, 2009, p. 190), was an important educator whose path-breaking scholarship laid the ground for the reconceptualization movement of curriculum studies—from "curriculum development" to "understanding curriculum"—in North America (Pinar, Reynolds, Slattery, & Taubman,1995). The central thesis that pervades Macdonald's work explains the inseparability of personal and social change. Macdonald proposed that any *real* change in society is only possible through radical change in individual consciousness. Curriculum and school can, Macdonald suggested, provide viable opportunities for change in human consciousness in order to bring about change in society.[iii]

Jiddu Krishnamurti (1895-1986) was a world renowned educator, philosopher, and institution builder from India who contributed immensely to the fields of philosophy, education, religious studies, consciousness studies, and psychology. His greatest contribution lies in his profound insights into the conflict-ridden nature of human consciousness and the significance of the art of awareness to understand and transform the former. In his lifetime, Krishnamurti established several schools, study centres, and foundations in India, the UK, and the USA that continue to survive as one of the major alternative educational institutions in the world. Krishnamurti's main intention behind establishing schools was to provide teachers and students with the opportunity to explore their own selves along with acquiring disciplinary knowledge and developing creative potentials such as in music and the arts. Krishnamurti's insights into the meaning and significance of life and education are contained in more than seventy books. Through his work, Krishnamurti shared a significant approach to education centered on self-knowledge and psychological transformation. Major themes that characterize Krishnamurti's writings, public talks, and dialogues with students, teachers, and scholars include: education, meditation, fear, self-knowledge, psychological revolution, world crisis, peace, truth, intelligence, consciousness, time, and creativity.[iv]

Significantly, both Krishnamurti and Macdonald think that the highest function of education is to provide opportunities for teachers and their students to understand and transform their consciousness and, thereby, society. Consider their statements regarding the role of education:

> [Education] should help the student to recognize and break down in himself [herself] all social distinctions and prejudices, and discourage the acquisitive pursuit of power and domination. It should encourage the right kind of self-observation and the experiencing of life

> as a whole, which is not to give significance to the part, to the "me" and the "mine," but to help the mind to go above and beyond itself to discover the real. (Krishnamurti, 1953, p. 46)
>
> [M]an [woman] has a personal, self-actualizing and creative capability not limited solely by biology or conditioning; that personal response is the avenue through which individuals stretch and reach their potentialities; and that a view of human development which wishes to focus upon human potentialities must centre upon the development aspect of personal responsiveness [that constitute self-aware, self-critical and self-enhancing capacities (Allport, 1955 cited in Macdonald, 1995/1964)] (p. 17).

In what ways can we provide opportunities at the level of the school so that students and their teachers "discover the real" and "reach their potential"? In other words, in what ways can we help lay the groundwork to provide self-transformative educational experiences in schools? Meditative education, I believe, can be a significant response to these questions.

A meditative education basically aspires to cultivate a deeper sense of awareness among teachers and students of themselves and their relationships to people and nature. Cultivation of such a deeper sense of awareness requires an emphasis on learning the arts of listening, seeing, and dialogue as well as developing the qualities of openness, personal responsiveness, aesthetics, centering, and transcendence in educational experience.

Personal Responsiveness, Openness, and the Reality-Centered School

Krishnamurti (1953, 1964) and Macdonald (1995/1964) think that society, through its incessant conditioning mechanisms, greatly undermines the quality of creative and critical response among its youth to the inner (biological and psychological) and the outer (e.g., cultural conditioning) challenges. In Macdonald's (1995/1964) view, the fulfillment of the minimal conditions (i.e., physical growth and learning of social signs and symbols) is necessary but not sufficient for the development of "personal responsiveness." Social conditions, according to Macdonald (1995/1964), are "essentially *closed*" (Macdonald 1995/1964, p. 19) in nature. "No matter what the structure of a specific culture may be," Macdonald explains, "the individual is closed in its symbolic universe and world view, its customs and mores, its functions and objects" (p. 19). While biological maturation and socialization are important, the development of personal responsiveness requires what Macdonald calls "openness to life." *Openness* to life is the "maximal condition for developing human potential" (p. 20). It implies to be "open in thought" (fluent, flexible, and original), "open in affect" (experiencing the potential feelings in an activity), and "open in perception" (meeting the potential stimuli in the world). Significantly, this openness is not merely cognitive; it also encompasses the affective and perceptual dimensions. Do our contemporary schools facilitate the development of openness and personal responsiveness? Do our teacher education programs provide opportunities to the inservice and preservice teachers to understand the significance of openness and personal responsiveness?

In Macdonald's (1995/1964) view schools, via an "imposition of authority," establish absolute stan-

dards of "good" and "bad" and "right" and "wrong" instead of relatively open concepts like "appropriate" and "inappropriate." The imposition of absolute standards of "good" and "bad" instead of a relative understanding of "appropriateness" or "inappropriateness" closes "alternatives in the development process" and stultifies "individual judgment" (p. 26). Since most of our schools are basically grounded on a reward and punishment system (Krishnamurti, 1953) students generally tend to move along the predetermined standards and are thus embedded (Macdonald 1995/1964).[v] "Learning becomes an affect-embedded necessity to maintain balance by escaping [punishment,] shame, guilt, anxiety, and seeking socially approved satisfaction and gratification" (p. 28). Naturally, imposition of authority and cultivation of fear undermines qualities of openness and personal responsiveness. Unfortunately, many teacher education programs only prepare teachers to be good implementers of these predetermined standards and thus contribute to their own and their students' embeddedness.

Instead of giving a "prescription" (Freire, 1973, p. 47) of what is "right" or "wrong," Macdonald (1995/1964) appeals to teachers—and I would consider this equally valuable for teacher educators—to engage their students in a *value clarification process*: "a questioning behavior which is essentially non-judgmental and which does not reject pupils' answers (p. 29)." The main goal of this pedagogic approach is to encourage students (in schools as well as in teacher education programs) to be self-reflective of their thinking, assumptions, and values (p. 29). Such a dialogic pedagogy requires teachers and teacher educators who realize the significance of deep listening, empathy, and consideration of students' thoughts and feelings.

The school that gives space to openness, dialogue, responsiveness, and humanistic relations between teacher and learner "is not child-centered or society-centered, or subject-matter centered. It is *reality-centered*" (Macdonald, 1995/1964, p. 32):

> [S]chool does not exist primarily to inculcate our cultural heritage, not principally to develop role players for society, nor primarily to meet the needs and interests of learners. *The school exists to bring learners in contact with reality, of which our society, ourselves, and our cultural heritage are parts*. (p. 32; Emphasis added)

The basic goal of a reality-centered school and its education is founded upon the principle that children are self-actualizing. It sets learners free to explore, seek, search, discover, invent, and experiment. The teacher's role in a reality-centered school is to guide, clarify, help, and support the children. The reality-centered school is an "open" school[vi] where children are seen as self-actualizers and creators and the goal of learning is primarily to develop their capacities of "openness" and "responsiveness." "Reality-centered school," Macdonald (1995/1964) maintains, "recognizes that *living is learning and the quality of living is the quality of learning*" (Macdonald, 1995/1964, p. 33; Emphasis in original). That is, "living" and "learning" are not mutually exclusive domains. In fact, it is the perceptive understanding of how one lives—thinks, feels, and acts—that constitutes learning rather than mere passive information absorption. The more deeply one understands one's living, the more perceptively and insightfully one learns. Yet again the significance of the teacher educators who understand and realize the value of connectedness of living and learning cannot be emphasized enough. Without the existence of teacher educators who see learning and living as connected

processes, the possibility of teachers creating reality-centered schools, which can foster the qualities of openness and personal responsiveness, seems dismal.

Freedom, Aesthetics, and Love

Underscoring the critical significance of "personal responsiveness," "openness," and the "reality-centered school" is recognizing the tremendous importance of subjectivity in the educational process. Contemporary schools, and in many cases teacher education programs, because of primarily being based on technical rationality (the core of positivistic-behaviouristic-administraive-institutional-managerial-technocratic-standardized-scientific thinking), have overemphasized production of skillful technicians who are organized into complex bureaucratic structures and thereby have greatly undermined the importance of individuality and "creative humanness." Thus, the majority of our schools and teacher education programs have become an integral cog in our technocratic system as exemplified by the prevalence of alienation, boredom, law and order, regimentation, and de-personalization in their overall working (Macdonald 1995/1971b, p. 50). It is disheartening to see how often the pre-service teachers that I teach seem alienated because of the instrumentalist demands of an outcome-based provincial education which undermine creative capabilities of teachers and their students to be free to work with a curriculum and pedagogy of their own choice that emerges out of their own specific contexts.

Our schools also dehumanize teachers and students when they organize educational experience around the "accumulative consumption ideology" (Macdonald, 1995/1975, p. 122) or "ideology of achievement" that justifies grouping practices, testing programs, grading, reporting, scheduling, and most of the current school practices (Macdonald, 1995/1971b, p. 51). The ways in which standardized tests and the subsequent comparison of students, teachers, and schools based on their results terrorize everyone and create a culture of competition is well documented? Recently I heard a superintendent from a school board in Western Canada at a conference in Halifax. In his view, the most crucial way to carry out schools reforms—which Bill Pinar (2011) accurately calls "school deform"—is to promote competition among them so that they may perform well to retain the number of their students. Is this not educational barbarism in the name of school reforms?

The ideology of achievement, naturally, is based on the principles of behaviorism, scientism, and psychologism where students are "learners" who have to be "motivated" and "measured," and who possess certain "traits," "capacities," and "needs," which educators "diagnose" (Macdonald, 1995/1971b, p. 52). Tests (standardized and otherwise) in schools represent the grossest manifestations of the ideology of achievement. Tests are justified all over the world because they "facilitate learning" through feedback and reinforcement. Few teachers and administrators, however, seem to bother about the question: What is the intrinsic value of conducting tests in terms of the growth and development of students and their teachers? According to Macdonald (1995/1971a):

> [S]tudents are taught their abilities by continuous evaluation and allotted social slots on the

> basis of their cumulative performance. This provides a useful way for society to deal with the young as they emerge into the work force, for we can be assured that their predictive success (in terms of tests) has been set (psychologically and socially) as early as fourth or fifth grade. (p. 42)

Guided by the "ideology of achievement," the "best" curriculum is thought to be the one that is devoted to the realization of the collective goals and the content of which is measurable, specific in detail, and emphasizes the academic knowledge and skills necessary for collective needs—primarily reading, mathematics, and science (Macdonald, 1995/1971b, p. 54). In essence, technological rationality—"irrational rationality" (Macdonald 1995/1981a)—predominates in schools and is "characterized by a complete commitment to an instrumental thinking which separates means from ends…emphasizes the efficiency and effectiveness of measurable achievement and divorces human activity from the source of valued meanings or qualities" (p. 162). Undoubtedly, as educators, it is our fundamental and moral responsibility not to succumb to the "ideology of achievement" and work as an "accountable technician" for the collective. On the contrary, we should help our students—whether in schools or in teacher education programs—and ourselves in developing their and our own full individual potential.

How can we make sure that individuals remain at the core of the educational process? First of all, we need to draw students' and teachers' attention toward the dominant "cultural mind-set" of the ideology of achievement and the ways in which it enters:

> [their] lives through such practices as behavioral objectives, behavioral modification, and management by objectives, systems analysis, teacher competency approaches, and accountability movements. They must be constantly encouraged to shift from the "How?" to the "What?" and the "Why?" (Macdonald, 1995/1981a, p. 162)

Second, we must realize that "freedom" is a fundamental requirement in students' as well as their teachers' self-actualization. It is the presence of freedom and individuality that gives rise to "purposefulness" in life (Macdonald 1995/1971a, p. 18). Thus, students and teachers need to be given the space to make efforts on their own and have experiences so that they can choose and be free of the constraints of the environment and their own internal structures (Macdonald 1995/1971b, p. 53).[vii]

In other words, education should help students and teachers to question and go beyond conditioning influences in and about them. In the absence of freedom students and their teachers will only conform to the conditions set by the society and breed mediocrity (Krishnamurti, 1953). If we could emphasize creative self-understanding, instead of forcing the conditioning and the ideology of achievement, the former will naturally allow for the growth and development of students personal interests and unique approaches to pursue and nurture those interests that may ultimately flower into their vocation or profession. For teachers possibilities of creative self-understanding and a freedom from working as a slave of the ideology of achievement (which is perhaps a chief cause of prevalence of burn out and stress), will reconceptualize teaching as a deeply creative and fulfilling profession rather than as a routine job in an ideological state apparatus (Althusser, 1971) that we call school.

Finally, we must bring back the aesthetic dimensions of education—humanities, the arts, literature, philosophy, and other aspects of social studies—that are slowly being pushed out of the school curriculum to the desert of irrelevance because they cannot easily be included in the rhetoric of the ideology of achievement (Macdonald, 1995/1971b, p. 54-55). It is the aesthetic dimension that can act as a "counter culture" (Roszak, 1970) and become a vehicle for providing a broadened freedom for the development of individual potentiality and of aesthetic relations to the world. Why aesthetic education? In Macdonald's (1995/1971b) view:

> The humanities [arts, literature, and philosophy] as a counter culture in the schools are focused squarely upon development of individual persons as human beings, upon welding of feeling and thought with action, and upon the awareness, experiencing, and analysis of cultural forms as expressive symbols. The validation of the truth of the humanities lies within the process of creating personal meaning in experiences, not in experimental abstractions and manipulations.(p. 57).

Aesthetic sensibility broadens the meaning and implications of rationality; it brings in emotions and creativity with intellectual activity. Endorsing John MacMurray's (1958) assertion that "unless the emotions and intellect are in harmony, rational action will be paralyzed" (p. 47) Macdonald (1995/1971b) defines rationality as "an integrated activity" (p. 56) that encompasses actions, thoughts, feelings, values, commitments, and involvement. In other words, aesthetic sensibility is a central dimension of meditative education that views students and their teachers as human beings rather than "machines" which lack consciousness and sensitivity.

Viewed from the perspective of aesthetic sensibility, education should be seen as creative expressions of human potential. In Macdonald's (1995/1971b) understanding, no specific theory, ideology, or research result can provide an absolute structure that is best for making a curriculum. These processes are the ways of science and technological rationality and are not amenable to the phenomena of education—"a creative characteristic form involving selection and organization of symbols from many diverse areas… [where] all data that are relevant to concrete phenomena are welcomed…[and] are essentially assessed by aesthetic criteria" (p. 58). This aesthetic approach to education is "curriculum imagination" (p. 60) where every aspect of school is engaged imaginatively. The idea of curriculum imagination, undoubtedly, is a challenge to the outcome-based education which has become most popular in Western world and is slowly overtaking education in other parts of the world in the wake of neoliberalism and consequent school reforms (Ross & Gibson, 2007). Macdonald elaborates further:

> There is no master plan; no secret of structuring subject matter; no secret formula for relating to others; no special methods of teaching the sciences or the humanities…Each situation is entered anew with the serious attitude of freedom and choice, with the goal of providing maximum opportunity for all to engage freely in meaningful doing through self-expressive activity in each new context. (p. 60-61)

The above paragraph, while containing a deeply liberating and creative view of the process of education, has possibilities of a shock for curriculum developers and planners, school administrators, superintendents,

members of school board and school directorates, ministries of education and to those teacher educators who see themselves as obedient technician whose job is to "professionally develop"—which I call professionally degrade—teachers to "creatively" implement a curriculum that was handed from the top, down to teachers.

Mirroring Macdonald's concerns in the quoted paragraph above, Krishnamurti (1953) also thinks there is no teaching or testing method by which to educate students to be integrated and free. In fact, methods, which classify students according to temperament and aptitude, merely emphasize their differences, breed antagonism, encourage divisions among students (and their teachers because students' performance is linked to teachers' "effectiveness") as well as in society and do not contribute to developing integrated human beings. Dependence on a particular method of teaching or testing, rather than learning from present situations, indicates sluggishness on the part of the educator. "As long as education is based on cut-and-dried principles," Krishnamurti (1953) claims, "it can turn out men and women who are efficient, but it cannot produce creative human beings" (pp. 23-24).

Significantly, educators who are interested in awakening their own and their students' creative intelligence will lay far more emphasis on understanding their own and their students' psychological nature rather than depending on a new method of education. "When one follows a method," Krishnamurti (1953) contends, "even if it has been worked out by a thoughtful and intelligent person, the method becomes very important, and the children are important only as they fit into it. One measures and classifies the child, and then proceeds to educate him [her] according to some chart" (p. 26). Obviously, method-centric education works well for the nation-states, the market, and the administration for its purpose is to produce, distribute, and sell educational commodities at the expense of rich experiences whereby the educator and the educated may grow into integrated beings. No government, market, organized religion, or even family is interested in teachers' and students' subjectivity; everybody's main concern is to seek control over education to meet their respective agenda.

No master plans, no methods, no specific theory, ideology, system or research! Then, what is it with which we educate our students? "Only love," Krishnamurti (1953) suggests, "can bring about the understanding of another. Where there is love there is instantaneous communion with the other, on the same level and at the same time" (p. 24). Surely, it is in the absence of love, care, trust, and respect for each other that we resort to an outside agency—government, system, method, technique, philosophy, and ideology—to decide what and how we should teach. Krishnamurti (1953) argues: "To study a child one has to be alert, watchful, self-aware, and this demands far greater intelligence and affection than to encourage him [her] to follow an ideal [or a method]" (p. 25). In Krishnamurti's understanding, self-aware and integrated educators will come to the context-relevant technique or method "through experiencing, for the *creative impulse makes its own technique—and that is the greatest art*" (p. 47; Emphasis added).

Transcendence, Centering, and Awareness

While freedom, aesthetics, and love are very important as far as creative teaching, learning, and self-expression are concerned, a deeper understanding of self requires a profound search: a search for the "transcendental" (Macdonald, 1995/1974) and "beyond" (Krishnamurti & Bohm, 1985) through "centering" (Macdonald, 1995/1974) and "meditation" (Krishnamurti, 1954). In other words, educational experience must incorporate a search for the spiritual dimension of human beings so that students and their teachers not only have knowledge of the outer but also of the inner. Why is knowledge of the inner—self-knowledge—so important?

Knowledge is not simply things and relationships that are real in the outer world and waiting to be discovered, but it is also a process of "personalizing" the outer world through the inner potential of human beings as that potential interacts with outer reality (Macdonald, 1995/1974, p. 83).[viii] According to Macdonald (1966):

> Personal knowledge brings depth to meaning and reflects uniqueness of our own experience. The connotation we bring to words, the commitment we give to certain ideas, or the perceptual selections we make from among relevant alternatives are all predicated upon and integrated through the unique being of each individual (p. 4).

The concept of "tacit dimension of knowledge" and its derivative "that we can know more than we can tell" (Polanyi, 1967 in Macdonald, 1995/1974, p. 84) explains this point further. Any "explicit knowing" (whether in practical and formal knowledge structures or in aesthetic and scientific realms) is grounded in a tacit dimension of knowing (or understanding)—what Polanyi (1967) calls "indwelling"—that makes sense of explicit statements. Thus, "an epistemology that does not recognize tacit knowledge components…is simply weighted down with the baggage of philosophical and materialistic biases" (Macdonald, 1995/1974, p. 86). It is the recognition of a tacit dimension that forms the basis of transcendental, and in turn, meditative education. From a transcendental perspective, what is most significant as an educational experience is the understanding of one's own inner being or what Macdonald, borrowing from Mary Caroline Richards (1962), calls "centering." What is centering as the goal of a transcendental education?

Centering is a human experience facilitated in many ways by what Carl Jung calls "religious attitude"—not necessarily related to any recognizable creed—that encompasses the search to find our inner being or to complete one's awareness of wholeness and meaning as a person. The process of centering draws its power and energy from the sources that are not completely explicable (what Krishnamurti calls "unknown" or "beyond").

Centering is not in contradiction with the accumulated knowledge of a culture; it places knowledge at the base or ground from which it grows. Thus centering is the fundamental process of human beings that makes sense out of our perceptions and cognitions of reality. In conclusion, the process of centering aims for the completion of the person or the creation of meaning that utilizes all the potential given to each

person (Macdonald, 1995/1974, pp. 86-88). Macdonald (1995/1974) articulates the following questions as the core of a transformative education aimed at centering[ix]:

> What kinds of activities are encouraged that provide for opening up perceptual experiences? What kinds of activity facilitate the process of sensitizing people to others, to inner vibrations? What kinds of activity provide experiences for developing close-knit community relationships? What kinds of activity encourage and facilitate religious experiences? What kinds of activity facilitate the development of patterned meaning structures? What ways can we organize knowledge to enlarge human potential through meaning? How can we facilitate the development of inner strength and power in human beings (p. 88)?

In a nutshell, what should be the curricular and pedagogical considerations of transcendental and meditative education aimed at centering? Macdonald has given many brilliant suggestions to facilitate the process of centering in a thoughtful, engaging, and interesting manner which in my view may completely transform the dominant technical, behavioristic, and positivistic forms of education in schools as well as in teacher education programs. His key suggestions include: playfulness, meditative thinking, imagining, the aesthetic principle, the body and the biology, understanding of ecology, and education for perception.

Playfulness is the essence of a meditative education. However, *work* is too often considered separate from *play* in the serious business of schools. The serious business of schools is conducted in linear, prescriptive, and restrictive *time* and *space*. *Materials* (school infrastructure, resources for teaching and learning etc.) are also strictly work-specific and are used in administratively prescribed ways. *Interactions and associations*—the approved process of communication and grouping practices—are also work-specific, prescribed and "facilitative" of the learning. While *sexuality* is carefully repressed, it is utilized in its "bisexual implications" (Macdonald's term) for many managerial-disciplinary tasks such as the lining up of boys and girls for different activities. *Learning* in schools, thus, happens by working (not playing) in pre-decided interactions and associations, with pre-determined materials in specific spaces under carefully controlled time sequences[x] (Macdonald, 1995/1977, pp. 131-132). The idea of *playfulness* is often seen as diametrically opposite to *seriousness* in most schools. Emphasis on playfulness implies that students are given freedom to play with ideas, things, and other people in a manner that does not make learning a burden. The reason for emphasizing playfulness is to provide freedom to children and their teachers so that they may learn creatively without any behaviorist and totalitarian disciplinary structure. Playfulness is not against order; it is against a regimented structure that kills freedom, intelligence, and creativity.

Meditative thinking has the potential to make playful learning intelligent and sensitive. Instead of thinking in a functional, utilitarian, and a problem-solving manner, we should encourage what Heidegger (1966) called a "releasement toward things" and an "openness" to mystery. Emphasis on meditative thinking—rather than "calculative thinking"—encourages students not to accept things on their face value. It is our responsibility as educators that by means of meditative thinking we "encourage the young to say both yes and no to culture [or what Krishnamurti calls conditioning influences] and probe the ground from which our culture arises…" (Macdonald, 1995/1974, p. 92). And I think it is also our responsibility as teacher educators to engage the pre-service and in-service teachers in meditative thinking about deep-

er questions related to teaching and learning and the political and historical context within which they happen rather than viewing teaching as technical-instrumental acts aimed at meeting pre-determined outcomes that often emerge in rather mysterious fashions.

Evidently, meditative thinking and what Krishnamurti (1953) calls the "flame of discontent" in students is suppressed through conditioning their minds with political and religious dogmas and by cultivating in them fear of authority, discipline, failure, and rejection. If we, as educators, are really interested in the development of "critical alertness and keen insight" among our students then we must encourage them "to question the book, whatever it be, to inquire into the validity of the existing social values, traditions, forms of government, religious beliefs and so on…" (Krishnamurti, 1953, pp. 41-42).

Most of us are afraid of meditative thinking or deep discontent, for it has the capacity to disturb false values, securities and comforts, and certainty in relationships and possessions. Instead of being afraid of discontent and canalizing it into a certain direction to avoid it, Krishnamurti (1964) suggests that students should "give it [discontent] nourishment until the spark becomes a flame and you are everlastingly discontented with everything…so that you really begin to think, to discover" (p. 39). Unless there is this profound discontent, which is not merely a superficial complaining attitude or a state of frustration, there can be no "initiative" and "creativeness." "You have initiative," Krishnamurti (1964) explains, "when you initiate or start without being prompted" (p. 39). And this "initiative…becomes creative as it matures; and that is the only way to find out what is truth…" (p. 40). Meditative thinking and discontent, thus, are the essential elements of a meditative education.

Recognizing the significance of discontentment, I always encourage my students to question the validity of curriculum documents—that are considered their bible which they should learn by heart and implement without any criticism—and the prevalent notions about teaching, learning, education as well as life. Meditative thinking and discontent are definitely not comfortable for those who see their primary function as the uncritical and dutiful subject of the State carrying out all the responsibilities without raising any questions or developing thoughtful and constructive criticisms. While challenging, without meditative thinking and discontentment, we only produce mediocre teachers whose chief interest is to find a secure job rather than educators with serious interest in creating spaces (physical, political, psychological, and even meditative) where deeply thoughtful and creative education can take place.

Imagining or what Macdonald has also called "mythopoetic imagination" elsewhere (1995/1981b), is to balance the dominance of *verbalization*—constant externalizing of meaning, of coming to name the object, and manipulate external reality—in the educational process. Imagining aims to provide an internal referent for the external world. The practical method of mythopoetic imagination is similar to Polanyi's (1967) "indwelling" and what Steiner (1979) credits Heidegger's life work to be—a process of "radical astonishment." Drawing upon the works of Rudolf Steiner (1968) and the Waldorf Schools, Macdonald thinks that imagination—the ability to picture in the mind what is not present to the senses—is a perceptual power that involves the whole person and puts him or her in contact with the ground of his or her being.

Those who espouse the *aesthetic principle* (Read, 1956) intend to educate students by engaging them in artistic activities. Aesthetic education should help students to move from feeling to drama, sensation to visual and plastic design, intuition to dance and music, and thought to craft. Since aesthetic education—the activities of dramatization, designing, dancing, playing music, and making crafts—aims at allowing students to express their inner creative potential, it forms a key feature of a meditative education. In my courses, especially the courses in Holistic Education, I encourage my students to move beyond their zones of comforts, which is to write academic essays, to experimenting with reflecting on their everyday practices, life experiences, experiences and the commonly accepted meanings of teaching and learning through art-work e.g., poetry and drawings. How can we expect aesthetic education in schools if our teacher education programs remain focused on methods and outcomes?

Macdonald's emphasis upon *body and biology* is to challenge the overemphasis in education on cognitive-verbal learning, which is a kind of fragmentation that separates us from our biological organism. While there has been a lot of discussion of alienation from one's self in a Marxian or Jungian way, alienation from one's body—that may be due to psychological, environmental, and psycho-environmental reasons—is hardly emphasized in educational literature. Understanding one's body and its functions is not merely physical or medical in nature. Understanding one's body and its functions involve being aware of the internal as well as external; the technical as well as creative; and the mundane as well as spiritual dimensions. Having an awareness of one's body is basically a way to be at home—body is our home—to allow centering to happen at a deeper level. In my classes, I attempt, in very small ways, to encourage students to experiment with relaxation exercises (e.g., exhaling deeply and allowing their bodies to relax and centre) to be attuned to their bodies, minds, and emotions rather than remaining head-centered all the time. Most of my students share that these relaxation exercises help them be grounded and be more aware of and open to classroom dynamics. True relaxation happens naturally—without control or effort—when we realize its significance for meditative education and holistic living.

Body is our home and *ecology* is the home for the body. As centering points to unity of the inner being, ecology as a concept emphasizes the unity of life. Therefore, along with educating students to be aware and centered—not self-centered—it is crucial that educational experiences also encourage students to understand how our technological and developmental expansion impacts our planet. It is for the sake of the survival of life on the planet as well as to have a sense of wholeness of being that we need to educate our students and ourselves to be sensitive to the environment and the connection between the inner and the outer.

Learning to be playful, imaginative, meditative (of thoughts, emotions, and body), and artful is in the service of being more perceptive. These are the ways that lead to what Macdonald calls *education for perception* that may open us to many other worlds of consciousness. While Macdonald's proposal regarding education for perception is very important, it would, perhaps, not be possible to actualize his concerns without incorporating what Krishnamurti calls awareness or meditative inquiry into the educational process.

According to Krishnamurti (2002, p. 2), awareness or meditation is "one of the greatest arts in life—perhaps the greatest"; it is an art because "one cannot possibly learn it from another" and it is greatest

for it opens doors to understanding oneself and one's relationship to the whole of life. The art of awareness subsumes as well as enlivens arts of listening, observation or seeing, dialogue, and learning. The first significant consideration in developing awareness is to give careful attention to one's body, thoughts, and emotions, moment-to-moment. This observation or careful attention has also to be extended to other people, things, and nature. Second, the art of observation needs to be combined with the art of listening. The art of listening demands an astute listening to oneself, to other people one is engaged with, and also to the sounds of the environment. It is only for the sake of easy comprehension that in his writings Krishnamurti often talks of the listening and observation separately. Existentially, these two become *one* in the act of total attention or meditation, which provides deeper perception into the way life functions. Krishnamurti elaborates (1999) to students in his school at Rajghat:

> [I]f you know how to observe and listen—observing and listening are essentially the same thing, it is all one act—you will find that you take in everything, and are, therefore, immediately aware of everything around you. That will naturally make you highly sensitive; you will be tremendously awake, and your body, your whole being, will come alive (p. 57).

Also,

> If you know how to watch, you will not have to read all the complicated books on philosophy or religion. *If you know how to look, how to listen, and how to speak, you will realize that it is all there in your eyes, your ears, and on your tongue* (p. 56; Emphasis added).

Significantly, it is essential for profound listening and observation that they happen without any form of interpretation, judgment, condemnation, or appreciation. The moment ego interferes with the act of listening and observation, there comes a psychological barrier between oneself and others and phenomena, which obstructs intelligent perception into the nature of things. In other words, for such observation and listening—the core of meditation or awareness—it is essential that we give our full attention to "what is." "If you…[listen and observe]…to have confirmation, to be encouraged in your own thinking, then listening [and observation] has very little meaning. But, if you are listening [and observing] to find out, then your mind is free, not committed to anything; it is very acute, sharp, alive, inquiring, curious, and therefore capable of discovery" (Krishnamurti, 1964, p. 32). Furthermore, when listening and observation happen "with ease, without strain," Krishnamurti (1964) explains to students, "you will find an extraordinary change taking place within you, a change which comes about without your volition, without your asking; and in that change there is great beauty and depth of insight" (p. 32).

These two arts—listening and observation—when functioning together bring about a meditative state of mind whereby the other two arts, the arts of dialogue and learning, can flower. Dialogue or conversation defines human relationships. We cannot possibly imagine human relationships without communicative action. Yet, we see that it is the communication with each other that has perhaps come to be a real challenge, as also aptly described by the key phrase of curriculum theory, "complicated conversation" (Pinar, 2011, p. xiii). It is the absence of pure observation and listening that brings about the relational problems, personally and socially. In the absence of clear observation and careful listening, what we see and hear is

our own projections about the people and things, based on our conditionings, fears, desires, likes, pursuits, which inhibit authentic relationships. For dialogue, communion, conversation or deeper relationship to happen in schools or in teacher education programs or in other life situations it is essential that there be meditative listening and observation.

The arts of listening, observation, and dialogue form the core of the "art of learning." Learning is not merely accumulation of knowledge from the books. While there is no dispute about the importance of acquiring disciplinary knowledge, the highest function of education should be to bring about learning of one's self, which is possible when both teachers and students learn the arts of listening, observation, and dialogue, and which in turn awaken the intelligence among them to make use of the available knowledge rather than being bogged down with it. Therefore, one of the prime functions of the right education should be "to give the student abundant knowledge in the various fields of human endeavor and at the same time to free his [her] mind from all tradition [beliefs, superstitions, ideologies, and other conditioning influences] so that he [she] is able to investigate, to find out, to discover" (Krishnamurti, 1964, p. 143). It is only when the mind is free from the burden of knowledge that it can find out about itself. Obviously, in the process of finding out, there should be no accumulation, for accumulation will burden the mind to meet reality—inner and outer—afresh. Krishnamurti (1964) elaborates:

> The moment you begin to accumulate what you have experienced or learnt, it becomes an anchorage which holds your mind and prevents it from going further. In the process of inquiry the mind sheds from day to day what it has learnt so that it is always fresh, uncontaminated by yesterday's experience. Truth is living, it is not static, and the mind that would discover truth must also be living, not burdened with knowledge or experience (p. 161).

Art of awareness (that subsumes the arts of listening, observation, dialogue, and learning) forms the core of what I have called *curriculum as meditative inquiry* (Kumar, 2013)—a transformative approach to education where learning about oneself and one's relationship to people, nature, and ideas is the core of educational process. A significant question arises when one sees the significance and potential of meditative approach to education: What is the role of teachers and teacher educators in a pedagogy focused on nurturing awareness and centering?

Unlike transmission and child-centered pedagogic approaches where a teacher is a non-subjective being and facilitator respectively, "centering" and "awareness" are as critical and significant for the teachers as they are for the students. A teacher who is interested in understanding himself and his students is not judgmental about the students. To understand students, the teacher should listen to them and engage with them in different contexts and phases in the life of the school, but without forming any judgments. The constant judgment on a teacher's part, according to his or her personal likes and dislikes, is bound to create barriers and hindrances in his or her relationship with the students. The beginning of a real relationship between the teacher and the learner starts when the former gives his or her heart to understand the nature of relationship and its complexities of domination, possession, and control. Authentic relationship, which comes about through understanding self and its processes, is the beginning of a meditative education.

An education that appreciates the significance of the right relationship between teacher and student, unlike positivist and cognitive approaches, emphasizes *understanding* in the mutually responsive process of centering and awareness. In Macdonald's (1995/1974) perception:

> Teachers cannot be said to understand children simply because they possess a considerable amount of explicit knowledge about them. *Understanding is a deeper concept*. It demands a sort of indwelling in the other, a touching of the source of the other. Understanding others is not a "useful" procedure in the sense that knowing is…it does not provide the basis for planning, manipulating, and calculating. *Understanding provides the ground for relating, for being fully there in the presence and as a presence to other* (p. 95; Emphasis added).

In other words, understanding in an existential sense—rather than techniques and methods of teaching and learning—is the way for teachers to relate with students at a deeper level. In the context of teacher education programs, the significance of understanding may mean that we encourage inservice and preservice teachers to not merely impart knowledge to their students but also learn about themselves and their students. And this learning should not be a technical or strategic approach so that they can implement curriculum outcomes more efficiently; rather the learning about oneself and one's students should be deeply human and existential. Unless one understands oneself, one cannot understand one's students and without deeper, existential understanding teaching remains an instrumental-technical activity.

While the knowledge of the subject matter and developmental stage of the students may be helpful from a utilitarian educational viewpoint, a deeper communion between student and teacher requires relating to each other's centers or beings. Macdonald (1995/1974) explains further:

> [Understanding] is the process of locating one's center in relation to the other: to "see" one's self and the other in relation to our centers of being; to touch and be touched by another in terms of something fundamental to our shared existence.
>
> This act of relationship, called understanding…is an act of listening, but not to the explicit content that a person is expressing. Rather, it is "tuning in" to the "vibrations" of bodily rhythms, feeling tone, inward expressions of a person's to integrate and to maintain his integrity as a whole person (p. 95).

Macdonald (1995/1974) thinks that dialogue or relationship happens when there is the "intent of listening, and listening beneath the surface" (p. 95). Macdonald (1995/1974) also thinks that unless there is dialogue, "even the expressions of ideas, of philosophical and religious truths, of psychological insights, is often in the service of the cognitive ego of the participant" (p. 95). *Without listening, there is no dialogue. Without dialogue, there is no relating or understanding. Without understanding, there is no learning. Without learning, there is no living.*

Conclusion

Macdonald and Krishnamurti, whose insights provided the material for this essay, worked in the last century, although their work is as pertinent today as it was when they originally published it. That their

insights are still applicable to understand the larger phenomena of education only explains our lack of attention to their thoughts and ideas. Recently, I invited Professor Ardra Cole[xi] to my Holistic Education class at the Mount Saint Vincent University in Halifax to share with students the significance of autobiography and self-reflection in teaching and learning. Her beginning remarks that I can recall now from my memory were:

> Even after so much research and thinking about how to better prepare and support teachers, very little has changed in schools and teacher education programs. Seldom are teachers encouraged to think deeply about who they are as teachers and how that influences what they do in classrooms.

She also brought in several books to share with students which included one of her all-time favorites, *When Teachers Face Themselves* (1955) by Arthur Jersild to emphasize the fact that, while there have been scholars and writers who, for many years, have emphasized the significance of true and deep self-reflection for teachers, our usual practices have been to see teaching and learning as instrumental activities without much deeper subjective engagement.

This is no surprise to the serious students of the discipline of education that the instrumental, technical, and behaviorist orientations of education continue to dominate the field of teacher education as well as school education. Why is this so? Is it fear of change? Is it the government control over education? Is it market propaganda? Is it general apathy and ignorance of the significance of true teaching and learning? Is it a reflection of lack of self-understanding and deeper engagement with life as a whole of which education is a central dimension? Perhaps the reasons include all the above and more—some superficial and some deeper, connected to the very nature of human consciousness (Kumar, 2013). To explore the reasons behind the pathetic state of education is perhaps not the place for this discussion here, and if one is interested there is tones of work to explain why school education, and I would say teacher education, remain so limited in its vision and practice.

While I am a very new teacher educator, I, fortunately, am standing on the shoulders of many serious and engaged educators including William Pinar, Maxine Green, Ted Aoki, Dwayne Huebner, John Dewey, Osho, Ranidranath Tagore as well as Krishnamurti and Macdonald to name a few. Based on the work of these educators and my own engagement with the notion of education, I want to propose few ideas that I hope have the potential to bring about an existential renewal of teacher education programs in the 21st century, which, I also hope, will be useful for education in schools. My suggestions should not be seen as instrumental goals and objectives to be implemented, but ideas to be engaged with to see if they have any relevance to our work as educators. If one sees there relevance, they become part of one's understanding, and it is the true understanding that has the potential for creative transformation not the ever growing noise about the so-called "new, interesting, and creative" techniques, methods, and strategies.

First of all, the core purpose of education should be the study of one's consciousness and one's relationship to people, nature, and ideas. Without understanding of the self and its intricacies and relationships, education remains a very superficial affair. Unfortunately, hardly any course in the teacher education

programs engages teachers to look at their own life, which basically, implies that teaching and living are seen as unrelated activities. If one studies oneself, one will discover that there are not compartments in one's consciousness, it is all one flow of human experience and action.

Studying oneself is not an isolated activity. It requires dialogue as much as it requires self-reflection and meditation. It is my understanding that critical, open, and engaging dialogues, which Bill Pinar calls "complicated conversation" (Pinar, 2011), should form the core of teacher education as well as school education. I think more often than not we take it for granted what education is and what purposes it should serve. We should keep these fundamental questions always open so that teachers begin to develop their own views of what education could and should mean. Self-reflection and dialogue are the key of not becoming victims to the conditioning influences of the dominant views regarding education, teaching, and learning.

Academic freedom should be the first principle around which we should organize our curriculum and pedagogy in schools. The purpose of teacher education, as is most often thought of, should not be to prepare implementers of State-mandated curricula. If we do that, then we are letting a document, which is of course a form of State ideology, to control every aspect of teaching-learning situation. The whole potential of education becomes extremely limited and uncreative if we begin to organize it around curriculum documents that are often prepared in rather "mysterious" fashions. Academic freedom implies that we encourage inservice and preservice teachers to see themselves as creators and co-creators rather than as conduits or the implementers of curriculum. This, of course, requires that teachers and teacher educators see teaching as an intellectual and a research oriented profession.

My experiences in New Delhi, British Columbia, and Nova Scotia have revealed that teacher education programs subtly or explicitly consider themselves as a component of the provincial education system. That is, educational policies and practices are formed by governments, handed down to school boards or education directorates, and the role of the teacher in this scheme is to carry out the vision of the governments on ground without much subjective, intellectual or political interference. The role of teacher education programs in this scheme is to prepare teachers so that the latter can play their role efficiently in the governmental education system. I think this is a very problematic conception of teacher education. The purpose of teacher education is not to prepare teachers to fit into any particular provincial or national education system. The purpose of teacher education programs is to bring about creative, critical, and intelligent educators who see teaching as a transformative act. I am not saying that we should not study the particular culture we are in and will teach in; but the purpose of study is not to find ways to fit well. On the contrary, the purpose of the study is to develop critical minds that are capable of bringing about desired changes in the existing education system.

When the teacher education only focuses on meeting the provincial requirements its vision becomes very limited as it then caters to the dominant paradigm of education. Since there exist numerous perspectives and models of alternative schools, teacher education should introduce teachers to a variety of curricular and pedagogical approaches to broaden their minds and hearts of the extraordinary potential of education

where teaching and learning leave behind stressful, standardized, oppressive, comparative, and instrumental outlook and enter a meditative space where creativity, intelligence, and beauty can come into being.

Does this all seem very idealistic? Do we ever question why reality is so ugly? It is so ugly that it seems to me we have achieved an extraordinary "ideal" of human destruction and misery in the name of education? Why do we accept the so-called reality? Perhaps that is a question that I should leave for our individual and collective meditative inquiry.

Notes

[i] In this chapter I have re-contextualized my previous work to be relevant to teacher education. This chapter is a revised version of my working paper "Fundamentals of a Meditative Education" (Kumar, 2012) (that was published by D. S. Kothari Centre of Science, Ethics, and Education, University of Delhi) and Chapter 5 "On the Nature of Curriculum as Meditative Inquiry" of my book. [Kumar, Ashwani], [*Curriculum As Meditative Inquiry*], [2013], [Palgrave Macmillan] reproduced with permission of Palgrave Macmillan.

[ii] While the focus of this essay is school education, my key criticism (that most of our schools are primarily focussed on information transmission without much serious consideration to the subjective consciousness of teachers and students) and recommendation (that meditative education provides possibilities for the holistic growth and development of students and teachers) can also be extended to higher educational institutions.

[iii] To know more about the life and work of Macdonald see Burke (1983, 1985) and Kumar (2013).

[iv] To know more about the life and works of Krishnamurti see Jayakar (1986), Lutyens (1990), and Kumar (2013) among others.

[v] Embeddedness (Schachtel, 1959) conveys a psychological state of mind when a person, under the threat of new experiences and activities, is aroused emotionally to seek equilibrium, to return to a lack of arousal. Thus, instead of turning outward and exploring the new, he or she turns his or her activity towards restoring the old—either personal or cultural. In either case, the "circuit" is closed to the development of potential and the person is embedded. I often see, especially in the beginning few classes, this feeling of embeddedness in my students—who are preservice and inservice teachers—when I propose the possibilities of looking at education as a truly free, creative, and critical process. Most of them find it difficult—primarily due to the dominant instrumentalist view of education—to visualize an educational experience which is free of State or management imposed curricula and standardized objectives and goals.

[vi] Macdonald's view of "open" school is in contrast with most schools of the contemporary society—primarily functioning as "a degree factory, a credential provider, or a certifier" (Macdonald 1995/1971a, p. 41)—that he characterized as "closed." In a closed school, "learning outcomes are synonymous with evaluated performance. Learning is described as conditioning and/or reinforcement, problem solving (with predetermined answers), remembering and recognizing … [Children] are objects to be manipulated and consumers of school goods. The function of the school is simply life adjustment, or occupational preparation, or cultural indoctrination, literacy or citizenship. Social relationships are primarily bases of confirmation, sanction and motivation; and communication is a process of attending to predetermined stimuli with the production of predictable responses. Everything is, in a sense, inside the reality of prestructured relationship" (Macdonald, 1995/1964, p. 33).

[vii] While elaborating the importance of developing "self-governance, autonomy, and independence," Macdonald (1995/1981a) suggests that students and teachers in schools and in academia should be "asked to develop and share their own creative models of educational contexts that are relevant to their own work" (p. 161). This process of developing models involves specifying the "intention of the model" (i.e., control, understanding, or liberation) as well as clarifying the "value assumptions concerning cosmos and human nature." Persons involved are also encouraged to share "what new insights" or "practical implications" their models have for them as well as to engage in mutual criticism for further improvements. Such a curriculum activity—that has freedom, creativity, and sharing at its core—"not only is an exercise of thinking, but of revealing and clarifying values, of searching for new perspectives, and engaging in moral, political, and aesthetic discourses" (p. 161). Freedom to experiment and critically engage with what one considers worthwhile is, undoubtedly, an essential part of a meditative education. I have experimented with these suggestions in my teacher education courses and they yield surprising results as students begin to see the significance of their own understanding of what education should be and could be. Transformation of education has very little possibilities unless teachers begin to see themselves as creators rather than implementers of externally produced curricular material and pedagogical approaches.

[viii] See Michael Polanyi's *Personal Knowledge: Towards A Post-Critical Philosophy* (1958).

[ix] *Vigyan Bhiarav Tantra* is an ancient Indian text that contains 112 methods of meditation, several of which have "centering" at their core. This ancient Indian text was reproduced in Paul Reps and Nyogen Senzaki (1957) *Zen Flesh, Zen Bones: A Collection of Zen and Pre-Zen Writings.* Osho, in his highly acclaimed *Book of Secrets: 112 Keys to the Mystery Within* (1998), provides detailed explanations of these methods and their significance for contemporary human beings. In my view, *Book of Secrets* is indispensable for anybody interested in understanding the meaning and significance of meditation.

[x] For his understanding of the ways activities are organized in schools, Macdonald draws upon Hall's (1959, 1966, 1976) expositions regarding ten interrelated and dynamic non-verbal systems of culture, which include: interactions, materials, associations, defense, work, play, bisexuality, learning, space, and time.

[xi] Professor Ardra Cole is a very well-known Canadian educator for her work in teacher education and arts-based research. She worked for a long time at Ontario Institute for the Studies of Education (University of Toronto) and is currently Associate Vice-President (Academic and Research) at Mount Saint Vincent University in Halifax, Nova Scotia.

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