Systems Thinking and Global Education: Towards a framework for a transformative global education

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Abstract

A transformative global education, one critical of the status quo and supportive of the development of students' ability to change their world, would benefit from further development of a conceptual framework within a holistic paradigm. Some who have begun to explore the potential of such a global education and its significance for curriculum and practice look to systems thinking to provide such a framework (Pike & Selby, 1988; Selby, 1999; Young, 2010). This research seeks to continue this exploration by identifying particular systems concepts that might have particular relevance for global education, and by imagining how they might inform practice. In order to discover whether systems theoretical concepts can serve as an effective theoretical framework for a transformative global education, I turned to both literature and the practice of global educators. I worked with a group of four global educators, exploring their practices through interviews and observations. Moving back and forth between the experiences of the teachers and systems theory literature (Ackoff, 1974; von Bertalanffy, 1968; Churchman, 1971; Georgiou, 2007), I was able identify and better understand systems concepts and how they might be enacted in global education classrooms. The importance of boundary judgements in systems theory has great significance for global education, underlying such key ideas as a synthesis approach to study of phenomena, relationality, recognition of holistic and multiple perspectives, and critical awareness of system boundaries and goals and their relation to power dynamics. The fact that systems concepts are already embedded in the practices of some global educators who are not themselves knowledgeable about systems theory, coupled with my own experience of reaching greater understanding of the concepts through an exploration of practice, suggests that global educators might not need expertise in the theory to adopt such an approach. However, the concepts developed here can provide guidance and support for global educators seeking to practice a transformative global education.

Keywords: global education; systems thinking

For Tomo and Moay

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1.   Introduction

"How are we supposed to connect everything in every subject area to a global issue?" This was a recurring question that arose in my Global Education course for pre-service teachers as we explored ways to infuse their practice with a global perspective. My goal as a teacher educator was to encourage teachers to adopt global education as an approach that was cross-curricular, holistic, and critical, and was driven by a moral imperative: to create greater social and global justice. The ideal was a global education that would change the world. Yet when we examined global education within the context of school experience, with curricular and institutional requirements and constraints, I found myself giving an unsatisfactory answer; I would say that everything is connected to an issue, and situating curricula within real life experience is more meaningful, so that is what we should do. However, while this might be true at the level of the goals of education, at the level of classroom decision making within a system where knowledge is compartmentalised, where learning is structured around pre-set answers, and where students are expected to change grades each year, it was less clear what pathways we should take in order to attain the goals of global education.

The global education I introduced in my classrooms was one that had, as its purpose, making the world a "better place". I do not think our current world is "good" or perhaps I should say "good enough". I speak from a position critical of current dominant social, economic, and technological structures and practices. People in my community and in the larger national and international communities suffer from structural, spiritual and physical violence. Non-human life is driven to the limits of their resilience, their ability to maintain their survival systems. I begin, then, with the disclosure that I am driven by ideals of social and environmental justice.

Moreover, global education as I understand it is one that does not seek to simplify the world for students by removing the uncertainty and ambiguity that is the reality of individual experience and of the global issues that are its concern. That is, this

global education recognizes the multiplicity of perspectives, the complexities of interconnection and interdependence, and the changing nature of the world. Drawing primarily on the work of Pike and Selby (1988, 1999), the global education I teach is situated within what has been called a systems paradigm, one that grows from a relational ontology and epistemology. The world is created in interaction, as is our perception of it; and that interaction itself becomes the subject of study.

My answer to the question "must everything be related to an issue" made sense in a big picture kind of way. And in terms of my own ideals of education, such big picture thinking was something that had to be infused into everyday curriculum and practice. But as a teacher myself, I could sympathise with the frustration that my students might have felt: it is a nice idea, but how does it work in the real world? The focus of this investigation is, in part, an attempt to address this question.

1.1. A little about Melanie

It is necessary at this point to provide some back-story – I have identified myself as critical of the status quo and of being oriented toward social justice. I have always been somewhat idealistic, with a strong sense of right and wrong, and a disposition to fight against injustice. While I do think this can be a strength, it might actually spring from weakness. I wonder sometimes if my efforts to "fix" the wrongs of the world are a product of my insecurity: a desire to control, to shape my world. It might also grow from arrogance: I often think I am right! Though this disposition can lead me awry, it has given me the strength to continue to struggle for a more just world, a goal that I believe is worthwhile.

Two major experiences in my life have informed the direction of my career as a global educator. The first is growing up in rural Nova Scotia in the 70s and 80s. Nova Scotia has a very large African Canadian community, dating back to the American Revolution, when African American slaves were offered land and freedom in exchange for fighting for the British. Throughout my teen years, I lived in a community where White British Canadians and African Canadians were largely segregated socially and geographically, and where crossing those boundaries was met in many cases with

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abuse and social ostracization. As a White British Canadian, I was very familiar with the casual racism that permeated that community. I was also familiar with the consequences of crossing the boundaries between groups: friends' parents forbade their children from socializing with me, and I had multiple altercations with peers, both verbal and physical. Such experiences served to raise my awareness of the injustices associated with group affiliation and with resistance against social norms.

A happy accident in university led to my joining a seminar on South African history. What I learned about that part of the world spoke so strongly to me: the social parallels with Pictou County, Nova Scotia were many. This led me to take up positions as a secondary school teacher in Malawi and Zimbabwe, the second major experience that served to direct me toward global education. Racism again played a major role in the injustice I witnessed. People with European heritage living in Malawi and Zimbabwe at that time were largely segregated from the Africans, and occupied positions of economic, if not political power. The casual racist language I encountered from both European and African Malawians and Zimbabweans echoed that which I had heard in Pictou County. In addition, living in those countries allowed me to see firsthand the material inequities that international development is meant to address, and highlighted the inadequacies and questionable decision making of that field of endeavour. For example, I witnessed the outcomes of the Canadian tied aid program, where government international assistance is given through Canadian businesses. In Malawi, this came in the form of tractors that I saw sitting unused in a field. The Canadian company that made them had benefited from their donation as they were paid for by the Canadian government. However, they came without sufficient spare parts, or funding for maintenance over the long term, and so were of little long term benefit to the local farmers. In the school where I taught there were plastic chairs made in Canada: such donations do little to support local furniture manufacturers. To me, it seemed that the legacy of colonialism had survived in such practices.

My concerns, then, were focused on how injustice is related to difference and to historical inequalities, and on the efficacy of efforts to address such injustice. When I returned to Canada, I had originally intended to shift my career direction from education to international development, but during my studies in that field, I discovered the Canadian global education network. Global education brought together many

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professional and personal interests, and I have since made this the focus of my research and my practice as a teacher and teacher educator.

1.2. Discovering global education

A common understanding of global education includes the awareness of global interdependence, that the planet is a system that must be perceived as such in order to understand many of the problems humans face (Mundy, Manion, Masermann & Haggerty, 2007). The problems are identified as global issues, and concern human rights, equality, intercultural understanding and sustainability. Some global education definitions include a belief in the efficacy of individual action to address these issues (Hicks, 2003; Pike & Selby, 1988, 1999; Toh, 1993). A feature in some definitions is that it is an approach to curriculum and instruction rather than a content topic: that is, it is cross-curricular and it includes a child-centred or progressive pedagogical stance (Hicks, 2003; Pike & Selby, 1988).

Beyond this, global education is difficult to define, perhaps because it has developed in different environments, informed by different values (Pike, 2000a). In the United States it began with an ideal of developing a global perspective (Hanvey, 1976), and the idea of placing the planet at the centre of concern (Anderson, 1977; Becker, 1979). It then shifted to a focus on content (Kniep, 1986), more like a study of other countries and cultures. Later, the American version seemed focused on the cross-cultural (Merryfield, 1998; Tye, 1990), and then there was a shift to the inclusion of a more critical lens (Merryfield, 2009). In the United Kingdom and Canada, there was a strong values component from the beginning (Alladin, 1989; Richardson, 1976). There was also a discussion of a more holistic global education (Selby, 1999; O'Sullivan, 1996), described by Selby as the understanding of the interconnectedness of all life, and including the interrelationships between mind and body, self and community, and self and earth (p.127). In contrast, there have been versions that promote global education as a form of cultural capital, providing skills and tools to benefit students working in the international marketplace (O'Sullivan, 1995). Recent moves toward global citizenship education also reflect this variety of conceptions (Schultz, 2007). Whether or not these differing perspectives are reflected in practice remains a question, though what evidence

there is suggests that teachers are also somewhat vague as to what global education is, and adopt or create versions that suit their needs (Marshall, 2007a; Mundy, et al, 2007).

This ambiguity around what global education actually is was not obvious to me in the beginning. When I first came across the approach, I immediately assigned to it my own concerns around social justice and international development, and created a model of global education that suited my values, assuming that this was indeed what global education "is". What I knew was that here I had found an educational approach that allowed me to question, together with my students, the reasons for injustice, and to explore the means by which the world might be made more just. It became, for me, the context through which I taught English. I thought of it as content with a purpose: to raise awareness and make the world "a better place". However, I had not examined what I actually meant by that ideal, what assumptions were guiding my beliefs, whether others held those same beliefs, or whether they should. My understanding of global education was emotional: an uninformed idealism.

1.3. Questioning global education

I became somewhat concerned about my understanding of global education when I began to explore it in my Master's program, as a topic of study outside of my own practice. When I conducted a serious literature review, it seemed that again and again I was finding introductions to global education, general overviews of what it was, or why it was needed, or guides to practice. I did not find much in the peer reviewed journals; what little research there was primarily focused on teachers' conceptions or teachers' practice (Pike, 2000b). I did not find the rigorous theoretical work that provided roots for other educational approaches focused on social justice. For example, the critical pedagogy work of Freire (1970), Apple (1979) and Giroux (1981) drew upon Marxist theory. Anti-racist education may draw from post-colonial theory (Willinsky, 1998) or Freudian imagery (Castenell & Pinar, 1993 as cited in Pinar et al., 2004). Grumet's (1988) work in feminism and curriculum also drew from psychoanalysis and examined feminine and masculine epistemologies. This type of deep analysis seemed to be missing from the global education literature.

However, it was when I conducted research for my Master's thesis (Young, 2003) that problems associated with this lack of clarity became clear. I found that the teacher I was working with enacted a version of global education that I did not recognise. One episode that springs to mind occurred when I was observing this teacher's global education class in a local secondary school. A student questioned whether the service project they were engaged in (building dorms for a rural school in an international context) might have any implications for gender equality – that is, were girls and boys going to benefit equally? I remember my own excitement at the question – finally getting into issues and critical thinking, evaluation, the deeper issues underlying this kind of service learning – and then my utter disappointment when the teacher shut it down and later told me he did not discuss controversial issues in the classroom. I was dumbfounded – I had thought a primary goal of global education was the exploration of such difficult and sometimes controversial issues.

While I was conducting my Master's research, I was also asked to take part in a project developing global education workshops with the British Columbia Teachers' Federation (BCTF). That there was a broad range of classroom activities called global education had raised some concern among the project coordinators. There were some classroom activities that they felt were not true to the intent of global education, either in terms of pedagogy or curriculum. The BCTF coordinators' objections focused primarily on the lack of a critical approach in some of the classroom work they had seen (similar to my experience). I was asked to define what global education is and what it is not, so that it would be easier for workshop facilitators to articulate a clear explanation of global education, one that excluded programs, projects and activities that unquestioningly accepted the status quo (in terms of economic, political, social and environmental systems). The BCTF coordinators, like me, envisioned a transformative global education and did not accept the other versions.

While I did not provide a definition, I did work with the workshop participants to identify which global education resources and activities might be more oriented toward change. And I began to question myself: what exactly was global education and what was there within its definition or its principles that made it a critical or transformative education?

A number of questions arose during and after my Masters research. First, when asked whether everything, all curricula could be connected to a global issue, I responded that everything could because once the multiple and layered connections were considered, once any topic was situated in the world, it was associated with multiple global issues. But this raises new questions: how should global education teachers and students cope with the complexity of everything being connected to everything else? When do the connections end? How can anyone know enough to approach all content in this way? Is such an approach even possible within a curriculum that is divided by subjects and evaluated by standardized exams?

Second, to what extent does the study of global issues constitute global education? Or to what extent is the inclusion of international or intercultural content necessary? Would an international focus be manifest as a context/topic for the development of desirable skills: for example, math questions that look at international poverty, science units that include connections between disease and nutrition, music from different cultures, etc.? Is this a means of bringing countries, peoples, global issues into the classrooms? If the international topic or a global issue is not included over a month of classroom teaching, does this mean global education is not being practiced? That is, is it the content that determines whether education is 'global' or not? But if global education is determined by content, then, within a subject divided curriculum, does that not lead back to the compartmentalization that global education is meant to address?

It seemed to me that the only way to address these concerns was to understand global education as an approach, as defined by Pike and Selby (1988). There would have to be applicable underlying principles regardless of content. In this way, the orientation toward curriculum and instruction necessary to the investigation of global issues would be infused in all practice, regardless of content. Thus, the habits of thought, the understanding of learning that is embedded in global education would constitute the approach and would guide global education teachers in all of their curricular and pedagogical decision making.

I returned to the global education literature, to find something that might offer a theoretical ground within which such concepts might be found, concepts that would

provide orientation toward the critical, social justice oriented practice that I believed should be the foundation of global education.

1.4. Systems thinking and global education

It was after I had completed my Master's degree and was working with pre-service teachers that I began to look for literature that dealt philosophically and theoretically with the kind of concepts I thought were needed. I turned to Pike and Selby (1988) who had referred to 'systems thinking', and then discovered David Bohm (1985, 2003) and Fritjof Capra (1982). I was not quite sure what all of this meant to the practice of global education, but the ideas of interconnection and interdependence began to have meaning for me, beyond the linear 'the leg bone is connected to the hip bone'.

A great breakthrough for me was when I discovered an article by William Doll Jr. (1987). He described what he called a 'post-modern curriculum', using foundational assumptions drawn from systems science: the nature of open systems, the structure of complexity and the transformational change. Such a curriculum requires planning that includes a "sense of indecision and indeterminacy" (p.19) and encourages transformative learning. Here was the direct connection between systems thinking and curriculum that I sought. There were many linkages with global education and I felt that I was moving in the right direction.

Doll's work led me to explore systems theoretical literature and complexity sciences as a possible source for a theoretical framework. As I read more, I better understood the significance of open systems in terms of curriculum. That is, I could see that the structures of curriculum required teachers to explore content in their classes as closed systems (creating false boundaries), even though they were in reality open systems. I could appreciate in a more contextualized way the implications of such reductionism, that is, the reducing of an open system to a closed one. The obvious examples of this appeared in science (growing a bean in a cup), social studies (poverty or peace as one-off topics), and language arts (studying stories without acknowledging cultural/historical context). Here was the breadth and the messiness; the "global" of global education was in its holistic orientation.

This last example, the idea of having to acknowledge cultural and historical context of knowledge, was when I finally began to see a connection between systems thinking and critical approaches like anti-racist and social justice education. If there are multiple systems and multiple positions from which to view the interactions within those systems, then it follows that there are multiple perspectives, multiple truths, not the same but potentially equally true. Finally, I could begin to tie together the two streams of thought, the two literature explorations I was engaged in: systems thinking and critiques of school and society. As well, the concept of multiple perspectives was key to most definitions of global education. I could begin to see how system theory was an answer to my questions.

Global education, in my mind, had become an approach to curriculum and instruction grounded in a holistic understanding of the world and informed by a critical awareness of individual and social roles in creating the world we have. I had essentially found ideas, a theory or theories, which could inform a powerful approach to curriculum and pedagogy in general and global education in particular. I still needed to flesh it out, however, and find out what this could mean for global education teachers' practice, what was its potential and what were its limits, if any.

1.5. Exploration begins

In order to explore the possibilities of this global approach to education in this investigation, I turned to practice. I was excited by the possibility that I had found a framework for a global approach to education, different from (but compatible with) other approaches to education that I admired (environmental, social justice, anti-racist), and an answer to some of my big questions. However, this was still a broad understanding. I now had to explore the theory in depth in order to clarify this understanding, to find principles that would guide curricular and pedagogical decisions, to provide a theoretical framework.

I had read what was available – that is, I had read what I had determined was relevant! – and I needed something new to push me. The obvious place to turn was to teachers' practice. It was this kind of concrete experience that I found less 'easy' to

articulate, except in the specific examples I had seen and written about. As well, the practice of global education had been, in the literature, identified as a site of global education development (Merryfield, 1993; Pike, 1996). If I could work with teachers who were experienced and informed global educators, might I not find in their practice a more concrete picture of the role of systems thinking within global education?

Though the source of data seemed to me quite obvious from the beginning – the systems theoretical literature and the practice of global education – determining the actual questions I was trying to answer was a cloudier proposition. It took me some time to realise that it was not the teachers' practice I was studying, but rather that the teachers' practice offered me the insight I needed to understand how the theory could inform practice.

I began with the broader theme that framed my research:

> Can systems theory concepts serve as an effective
> theoretical framework for a transformative global
> education?

This led to two research questions that would provide the more practical focus that I wanted for my investigation, situated in practice.

> 1. In what ways does systems theory provide a conceptual
> / theoretical framework for scholarship and practice of an
> approach that supports a transformative global education?

> 2. In what ways can global educators enact such an
> approach in practice?

The second question I designed specifically to assist in answering the first; that is, it is not asking what global education teachers *do*, but rather it is asking what they *can do*. The participation of practicing global educators in this study guided my exploration of systems theoretical concepts and inspired my imagination as to its potential in practice. Answering these questions will, I believe, offer guidance to teachers who have taken up global education when they are making their curricular and

pedagogical choices, and provide a justification when they challenge the status quo. This is the purpose of this thesis.

1.6. Structure of this thesis

To explore these questions, I begin by providing the context for this thesis, an overview of the global education literature, in Chapter 2. There are different versions of global education, (Mundy, Manion, Masermann & Haggerty, 2007), but the key ideas of interconnection, interdependence, and awareness of perspectives do commonly appear (Pike, 2000a). The version of global education that is the focus of this study is holistic and transformative; that is, it is aimed toward changing self, school and the world. This global education is a cross-curricular approach and has been situated within a systems thinking paradigm (Pike & Selby, 1988). Research indicates that there are tensions in the field, specifically in the area of global education teachers' practice (see for example Holden & Hicks 2007; McKenzie, 2006; Mundy et al., 2007; Reimer & McLean, 2009). The further development of a systems thinking framework offered by this study may serve to address some of these tensions.

Because my intention is to find guidance within systems theory, it was necessary to also explore the different streams of systems thought that have made their way into educational research and practice. The second part of Chapter 2 reviews this work. There are two streams: the first is concerned with student development of systems thinking skills, and focuses primarily on learning to model systems (see for example Booth Sweeney, 2001; Richmond, 1993, 2000). The second stream grows from the complexity sciences, which occurs largely in the fields of the physical sciences (physics, chemistry, biology). Therefore, in education, complexity theories are often discussed within the science and mathematics education disciplines. The literature is largely focused on conceptual development, although there is some empirical research, mainly in how to understand education systems and group dynamics and in science education (see for example Davis & Sumara, 2008; Dellar, 1994; Perkins & Grotzer, 2000; St.Julien, 2005).

This leads to a more in depth examination of systems thinking itself, its history, the many directions it has taken, and the theoretical principles that are key to this thesis. This theoretical framework appears in Chapter 3. It is argued that systems theory was considered an alternative to the dominant positivist paradigm, which some scholars argue has dominated Western science and thought since the Enlightenment (Georgiou, 2007; Skyttner, 2005). Understood as a new paradigm (von Bertalanffy, 1968) or as epistemology (Georgiou, 2007), systems thinking is concerned with relationality within and between systems and how organization creates behaviour. Following an overview of systems principles, I will provide a review of key thinkers in systems theory research, each of whom contributed concepts or new directions that have informed this study.

Systems theory also served to guide my methodological and design decisions, outlined in Chapter 4. Since systems theory corresponds epistemologically, according to Georgiou (2007) to phenomenology (knowledge is created in relationship between knower and known), phenomenology provided the justificatory dynamics that guided the interpretation of data. Qualitative methods provided the best fit for the purposes of this study, both because the assumptions that underlie the constructivist-interpretive paradigm of qualitative inquiry (Denzin & Lincoln 2005) correspond to those of systems theoretical /phenomenology described by Georgiou (2007), and because a goal of the study is to explore systems concepts as they might appear in practice, in the "natural settings" that are a focus of qualitative researchers (Denzin & Lincoln, 1994 as cited in Gall, Borg & Gall, 1996, p.29). In this case, the natural settings were the classrooms of four global educators who participated in this study through interview and observation, and who collaborated in interpretation. Such a focus on individual experiences called for a case study approach, where there is an extension of experience that can inform theory development (Stake, 2005).

Chapter 5 provides description and exploration of the data concerned with systems thinking within classrooms, finding connections between systems theoretical concepts and global education teachers' practice. The means by which holism and relationality can be embedded in approaches to curriculum is reflected in teachers' use of synthesis, questioning and moving back and forth between local and global contexts. The role of perspective in understanding is embedded in practices that highlight multiple points of view. Perspective is also embedded in the inclusion of a critical lens by which

decisions and goals are made explicit and questioned. In each of these global education practices, the systems theory concept of boundary judgements provides a means of exploring how knowledge is created.

Since systems thinking entails recognition that the system cannot be removed from its environment without losing something essential to understanding that system; therefore, the practice of a global educator must be understood within the context of the school system itself. This is the focus of Chapter 6. Teachers who participated in this study perceived some of the problematic behaviours of the systems within which they worked as unintended consequences of interaction. Other behaviours, however, were perceived as resulting from a difference between decision makers' and teachers' goals.

Finally, Chapter 7 describes the implications of the theoretical and experiential exploration of this study and offers some guidelines for global educators based on these findings. It begins by returning to the research questions to discover how they have been answered by this investigation. It then outlines the correspondences between global education concepts and systems theoretical concepts, and suggests classroom practices that might be informed by them.

Skyttner (2005) points out that a systems paradigm would require the researcher to begin with the environment within which the system exists; if this study can be understood as a system, an interaction of people, practices and ideas, the goal of which is to create knowledge, then its environment must be the larger conversation, the global education knowledge within which it grows. Thus, we begin this exploration in the next chapter with an overview of the context, the field of global education.

2.   Literature Review

This study is a contribution to an existing system of ideas and practices that constitutes global education discourses. What emerges from these discourses is a somewhat vague and often contested, but nonetheless grand idea of an educational purpose and approach. As a site of interaction between global education and systems theoretical concepts, this study also adds to the discussion of systems thinking and education. This chapter provides an overview of the context of global education and systems thinking in education, the environments within which this research is situated.

Because this research takes place within Canada, and because, as Pike (2000a) noted, there are connections between global education concepts and practice and national culture, I draw more heavily on global education literature associated with Canada or is commonly cited in Canadian research literature, calling this the Canadian context. I also include literature from the United Kingdom for two reasons: first because, as Pike (2000a) explained, the perceptions of global education in Canada and the United Kingdom are similar in many ways. Second, and more importantly, the interpretation of global education within which this work is positioned, a holistic, transformative global education, draws upon the work of British global education proponents Pike and Selby (1988, 1995, 1999) and Selby (1999, 2004) who also have ties to Canada. They conceive global education as comprising four intertwined dimensions: spatial, temporal, issues and inner. This is explained in more detail below. Their work is commonly cited in the Canadian global education literature (see, for example, Alladin, 1989; Clipsham & Charbonneau 1994; Ferns, 1992; Greer, 1996; Mundy et al., 2007; O'Sullivan, 1996; Reimer & McLean, 2009; Werner & Case, 1997), and their conception of global education lies at the heart of this research.

Following my review of the global education literature, I offer an overview of the literature focused on systems thinking and complexity thinking in education. I do so for two reasons. First, it shows that the divisions in systems theory between the more

deterministic and the more interpretive forms are mirrored in the theory's education applications. Second, it demonstrates some of the ways systems thinking is appearing in education, highlighting the differences between systems thinking in education and systems thinking in global education.

2.1. Global education

Global education is broadly understood to be an approach to curriculum and instruction growing from an understanding of the world as interconnected and interdependent and with the aim of promoting social justice and planetary sustainability through a child-centred or progressive pedagogy (Mundy, Manion, Masermann & Haggerty, 2007; Pike & Selby, 1988). Within this rather broad ideal, there are different versions of global education. For some it is simply 'international awareness' or charitable fund-raising (Mundy, et al., 2007; Young & Cassidy, 2004); for others it constitutes a paradigm shift, a move to a more holistic curriculum (Pike & Selby, 1988; Toh, 1992; Young, 2010).

In fact, it has been claimed within the global education literature that the conceptual development of the approach grows from its practice, which may account to some extent for the diversity of versions (Merryfield, 1993; Pike, 1996). Certainly in Canada, where institutional support is weak, it is largely dependent on the energies of individual teachers to include a global education in practice (Mundy, et al., 2007). However, as Reimer and McLean (2009) warn, it may be necessary to limit the current broad concept of global education that allows for this diversity, "so as not to allow global education to become a meaningless slogan" (p.923).

Despite the lack of a clear definition and the lack of institutional support, global education remains a focus in Canadian elementary schools (Mundy, et al., 2007). A report commissioned by the Council of Ministers of Education, Canada and the Canadian Commission for UNESCO (Council of Ministers of Education Canada, 2001) found that global education was included in all provincial and territorial curricula by 1994, particularly in social studies and citizenship education. In interviews with global education teachers, Pike (1996) found that those who took up the approach did so for

many reasons, which frequently included a desire to prepare students for what they perceived as being an increasingly interconnected world, and to provide students with the knowledge, skills and attitudes to make that world 'a better place'. Thus, the understandings of some teachers correspond with the concepts of many proponents: global education is an approach focused on interconnection, interdependence, and perspectives consciousness in order to create a more just world (Alladin, 1989; Lyons, 1992; O'Sullivan, 1996; Pike & Selby, 1995; Selby, 1999; Toh, 1993).

A more recent overview of global education, drawing upon international academics and groups, was offered by Mundy et al. (2007, p.9). They described the concept of global education as comprising six main orientations:

- a view of the world as one system - and of human life as shaped by a history of global interdependence;
- commitment to the idea that there are basic human rights and that these include social and economic equality as well as basic freedoms;
- commitment to the notion of the value of cultural diversity and the importance of intercultural understanding and tolerance for difference of opinion;
- a belief in the efficacy of individual action;
- a commitment to child-centred or progressive pedagogy;
- environmental awareness and a commitment to planetary sustainability.

Selby (1999) described global education as an all-encompassing approach, holistic and transformative:

Global education is an holistic paradigm of education predicated upon the interconnectedness of communities, lands and peoples, the interrelatedness of all social, cultural and natural phenomena, the interpenetrative nature of past, present and future, and the complementary nature of the cognitive, affective, physical and spiritual dimensions of the human being. It addresses issues of development, equity, peace, social and environmental justice, and environmental sustainability. Its scope encompasses the personal, the local, the national and the planetary. Congruent with its precepts and principles, its pedagogy is experiential, interactive, child-centred, democratic, convivial, participatory, and change-oriented. (p.126)

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It is Selby's definition that underpins the understanding of global education reflected in this thesis. This will be explained in more detail below, but I begin with the broader context where this holistic version is situated within the multiple interpretations of global education and associated approaches to education and related global education themes. I then focus on a more detailed account of holistic and transformative global education. Next, the key ideas of holism, interconnection and interdependence and perspectives consciousness are presented. And finally, some of the tensions in global education are discussed.

2.1.1.   Narrowing the focus in a broad field.

Reviewing literature that is specifically labelled 'global education' can be a challenge, as it has been linked over the years with other forms of social justice or progressive approaches to education (Choldin, 1992; Pike, 2000a; Mundy, et al., 2007) and thus the boundaries between these educational approaches are often blurred. Indeed, Marshall (2007b) reports that the history of global education is entangled with the respective histories of the intercultural, antiracist, human rights, environmental and sustainable education agendas (Dufour 1990 as cited in Marshall, 2007b, p.39). Choldin (1992) described multicultural education, environmental education, development education, peace education and futures education as "sister movements" of global education. Selby (1999) explored the connections between environmental education and global education through their biocentric focus growing from a quantum worldview, calling the two "mutually enfolded" (p.135). McKenzie (2006), in her report on how students within educational programs focused on social and environmental education resist dominant narratives, included an environmental Montessori program a Theory of Knowledge course, and a global education course. Cook (2008) demonstrated that, although peace education has a "deeper history" (p.890) than global education, it has been inserted into the larger framework of global education. Bickmore (2009), too, framed a discussion of the need for a pedagogy that develops understanding of conflict and skills for peace building within the context of global education. Mundy et al. (2007) note that global education has incorporated or been aligned with development, peace, human rights, multicultural and environmental educations.

As well, global education is often associated with citizenship education. The link between the two is not new; in Canada, for example, connections were drawn between global education and citizenship education when global education first appeared prominently in teacher magazines (for example, Alladin, 1989; Bacchus 1989, Lyons, 1992; Roche, 1989). However, there has been increasing focus on 'global citizenship education' as one field (see, for example, the 1996 issue of Orbit [Reed, 1996]. See also Davies, 2006; Davies, Evans & Reid, 2010; Evans & Reynolds, 2004; Schultz, 2007; Schweisfurth, 2006). This may be due in part to its inclusion within mandatory civics curriculum in Ontario and in the United Kingdom (Hicks, 2003; Schweisfurth, 2006). Certainly in Canada, a national survey of education for peace, human rights, democracy, international understanding and tolerance found that when global education appears in curricula it is "integral to the social studies and citizenship education curricula" (Council of Ministers of Education Canada, 2001, p.64). In addition, a cross-Canada report of global education in elementary schools found that it is situated in social studies curricula and is often associated with citizenship – in fact, the curricula of Alberta, British Columbia and Manitoba specifically refer to global citizenship (Mundy, et al., 2007).

The focus on global citizenship education may, as Rauner (as cited in Mundy et al., 2007, p.8) and Davies (2006) suggested, emphasize the philosophy of active engagement in learning and social justice initiatives that global education proponents support. Among Canadian proponents in the late 1980s and 1990s, many of those who referred to citizenship when discussing global education also directed attention to the importance of student empowerment and active participation to effect change (see, for example, Alladin, 1989; Choldin, 1993; Evans & Lavelle, 1996; Toh, 1993). Davies (2006), within the context of the United Kingdom, described the activism in global citizenship education as driven by a concern for social justice, rights and engagement with culture and cultural conflict. The implication is that knowledge leads to more questioning and action.

On the other hand, Schultz (2007) explained that, in practice, whether that activist conception is realised depends upon the image one has of what it means to be a global citizen. A neoliberal global citizen is a traveler who works within current systems to mitigate harm; a radical global citizen seeks to disrupt the systems that (re)create power imbalances; and a transformative global citizen focuses on creating relationships

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and engaging in negotiation across local and global contexts. As well, Marshall (2007a, 2007b) reported that, though there has been advocacy for the development of a more cosmopolitan citizenship ideal (Marshall gives the examples of Heater, 2002, Noddings, 2005, and Nussbaum, 1997), this has yet to appear in global education practice. Finally, the apparent shift towards a global citizenship education focus is not universally accepted. Marshall (2007b) noted that there are those coming from an international education tradition who may object to the downplaying of national boundaries implicit in the world 'global'. Citizenship is, after all, a national concern, and global education is not, by definition.

Defining global education as a distinct field, then, is difficult because of its entanglement with other progressive or social justice approaches to education and with global citizenship education. Once that challenge is met, and the focus turns specifically to global education as a distinct field (within which this research study is situated), yet another difficulty is encountered because there are different versions or varieties of global education, growing from different ideologies, rationales or philosophies. Heater (as cited in Marshall, 2007b) noted that in the 1970s, the assumptions underlying world studies programs (the original name of global education in Britain) ranged from conservative to liberal to radical. In the early 1990s, Toh (1993) identified two versions of global education growing from different paradigms, the liberal technocratic and the transformative. O'Sullivan (1995) also examined two streams of global education, but divided them by rationale: the first promoting global education in the name of national economic and political interest, the second promoting global education in the planetary interest. Pike (2000a) argued that the version of global education practiced is influenced by national culture. He compared global education as it is conceived in Canada, Britain and the United States, finding that American proponents tended to focus on learning about other countries and cultures within the context of social studies, while Canadian and British proponents tended to conceive of global education as an integrating approach focused on interconnection and issues. In her review of the global education terminology debate, Marshall (2007b) also situated her discussion within the social and political history of Britain. She demonstrated the interaction between the larger socio-political context, education policy, and global education meaning and practice and how these change over time.

This is reflected also in the calls for a shift in how global education is conceived in the United States. Tye (2009), for example, argued that global education in the United States should include not only descriptive teaching of global systems and the globalized world, but also a greater normative content; that is, the analysis of how values intersect global problems and issues. Merryfield (2009), too, identified assumptions underlying global education as it is practiced in the United States. She claimed these have recently been challenged, and argued for a shift in global education thinking and practice from uncritical views of globalization, Western capitalism and democracy to views that examine the educational legacy of imperialism, include the worldviews of underrepresented people, and encourage sustained and reflective cross-cultural learning.

Selby (1999), in situating his own work within the field, noted four interpretations of global education. Three are focused on curriculum: world affairs as a topic in secondary school, the infusion of global perspectives into social studies in intermediate and secondary school, and the study of global issues and themes across the curriculum. The fourth interpretation, in which he included his own work, is "nothing less than the educational expression of an ecological, holistic or systemic paradigm and, as such, has implications for the nature, purposes and processes of learning and for every aspect of the functioning of a school or other learning community" (p.126).

It is in this fourth interpretation that I situate my own work, including this research study. A more comprehensive description of holistic global education is provided below, followed by a review of some key ideas in global education. Then, I will outline a selection of recent empirical research in order to illustrate some of the concerns surrounding global education in practice and how a holistic approach might address them.

2.1.2.   *Transformative global education: The expression of a holistic or systemic paradigm.*

Selby (1999, 2004) spoke of global education as more than content; rather, it is an approach that transforms students, curriculum, school, and world. It is the expression of a paradigm shift, a way of understanding the world that is relational, contextual,

focused on the whole. He argued that this is different from the linear, mechanistic and reductionist paradigm that has dominated Western thought (and educational structure and practice). The two paradigms are incommensurate. Therefore, where current educational structures are expressions of mechanistic and reductionist thought, such a shift in worldview cannot be achieved piecemeal, it must be occurring everywhere throughout the system. Reform, argued Selby (2004), is not enough: change has to be radical, holistic, transformative, because everything is related to everything else, and a tweaking of the system will not be effective.

This idea of global education would appear at the far end of the global education continuum described by Mundy, et al. (2007, p.9). At one end of this continuum are traditional practices and international content. Farther along the continuum, attitudes, values and behaviours are included in interpretations of global education. Finally, at the other end is a "commitment to global social justice, universal rights and ecological sustainability" (p.9). To achieve such a change in the world accompanies changes in self and in the structures and practices of schooling, as Pike and Selby (1988) and Selby (1999, 2004) argued. Richardson (1990) also contended that there is a need to synthesise the progressive, learner centred approach (the process or global education) with building equality in the world, and changing social reality (the content and purpose of global education) since wholeness in one cannot be achieved without wholeness in the other. Marshall (2000a) noted that the competence based, student centred pedagogy of global education faces difficulties in current educational systems. Similarly, Bickmore (2009) argued that a global education that addresses the structural and psychocultural causes of violence at global, national and local levels "requires transformation of curriculum, not mere addition to it" (p.273). For change to be meaningful, it must be multilayered and interconnected.

Toh (1993) discussed the need for such an all-encompassing shift when he compared two types of global education. One is uncritical of current dominant global systems, characterised as the liberal technocratic paradigm. He critiqued four major themes in this paradigm: liberal appreciation for the cultures of others that does not address the quality of that appreciation; the notion of interdependence, again without any question of the quality and history of the relationships; the idea that interdependence, mostly characterised as economic interdependence, can be managed

through social engineering; and the assumption that human progress is measured in terms of industrial civilization. As an alternative to this, Toh (1993) proposed a transformative paradigm, one that privileges action for human liberation and emancipation, and encourages a critical global literacy that uncovers structural violence. Linked to this is ecological violence, and so a third theme of the transformative paradigm is ecological security. Students and teachers are expected to be active agents of change, participating in the political discourses, and recognising the parallels between global and local problems. Finally, this paradigm depends upon the engagement not only of minds but of hearts, the deep fellow feeling and concern that leads to learning and action.

Toh's (1993) transformative paradigm centred the need for change in the world through informed and active participation. He explained that "it moves learners, and that includes teachers, to try to transform their realities as they become critically conscious of the way the world works" (p. 14). This is accompanied by a deepening of the interior lives of students as they become engaged in "crucial struggles of all peoples for justice, dignity and freedom" (p.12). Toh (1993) advocated a liberating curriculum, intertwined with an empowering pedagogy, critical, participatory and active teaching and learning methodologies focused on moving both minds and hearts. Toh (1993) argued for a global education that has implications for the world, the students and teachers, and the practices of schooling.

The "irreducible global perspective" advocated by Pike and Selby (1988, p.34-35) is also an expression of the transformative paradigm. This is expressed in five aims of global education. *Systems consciousness* requires students to think in a systems mode, acquire an understanding of the systemic nature of the world, and a holistic conception of their own potential. Included in this is the inescapable connection between person and planet and that the individual's perception determines, in part, what is observed. *Perspectives consciousness* is described in terms of multiple perspectives, the recognition that there are different positions from which and within which to view phenomena, again recognising the interaction between knower and known. In *Health of planet awareness*, students are asked to be aware of global conditions and understand concepts such as human rights, and to reflect on the futures they can imagine. *Involvement consciousness and preparedness* stresses the agency of the individual as

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creators of the systems in which they are embedded: their choices and actions have impacts. Thus, they must develop skills to become effective participants in political action. Finally, in *Process mindedness*, students are reminded that their personal development is a continuous process and one that requires attention lest they become too attached to any particular paradigm or way of seeing the world. In this conception of a global perspective, students are encouraged to engage in a critical reflection on their own being in the world and on the world's becoming that they are engaged in. They exist in an ongoing co-creation of self and world and must be attentive and active participants.

According to Pike and Selby (1988), as students become more aware of how their choices and actions impact their world, the short- and long-term consequences of those choices, and develop tools to assist them, they might "capture more control over the direction change takes" (p.18). One goal is to change the world. The changes made in the world are mirrored in the changes in the students: the journey outward is the journey inward. Pike and Selby stressed the interaction between learning about the world and learning about self. A second goal is to change the self. And finally, they argued that, as the famous phrase goes, "the medium is the message", and that the process of learning must be commensurate with the content and purposes of global education; it is not merely content, it is an approach having implications for knowledge, attitudes and skills across the curriculum. It is also reflected in the profile of the global teacher, who is (among other characteristics) global-centric, future-oriented, concerned with the development of the whole person, and who strives toward congruency in her teaching approach. The third goal is to change schooling. Change, then, must occur at multiple levels, everywhere at once; it "has to be holistic to be effective" (Selby, 2004, p.30), because all levels are in dynamic interaction. The transformation must cross the perceived boundaries.

Pike and Selby (1988, 1999) conceived of global education as comprising four dimensions, each intertwined and present in the creation of an irreducible global perspective, and each necessary, they argued, to prepare students for participation in an interdependent world. The *spatial dimension* forefronts the relationality of phenomena, events and ideas. Students are embedded in myriad systems, which are themselves dynamically interconnected. The global system emerging from the increasing interaction between human systems at multiple levels is the focus. The *temporal dimension*

recognises that past, present and future are linked and that the world is in a state of flux and is therefore malleable. This dimension calls for a consideration of possible, probable and preferred futures, in order to guide decision making and action. The *issues dimension* is concerned with the complex problems crossing national, cultural and geographic boundaries. Such issues are pertinent to the students' lives and are also themselves also interconnected. They must be explored with the multiple perspectives of stakeholders in mind. Finally, the *inner dimension* centres the potential of the whole person in global education, and focuses on person-centered, planet conscious learning, affirmative of self and others. Students learn about their global selves and the global village simultaneously. This calls for a pedagogy that is participatory, cooperative, experiential and creative.

Pike and Selby (1999) drew from two streams of educational thought in the development of the four dimensions. First, world-mindedness is a commitment to the planetary interest rather than the individual, local, group (e.g. culture, faith, and worldview) or national interest alone. It calls for the understanding of global issues. Second, child-centeredness, an understanding of learning and teaching that grows from such progressive educators as Dewey, encourages exploring and discovering, and views the child as a unique individual. According to Pike and Selby (1999), in the construction of their model of global education, they set these two strands of educational thought "within contemporary framework of systems theory" (p.12) where relationship is everything.

Systems theory offers an alternative to the mechanistic, which, as Pike and Selby (1988) noted, is at the root of many of the current global crises in the world. The mechanistic worldview is characterised by the separation of mind and body, human and nature. It offers a compartmentalised view of reality and knowledge, which, although it has had some positive impacts, is also dangerous when applied to every aspect of human experience. The systems paradigm, however, concerned with the relationality of phenomena, events and knowledge, connects human with nature, mind with body, and requires consideration of multiple, personal and global impacts of decisions, actions, systems. Among the systems' principles highlighted by Pike and Selby (1988, p.29) were:

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- The whole is greater than the sum of its parts;
- Phenomena and events are dynamically interconnected in time and space;
- Observer and observed exist in interrelationship;
- The whole person (mental, physical, emotional, spiritual) must be involved/engaged in knowledge creation;
- Synthesis is a means of knowledge creation;
- Problems are not simple cause and effect. Mechanisms of interaction - Feedback loops – are recursive. Technical fixes don't work;
- Knowledge is indivisible into separate subjects, etc.;
- Humans are embedded in nature, and to pretend otherwise is dangerous;
- Recognising the enlarged potential of humans decreases dependence on experts.

Selby (1999) further explained how the quantum worldview profoundly influenced the four dimensional model when he explored the relationality inherent within it. Drawing upon findings in quantum physics, he described the interconnectedness of all that is experienced, the role of the observer in creating what is observed, the relationship between phenomena and environment. The divisions humans perceive are their own creations; individuals belong in the world, to the world in multiple ways.

> The radical interconnectedness of the quantum world carries potentially far-reaching implications at the level of our human-in-world reality. If self arises in large part out of the sum total of our ongoing dynamic relationships, if we are intimately embedded in a reality greater than ourselves, if all phenomena, including ourselves, are non-localised, at least in our potential, then we move to a sense and experience of belonging, of being "at home" with all life forms and all places. (p.129)

This understanding of self and world in dynamic interrelation lies at the heart of Pike and Selby's (1988, 1999) four dimensional model of global education: it provides both the rationale for its moral imperative – to act as informed, caring and responsible participants in the world – and as the means by which that action occurs. As intimately connected to the world, individuals are empowered to change it.

In his review of thirty years of global education, Hicks (2003) claimed that Pike and Selby's (1988, 1995) model was like his own; anything less, he contended, could not be considered global education. I echo his sentiments: it is the global education of Pike and Selby, drawing upon systems theoretical concepts, which forms the context of this study because it is the one that addresses the complexity of knowledge creation and self/world transformation.

It is necessary, however, to acknowledge the problems with this version of global education. This is discussed in more detail below, but briefly, the idea of transformation itself can be troubling. Not all agree that current systems are inherently unjust or that some other organisation would be more just. It must be recognised that this is a position that is contested. As well, change is difficult, especially change of large, complex systems, and the impacts of such change might be more than many are willing to endure. In addition, research shows, as is discussed more below, that teachers have difficulties with the scope of global education as well as with the change orientation described as transformative. Such concerns must be taken into account.

As noted above, the transformation oriented global education is not the only version practiced or appearing in the literature. Indeed, there is some indication that the transformative conception of global education may appear less in practice than other forms (see 'Some tensions in global education' below). There are key ideas shared by most versions of global education, and within the context of these ideas it is possible to make the case for benefits of a more transformative global education, though there are potential costs as well. These are discussed below.

2.1.3. Some key ideas in global education.

Global education is such a broad idea that it can be interpreted in different ways – as Reimer and McLean (2009) point out, it is "interpreted… through ideological orientations and approaches" (p. 923). There may be benefits to this; it can appeal to a broad range of practitioners who find it accessible, as it fits into their own frameworks and beliefs. However, it can also constitute a risk. Complexities might be "glossed over" as Evans (2006) noted in reference to global citizenship in schools (as cited in Mundy, et al., 2007, p.10). Bickmore (2009) argued that a focus only on teaching students to care,

contribute to charity, and make individual choices as consumers, "is not sufficient to redress the transnational causes of destructive conflict and violence" (p.274). A global education practice that takes such an approach may be creating a warped sense of the impact that individual students might have on the world.

The range of interpretation and the potential benefits and risks of different versions is explored here within the context of some key ideas in global education.

Holism

Holism is a concept appearing in the transformative versions of global education. Toh (1993) claimed that his transformative paradigm not only moves learners to act toward a more peaceful world, but also empowers learners "to critically understand the world's realities in a holistic framework" (p.11). Pike and Selby (1988) described a global education growing from a systems paradigm, calling it holistic. The influence of systems thinking in conceptions of global education was also apparent in an issue of Orbit (1996), which focused on the topic of global citizenship. In the issue, Selby (1996) argued for a move away from an anthropocentric focus in global education and for a darker green school, characterised by "a holistic and biocentric worldview" (p.41). O'Sullivan (1996) drew upon ecological thinking and argued that a holistic paradigm, providing a view of the emergent universe, is a necessary characteristic of global education. Greer's (1996) description of a holistic global education was informed by Aboriginal spirituality. Both O'Sullivan and Greer refer to Pike and Selby's earlier work in *Global Teacher, Global Learner* (1988) and the need for a systems consciousness.

Pike and Selby (1988) described the current dominant worldview as reductionist with a strong belief in objectivity and a high degree of predictability in phenomena. While recognising the technological achievements that grew from this mechanistic paradigm, they warned that "it is a dangerous orientation… if applied comprehensively and monopolistically to the sum total of human activity and experience" (p.25). It alienates humans from the natural world and from each other, creating a "global cultural crisis". A systemic paradigm, however, offers an alternative worldview that is holistic, subjective and with a recognition of the uncertainty which pervades human experience. Such an orientation would encourage consideration of the impact of an action on the whole rather than just some individuals or parts; it would also recognise the role of the whole person

on personal potential, the rational, emotional, intuitive and spiritual. Holism, in Pike and Selby's global education, applies to understanding of the world, of the self and of the processes of teaching/learning.

The benefits of such an approach lie in its all-encompassing nature; students develop habits of mind, ways of seeing, because relationship is consistently at the forefront of what they are doing. However, within current educational contexts, where subjects are divided, curricula are framed as specified outcomes, and testing structures learning in terms of right and wrong, a more holistic approach is very difficult for teachers and students (Marshall, 2007a). To create a truly integrated education, from Kindergarten to Grade 12 and beyond, would require changing procedures, structures and ways of thinking (Pike & Selby, 1999). In an article in which he described metaphors as offering understandings of different aspects of reality, Selby (2004) offered the metaphor of dance as a third level of presence, one focused on process. He asked that we rethink how we try to bring about educational change, saying our challenge was to "mount the kind of holistic, multi-faceted change initiatives our hearts and minds tell us are essential if we are to have sustained impact on educational institutions and systems" (p.30). The means to create more holistic education systems must, then, be holistic. Through its focus on the development of a cross-curricular approach, this study offers support for such an initiative.

Interconnection and interdependence

Definitions of global education consistently refer to interconnection and interdependence as key to the approach. In his definition of global education, Hanvey (1976) identified *Knowledge of global dynamics*, understanding the role of interconnection and interdependence in global systems, as one of the key elements of a global perspective. In the Canadian context, a 1989 issue of The ATA Magazine was devoted to the topic of global education. In it, articles outlining definitions of global education (Alladin, 1989; Kniep, 1989) and those offering rationales for adopting the approach (Roche, 1989; Bacchus, 1989; Perinbam, 1989) described a world increasingly characterised by interconnection and interdependence. Similarly, in Orbit's 1992 global education issue, global interdependence was given as both a reason for and the focus of the approach (Moore, 1992; Lyons, 1992; Choldin, 1992; Petrie, 1992). Tye's (1991, as

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cited in Tye, 2009) definition states that global education "involves learning about… the interconnectedness of system (sic) – ecological, cultural, economic, political and technological" (p.3). Interconnection and interdependence appear in each of the four dimensions of Pike and Selby's (1988) description of global education: in the context of human and ecological systems; past, present and future; issues and problems; and self and world. They discussed the notion that the world is comprised of webs of interaction of which students are part, and that the interactions within and between webs occur over time.

Overviews of global education literature and practice also refer to interconnection and interdependence. Pike (2000a) found the concepts of connectedness and interdependence to be common threads in global education characterisations across the United States, Canada, and Britain. Hicks (2003) included interconnection and interdependence in descriptions of the core elements of global education. And Mundy et al. (2007) reported that global educators agree that one of their practices is to teach about global interdependence (p.10).

However, what exactly is meant by interconnection and interdependence in terms of practice can be interpreted differently. It can, for example, become an uncritical focus on connections between countries and peoples. For example, Reimer and McLean (2009) found that there were differences in the understanding of global education within teacher education program documents and the understanding held by teacher candidates. Within the program documents, greater value was placed on critical thinking and development issues than was the case for the teacher candidates. Interdependence of people's experiences, global issues and dominant discourses might not figure largely in their understanding, which could help explain the teacher candidates' preference for fundraising for charity as a way to help others. Similarly, in their overview of global education in Canadian elementary schools, Mundy et al. (2007) described the school level view of global education. Teachers included reference to global interdependence in their definitions of global education, but rarely mentioned issues, nor the idea of linking local and global concerns. The main global education action was fundraising for charitable donations to people in other countries. In terms of interconnection, this seems mainly focused on nations and peoples other than our own, and the type of interdependence this describes seems more like dependence. In a case study of a

secondary school global education course that I conducted, the focus was entirely on fundraising for and conducting a service learning project in a 'developing' country; the connections that were highlighted were interpersonal, and there was no reference to the interdependence of issues or indeed to issues at all (Young, 2003). Nor was there any critical examination of the nature of the relationships between Canada and developing countries, or the mechanisms that create and maintain those relationships.

Pike (2000a) identified "interdependence of all people within a global system" as a concept common to understandings of global education (p.65). Another common concept, connectedness, might, in some definitions, move beyond people to include "real or desired links between areas of knowledge, curriculum subjects, aspects of schooling, or humans and their environments" (p.65). This understanding of connectedness appeared in Hicks' (2003) description of the core elements of global education, in which he includes the relationship between pedagogy, content and values in his process dimension, as well as the nature of connections between local and global contexts. The content and processes of global education may also be considered interdependent. Marshall (2007a) conducted a study of a comprehensive school in Britain, which had adopted an explicit internationalist dimension and had received recognition for its global education successes. She found that, while some teachers questioned the necessity of connecting global education content with participatory and learner-centred pedagogy, many teachers' future ideals included a belief that "global education could and would increasingly permeate all subjects both in terms of curricula and pedagogic content" (p.364).

A people and places focused understanding of global education may more easily allow for the version that explores the world as an objective reality, with a sympathetic but uncritical acceptance of global systems that create and maintain injustice, and without recognition of how we are embedded in and embody those systems (Young, 2010). A different understanding of interconnection and interdependence might challenge such practices (Selby, 1999). Questions not sufficiently addressed in the global education literature, however, are what types of interconnections might be identified, what mechanisms create interdependence, where else those mechanisms or organisations appear, and whether their behaviours or impacts are similar? Also needing clarification are questions regarding where the boundaries of interconnections are drawn

and why? What principles might guide teachers who are teaching spelling, or the laws of motion, or sex education? These are questions which are addressed when the systems concepts explored in this thesis become principles which guide global education practice.

Perspectives consciousness

The role of perspectivity in global education is perhaps the most fully explored of the concepts associated with the approach. Pike (2000a) identified two ways that perspective is understood in the literature: the first refers to the object of study, to the holistic, planetary focused concerns of global education, a focus on the global system as a whole; and the second refers to the subject, to the positions from which phenomena are viewed, a focus on the points of view of those concerned with the object of study. Perspective in global education, then, can indicate both the known and the knower.

Case's (1993, 1999) explanation of a perceptual dimension of global education is commonly cited in the literature (see, for example, Hicks, 2003 overview and Pike, 2000a; see also, in the Canadian context, Cook, 2008; Mundy et al., 2007; Pike, 1996, 2000b; Reimer & McLean, 2009). Case described two dimensions that make up a global perspective. For the substantive dimension, the object of focus, Case drew upon the work of Kniep (1986) and Hanvey (1976). The elements of this dimension are universal and cultural values, global interconnections, resent worldwide concerns and conditions, and origins and past patterns of worldwide affairs (Case, 1993, p.320). The perceptual dimension, "the matrix of concepts, orientations, values, sensibilities, and attitudes" (1993, p.318) is comprised of five elements. *Open-mindedness* is the willingness to make judgements based on evidence and consideration of all positions. *Anticipation of complexity* describes scepticism in regards to simple explanations and an expectation that easy answers and solutions to global problems will not be forthcoming. A similar scepticism toward easy generalisations about people, categorising and defining others rather than appreciation of and expectation of diversity, is identified as *Resistance to stereotyping.* The willingness to place oneself in another's position, to imagine their feelings is the *Inclination to empathise*. And *Nonchauvinism* describes the ability to move beyond one's group interest and consider the concerns of other groups, even if they are not compatible with one's own. In his later formulation of the global perspective Case

(1999) combined the elements of the perceptual dimensions into three broad habits of mind: open-mindedness, full-mindedness and fair-mindedness.

While it is fair to say that Case's definition of global perspective comprises both the object of attention and the subject engaged in the attention (the known and the knower), his treatment of the two is different in one key respect: he includes a critical element only in the perceptual dimension. That is, the perceptual dimension requires scepticism toward simple explanations, generalisations, or expressions of group interest, but the focus is on personal attitudes rather than on institutional and systemic injustice. Students are encouraged to be critically reflective of their own attitudes, but not to be critical of systems that create or encourage simplistic, short term thinking, stereotyping and ethnic profiling, or nationalism. His account of global education presumed that students can be narrow-minded, short sighted, and selfish, but not that systems can exhibit the same behaviours.

In addition, Case's conception treated knower and known as discrete entities rather than as co-created. It suggested an understanding of global systems as objective realities, and a belief that the adoption of the habits of mind he suggested can lead to a more objective understanding of global realities. While he did state that the two dimensions are necessary for a global perspective, he also claimed that "promoting the virtues that make up the perceptual dimension reduce the extent to which students' perceptions of their world, both domestic and international, are distorted by inadequate cognitive lenses", which may lead to "naïve, often mistaken views of the world" (1993, p.324). A question which arises from Case's framework is, why cannot students and teachers also be encouraged to critique the roles that larger social, political, economic and environmental systems play in creating their perceptions and actions, as well as the role the students play in creating the systems of the world?

A more critical and holistic envisioning of global perspective is provided by other global education proponents. Hicks' (2003) definition of global education included both the exploration of individual values and emphasis the exploration of the nature of interdependency and dependency in local-global connections. Marshall (2007a) drew upon both Hicks' and Pike and Selby's work in defining global education, and added the recognition of the homogenous and heterogeneous characteristics of global education,

highlighting the role of the observer of global education into the definition of the approach. Perspective is not only embedded in the content and pedagogy, it is also embedded in discussions of global education itself.

In their irreducible global perspective, Pike and Selby (1988, pp.34-35) included five aims: systems consciousness, perspective consciousness, health of planet awareness, involvement consciousness and process mindedness. They stressed the link between person and planet, that they are "inescapably locked together" and stated that "observers in part determine what is observed". Crucially, they did not separate what is known from the knower. Like Case, Pike and Selby (1988) recognised the necessity for students to address unexamined assumptions and understand that their positions colour how they see the world. Where they differ from Case is in their inclusion of a critique of trends in global society and of the response to global issues, defined as a "contemporary phenomenon affecting the lives of people and/or the health of the planet in a harmful or potentially harmful way, such as environmental pollution, racism and the threat of nuclear war" (Pike & Selby, 1988, p.22). This critique appears in the futures orientation embedded in their interpretation of global education. Through the systems lens they employ, the systemic nature of global issues is highlighted; they are an emergent property of system interactions. The systems themselves are a focus of critique, as are the interactions between students and world, both in terms of how students' points of view are shaped, and in how their actions (or inactions) shape the world.

2.1.4.   Some tensions in global education.

In an overview of the field, Pike (2000b) pointed out that there was a lack of critical debate in global education. He did identify, however, differences of opinion embedded within the research, which suggested tensions to be explored. These included the moral purpose of global education; is it in the national interest or the planetary interest or somewhere in between? As well, there is disagreement as to whether or not global education should be advocating for social change. Connected to this is the conception of citizenship underlying global citizenship education: does citizenship have meaning outside the context of the nation state and if so how is this manifest? Similarly, Mundy et al. (2007) described four major tensions in the global education construct. Like Pike, they identified conflicts between the values represented

in global education. What is 'good'? Should international competitiveness be enhanced through global education? Should global citizenship supersede national citizenship? A second challenge lies in the ambiguity and under-definition of global education. They used the example of global citizenship to highlight the number of interpretations and competing values that this entails. Third is the difficulty teachers may have in responding to the complexity and uncertainty of the holistic approach. Finally, the notion of universal values, particularly in the focus on human rights, is called into question. There is a conflict between an education for diversity and the imposition of a set of values.

For the purposes of this study, there are two concerns, embedded in those described above, which are key. First is the difficulty teachers may face in enacting global education when they do not feel confident in their knowledge and skills. Second, and connected to the first, is the lack of a critical lens used to explore global education content, leading to what I am calling 'global ed lite'.

Teacher knowledge and confidence.

As noted above, Mundy, et al. (2007) reported on the widespread appearance of global education ideas in curricular documents and resources across Canada, but their implementation in elementary school was uneven, without curricular or professional development support, and dependent on the commitment of individual teachers. This, perhaps, contributed to the vague definitions teachers offered, as well as the fact that their practices seemed primarily confined to "efforts (that) reinforced a 'them/us' charity-focused perspective" and an idea that students should be encouraged "to recognise how fortunate they are to be in Canada" (p.99). Reimer and McLean (2009) also reported that teachers' concepts of global education are often vague, despite having participated in teacher education programs with a global education lens. Similarly, in my own research it was clear that one teacher's practice of global education did not correspond to that found in the literature, avoiding controversial issues and focusing instead on learning about another country and engaging in an overseas humanitarian project (Young, 2003).

Researchers offer different explanations as to why there is a disconnect between knowledge of global education as it is conceived in the literature and the interpretation of many teachers. It may reflect, as Marshall (2007a) found, an explicit decision to accept some aspects of global education and reject others, perhaps informed by personal

beliefs and values. It may be that teachers' experiences with global education have not encouraged a nuanced understanding of the complexities of the approach as it is conceived in some of the literature, and that an evolution of understanding should become a focus of teacher education programs, as suggested by Reimer and McLean (2009). Associated with this idea of the development of nuanced understanding, is a lack of confidence some teachers feel when they practice global education. Holden and Hicks (2007) reported that many trainee teachers feel the need for more guidance: they are not confident in their knowledge and abilities to teach global education. Teachers might feel that they are not sufficiently knowledgeable about global education concepts or about the global issues that constitute much of its content. My own interpretation of this apparent disconnection forms the crux of my inquiry; it may be that the fragmented nature of what constitutes 'global education' coupled with the lack of a systems thinking approach to teaching and learning, does not incline practitioners to 'see' or 'act' holistically.

Lack of critical focus: 'Global ed lite'.

The reports documenting the limited attention paid in global education classes to issues that may be controversial is cause for concern (McKenzie, 2006; Mundy, et al., 2007; Young, 2003). Not only does it point to a difference between proponents and practitioners in their interpretation, it also calls into question the goals of global education found in much global education literature: that of saving the planet or addressing the global problems by changing the world in some way (see for example Alladin, 1989; Parchment & Vahed, 1996; Roche, 1989; Council of Ministers of Education Canada, 2001, report on global education in Quebec; Toh, 1993). If there is no recognition of the systemic nature of the inequities of global structures, that their very organisation creates and maintains injustice, then there is little chance that people will be moved to actively change them. This was recognised in Toh's (1993) overtly political and values based conception of global education, when he argued for a transformative paradigm critical of liberal technocratic discourses and encouraging engagement in political practice. Cook (2008) demonstrated that as global education has broadened its scope over time, the peace "thread" within it has been reduced to the local and the personal, ignoring the structural roots of violence and essentially losing its political focus. Such critiques are in line with more activist conceptions of global education and current strands of global

citizenship education (Mundy, et al., 2007; Schultz, 2007). It also echoes the calls for a global education situated in a systemic paradigm that nurtures personal and ultimately social transformation (Selby, 1999; Young, 2010).

In addition to the concern around the lack of critique, is the connected lack of social activism. This speaks to perhaps the more contentious element of global education. Case (1993) cautioned, for example, that global educators should not be critiquing current systems (e.g. capitalism) but should instead be providing students with the tools to make their own evaluations. Although Werner and Case (1997) did highlight the unequal nature of global interdependencies, they were careful in their support for social activism, saying that such activities may, at times, promote skills development, but they should not constitute a goal of global education because schools are not "primarily in the business of solving social, environmental, or other global problems" (p.190). Critiques of political and economic systems clearly contradict some versions of global education aiming to increase Canadian economic competitiveness, and so social activism would presumably not be a welcome direction (O'Sullivan, 1995).

The exclusion of such critique and action, however, presumes that global education (or any education) can be separate from values, or specific values. It also presumes that students are not yet full members of their communities, created by and creating social, political and environmental systems. This 'ideal' of objectivity and compartmentalisation is rejected by a global education growing from systems thinking, as such a separation of the student from their roles as actors in the community represent the mechanistic paradigm dominating curriculum and instruction (Selby, 1999). It represents a belief in a values free curriculum, that objectivity is a reality and that learning can be (should be?) divorced from experience (Young, 2010).

Associated with the lack of action is the practice of a particular type of action within global education practice (and one shared by other progressive educations), what McKenzie (2006) called "lifestyle activism" (p.212). This is evident in actions such as recycling, taking public transit, cleaning up litter, consumer choices, and fund-raising (Jefferess, 2012; Lousley, 1999; Young, 2003), essentially depoliticized behaviours that do little to challenge dominant discourses or change the systems that threaten environments and peoples. A common response to the introduction of global education

in classrooms is a fund-raising activity for the purpose of helping those less fortunate (Mundy, et al., 2007; Young & Cassidy, 2004). Such fund-raising may not be tied to curricular content nor include any examination of the reasons why some are poor while others are not (Jefferess, 2012; Mundy, et al., 2007). In addition, it may give students a sense of benevolence and happiness that is unwarranted. Jefferess' (2012) critique of the "Me to We" social enterprise highlighted the fact that such action focuses on the happiness and benefits to the "helper" while doing little to challenge the "neo-colonial relationships that (re)produce poverty" (p.20) or even consider our complicity within the systems or structures that create it. Such charity does little to change the status quo nor does it create meaningful relationships between students and those they want to help. Rather, it serves to maintain "dominant ethno and anthrocentric discourses, such as Western intervention in 'less developed' countries, globalised economic development" (McKenzie, 2006, p.205). In effect, charity does not change or critique the systems which produce and maintain unequal economic and political power between nations; it holds so-called developing nations fast in a position of dependence.

Charity may be considered a more powerful action than say, recycling, and some might argue that it gives students the opportunity to affect the lives of others directly. However, even following these activities, some students express a sense of powerlessness to really make a difference in the world (McKenzie, 2006; Young, 2003). References are made repeatedly in the global education literature to the powerlessness some teachers and students feel when faced with global issues (Holden & Hicks, 2007; Marshall, 2007a; McKenzie, 2006). In a study I conducted, a teacher, explaining why he thought global education was important, said that he hoped someday, one of the 200 students he had taught would be "in a political position of real strength and power" and would "be able to make some really high powered changes" (Young, 2003, p.137). The other 199 presumably would have little impact on the world. Perhaps this lack of belief in individual agency influenced his curricular and pedagogical decisions.

Elsewhere, I have argued that systems thinking in global education leads to a recognition of greater individual agency by challenging beliefs in universals, thus making explicit the created nature of human systems, and by positioning the subject in the world where all action or inaction has impact (Young, 2010). Our agency exists through our embedded and embodied relationship with the world: we physically (inter)act with/in the

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systems we are studying, we create human systems through our (inter)actions and we create natural systems through our inter-system relationships. We always have agency through our existence in and interaction with the world. A question which arises is, if teachers have a clearer understanding of systems interaction and their roles in that interaction, would a greater belief in individual and social agency emerge?

2.2. Systems thinking in education

Reference to systems appear in global education from the beginning (Hanvey, 1976; Kniep, 1986). However, it was the work of Pike and Selby (1988), and other global education advocates who championed a more holistic approach, in the sense that we recognise everything is connected to everything else (for example Greer, 1996; O'Sullivan, 1996). Systems thinking was identified as a way of approaching content, and the process or pedagogy of teaching was a focus.

Global education is not the only approach which references systems thinking. There are more direct inclusions of systems thinking into education: how it might inform what we teach, how we teach, how we design education systems and how we research education questions. The reasons most commonly given for the inclusion of systems theoretical ideas in education are, first, that the thinking and concepts associated with systems thinking are needed to understand science and so should be included in school curricula (for example, Gulyaev & Stonyer, 2002; Perkins & Grotzer, 2000). Second, since education is in itself comprised of complex systems, so complex systems approaches are the most appropriate for research and practice in the field (for example, Davis & Sumara, 2008; Fleener, 2005). Finally, similar to rationales in global education, the complex problems facing the world require complexity thinkers to understand and perhaps address them (for example, Booth Sweeney & Sterman, 2007; Kunsch, Theys & Brans, 2007). What follows is an overview of some of the literature on systems thinking and education. This is by no means comprehensive, but it does provide an idea of the range of work that has been done in this growing field.

Systems thinking is essentially the consideration of wholes, their constituent parts, and relationships and interactions among them. Considered a paradigm different

from that which dominates much of educational thought, which reduces and compartmentalises (Doll, 1987; Orr, 1994), systems thinking contends that in systems – phenomena that are irreducible and have emergent properties associated with their relationality - the whole is greater than the sum of its parts and cannot be reduced into easily quantifiable pieces, and where existence itself is determined by relationship (Bohm, 1985, 2003). To view the world as separate pieces, as objects which just happen to coexist or work together as "building blocks" or even to try to understand it by creating convenient categories and simplifications, is to miss the very essence of the world's being and our perception of it, which is always relational (Capra, 1982; Selby, 2004).

One of the earliest efforts to connect systems thinking concepts to education was a curriculum guide developed by Kenneth Boulding, an economist and systems theorist, along with Alfred Khun and Lawrence Senesh (1973). The document outlined the use of systems analysis as both a subject of study in classrooms and a means by which content could be examined. It used the family, ecology and poverty as contexts through which to explain system structure and system models and offered sample questions teachers could use with their students. The language was somewhat technical and seemingly drawn directly from systems analysis (for example, transactions as forms of interaction, inter-system and intra-system analysis, detectors, selectors and effectors in systems, etc.) Perhaps this explains why it does not seem to have had much impact on curriculum and pedagogy: I could find no references to it in any other documents.

Some of the more recent work which attempts to bring systems thinking into education is informed by systems dynamics, which involves the use of computers "to model feedback processes in complex social and industrial systems" (Hammond, 2003, p.22). System dynamics was developed by Forrester (1961, 1968) a computer engineer and professor at MIT School of Management, who himself wrote on developing systems thinking skills in schools (for example, Forrester, 1992, 2009). The education research and systems thinking strategies which grow from systems dynamics focus on identifying feedback mechanisms and making models, (see, for example, Booth Sweeney, 2001; Booth Sweeney & Sterman, 2007; Davidsen, Bjurklo & Wikström, 2006; Draper, 1993; Evagorou, Korfiatis, Nicolaou & Constantinou, 2009; Meadows, 2008; Richmond, 1993, 2000).

Booth Sweeney focused in particular on ways for students to develop systems thinking skills (2001, 2005). To inform her definition of systems thinking, she drew upon systems dynamics and Peter Senge's work on learning organisations (1990), itself based on systems dynamics. She identified the type of reasoning required to engage in systems thinking: called homologous reasoning, it involves the ability to recognise recurring patterns of behaviour in different domains (Booth Sweeney, 2005). Thus, the system dynamics associated with a fight in the playground can be applied to business competition, or exponential growth in a dish of bacteria can be applied to population growth in human societies.

A possible critique of this stream of systems thinking in education, similar to the problem identified in reference to Boulding, Kuhn and Senesh's (1973) work, is that it seems to require a level of expertise on the part of the teacher. That is, teachers are expected to be sufficiently familiar with the process of modelling and in some cases the systems archetypes described by Senge (1990), so that they can successfully guide their students to develop such systems thinking skills and practice modelling systems. And, indeed, while two studies concluded that given formal practice, children could develop systems thinking skills (Evagorou, Korfiatis, Nicolaou & Constantinou, 2009; Jacobsen and Wilensky, 2006), in another study regarding how students and teachers, who had not received any formal training, think about systems concepts like feedback, stocks and flows, and time delays, it was found that they had limited intuitive systems thinking abilities (Booth Sweeney & Sterman, 2007). More research, however, is needed both to investigate intuitive systems thinking skills and to explore the type and scale of formal training which might assist teachers and students in developing such systems thinking skills.

A second possible critique is around epistemological and ontological assumptions as to the nature of systems and our knowledge of them: are the systems identified real, objective entities? How are their boundaries determined? And who decides? Can we so easily assume that the patterns of behaviour observed in bacteria can be applied to human systems? Might this not tend toward a deterministic view of human interaction? These are concerns of soft systems and critical systems researchers which are discussed in the next chapter.

There is an interesting division between streams of systems thinking in education: one flowing from systems dynamics and Peter Senge's work on learning organisations, and the other flowing from complexity sciences. This mirrors the different directions in systems theory identified by Checkland (1983, 1985) in the field of Operations Research and the Management Sciences: the division between hard and soft systems research approaches. Checkland (1983) described hard systems approaches growing from an ontology that understands systems, specifically human systems, as real entities. Soft systems methodology sees human systems as epistemology, as interpretive. Thus, there is an appreciation of multiplicity and a need for comparison in order to yield changes. Like the divide in Management Sciences, the streams of exploration in systems thinking in education seem to reflect different ontological positions, a division which is reflected in their having different Special Interest Groups in the American Education Research Association. Both focus on wholes, dynamic interrelation and coping with complexity and there is overlap between the two streams; but while the systems thinking literature which draws upon systems dynamics tends to model systems as though they were real, definable entities, and thus have behaviours which can be predicted (see, for example, Richmond, 1993), the complexity thinking literature is less concerned with precision and more focused on multiplicity, emergence, and creative chaos (see, for example, Davis & Sumara, 2006; Doll, 1987; Smitherman, 2005). Though the research which draws upon systems dynamics is contextually aligned with this thesis, since it includes a focus on developing systems thinking skills in classroom practice, my work fits more comfortably within the complexity stream, where systems behaviours are understood as uncertain and often unpredictable.

Complexity thinking grows from the complexity sciences, also called 'New Science", which refers to the "techniques and explorations of complex adaptive system theory, the theory of dissipative structures, or chaos theory" (Fleener, 2005, p.2). It is a relational, holistic and evolving logic which disrupts the quest for certainty, truth or objectivity (Fleener, 2005). In education, it is characterised as an alternative to the traditional analytic or mechanistic paradigm which dominates education systems. Since living systems are both complex and dynamic, and since education is itself the interaction of multiple living or open systems (social, institutional, classroom, ontological, epistemological), the many systems associated with education can be – should be –

seen through a complexity thinking lens (St. Julien, 2005). A complex systems paradigm calls into question the idea of pre-set outcomes, universal truths, and linear interactions like cause and effect or problem and solution (Doll, 1987). This has implications for our understandings of learning, pedagogy, and curriculum, as well as the methodologies we choose to conduct educational research.

Much of the literature which explores education through complexity science concepts has included a rationale, arguing that the systems thinking paradigm and complexity sciences in particular offer a more meaningful and appropriate lens through which to explore educational contexts (see, for example, Doll, 1987; St.Julien, 2005; and for a comprehensive overview of the potential for complexity thinking in educational research, see Davis & Sumara, 2006). New metaphors or representations, which better serve this complexity perspective, are proposed for education, like the fractal which is recursive and scale independent (Davis, 2005) or cartography (mapmaking) which encourages visual appreciation of spatial characteristics, rhizomatic interconnections and social positioning (Ruitenberg, 2007). Researchers find correspondences between concepts in complexity thinking and ideas which are common in educational discourses, such as dynamical systems theory and the role of novelty and creativity in Dewey's pragmatic inquiry (Semetsky, 2008), and notions of emergence and enaction in complexity thinking and Ranciere's ideas on democracy (Bastrup-Birk, & Wildemeersch, 2013). Proulx (2008) explained the differences between aspects of constructivist theories and Maturana and Varela's theory of cognition, in particular showing that

> the notions of co-evolution within structural coupling and structural determinism, [… do] away with this dichotomy of objectivity and subjectivity [in constructivism] and explains that the knower and the known – the subjective individual and the external constraints of the learning experience – us and the physical external environment, are reciprocal and simultaneous specifications of the other. They co-define each other. (p.21)

Complexity concepts are used both as theoretical frameworks to explore structures and processes of education and learning, for example school organisation

(Dellar, 1994), classroom relationships and learning in collectives (Davis & Sumara, 2008; Raia & Deng, 2011), and teacher education (Burris, 2005; Fels, 2004; Kentel & Karrow, 2007; Laroche, Nicol & Mayer-Smith, 2007; Phelps, 2005). Student learning is also a focus of research: Nelson (2004) used complexity concepts to understand how ESL students learn language, and Sinclair (2004) explored how learning systems evolve within a technology classroom.

Jacobsen and Wilensky (2006) linked complexity sciences and student learning is a different way: they examined to what extent students are able to understand and adopt complex systems concepts themselves. They found students had some difficulties understanding emergent patterning (how behaviours emerge from interaction of subsystems within larger systems) and were not always able to take on different perspectives (move between agent-based to aggregate or whole system perspectives). To assist students in understanding and using such concepts, they suggested teachers adopt more experiential strategies, make the concepts explicit, encourage collaboration and discussion, have students construct models, theories and experiments, and they recommended that complex systems concepts be infused across curricula.

Similarly, complexity thinking informs the pedagogical and curriculum content of classrooms. Perkins and Grotzer (2000) described a project which engaged students in inquiry in science classrooms, in order to add to their repertoire of causal models, beyond surface generalisations or simple cause and effect to understandings of different levels of underlying mechanisms in scientific explanations or the interactive causality of evolution. Also in science classrooms, Stewart (2012) examined the benefits of using concept mapping to understand the connections in phenomena that are dynamic, ill-structured and interconnected. For Khan (2006), complexity thinking offered a lens through which children's consumer culture could be examined in order to foster a pedagogy for citizenship. The goal is to help students form lifelong ethical relationships with and between themselves and their world (other people, places, things and ideas).

The idea that an education informed by or growing from concepts, ontologies or epistemologies associated with complexity thinking can create ethical action is a focus of discussion in some of the literature. Bai and Banack (2006) argued that the non-linear, relational nature of complexity theories, incorporated into classroom experience, would

encourage recognition of inter-being, that we *are* our relationships, and this realisation has ethical implications. Students and teachers would enact this "participatory" sense of being through an understanding and practice of mutuality in classroom knowledge exploration, a recognition of self-similarity as it runs through the curriculum, and a view of our relations in the world as patterned and potentially multiplying. Mgombelo (2006) used Varela's work in complexity and Newburg's work on neurotheology to show the autonomous and unconscious nature of human ethical action. Like Bai and Banack (2006), she drew upon the complexity notion of human embeddedness in the world, our relationality, to discover an ethics – in her case, focused on teacher action.

Though Fenwick (2009), too, saw ethical implications in the relationality of complexity themes, she argued that complexity thinking offers more "generative alternatives" to "the delimiting of learning that occurs when education defines itself as teleologically riveted towards particular outcomes" (p. 103) whether they be assimilationist or transformative. She explored the tensions between the complexity notions of the relational self, that there are no distinctions between self and other, and the need for diversity and interaction within self-organising and emergent systems. She noted that self-organisation and emergence do not of themselves prevent the creation of hierarchical, unjust or oppressive systems. Complexity concepts are consistent with notions of educational responsibility, but it is a responsibility without knowledge, without certainty about what is right or what might emerge.

> Complexity itself neither implies not encourages any 'oughts' for behaviour among its elements, and educators are left to map their own answers to the central question: How should we act in a relational universe? (Fenwick, 2009, p.109)

The exploration of ethics and morality within complexity are particularly relevant to this study, as one of the ultimate goals is to provide a strong conceptual framework within which teachers and students can act with social justice in mind. Although global education includes this moral imperative – when its social justice aims are highlighted – it may be that systems theory concepts can help provide a theoretical basis for the moral

position. However, as Fenwick (2009) explained, relationality may not, in itself, lead to a more just or equitable behaviours of and within systems.

2.3. Conclusion

As reviewed in this chapter, when global education is disentangled from other education approaches, it emerges from the literature as a grand idea with range of interpretations. Though there are shared concepts of interdependence, connectedness and perspectivity across this range, the way these are understood and discussed can vary considerably. Yet even within the range identified within the literature, there are concerns around the way global education appears in practice. There seems to be widespread critique, for example, of global education that is solely focused on other countries, commonly manifest in one-off fundraising initiatives without critical exploration of associated issues. The calls for the inclusion of a more critical lens appear in versions of global education which situate it within social studies (see, for example, Merryfield, 2009 and Tye, 2009) and those who advocate a holistic, cross-curricular approach (see, for example, Selby, 2004). It may be that the lack of teacher knowledge and confidence identified in the research plays a role in this, as teachers may be reluctant to include in their classes a critical examination of systems which they do not feel they know much about.

The lack of knowledge and confidence may be particularly relevant to the transformative version of global education. Since this conception calls for teachers to explore and enact change in self, school and world, it is asking for a significant level of commitment and confidence. Evans (2006, as reported in Mundy, et al., 2007, pp.10-11) noted concern around the readiness of teachers to embrace the complex challenge of the holistic approach or to take on the uncertainty surrounding the behaviours of systems interaction (for example, the relationship between capitalism and social well-being). Yet the rationale for the holistic approach requires such an embrace: first because in an interconnected world, change in one area creates change everywhere, over time and space and this should be recognised; and second, because such change is constrained, hampered, perhaps warped within a school/curricular/pedagogical system which is incommensurate with relational ontological and epistemological claims.

Marshall (2007a) asked "is the discourse of social change (so intrinsic to global education) being dominated by hierarchically structured knowledge forms and technical-instrumentalist, economic educational discourse?" (p.371). That is, might it be that to achieve the change goals of global education, the structures of schooling must change as well?

One way the complex challenge of the holistic, transformative global education can be met is through embedding systems thinking into the approach, and systems thinking in education is a field which has its own literature. As is evident from the literature reviewed here, it can be divided into two broad streams: systems thinking in education and complexity thinking in education. Though there is some focus on teaching the skills of systems or complexity thinking, it appears primarily as a theoretical framework for research and as a means by which to explore and understand school and classroom interaction.

There is some literature on the skills of systems thinking and their development in the classroom. For example, complexity thinking does become infused into classroom practice in science education where, for example, students examine types of causality (Perkins & Grotzer, 2000) or engage in concept mapping (Stewart, 2012). Engaging students in the practice of systems thinking also appears in streams of systems thinking in education that draw upon systems dynamics. Of the three studies I found that examined children's systems thinking skills, two focused on student understandings following formal training (Evagorou, Korfiatis, Nicolaou & Constantinou, 2009; Jacobsen and Wilensky, 2006). The third, which focused on the limited skills before formal training, is the only one that included teachers' understandings (Booth Sweeney & Sterman, 2007). Like some global educators, they, too, noted the influence of the larger educational and social environment on the development of skills they were looking for, raising "concerns about the degree to which ordinary discourse, educational materials, and common teaching methods may encourage and support sloppy and incomplete thinking about complex systems" (Booth Sweeney & Sterman, 2007, p.307). Teachers' knowledge is key, but so are larger educational systems and social discourses. The fact that the boundary we imagine between the classroom and larger systems is not real must be recognised.

This review has established that there are some gaps in the literature and, therefore, a need to explore some aspects of global education in more depth. The development of guiding principles would help teachers navigate the difficulties around adopting a holistic approach within current educational structures, identify types of connectedness and the mechanisms that create them, and determine and evaluate the boundaries of classroom content and practice. There is also a need to continue the development of a more critical orientation to curriculum and pedagogy. That systems thinking offers the necessary theoretical framework has been recognised, but the literature on systems thinking and complexity thinking in the education literature reviewed provides limited curricular and pedagogical guidance. This thesis offers a step toward addressing these gaps.

The environment of this study, the systems of thought and ideas found in global education within which it is developed, is one which should prove to be fertile ground for concepts of relational epistemology and holistic ontology found in systems theories: indeed, they are already present in different forms. The focuses of the holistic version of global education and systems thinking or complexity thinking in education are generally quite different, with global education firmly rooted in the classroom and in the practice of teaching, and most of the work in complexity concerned with research approaches and theoretical frameworks. The overlap between the two lies in their rationales: they each argue that they are necessary to deal with the complexity of our current reality, a complex globalised world, and they have determined that the concepts and framework offered by systems theory are best suited to this task. The goal of the next chapter is to more fully explore those concepts within disciplines where they have been developed and explored for decades.

3. Theoretical Framework: Systems Theory Literature

If global education is an approach to all curriculum and instruction, encouraging a transformation of self, school and world, then there must be concepts underlying it which apply regardless of the topic of study. That is, the approach itself must cross curricular and content boundaries. This would develop habits of mind, an orientation toward holistic and critical thought, which would support global education goals. Following from Pike and Selby's work (1988, 1999), I look to systems theory to provide this. In this chapter I provide an overview of systems theory concepts that I find useful, and thus form a conceptual framework for my study. This overview includes a description of contributions of systems theorists whose work has informed this study.

3.1. General overview

Systems theory, at its most general and abstract level, is concerned with organised wholes or organised complexes. These are comprised of interrelated elements whose interaction creates a system with properties and behaviours that are attributable to the system rather than to the elements individually or added together. This is perhaps best expressed in what M'Pherson (1980) called the *weltanschaung* (worldview) of systems thinkers: the whole is greater than the sum of its parts (p.134).

The understanding that the whole of the system is greater than the sum of its parts springs from the recognition that the system identity itself emerges, instantly, from the dynamic interrelationships of the parts rather than any kind of incremental summation of the properties or behaviours of those parts (Georgiou, 2007). The behaviour of the system cannot be deduced from adding the properties or behaviour of the parts, nor is it a simple cause and effect relationship: Causes can be effects and effects, causes; the interactions are multidirectional. Only by a holistic approach,

meaning the investigation of organisation, behaviour, and properties as interacting, causing and caused by each other, can the system be explained.

Systems thinking has been offered as one alternative to the what had been in the past the dominant paradigm of science, characterised as reductionist, deterministic, positivistic, and mechanistic (von Bertalanffy, 1968; Capra, 1982; Hammond, 2003; Meadows, 2008; Skyttner, 2005). It is important to note that the systems theorists cited here argued against a very specific kind of reductionism, which is framed in a way that allows them to contrast a particular view with their ideas about emergence. Another way to argue against reductionism, more broadly, is to use Sober's (1999) multiple realizability argument, which states that properties of a higher level phenomenon may be related to properties of multiple lower level phenomena rather than just one: "the mapping from lower to higher is many-to-one" (p.545). For the purposes of this thesis, reductionism is defined as in opposition to the relationality of systems theory as a result of the literature that I am building on. However, it must be recognised that there are other ways in which reductionism might be framed and that scientific disciplines and traditions of inquiry not grounded in systems theory are not necessarily reductionist in nature.

In systems theory literature, it has been argued that, growing from the work of Descartes and Newton, the scientific world view of 18th century Europe conceived reality as "determined, exact, formulated, explicit and that it is possible to control the natural forces" (Skyttner, 2005, p.12). This idea was represented in the view of the universe as clockwork mechanism where effect was preceded (never followed) by cause, where identical causes imposed upon identical rational systems produced identical effects, where causes and effects are measurable. Such a view of reality allowed for phenomena to be explained by use of the analytical method:

- Dissect conceptually / physically
- Learn the properties / behaviour of the separate parts
- From the properties of the parts, deduce the properties / behaviour of the whole (Skyttner, 2005, p.15).

According to Skyttner (2005) the first fatal blow to this deterministic view came from physics, specifically from Einstein's theory of relativity, followed by quantum theory,

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where existence itself is shown to be created by relationship. Moreover, human ability to explain and measure phenomena is called into question.

> The view that only one truth about reality exists and that the various scientific disciplines describe different parts of it is no longer tenable. What exists is only subjective and often contradictory conceptions of reality… Present-day knowledge is only the best description of reality we have at the current moment in time. (Skyttner, 2005, pp.28-29)

The "machine view" of living organisms was challenged as well in the field of biology. According to Hammond (2003), two issues confronting theoretical biologists in the early 20th century were

> 1. The nature of life and the relationship between biological/psychological and physical/chemical phenomena, and
> 2. The processes of evolution and development (p.32).

The reductionist orientation of mechanistic models in biology did not serve to explore these issues, and, as Sober (1999) contended, philosophers of mind and of biology had reached the conclusion that reductionism was mistaken. One response to this conclusion was the emergence of organismic biology which served to "redefine the relationship between the physical and biological sciences" as it "sought to understand living organisms in holistic, dynamic and interactive terms" (Hammond, 2003, p.32).

Called a new paradigm in scientific thought, what grew from these challenges to the mechanistic view of reality were systems approaches or systems thinking, the implications of which reached beyond new methods for scientific research. Connections were drawn between the mechanistic paradigm and a host of social and environmental problems because its reductionism lead to a division of human from human and human from environment, allowing for objectification and exploitation of the other (human and non-human). To begin to address these global social and environmental issues, a new worldview or paradigm was needed. Capra (1982) called it a crisis of perception, as "we are trying to apply the concepts of an outdated world view - the mechanistic world view of Cartesian-Newtonian science - to a reality that can no longer be understood in terms of these concepts" (pp.15-16). Systems theory represented an alternative paradigm

which might provide a conceptual framework for the social change which was deemed necessary.

Providing a specific and detailed explanation of what systems theory is, however, can be problematic: it might not be considered itself a theory, but rather a paradigm for the development of theories. Thus, there would be different theories explaining different aspects of the behaviours of different types of systems. Flood and Carson (1993) used the title systems science to describe this paradigm, and defined it as a meta-discipline, arising from General System Theory (GST) and cybernetics, and leading to interdisciplinary studies in the experimental sciences as well as systems approaches in a wide variety of disciplines. Skyttner (2005), on the other hand, defined General System Theory itself as a meta-theory, with common underlying principles and language established, allowing scientists in different disciplines to share ideas and discover similarities. Whether characterised as systems science, systems approaches, systems theory or GST, there are common terms and concepts which cross disciplinary boundaries. Below are some concepts and terms which will be used in this study (adapted from Skyttner, 2005, pp. 34, 53-54).

- Synthesis is the systems alternative to the analytic method of the mechanistic approach. Rather than taking apart and examining the pieces of a phenomenon, synthesis explores the phenomena as a whole, recognising that properties of the whole are lost when it is taken apart. Understanding requires first that

  The system of which the phenomenon in question is a part be identified (the environment of the phenomena)

  The properties or behaviours of the system be explained, and finally

  The properties or behaviour of the phenomenon in question be explained as a part of or function of the system.
- Interrelationship and interdependence of objects and their attributes constitute a system.
- Holism is the detection of properties or behaviours of the systems as a whole, emergent properties or behaviours, undetectable by analysis.
- Systems are goal seeking: interaction has the purpose of some final state being reached.
- To obtain its goal, systems transform inputs into outputs. In open systems, this transformation process is mainly cyclical in nature.

- Open systems are regulated through feedback mechanisms so that equilibrium can be maintained and goals can be realised. These ensure that deviations are detected and corrected.
- The nesting of systems within other systems is called a hierarchy. Complex wholes (systems) are made up of smaller sub-systems. Thus the environment of a system is itself a system.

The role of feedback mechanisms in systems creation is important to understanding the system as entity. Meadows (2008) offered a useful explanation of feedback, explaining that it is a "consistent behaviour pattern over a long period of time" (p. 25) characterised by a closed chain of causal connections whereby changes in a system's stock (the accumulation of material or information in a system) affect both the input and output of the system. That is, causal relationships are reciprocal through interaction within the system. This also accounts for the delays in response to changes in input or output; because interactions are not direct or simple, it can take time for systems to react. She described balancing feedback loops as those which are goal seeking or stability seeking. Reinforcing or positive feedback loops, on the other hand, enhance or amplify change. Systems dynamics is the field of systems science which focuses particularly on feedback mechanisms as they are essential to systems modeling (see, for example, Forrester, 1961, 1968; Meadows, 2008; and Senge, 1990).

Systems concepts of holism, relationaility, boundary setting and goal seeking originated or were further developed in the works of systems thinkers discussed below. However, the ideas represented in these concepts have a much longer history.

3.2. History of systems theory

There are multiple roots to what is called systems theory today. A focus on wholes and organisation has been present in the study of phenomena for centuries. Von Bertalanffy (1968) pointed to the 'natural philosophy' of Leibniz, the grand constructs in history of Giambattista Vico, and the dialectics of Marx and Hegel. Churchman (1979) found the roots of systems thinking in the I Ching, Bhagavad-Gita, pre-Socratic philosophers, and Aristotle, who he named a hero of the systems approach. Cybernetics can trace its roots to studies of control mechanisms and feedback in the 19th century

(Flood & Carson, 1993). As was outlined above, early 20th century work in physics and biology led to the development of coherent systems approaches in those fields.

The systems approaches which grew from these sources have sometimes connected, and at other times gone in completely different directions. They include such diverse fields as international relations, psychology, engineering, and immunology. Flood and Carson (1993) traced systems approaches as growing from General Systems Theory and from cybernetics, which informed systems sciences which themselves arose from interdisciplinary studies in experimental sciences and lead to further systems approaches. An adaptation of their summary of the many facets of systems science is given below in Figure 3.1.

Hammond (2003), on the other hand, identified four sources of systems thinking: the life sciences; engineering, management and the military industrial complex; cybernetics and information theory; and ecology and social theory. Though there are significant overlaps between these streams, there are also significant differences, especially in what was developed. For example, systems engineering and systems analysis were concerned with problem solving; system dynamics and systems ecology were focused on modelling; cybernetics and General Systems Theory aimed toward integration and synthesis; while deep ecology and new paradigm thinkers explored changes in consciousness.

> Far from being monolithic, the "systems movement" includes a tremendous variety of diverse and even contradictory strands of thought. (Hammond, 2003, p.11)

A key event in the early development of systems theory was the creation of the Society for General Systems Research (SGSR) in 1956, which brought together researchers who were working on systems theoretical concepts in their respective fields. Founded by a biologist (von Bertalanffy), an economist (Boulding), a biomathematician (Rapoport) and a physiologist (Gerard), the SGSR was organised to further explore and develop systems theories in an interdisciplinary framework (von Bertalanffy, 1968, p.15). The different approaches and concerns of its founders reflect to some extent the

Figure 3.1. *Adaptation of Flood and Carson (1993, p.7) Systems science, its origin and evolution (modified from Beishon, 1980)*
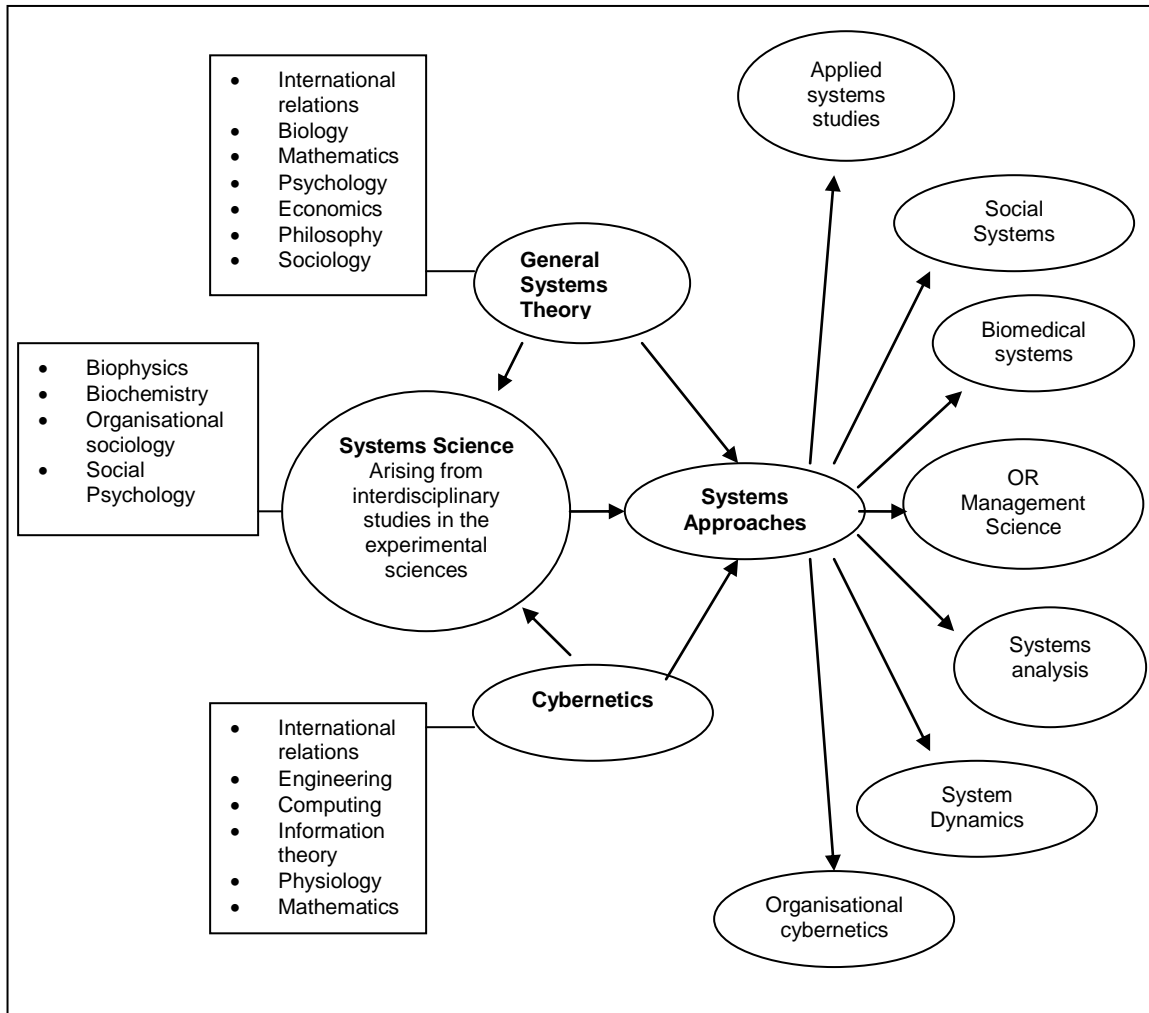
diversity of the movement, with von Bertalanffy and Boulding interested in the more philosophic level of systems thought, while Gerard and Rapoport tended to focus on social control and mathematical models (Hammond, 2003). The Society, later renamed the International Society for the Systems Sciences (ISSS), has been inclusive of the different streams of systems approaches as is reflected in the interests of the different Presidents over the years.

Systems ideas, then, emerge from diverse fields and reflect a complex synthesis of developments, informing and contradicting each other. This work is informed by the

more philosophic focus, which demonstrates a subjective and interpretive understanding of system theory, its meaning and potential. Thus, in providing some background on key systems thinkers and the ideas they contributed to the field, I turn to two of the founders of ISSS, Ludwig von Bertalanffy and Kenneth Boulding.

3.3. Two early systems thinkers

Both von Bertalanffy and Boulding referred, when writing about systems theory, to their belief that it offered ideas which might help address some of the problems they saw in the world, such as prejudices, pollution, the population explosion, and the arms race (von Bertalanffy, 1968, p.8; Boulding, 1985, p.5). They had the notion that awareness of interconnection and interdependence, the understanding of the world as a great organisation fostering immense variety, might "reinforce the sense of reverence for the living" (von Bertalanffy, 1968, p.49) and "a delight in the great variety of the world" (Boulding, 1985, p. 5). Such thinking aligns with the ideals of global education.

What follows is an overview of some of von Bertalanffy's and Boulding's work in the field of systems theory, with particular focus on the concepts which contribute to this study: von Bertalanffy's idea of the open system, and Boulding's development of the hierarchy of systems complexity.

Ludwig von Bertalanffy. In the 1940s, systems principles came together in the work of Ludwig von Bertalanffy, commonly held to be one of the principle founders of systems theory through his work developing General System Theory (Georgiou, 2007; Hammond, 2003).

> In one way or another, we are forced to deal with complexities, with "wholes" or "systems," in all fields of knowledge. This implies a basic re-orientation in scientific thinking. (von Bertalanffy, 1968, p.5)

In developing General System Theory (GST), von Bertalanffy was proposing a new perspective, a new way of doing science (Laszlo, 1975). He argued that the then dominant approach in science, based on a mechanistic paradigm deriving from

Descartes and Newton, was insufficient when it came to the study of complex systems in general and living organisms in particular. The parts of the living organism, when added together, may make up the substance of the organism, but it may also be a dead organism. To study the living organism, it is necessary to consider those parts in interaction. His goal in developing GST was to provide a means by which that which cannot be reduced can still be studied; it attempted a "scientific interpretation and theory where previously there was none, and higher generality than that in the special sciences" (von Bertalanffy, 1968, p.14).

In the text *General System Theory*, von Bertalanffy (1968) identified structural similarities or isomorphisms across disciplines, in such principles as the laws that govern growth, which applies in cells, populations of bacteria, animals and humans, as well as the growth of scientific research when measured by publications. Equations which describe competition between plants and animals also apply in certain physical chemistry phenomena and in economics. In addition, he identified principles of organisation such as equifinality, homeostasis and differentiation as systems concepts which can serve as theoretical frameworks in a variety of fields.

Key to his development of GST was the recognition that classical science dealt with closed systems, and system theory would allow for the study of open systems as open systems; that is, systems which interact with their environment (exchanging matter, energy and information) could be studied with that interaction included, not separated from it. The entity is not just itself a system of interacting parts, but is also interacting itself with an environment, sometimes characterised itself as a larger system, and that interaction creates a dynamic equilibrium, a self-regulation so that a steady state can be maintained. The complex modelling required to study phenomena in this way was not available through classical science; system theory provided the alternative.

Beginning with organismic biology, von Bertalanffy moved to the study of organisation itself, and discovered that there were simultaneous moves in a similar direction in different fields. Problems of order and organisation appeared in disciplines such as quantum physics, psychology and cybernetics. Despite the inadequacy of classical procedures in exploring some phenomena in these disciplines, the acceptance of organisation as a context worth examining in itself met with resistance.

It was philosophically and methodologically unsound because the alleged "irreducibility" of higher levels to lower ones tended to impede analytical research whose success was obvious in various fields such as in the reduction of chemistry to physical principles, or of life phenomena to molecular biology. (1968, p.14)

However, the move toward "a basic re-orientation in scientific thinking" (p.5) was occurring across domains in the early and mid-twentieth century. The idea of studying wholes was taking place in biology, psychology, and the social sciences in parallel. A letter dated 1953 from Kenneth Boulding to von Bertalanffy highlighted this parallelism:

I seem to have come to much the same conclusion as you have reached, though approaching it from the direction of economics and social sciences rather than from biology - that there is a body of what I have been calling "general empirical theory" or "general system theory" in your excellent terminology, which is of wide applicability in many different disciplines. (von Bertalanffy, 1968, p.14)

The interdisciplinary nature of the origins of the systems focus, and of General System Theory, led to von Bertalanffy's second purpose in developing GST: to create a common language across disciplines, allowing scientists to both share ideas and to reduce the duplication of work in isolated fields of thought.

General system theory should be, methodologically, an important means of controlling and instigating the transfer of principles from one field to another, and it will no longer be necessary to duplicate or triplicate the discovery of the same principles in different fields isolated from each other. (1968, pp.80-81)

He was particularly concerned with the isolation of the sciences from each other, pointing out that this was counterproductive.

Conventional education in physics, biology, psychology or the social sciences treats them as separate domains, the general trend being that increasingly smaller subdomains become separate sciences, and this process is repeated to the point where each specialty becomes a triflingly small field, unconnected with the rest. (1968, p.51)

Von Bertalanffy advocated for the education of scientific generalists in order to acknowledge the structural uniformities of reality. A systems perspective, he thought, demonstrates the relatedness of different fields of study, and offers a means toward a more integrated approach. His reasons for this position were not solely to reduce replication, but to help create a different relationship between individuals and their world.

We come, then, to a conception which in contrast to reductionism, we may call perspectivism. We cannot reduce the biological, behavioural, and social levels to the lowest level, that of the constructs and laws of physics. We can, however, find constructs and possibly laws within the individual levels... The unifying principle is that we find organization at all levels. The mechanistic world view, taking the play of physical particles as the ultimate reality, found its expression in a civilization which glorifies physical technology that has led eventually to the catastrophes of our time. Possibly the model of the world as a great organization can help to reinforce the sense of reverence for the living which we have almost lost in the last sanguinary decades of human history. (1968, p.49)

Von Bertalanffy's concern regarding global issues and his vision of a global system reflects the thinking of global educators, a complementary perspective which is pleasing; however, it is not because of this shared idea that his work is relevant to global education. Rather, it is because of two ideas which he highlighted in his work. The first concerns isomorphisms, the repeating patterns of behaviour which can be identified in different systems. In global education, this offers a means by which the behaviours of one system can be used to understand the behaviours of another. This constitutes an alternative way to understand relationship or connection; not through physical linkages but through patterned behaviour. The second idea he drew attention to that is key to this

thesis is the open system as distinct from the closed system. It is the concept of open systems from which other systems concepts explored in this study grows, particularly the role of boundary setting in differentiating system from environment. This forms the basis for the work of systems thinkers in Operations Research and Management Science outlined in this chapter (Checkland, 1981a; Georgiou, 2007; Hammond, 2003).

Kenneth Boulding. Kenneth Boulding was a founder of ecological economics and he actively connected systems research with peace research. Hammond (2003) cited his work with the role of perception and values in the decision making process as one of his most important contributions.

Like von Bertalanffy, Boulding had concerns about the isolation of disciplines from each other. The increase in specialisation coupled with a lack of communication due to "specialised deafness" (Boulding, 1956, p.199) would lead, he thought, to a slowing down of the total growth of knowledge.

> One wonders sometimes if science will not grind to a stop in an assemblage of walled-in hermits, each mumbling to himself words in a private language that only he can understand. (Boulding, 1956, p.198)

General systems theory, he contended, offered a response to this, and in order to develop its usefulness to the scientific community, Boulding pointed out that it required a structure, a framework of coherence so that the interdisciplinary movement could be productive. He suggested two complementary approaches to organising empirical and theoretical investigations (Boulding, 1956). The first places phenomena at the centre of study. For example, such phenomena as population, growth, and information processes are explored within the disciplines of physics, engineering, biology, economics and sociology. Von Bertalanffy (1968) proposed a similar focus in his discussion of isomorphisms in science.

A second approach involved the study of systems by means of their level of complexity and the relationship of those systems to other levels. To facilitate this, Boulding offered an arrangement of levels, a hierarchy of increasingly complex systems. The first and least complex level is of static systems, structures and frameworks like

crystals and bridges, followed by, clockworks (typically the study of classical natural sciences like physics) and closed loop control mechanisms (the subject of control theory and cybernetics). The fourth level, that of open systems, is the difference between life and not-life. This is the level of the cell. The fifth level, genetic societal, is the level of plants and the study of botany. Animal systems, which have the characteristics of mobility, teleological behaviour and self-awareness are the sixth level, followed by the level of humans. Humans are self-conscious systems, with the ability to think about thinking (self-reflexivity), to produce, absorb and interpret symbols. Humans also have knowledge of time, existing "not only in space but in history" (p.205). The eighth level is that of social organisations, difficult to distinguish from the human level, since, Boulding contended, there is no 'human' in the usually accepted sense without a social environment. However, he included it as another level of organisation because it may serve the purposes of some inquiries. Finally, the ninth level is that of transcendental systems, "inescapable unknowables" such as religion (p.205). Questions concerning such systems may have no answers, but there should be opportunity to ask them.

Boulding's (1956) hierarchy of increasingly complex systems provided both a framework for inquiry and an indication of the gaps in theoretical and empirical knowledge. Boulding pointed out that, at the time of publication, adequate theoretical models did not extend much beyond the fourth level (open systems) and that empirical knowledge was lacking at nearly all levels. Twenty-five years later, Checkland (1981a) confirmed that in management science, typical systems models of problems occurring in management at level eight (social systems) were actually focused on interactions as multiple feedback loops (level three) (p.106). The gaps in knowledge of the more complex organisational structures remained.

It is not, however, the structures at different levels and the types of interactions that might appear there that make Boulding's hierarchy particularly relevant to this thesis. Rather, it is the fact that the levels are embedded and interacting. This provides a perspective of interconnection as inter-systemic; a phenomenon can be understood as interacting at multiple levels on the hierarchy, offering different perceptions of the phenomenon as well as different possibilities for making change. In addition, Boulding's first approach to the organisation of general systems theory, which, like von Bertalanffy's isomorphism, focused on building general theoretical models of behaviour (for example,

growth), offers yet another perspective on interconnection: that of patterns of behaviour which can appear at different levels of complexity.

While von Bertalanffy is considered the father of systems theory, Boulding was instrumental in the establishment the Society for General Systems Research (SGSR), which encouraged interdisciplinary work amongst systems researchers. Both highlighted the importance of learning and reflexivity as part of the evolutionary orientation of systems theory, von Bertalanffy in his conception of open systems and Boulding in his view of all systems as interacting (Hammond, 2003). It is these concepts that would be useful in forming a theoretical framework for a global education with a holistic orientation and a focus on interconnections and interdependence, and I will explore their relevance within the context of teachers' classroom experiences in Chapters 5 and 6.

The challenge to historically dominant reductionist and mechanistic approaches and the humanistic potential of systems thought advocated by Boulding and von Bertalanffy was taken up in the field of management science, which was concerned with human systems in particular. System theorists who were key contributors to the interpretive stream of management and organisational sciences, and who inform this research study, are C. West Churchman, Russell Ackoff and Peter Checkland.

3.4. Focus on human systems: Operations research and management sciences

Research in the field of operations research and management sciences was an unexpected avenue of exploration for me. It came about because I found it difficult to imagine how the systems concepts I read about in the science literature could be applied to the organisation and behaviour of humans. Searches for the key words "systems" and "humans" consistently led to the management literature, but I was reluctant to explore this because of my own anti-corporate bias and the perception I had that this field was supportive of the corporate practices of which I was critical. In addition, some of what I read referred to the engineering orientation of operations research and its role in military planning (Flood & Carson, 1993; Hammond, 2003). This did not seem to align with the social justice goals of global education. However, the discovery of Checkland's work

(1981a, 1981b, 1985, 1988) with human activity systems and his inclusion of worldview in the identification of systems led me to reassess my assumptions. He explicitly differentiated his soft systems approach from what he called the hard systems methodologies dominating operations research and management sciences, calling them *systematic* rather than *systemic* (Checkland, 1981a, p.95).

Checkland (1981a) referred to his work as the operationalization of Churchman's philosophical analysis of enquiry systems (p.19), leading me to explore his work, as well as that of his student and collaborator, Russell Ackoff. Both Churchman and Ackoff argued for the need to care for ethics and morality in systems designs. Next, I will provide an overview of some of the ideas contributed by Churchman, Ackoff and Checkland, followed by a review of the critical systems movement where their work was brought together in a focus on the role of power in human organisations (Flood & Carson, 1993).

The work of these systems thinkers is in an applied discipline and as such is particularly concerned with the context of application. Therefore, although I will be brief, it is necessary, I think, to provide an overview of the applications of the ideas that they developed, because, as Ulrich (1991) argued, it is in the context of their application that their normative content and the justification for their propositions lies.

C. West Churchman. Churchman (1971, 1979) is credited with providing a philosophical and ethical grounding to systems theory within the management sciences (Flood & Carson, 1993). Coming from the field of operations research and management science, he established the systems approach as one of critical judgement rather than technique. His work was a reminder that in order to be rational we must learn to deal critically with the fact that we are not omniscient, that what matters is not knowing everything about the system in question but "understanding the reasons and possible implications of our inevitable lack of comprehensive knowledge" (Ulrich, 1988a, p.342).

He identified knowledge as being bound up in the user, without whom it is just a collection of information. It resides in the user, offering the potential for a certain type of action and or an adjustment of behaviour to changing circumstances. This is a very personal connection.

Knowledge carries with it both a tremendous joy and a great despair - a joy of being at one with a whole area of living human activity, and a great despair in recognizing how little this oneness really is compared to what it might be. (Churchman, 1971, p.11)

He argued that understanding of knowledge as essentially relational - as the interaction between the knower and the known - is a critique of the positivism, objectivism, and rationality of traditional mechanistic science and the use of those approaches to design, specifically in the field of management sciences (Churchman, 1971). Traditional science aims for precision, and in the messy world of reality where everything is ultimately connected to everything else, sciences like physics create a sufficiently closed system, one where the precision desired is possible. That precision, however, is achieved at a cost:

science's mode of representing nature is very restricted, so that it cannot even talk about some of its most pressing problems and specifically its relationship to other social systems… science has no adequate way of studying the elusive, since it always aims for precision, and hence in some real sense science is alienated from nature. (Churchman, 1971, p.18)

Focused on the management sciences, Churchman found such reductionism of particular concern. Arriving at sensible estimates of costs, demands and benefits need not be through the creation of unreal closed systems; nor would the problems associated with the messiness of open systems and a lack of precision be erased if they are ignored. To do so is to commit the environmental fallacy: trying to understand a phenomenon - and in management sciences specifically, to solve problems of concern to managers - without considering the environment of that phenomenon or problem (Churchman, 1979). Knowing the cost of carrying inventory, for example, entails knowing the financial system of opportunities, cash flow, marketing, and public relations - the explosion of linkages that occurs when the real world is the subject of investigation. If a problem with inventory is tackled alone, without consideration of the environment, there

can be unexpected effects elsewhere in the system, a risky approach in industry where stability is the desired state.

The systems approach advocated by Churchman is designed to avoid the environmental fallacy. It is, he said, a grand approach, where all aspects of the natural world are swept in, despite the messiness (Churchman, 1979, p.9). Within the context of business and operations research, a systems approach to design begins with the whole, with the big picture, and then focuses on interactions within that system. Operations research is concerned with system improvement, and its practitioners should be prepared for and comfortable with uncertainty and ambiguity, "the highest of values, because they represent the natural condition of the civilised intellectual person" (Churchman, 1970, B-39).

It is the recognition of messy reality, of the environment of the system that is investigated or designed, which led him inevitably to questions of morality and thus of the responsibility of the operations researcher. The connected nature of the world and its systems creates an obligation on the part of the system designers to be aware of the broader implications of their designs and to accept responsibility for the impacts on their environment. This is not to say that designers must thus find solutions to ethical dilemmas embedded in their plans before they implement those plans. Larger complex problems such as poverty do not submit to single solutions, nor are there right answers. Rather, ethics requires a continuous process - Churchman asserted an eternal one - of discussing, debating and occasionally fighting over the issues (Churchman, 1979, p.118).

Ulrich (1988a), a self-professed disciple of Churchman, identified his moral outrage as the driving force behind Churchman's intellectual explorations. Larger issues of poverty, malnutrition, war could not be set aside, could not be situated outside the boundary of system design.

> For West Churchman, such moral outrage renders systems thinking, in spite of all its difficulties, an indispensable obligation to every planner. To look at this world of ours in terms of systems, far from being a merely theoretical idea of some academics who may be ignorant of the

overwhelming connectedness of the real world, represents for him an unavoidable moral challenge to all people of good faith. (Ulrich, 1988a, p.344)

The understanding that the environment of the system must be considered as well as the system itself, that the interactions between system and environment meant the impacts of system design reached beyond the system itself, is one that draws attention to the implications of boundary setting. If a system is considered only as separate from its environment, then its effects on that environment might not be considered. In global education, the impacts of such thinking can be seen in the creation of and the perspectives on global issues. In global education classrooms, the importance of context and of interaction between systems is an expression of the need to recognise the role of environment in the exploration of phenomena.

I will be applying these ideas in within the context of teacher practice, particularly in regards to boundary setting, in the discussion of data in Chapters 5 and 6.

Russell Ackoff. A colleague and collaborator of Churchman, Russell Ackoff also focused on the ethical nature of decision making, though he arrived there through examining the teleological nature of systems, in particular, human systems.

Ackoff (1974) began with the understanding of systems as teleological. He argued that this is what distinguishes systems thinking from mechanistic thinking. Behaviour in mechanistic thinking is explained by causes, not effects. In systems thinking, on the other hand, behaviour can be explained by what produced it or what it is intended to produce (Ackoff, 1974, p.4). This provides a greater ability to evaluate and improve the function of a system.

The teleological nature of human systems is of a particular kind; human systems, or social systems, are purposeful (Ackoff & Emery, 1972). That is, while all open systems are goal seeking, social systems can select goals as well as the means by which to achieve them. Choice and decision-making are inherent in social systems. Thus, social systems must include the capacity to learn, so as to evaluate information and make decisions that will benefit the system in a changing environment. They must

also include the capacity to manage conflict; after all, the nature of social systems is such that their elements are also purposeful, and those elements, those individuals or groups (subsystems) will have purposes of their own that may not correspond with the purposes of the whole. This is what differentiates social systems from organismic systems, which do not contain purposeful elements (Ackoff & Emery, 1972).

A focus of Ackoff's research was how an organisation, called a social system, identified its purpose and achieved it (Ackoff, 1974, 1979; Ackoff & Emery, 1972; Churchman & Ackoff, 1954). What is the decision making system, and how might it be improved? When a decision-maker is dissatisfied with the state of the system, and a choice of ends or means is possible, but they are in doubt as to what choice to make, they are in a problematic situation. They must determine which problem to take up because there are no single problems. Problems themselves are parts of systems of problems with multiple connections to other problems. Calling these problem systems "messes", Ackoff (1974) contended that a problem can never be solved because it is so interconnected with other problems and systems. It is, therefore, not a question of problem solving but of planning, of changing the environment of the system so as to create a new reality where the problem is removed. That is, design systems that respond to changing environments: learning systems.

Learning had a very specific meaning for Ackoff (1996); focused on experiential learning in an organisational context, he identified the content of learning and ranked each type in a hierarchy of increasing value, from data, to information, to knowledge, to understanding. Each of these is required to be *efficient*, the ability to achieve particular ends or goals, an instrumental value. However, to determine whether a goal is worthwhile and to achieve that goal, to be *effective*, wisdom is required. Wisdom is "the ability to perceive and evaluate the long-run consequences of behaviour", it is doing the right thing (Ackoff, 1996, p.16). As an example, Ackoff described the increasingly efficient design of automobiles as doing a better job of doing the wrong thing. Doing the right thing - with mistakes that are learned from along the way - would require designing transportation systems that at the least did not have a negative impact on quality of life (for example, pollution, traffic congestion) and ideally had a positive impact on quality of life (for example, cheaper, more accessible urban transport) (Ackoff, 1995, 1996).

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For organisations to act with wisdom and to address the complexity of messes, Ackoff (1974) designed an approach called Interactive Planning. Two key elements to this approach to organisational design are in the planning process and its structure. First, the process begins with an ideal, with an idea of what the organisation should be, with a whole. The next step is to determine how to create that desired ideal, what resources are needed, the organisational requirements. Then implementation begins. This differs from what Ackoff considered reductionist, mechanistic approaches to management in that it recognises that smaller short run losses often precede long term gains, and that continuous redesign is a requirement of changing environments. As well, the process forces the explicit statement of values so that they can be debated and improved over time (Ackoff, 1974).

The structure of Interactive Planning addresses what Ackoff (1974) termed the Humanisation Problem and the Environmental Problem. These refer to the practice of focusing only on the organisational level of system design rather than including the interests of the elements of the system (individuals or smaller groups), which are also purposeful, and the interests of the larger environment (the systems of which the organisation is part). To remove these from consideration, to create a boundary and pretend that these are functionally divisible from the organisation, is to reduce the probability of successfully addressing problems, which are themselves interconnected to individual, organisational and cultural concerns. It also risks the alienation of stakeholders at the human and environmental levels. Interactive Planning requires an integration of individual, organisational and environmental concerns in the decision making system.

In terms of global education, this is particularly relevant in regards to teachers working within larger systems. First, understanding systems as having goals frames potential conflicts in terms of values and goals, helping to clarify where disagreements lie. Second, since human systems have decision-makers who make choices based on values which may or may not be transparent, a decision may be informed by long-term or short-term thinking, and the primary goal may be stated or hidden, but the behaviour of the system will identify it as a goal. Examining goals, then, can also help to clarify the values of decision-makers. This has particular implications for the design of schooling: the schedules, the curriculum, the buildings themselves. For global educators, it may be

that identifying their own goals, those of other stakeholders and of decision-makers in the system, will help to clarify how they can respond when conflict arises.

Peter Checkland. Influenced by Churchman and Ackoff, Checkland (1981a, 1981b, 1983, 1985) continued the work in designing methodology that was appropriate to social systems, which he called 'human activity systems'. He argued that human systems were not of the same ontological quality as natural systems, and that, unlike what he called 'hard' systems approaches which assumed the world to be systemic, the 'soft' approach was "the exercise of one trying out system descriptions on the world's complexities" (1984, p.108). The system defined is a social construction, and thus consciousness plays a role in its definition. To address this epistemological understanding of human activity systems within operations research and management sciences, Checkland (1981a) developed Soft Systems Methodology (SSM), an approach to research which includes the perspectives and needs of stakeholders through active consideration of multiple worldviews.

Necessary to Checkland's SSM approach is the recognition that, in human activity systems, the observer is part of what is observed. This includes participants in the problem situation (who have roles in determining what the system will be) and the researchers themselves. The system is not an object in itself, it is a perspective. The most important point to be remembered by all who work in the systems area, according to Checkland (1979) is:

> that 'system' is not the name of something which exists in the real world. 'System' is a means of notating the real world in a way which may or may not map on to reality; above all, it is a notation *chosen by the observer*, a contribution to epistemology before it is a possible contribution to ontology. (p.135)

In effect, it is not the world which is systemic; rather, within social processes humans are engaged in a continual co-creation of system. Systemicity is in the process of inquiry into the world (Checkland, 1988, p.383).

The focus on the epistemological nature of systems definition and all of the associated implications for goal identification and stakeholder impact can inform both the understanding of the role of perspective in global education, and the agency of the individual. Perspective serves to define what is to be considered, and that definition can determine to how and to what extent an individual has the power to make change in a system. Individuals can interact through participation in the making of the definition and / or through directly influencing system behaviour once self-system connections are identified. Perspective creates opportunities for change. This is an important analytical concept that serves to make sense of teacher practice as will be illustrated in Chapters 5 and 6.

3.4.1. *Critical systems thinking.*

The move to more participatory processes in systems research in management sciences which characterised the interpretivist stream of Churchman, Ackoff and Checkland, was followed by a shift to a critical focus on the application of systems theoretical methods to organisational intervention and design (Hammond, 2003). Critical systems theory (CST) was concerned with how power dynamics impact systems and was "dedicated to the ideals of social justice, human emancipation, and the development of human potential" (Hammond, 2003, p.259).

Flood and Jackson (1991) identified critical systems theory as having three fundamental intentions:

1. Complementarism focuses on systems approaches to intervention and design. It requires a critique of theoretical and methodological bases of systems approaches, their applications, and the effects of their use.
2. Emancipation is concerned with moving beyond the conservative limitations of systems approaches to address issues of power that prevent improvement.
3. Critical reflection is the examination and re-examination of assumptions in different systems theories and methodologies and reflection upon the different interests concerned in systems.

To meet these commitments, Flood and Jackson (1991) offered Total Systems Intervention (TSI), an application of systems thinking within the realm of management which set out "how the variety of approaches, methodologies, methods and models, now

available, can be used in a coherent manner to promote successful intervention in complex organisational and societal problem situations" (Jackson, 2003, p.278). However, TSI was itself the subject of critique as part of the evolving discourse of CST. Midgley offered a critique (1995) of the commitments to emancipation and critical reflection as operationalised within TSI. He pointed out that the focus on human emancipation uncritically prioritised human boundaries, separating humans from their environment. As well, TSI did not offer methodologies for all situations requiring critical awareness. It offered only Ulrich's Critical Systems Heuristics (explained below) for cases where coercion was identified. This would seem to lead to the taking of organisational boundaries for granted, accepting the status quo of power relations which CST is meant to address.

In identifying issues with TSI, Midgely drew upon the work of Churchman (1971) and Ulrich (1991) and their focus on an ethical critique of boundary judgements. Churchman, as explained more fully above, stressed that system boundaries are not a given in reality, but rather are social constructs. This has implications for who is involved in the decision making, as improvement in a defined system may not be an improvement in the larger system when boundaries are expanded. Boundaries determine both the knowledge to be generated and who will be generating that knowledge.

Ulrich (1991), in his examination of the practice of systems approaches in the management sciences, began with the argument that unlike the justificatory dynamics of scientific propositions which utilise falsifiability and thus cannot be used in questions of value, the applied sciences must find other means of justification. Application and justification propositions cannot be separated; they have normative content in that they represent value judgements and effects on those not involved in the scientific justification. The management sciences, therefore, must not only justify what can be done and how can it be done, but also what ought to be done.

Drawing upon Habermas' theory of communicative competence and the ideal speech situation, Ulrich turned to a dialogical concept of rationality to perform this function.

Basically, the answer is to understand "justification" no longer as the business of the involved only, but as the common task of both the involved and the affected. Hence a dialogical concept of rationality must replace the conventional "monological" understanding of rational justification. (Ulrich, 1991, p.104)

However, he argued that Habermas' ideal speech situation does not take into account the inevitability of justification break-offs (p.104). Any dialogical process must begin with judgements and end with judgements, when it cannot question any further. This calls for boundary judgements. The designer must trace and make explicit the normative content (boundary judgements) and the stakeholders and those affected must sanction the consequences of those boundaries. Thus, a system design or intervention will be subject to a process of boundary justification. To accomplish this, Ulrich developed a set of twelve boundary questions to be answered by those involved in the system design or intervention, and those affected by it. This requires the inclusion of those outside the boundary of the system as it is defined; it is the recognition that human systems are open systems which interact with their environment. Thus those affected "cause the involved decision takers, planners and experts to reflect on a design's normative content", allowing for the reconciliation of the (potentially) conflicting demands of the democratic participation of the affected and the cogent argumentation of the involved (p.111).

As Romm (1995) pointed out, however, this assumes that the powerful (the decision takers) will take account of those affected. They may simply argue that it is too expensive to elicit their voluntary consent, or they may take control of the situation. Flood and Ulrich (as cited in Romm, 1995, p.504) responded that the motivation for the powerful lies not in their willingness to take the concerns of others into account, but in their interest in making their own views appear defensible on rational grounds, an appeal to improving the practice of discursive rationality. Romm countered that this simply opens a "hornet's nest" of nested anomalies beginning with the suggestion that "human interest in emancipation is written as a historical possibility in our species" (p.504).

Critical systems thinkers focus on the role of boundary judgements in systems science, particularly when the focus is human systems. The implications of power dynamics are central to this. Such critiques have application within the more objectivist systems approaches like Forrester's (1961) systems dynamics or Senge's (1990) learning organisations, which begin with the assumption that the systems are real, distinct entities rather than one possible system out of many overlapping and interconnected possibilities (Flood, 1999, p.70). In addition, critical systems theory is a concern in the more interpretivist streams, where attempts are made to address the ethical concerns arising around the question of boundary judgements.

What critical systems theory offers to global education is the further explication of the role of boundary judgements and its normative content. This draws attention to the need to identify and justify system boundary decisions, both in terms of the content that teachers and students explore (for example, global issues) and in their pedagogical decisions (for example, where authority in the classroom lies or how material will be organised).

The identity of the system, who it effects and how, is dependent on the boundary judgements that are made, since the system identity emerges from the interactions within the system, and what is within the system is determined by the boundary judgements. This holds true in the case of any behaviours which emerge from the system as well. The focus, then, is the conception of the system, not the system itself. Checkland noted (1981b) that "we may regard systems thinking as the attempt to develop an epistemology" (p. 3), and that emergence may be the concept through which to develop this. Georgiou (2007) takes on this task.

This next section outlines Georgiou's (2007) conception of systems theory as epistemology, and is important to this thesis for two reasons. First, the focus on classroom practice and the development of a global approach is essentially an epistemological concern: how knowledge and its creation is understood in a global approach to curriculum and instruction. Second, this thesis itself represents an epistemological process, and as such, the understandings and mechanisms of knowledge creation which underlie it must be identified. Georgiou's (2007) work serves both these purposes.

3.5. Systems theory as epistemology

Questions as to identifying an appropriate epistemology for systems science have been explored or referred to by several systems thinkers (see for example Checkland, 1981a, 1985; Flood and Carson, 1993; Flood and Ulrich, 1991; Fuenmayor, 1991). Phenomenology or philosophers associated with phenomenology (for example Husserl, Heidegger, Sartre) are often referenced. Georgiou's (2007) exploration, on the other hand, looked to system theory itself to provide the epistemology, specifically the idea of emergent property (as developed in von Bertalanffy's work) as it is through this that consciousness engages with systems. However, finding that there were gaps in the epistemological moments he described, he too found himself turning to phenomenology, to fill in the missing dynamics.

3.5.1.   *A brief overview of phenomenology as it pertains to systems theory.*

According to The Cambridge Dictionary of Philosophy (Phenomenology, 1999), phenomenology is "a movement whose proponents, for various reasons, have propelled it in many distinct directions, with the result that today it means different things to different people" (p.644). Though phenomenology is defined and invoked in a variety of ways, I want to draw on the work of Georgiou (2007), whose clear correspondences with systems theory are central to his work. His description of phenomenology, drawing primarily on the work of Husserl and Sartre, among others, provides a helpful and concise bridge between the two bodies of ideas.

A phenomenon is understood as a whole, as an identity, even though it is a collection or complex of parts. The interrelated parts (elements, appearances) create the identity. Georgiou drew upon an example outlined by Sokolowski (2000, as cited in Georgiou, 2007). The six sides of the cube, connected through a particular structure, or governance, create the cube, a single identity. A group of people, depending upon how they interrelate, can be a family, an army or a nation. The whole is the organisation of the elements, their interrelationship.

Although we perceive these identities only partially, as appearances (sides, aspects, profiles), we understand them as wholes. We do not look at a cube, for example, and go through the steps of: these are the parts and if they are added together in this particular relationship, they are a cube. When we engage with a phenomenon, we call upon a theoretical epistemology, an intuition, which allows us to project or intend an identity, a whole.

Thus, a cube is understood as a cube even though we cannot see the whole thing at the same time. We project our understanding of cube (calling upon our intuition or epistemological theory), we intend a cube, when we see the sides. This does not mean that we create the cube in our minds: rather, this explains how we come to know the cube. Our knowledge of the cube is an interaction between the cube itself (with its own internal governance or structure) and our intended cube (the governance or structure which we project upon it as we engage with it).

Phenomenology, then, understands knowledge creation as the interaction or relation between knower and known, subject and object. It is not all in the mind (rationalism, idealism) nor all in the concrete object (empiricism) - rather it is in their interaction.

Just as there is no incremental understanding of phenomena as wholes (pieces to relationships to identity), so there is no gradual understanding of the identity of phenomena as a whole. The identity or essence of the phenomena is perceived as a whole at the moment of perception through the interaction between the intention of the observer and the phenomenon observed. There is an instantaneous recognition as consciousness projects understanding of the whole upon the perception of the phenomena.

If knowledge is always limited by the position of the knower in relation to the phenomena (seeing only part of the cube) and is dependent upon the intention of the subject through the epistemological mode of intuiting or epistemological theorising, then how do we justify our intending? How do we know that the cube is a cube and not just perception? How do we address concerns of relativism? According to Georgiou (2007), there is a process of justificatory dynamics at work. Through the temporality of knowing,

there is a continuous justification which allows the phenomenon to be confirmed or denied. Over time, as we continue to intend the identity of a phenomenon, our knowledge of it is more firmly established. As we look at the cube, our consciousness continues to intend its identity as a cube, and the projected identity is reaffirmed through time.

This continuous justification is embedded in the epistemological mode of intuiting, which itself has two modes: the mode of repetition of intuitions (dogmatism) and the mode of development of intuitions (bounded rationality). These two modes also play a role in the dynamic justification of intending. The mode of repetition is inductive; the initial epistemological actualisation draws upon previous intuitions. There is an expectation when a phenomenon is approached; a theory is already in place. The continual confirmation of that theory when phenomena are intended justifies the initial intention. The mode of repetition is "the structural epistemological principle without which no epistemological engagement is possible" (Georgiou, 2007, p.139). The mode of development is deductive: in this case, the intending reiterates, and each iteration is different. There is a continuous change in the consciousness' intending of identity, a developing understanding of the identity of phenomena as time goes on. These two modes of intuition are each necessary: on their own, each leads to phenomenal determinism.

3.5.2. Summary of Georgiou: Connecting system theory and phenomenology.

In his explication of system theory as an epistemology, Georgiou (2007) demonstrated that the emergent properties of systems essentially correspond to the identities of phenomena. He drew primarily upon the foundational work of von Bertalanffy to explicate the role of emergent properties in system theory. What follows is a general overview of Georgiou's work, highlighting what is necessary to the understanding of system theory and phenomenology as interdisciplinary partners.

Georgiou identified systems theory as dealing with wholes, not parts; that it is an alternative to what he identified as the reductionist, analytical approach of traditional

science. The focus is on the relationships between parts which create wholes or systems.

> The meaning of the somewhat mystical expression, "the whole is more than the sum of its parts" is simply that constitutive characteristics are not explainable from the characteristics of isolated parts. The characteristics of the complex, therefore, compared to those of the elements, appear as "new" or "emergent". (von Bertalanffy, 1968, 55)

Georgiou provided an overview of von Bertalanffy's explanation of a system. It goes as follows: Imagine sets (or complexes) of three dogs. One set can be understood in terms of quantity or summative characteristics. There are three of them. A second set can be understood in terms of a quality or special characteristic, for example, their species. There may be a poodle, a Dalmatian and an Alsatian. They are dogs. A third set can be understood in terms of their relationships: they are a family of dogs, a mother, father and puppy. Without knowledge of the relationships, they cannot be defined as a family - the family is the emergent property of the system, it is the system. It is the organisation of the parts, their inter-relationship, which makes the family, not the individual dogs themselves.

> This new characteristic is thus a property of the system and not a property of its singular elements; at best, if one wants to talk of elements, it is a property of the interrelations between the elements. Emergent properties are always properties of systems, never of their elements. (Georgiou, 2007, 43)

Further, Georgiou noted that, according to von Bertalanffy, the identity of a system as a whole occurs instantly, not as a gradual process of recognising the parts, identifying their relationships and naming their systemic identity. Once the dynamics of interrelation of the elements is known, the emergent property of the system, the knowledge of the phenomena as system, is immediate. Knowledge of the interrelation is knowledge of the system. And this immediacy is essential to the epistemological claims he makes in regards to system theory.

This is an important epistemological assertion by von Bertalanffy for it states that consciousness conceives instant systemic compositions, not isolated elements which it then synthesizes into systems (Georgiou, 2007, 43-44).

How does this immediate conception of the system as system, of the emergent properties, come about epistemologically? The relational characteristic 'family' does not depend upon the summative or special characteristics of the complex 'three dogs'. It transcends summative and special characteristics, and can emerge from complexes with quite different elements. It can apply to humans or rock classifications. What is the intrinsic dynamic interrelation which is necessary for the property 'family' to emerge from a complex? What are the dynamics which constitute the essence of the system?

The emergence of the relational characteristic depends upon there being an interrelation between the elements. At the same time, the structure or quality of those interrelations is governed by the fundamental dynamics demanded by the essence of the system. The characteristic 'family' depends upon a particular interrelationship between the elements (father, mother, child) and those relationships are governed by the demands of the essence of the system 'family'. The relational characteristic 'family' is created by and at the same time creates the dynamic interrelation of the elements. There is, therefore, an active relationship between the essence 'family' and the dynamic relationships of the system 'family'; the essence demands particular interrelationships. If the demand is not matched, a different relational characteristic will emerge, for example 'clan' or 'dramatic performance'.

There is a potential emendatory and expansive interplay of relational characteristics posited against an actuality of interrelations… *The essence of the relational characteristic, then, is a projected, inquiring activity.* (Georgiou, 2007, p.56, italics in original)

This echoes the relationship between the observer of a system and the system observed as explicated by Weinberg (1975, cited in Georgiou, p.45). The emergent properties of a system can appear to the observer in two ways: as a prediction and as a

surprise. When information or assumptions are made explicit (the father and mother are the biological parents of the child) then the emergent property can be predicted, it is expected. If information or assumptions are hidden (two adults and a child are observed), then the relational characteristic 'family' emerges at the moment the relational characteristic is perceived. The epistemological relationship between observer and observed determines the knowledge of the system as system in general, and the knowledge of the essence of the system in particular.

> Emergent properties… (do) not so much *emerge from* phenomena themselves as are *projected upon* phenomena by consciousness. When faced with phenomena, consciousness seeks an order of relations between them, or seeks to group the phenomena into some system, a search constituted by the very creation and projection of an emergent property. (Georgiou, 2007, p. 48, italics in the original)

As with phenomenological investigations of identity, we reach a point where a justificatory dynamics are necessary to address the problem of relativism. If we each create/project the emergent properties of systems, then how do we guard against the infinite possibilities of those projections? Georgiou stated that he could not identify any investigation of such dynamics in the system theory literature. However, he pointed out that, as in phenomenology, where identity of phenomena is attributable to the whole, the emergent property of the system is attributable to the system as a whole. That emergent property, like phenomenal identity, is the interrelationship of its elements, and is conceived of instantly as a whole. The observer of the system brings to the observation an understanding of the interrelationship as a system, as identity. Because of these correspondences between the emergent properties in system theory and identities in phenomenology, summarised in Table 3.1, Georgiou appropriately drew upon the justificatory dynamics of phenomenology to address the lack in systems theoretical literature. That is, the system's identity as system is confirmed or denied over time through the interaction of the intuitive modes of repetition (inductive or experience without theory) and of development (deductive or theory without experience).

Table 3.1. *Some Correspondences between Emergent Properties in System Theory and Identities in Phenomenology (Georgiou, 2007, pp. 112-115)*

System theory	Phenomenology
Emergent property is attributable to system as a whole	Identity is attributable to phenomena as a whole
Emergent property is associated with interrelating elements of a system	Identity of a phenomena is associated with interrelating elements of a system
Emergent property of a system conceived instantly	Identity of phenomena intended instantly
Emergent property is a function of the relationship between observer and the system observed	Identity is a function of the relationship between observer and the phenomenon observed
Emergent properties confirmed or denied over time through justificatory dynamics	Identity confirmed or denied over time through justificatory dynamics

Georgiou (2007) argued that a holistic approach, a systems approach, to understanding requires a holistic epistemology; it demands that not only should understanding of the world be holistic but that the manner in which that understanding is achieved be holistic. A systems methodology requires a systemic epistemology, one which is holistically structured and understood, and this can be uncovered in the notion of the emergent property of systems. Such an epistemology is insufficiently explicated in the systems theoretical literature. However, the correspondences with phenomenology allow for the provision of the missing dynamics.

Given the focus of this thesis, its concern with relationality and systems concepts, a systemic epistemology, as described by Georgiou is required to underlie the methodology. Thus, I employed the "sweeping in" process (Churchman, 1979) to enable an appreciation of how individual elements might interrelate. I also had to consider the manner of knowing, and how my interpretations might be justified, and the systems epistemology provided this also, in the justificatory dynamics borrowed from phenomenology. As Georgiou pointed out, a systemic methodology should be "an iterative, learning process with epistemological roots which allow it, at any point in time, to categorize its knowledge claims as either dogmatic or rationally bounded" (p.200). This requirement is provided through the inclusion of worldview (mine and the teachers) and through contextualisation (the descriptions).

3.6. Conclusion

A system cannot be understood as a mere collection of parts; it is an organisation, an interaction, which creates an identity. As von Bertalanffy (1968) said, "while we can conceive of a sum as being composed gradually, a system as a total of parts with its interrelations has to be conceived of as being composed instantly" (p.55). The recognition of relationship as itself creating system behaviours allowed for investigation of questions hitherto neglected in classical science. It also allowed for greater interdisciplinary study, as organisational patterns might appear in different contexts yet create similar behaviours, for example the way populations grow. Systems theory or systems thinking has been called a new paradigm, a new way of viewing the world, and as such, has implications for the way we view the world and what we choose to view (von Bertalanffy 1968; Georgiou, 2007).

Such systems concepts as relationality, holism, feedback mechanisms, and goal seeking behaviour provide tools for understanding how systems are created and how they function. As was noted above, the concept of relationality and the associated concept of boundary setting in particular highlight the fact that how those systems are understood is very much a product of personal judgement: the relationships are not only within the system but are also between the system and the observer.

As well as contributing key ideas to systems theory, each of the thinkers introduced above have developed ideas which provide guidance to my interpretation of systems concepts within the context of global education practice. The concept of the active, self-organising open system contributed by von Bertalanffy (1968) to the field of systems theory provides the basis for the holistic orientation of a transformative global education. The open systems idea also informs global education notions of interconnection and interdependence, as does Boulding's (1956) ecological conception of the systems hierarchy. The interpretative stream of systems theory in operations research and management sciences highlighted the ethical concerns in the identification and design of human systems (Churchman, 1971; Ackoff, 1974) and the possibilities of multiple goals of different stakeholders in systems (Ackoff, 1974). It also provided an understanding of perspective which profoundly shapes both curriculum and pedagogy; a critical systems approach requires an orientation toward phenomena which recognises

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not only the multiplicity of worldview (Checkland, 1991a), but also explicitly makes transparent the boundary judgements which create the phenomena (Ackoff, 1974, 1995; Flood & Jackson, 1991; Ulrich, 1991).

As well as providing the concepts which might create the holistic and critical approaches in global education, systems theory provides the interpretive mechanism used in this study through its correspondences with phenomenology. Georgiou pointed out that the mechanism which describes the concept of emergence in systems theory mirrors that described in the projection of identity in phenomenology. Georgiou (2007) went on to borrow from phenomenology its justificatory dynamics to develop a systemic epistemology. As will be discussed in Chapter 4, the back and forth between the intuitive modes of repetition and of development describes my own experience in developing the systems concepts which can guide global educators; that is, though I began with systems concepts in mind, experiences with the teachers led me back to the systems theory to explore new ideas, which in turn led me back to the teachers. Experience and theory interact to create ideas.

The addition of systems theoretical concepts could be considered an expansion of the environment of this study; it is situated not only within global education thoughts and ideas, but also within the systems theoretical literature. As this work develops, however, the boundary shifts and the interaction between key concepts of the two fields, how they inform each other, gain meaning within the practice of global educators.

4.   Methodology

In the literature review, Chapter 2, I provided an overview of the research context within which this study is situated. The epistemological implications of systems theory are developed in Chapter 3, Theoretical Framework. There I introduced systems theorists who had contributed to the development of concepts which are explored within the context of global education in this study, and provided a description of those concepts: open systems, holism, dynamic interaction, teleology, the nature of human systems and worldview, and boundary judgements.

My desire to further develop the systems theoretical framework for global education is a result of many years of practice and inquiry into global education and its practice. If systems thinking does indeed constitute an approach to curriculum and pedagogy in global education, then what ideas from systems thinking might constitute the basis for guiding principles for a truly transformative global education? As I've argued in Chapter 2, a transformative global education is to be understood as focused on change of self, schooling and world.

This line of inquiry led me to frame the research questions that guided this study.

> 1. In what ways does systems theory provide a conceptual
> / theoretical framework for scholarship and practice of an
> approach that supports a transformative global education?

> 2. In what ways can global educators enact such an
> approach in practice?

The first question is directly concerned with the conceptual development at the heart of this thesis. But it is the second question which informs both the intent and the methodology of the study. My goal is to understand the meaning of these systems concepts, their potential within global educator's practice, and so I must look to practice

to inform understanding. Global education and systems theory is concerned with relations: between self and world, between knower and known, between idea and action. To explore such relationships, theory must be informed by practice.

In this chapter, I first describe the design elements that I used in this research, supporting my methodological choices with scholarly literature. Next, I explain my selection of case study, describe the setting and participant selection, and provide an overview of the qualitative methods I used to collect data and interpret them. Following an explanation of my role as researcher, I describe the study itself, the protocols, the participants, how I interpreted the data, and how I addressed issues of trustworthiness. Finally I highlight issues of ethics and credibility which appear in the study, and its limitations.

4.1. Design

Qualitative methods were best suited to the investigation of my questions for several reasons. First, the stream of systems thinking that is a focus of this work explicitly calls into question the assumptions that underlie positivist research methodologies when they are applied to living, open systems: that a mechanistic and linear causality determines relations between real objects (see for example von Bertalanffy, 1968; Churchman, 1979; Skyttner, 2005). The objective reality posited within classical science was challenged by the findings of quantum physics, which offers a different view of reality, including the idea that when we observe something, we create and influence it (Capra, 1982). Moreover, the study of open systems, particularly human systems, is always an epistemological inquiry because of the relationship between observer and observed: what we choose to study and how we choose to study it create the reality because we are part of the systems studied and we are making decisions as to what to include and what to exclude. Our own worldview and the worldviews of the participants in the system under study, create the system identity (see especially Checkland, 1981a).

Since the study of human interactions is a study of open systems (Checkland, 1981a; Georgiou, 2007) then it is an expression of epistemological understanding. To

conduct research without an explicit recognition of how that understanding creates and is created by the research process threatens validity, empirical accountability, internal contradiction and it threatens the meaningfulness of the research process. It is necessary, then, to acknowledge the influence of phenomenology on this study. Phenomenological epistemology has been connected to system theory, the focus and process of my research; Georgiou (2007) called them interdisciplinary partners. This connection was described in greater detail in Chapter 3, Theoretical Framework, but here I provide a brief overview of these interdisciplinary partners within the context of research methodology.

Flowing from system theoretical and phenomenological ideas of knowledge creation as relational is a methodology focused on the relationship between knower and known, theory and experience. Just as in phenomenology and system theory, where essence is understood through engagement between the subject and the phenomenon/system as a whole (Georgiou, 2007), in this research, system theory within global education is understood through the engagement of the researcher and the practitioners of global education who reflect the experience of global education. Knowledge is understood as an inter-subjective creation.

As Georgiou (2007) argued, phenomenology and systems theory share an understanding of the relationality of knower and known. However, the mechanism of that relationality is not articulated within system theory; Georgiou turned to phenomenology to discover such a mechanism. The recursive interpretation processes of justificatory dynamics in phenomenology, the back and forth between the mode of repetition of intuitions and the mode of development of intuitions, provides the mechanism lacking in systems theory. The identity of the phenomenon or object is created in the dynamic interplay between experience (mode of repetition) and theory (mode of development), and this back and forth provides a continuous testing of that knowledge of identity, as the interaction can reject that knowledge, amend it, confirm it, or allow for deeper understanding.

These justificatory dynamics serve multiple purposes in this research; they model the research process, moving back and forth between theory and practice; they provide a means by which my interpretations can gain credibility; and they create the opportunity

for deeper understanding through the many iterations of my engagement with phenomena.

The view of knowledge creation reflected in the systems theoretical and phenomenological understanding corresponds to the ontological and epistemological roots identified as the constructivist-interpretive paradigm of qualitative inquiry (Denzin & Lincoln, 2005). This paradigm assumes that there are multiple realities (a relativist ontology) and that knower and known co-create knowledge (inter-subjectivist epistemology) (Guba & Linclon, 2005). Given that this worldview is a part of the subject of this study (in that systems theoretical concepts are being investigated within the practice of global education) and that it underlies the understanding of knowledge creation (the act of research), qualitative inquiry is the appropriate choice.

A second reason to choose a qualitative methodology lies in the goal of the study, which is to explore the possibilities and imagine the potential and especially the practice of global education growing from systems thinking concepts, not to measure or to generalise. Rather than working with ideal or reduced models, trying to achieve precision, or explore purely abstract ideas, the intention is to explore concepts within experience, understood as messy and overlapping. To achieve this, I needed to situate the study in global education classrooms, recognizing that "qualitative researchers study things in their natural settings" (Denzin & Lincoln, 1994 as cited in Gall, Borg & Gall, 1996, p.29).

Finally, qualitative methodologies are flexible; they allow for changes in method depending upon where the learning leads (Denzin & Lincoln, 2005). Continuous interpretation and interaction means that results cannot be predicted and nor can the direction new understandings will point to. In the "logic and process of qualitative research… each component of the design may need to be reconsidered or modified in response to new developments or to changes in some other component" (Maxwell, 1996, p.2). The processes of putting this study together called for a flexible methodology, one that could grow and shift as my understanding grew and shifted.

4.2. Case Study

Since I was interested in understanding how a global education grounded in system theory might be understood in terms of curriculum and instruction, the actual practice of teaching, this pointed to the benefits of working with a small group of practitioners. Yin (2003) defined a case study as an investigation of "a contemporary phenomenon within its real-life context" (p.13). Stake (2005) noted that case study is not actually a methodological choice. He argued that it can be qualitative or quantitative, can be studied holistically or analytically, hermeneutically or by mixed methods. What is significant is the case itself. For the purposes of this study, and in line with philosophical thinking which underlies it, I chose to apply qualitative case study methods.

Case study uses a variety of data sources to ensure the phenomena is viewed with a variety of perspectives, so that its complexity and multiple facets can be better understood. It begins with a conceptual structure, what Yin (2003) calls propositions and Stake (2005) calls issues, which connect "ordinary practice in natural habitats to a few abstractions" (Stake, 2005, p.448). In the case of this study, the issues included the congruencies between systems theory concepts and global education concepts; the practices of global education and global educators (as embodied in the research participants); and the challenges of enacting global education ideas in institutional education systems. Next, the data is drawn from a number of sources, which may include survey, observation, interview, documents or records. Drawing upon multiple data sources improves credibility, but more importantly it provides a richer description of the experiences, giving the reader the opportunity to better compare them with their own experiences and evaluate them from a position of greater understanding (Patton, 1990). In this study I chose observation, interviews, and curricular documents as the sources of data.

In order to add to the richness of the data, I planned to work with more than one participant, making this a multiple case study. Yin (2003) described such multiple case studies as enabling the researcher to compare and explore differences between cases. Stake (2005), however, identified better theorising as a possible goal of multiple or collective case studies and it is the latter that describes this work.

It is interesting to note that in his explanation of the case study, Stake (2005) utilised the same language as that of systems theory identifying the case as a system (p.444). He spoke of activity patterns (p.444) and bounded systems (p.444-445) and expressed similar concerns as those found in critical systems theory around where those boundaries are set. This correspondence makes it easy to draw upon the work of Stake to outline the strategies used in this study.

Stake's (2005) definition of the case study allows for different reasons for focusing on the case: he differentiates between an *intrinsic interest* in the case (the purpose is the understanding of this particular case) and an *instrumental interest* (the purpose is the understanding of an issue or general phenomena) (p.445). My goal in working with the teachers is to illuminate how the practice of global education can be grounded in system theory. I asked, what can these cases teach about system theory within global education? Given this focus, I selected the form of case study identified by Stake as instrumental; that is, examining a particular case in order to facilitate our understanding of something else, taking "greater advantage of already-developed instruments and preconceived coding schemes" (p.450) which is different from intrinsic case studies. The systems theoretical concepts upon which I draw to develop the framework are available for my use as themes and organising principles, I am not creating them within the context of the case.

However, I do include a characteristic of those studies identified by Stake (2005) as intrinsic; that is, I utilise thick description in order to allow the reader to "experience these happenings vicariously and draw their own conclusions" (p.450). Since teachers' practice served the role of clarifying and inspiring conceptual development, it seemed appropriate to provide the kind of description that would allow the readers to appreciate my own interpretations, how and why I reached conclusions, and to imagine how they might interpret things differently. More importantly, those thick descriptions served as the individual stories I wrote about the participants in this study, the four global educators, to which they were able to respond. In a sense, the case under study is the curriculum and pedagogy of global education growing from systems thinking, and the context is the teachers' experiences, and since "the case to be studied is a complex entity located in a milieu or situation embedded in a number of contexts or backgrounds… qualitative case study calls for the examination of these complexities" (Stake, 2005, p.449). On the other

hand, when the cases are considered to be the teachers' experiences themselves, then the context is the school, education and social systems and these contexts must be included, must be described sufficiently to illustrate the complexity of their experiences. Thick description, then, becomes necessary on multiple levels.

Finally, in case studies, the data sources are handled together, approached as a puzzle "with each piece contributing to the researcher's understanding of the whole phenomenon" (Baxter & Jack, 2008, p.554). The interpretation and data collection occur concurrently, with patterns forming and changing as new ideas are generated in interaction (Stake, 2005). In this case, the systems theoretical concepts provided orientation in guiding the interpretation; conversely, the data led to deeper explorations of the theoretical concepts themselves.

4.3. Setting and participant selection

The nature of the study required that the participants be global educators, willing to let me into their classrooms, and that I be able to access them. This narrowed the field of potential participants considerably, leading me to choose purposeful sampling to select participants. As Stake (2005) pointed out, "instrumental and collective casework regularly requires cases to be chosen" (p.450).

Thus, criteria were needed to determine who would be appropriate participants. Teachers had to define themselves as global educators and they had to have demonstrated this commitment by participating in some course of study focused on the approach. As well, it was important that I have access to them and their classrooms, so location was a factor. And finally, their willingness to engage in this research, to allow me into their classrooms, was essential. Because I had worked within a graduate diploma program wherein teachers explored global education theory and practice over a two year period, I knew and had taught a group of teachers who met these criteria.

Having worked with teachers in a global education graduate diploma program some years previously, I identified that as an ideal group from which to draw participants. The two-year Graduate Diploma program in which the teachers had participated was called *Teaching and Learning for Global Perspectives* (Simon Fraser

University, 2008). The program consisted of five special topics courses, a classroom based research project, and a portfolio development. Its topics of inquiry included controversial issues in classrooms, perspectives consciousness, social justice across differences, development and sustainable education in communities, and peace education and conflict resolution. Among the capacities participants would develop were to:

- engage thoughtfully in critical discourse about theoretical, philosophical and social issues and dilemmas in Global Education;

- embody qualities of an ethical, caring and culturally responsive educator who models and practices the goals and principles of Global Education;

- demonstrate educational leadership in light of the core issues and tensions in a Global Education approach;

- maintain a stance of critical inquiry toward practice by examining, testing and generating pedagogical theory in ongoing classroom-based research;

- critically examine one's personal and collective identities and their proximity to social and institutional power;

- explore, select and design ways to integrate Global Education learning experiences across the curriculum, including the informal curriculum.

Mine was the introductory course of the program. Called *Ideas and Issues in Global Education*, the course focused on developing a way of thinking about knowledge in order to begin with the idea that global education was an approach, not content. It stressed the philosophy behind global education, with special attention given to the perspectives-focus of Pike and Selby (1988), and introduced teachers to pedagogical approaches in global education, particularly approaches that are integrated, holistic and systemic. Later courses in the program were concerned with popular culture and media race, gender, ethnicity, class and sexual orientation in formal and informal curricula, exploring the ethic of care, and developing an action-taking orientation.

I was aware of potential conflict of interest or ethical issues regarding conducting research with one's students and I will address these issues in Section 4.6 (Researcher Role) below.

4.4. Data collection

The data consisted of individual interviews, observations, and group meetings. As well, I used curricular documents provided to me by the participants to illustrate and support what they were doing in the classrooms, and subsequent literature prompted by the interviews and interpretations. Such multiple sources of data provide multiple perceptions; called a process of triangulation, it allows researchers to reduce the likelihood of misinterpretation and to "clarify meaning, (and verify) the repeatability of an observation or interpretation" (Stake, 2005, p.454).

Interviews

Fontana and Frey (2005) described interviewing as a collaborative effort, "a contextually bound and mutually created story" (p.696). There is no neutrality on the part of the researcher, nor is her voice absent. Through the planning decisions, the engagement with the participants, and the reporting, the researcher is intimately involved in the interview content and meaning. The participants' voices are merged with the intentions and interpretations of the researcher. The interview is what grows out of this interaction.

Interviews can be conducted with individuals or groups, and can be structured, semi-structured or unstructured (Fontana & Frey, 2005). Structured interviews require the interviewer to ask the same questions, to replicate as closely as possible the predetermined script: little room is left for improvisation. Although this form may elicit rational answers, "it overlooks or inadequately assesses the emotional dimension" (Fontana & Frey, 2005, p.703), suggesting a reduction of the interview subject. The semi-structured interview, as the name suggests, is guided but allows for greater flexibility. The unstructured interview allows for open-ended conversation, providing greater depth than other types. This is closer to a conversation, allowing the interview to be a product of interaction between the interviewer and respondent (p.716).

Each interview can be described as a unique conversation "as researchers match their questions to what each interviewee knows and is willing to share" (Rubin & Rubin, 2005, p.4). The topic of conversation progresses in a logical fashion, with each participant taking turns. Emphasis is placed on listening and interpreting meaning rather

than questioning; the researcher is encouraged to "*listen to hear the meaning of what interviewees are telling them*" and to ask follow-up questions to gain clarity and precision when they cannot understand (Rubin & Rubin, 2005, p. 13-14, emphasis in original).

There were three types of interviews used in this research: individual, semi-structured; individual unstructured; and group, unstructured. The initial interview was with each teacher individually and was semi-structured (Gall, Borg & Gall, 1996; Fontana & Frey, 2005), as I had questions to guide the interview process, but also the flexibility to explore and probe the participant's answers, permitting some spontaneity and "the ability to establish a more conversational style" (Patton, 1990, p. 283). Thus there was a mix of yes and no, and more open ended questions (Patton, 1990). The second type of interview, called unstructured, is a kind of informal interviewing, in the field, which blurs the line between observation and interview (Fontana & Frey, 2005, p.705). This was the form used during the observations. The third type of interview was also unstructured, but with the full group. These meetings could be considered brainstorming sessions "where the intent is to tap inter-subjective meaning with depth and diversity (Fontana & Frey, 2005, p.704). The topics of discussion were around the written material I had sent them and the implications of the themes which had emerged.

Observations

According to Patton (1990), because it permits the researcher "to understand a program or treatment to an extent not entirely possible using only the insights of others obtained through interviews" (p. 25), participant observation is the most comprehensive of all types of research strategies. It provides the opportunity for another rich source of experience from which the researcher can draw. Like interviews, what is observed is an outcome of collaboration, it is an interaction between observer and observed, and is mutually constituted. And as Angrosino (2005) noted, it "often means the presumably equal participation of professional researchers and their erstwhile subjects" (p.732).

The focus of my observations had to be broad, including not only the subjects of attention but also their environment. Stake (2005) noted that this type of attention to context is also expected in case study, as activities within cases are expected to be influenced by contexts. Churchman (1979) described this as 'sweeping in', trying to see the whole of the case under study, including the environment in which the case is

situated. Thus, I included in my observations such details as the design and arrangement of the rooms, the atmosphere of the schools as I perceived it, and the school schedules (bells, breaks, class changes). However, not everything can be observed and documented, and since my primary focus would be the teachers and how they arranged their curriculum, I attempted to use what Patton (1990) called "sensitising concepts" (p. 216) when I was observing the teachers' practice and the action in the classroom. These are concepts which provide a framework, helping the researcher to decide what to record, in this case, experiences which seemed to directly relate to the teacher and her pedagogy.

4.5. Data analysis and interpretation

As Stake (2005) pointed out, in case studies "data [may be] sometimes pre-coded but continuously interpreted, on first encounter and again and again" (p.450). The process of interpretation is recursive, occurring and recurring throughout. This is in line with the justificatory dynamics of phenomenological inquiry, the back and forth between the mode of repetition (experience) and the mode of development (theory), which serves the dual purpose of creating and testing meaning (Georgiou, 2007).

Using existing theory (in the form of systems theoretical concepts) to provide the framework has both advantages and dangers. Maxwell (1996) noted that using existing theory provides a ready-made structure for meaning making. Data can be fitted into existing concepts. As well, the concepts serve to illuminate data that should be noted. However, using existing theory can also predetermine what you notice and how you interpret it. This would have to be addressed if the goal were to understand the case. Then, finding the theory which best explained the case would require that alternative frames be incorporated into the research, from literature or other sources, in order to provide a counterweight or test of assumptions. Since the goal of this research is to understand the theory rather than the case, there is not the necessity to provide alternate frames. It is appropriate, therefore, to select suitable experiences in the case to illuminate the concepts. Though themes did emerge from the data as part of the recursive process, the coding was based primarily on existing themes drawn from global education and systems theory literature.

In line with the understanding of this work as inter-subjective and collaborative, the teachers' contributions had to go beyond being objects of study or "fact checkers" in simple member checks. Stake (2005) noted that the provision of draft write-ups "revealing how they are presented, quoted, and interpreted" is never sufficient (p.459). The participation of the teachers was needed not only during the initial data collection, but also in the process of interpretation. Though these occur concurrently – data is interpreted as it is gathered and those interpretations serve to direct attention to particular phenomena which are reinterpreted – there is a shift in focus over the course of the study. That is, more data collection occurs in the initial stages and more interpretation in the later stages. The means by which teachers can be engaged more effectively in the interpretation is through the provision of individual stories; the data collected thus far, along with initial interpretations, can be packaged in a readable form, making it easier for teachers to comment and contribute. Douglas Foley (Foley & Valenzuela, 2005) described a similar collaborative process used in ethnographic study. Researchers asked community members to review their ethnographic manuscripts as it added "a great deal of reflexivity to the data collection and representational process" (p.223).

A concern I had was how to build into the design of the study a structure that would ensure a continual critical reflection and a focus that was not evaluative. The interplay between my desire not to evaluate the teachers, the research questions that drove the study (concerned with the theory itself) and my efforts to turn my critique toward myself and my assumptions (a practice of phenomenological inquiry) served to create this research design, one in which practice informs theory in a recursive relationship.

4.6. Researcher role

Consistent with the design and systems theoretical basis of this study, my position as researcher in relation to the research is one of inter-subjectivity; I co-created this work through interaction with the participants. Our relationship was friendly throughout. I did not strive for detachment or neutrality, but rather entered into their enthusiasms and concerns in the interviews and meetings outside the classrooms, and

"in the moment" during observations. Maintaining friendly relationships, taking a participant observer role and engaging in collaborative interpretation represent an interpretive framework, or understanding of research into knowledge creation and human experience, which recognises the subjective and inter-subjective experience of the researcher (Guba & Lincoln, 2005). In addition to representing the paradigm within which this study is situated, such a researcher role provides opportunities for access to the research participants and perhaps for more candid opinions shared by participants (Foley & Valenzuela, 2005). However, it also is related to problems around researcher bias (Yin, 2003). Although in this study I am not attempting objectivity, I do want my assumptions and conclusions tested. To that end, methods are included to reduce the distortions I create and to increase validity and correspondence with the interpretations of others (Stake, 2005).

It is most important to note, as well, that there are ethical concerns associated with any research which involves working with participants. In this case, because this research was not focused on investigating teachers' global education practice through the lens of systems theory, but rather was focused on investigating systems theory within global education as informed by teachers' practice, the concerns around power dynamics between researcher and researched were of a different quality. That is, neither the teachers themselves nor their practices were being evaluated. However, there were still potential power issues that needed to be made explicit and addressed because power plays in to any relationship in a variety of forms, and in research relationships ethical considerations of this nature must be recognised.

> Those whose lives and expressions are portrayed risk exposure and embarrassment as well as loss of standing, employment and self esteem. Something of a contract exists between researcher and researched: a disclosing and protective covenant, usually informal but best not silent, a moral obligation (Stake, 2005, p.459).

Thus, questions concerning benefits and risks to participants and researcher had to be made explicit. This was accomplished through the inclusion of a script read during the initial interview, which outlined such concerns (Appendix B). I also included

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questions in the initial interview (Appendix C) designed to draw attention to any concerns the teachers might have so that they could be discussed openly.

4.7. The study

It is important to note that this research was not the result of a smooth progression of steps. I experienced the stops and starts of any such endeavour. As I noted in the introduction, there was a change in focus. As I became more and more immersed in trying to understand the concepts and their implications, there was a growing realisation that I was not investigating the teacher understandings and practices themselves, but rather was using them to help me understand system theoretical concepts. This required that I return to the data and the literature again and again, to review and revise. However, the primary interruption to the development of the research was simply that life got in the way. I often had to stop work on the thesis completely, for months at a time, when the demands of my other work, which supported my family, became too great. I do not know whether these interruptions have affected the quality of the work. I sometimes wonder what I might be missing, what I might have seen if I had been able to maintain a sustained attention to the study. On the other hand, perhaps all of these interruptions served to give me the time to reflect and digest, and led me to useful ideas which I might not otherwise have had.

Having clarified why and how I chose the methods that I did, I now provide details of the process. Here I include information on the protocols followed, the participants, their reasons for participating, and some of the stories and images from the interviews and observations. I also include a description of the interpreting and writing processes.

4.7.1. Protocols.

An introductory email was sent to all of the students in the Global Education program when it was nearing its end, asking if there was anyone interested in participating in this research study. Initially, seven teachers expressed interest, but finally three decided not to participate, and I began the work with four global educators.

Schedules were set up through email. Each teacher agreed to an initial interview, observation period, and post-observation interviews (in person or by email) and group meetings. Before initial interviews, the teachers each signed a consent form, agreeing to participate in this study. The district offices and the school principals were also asked to provide permission. Before classroom visits, students and their parents were asked to agree to my presence in the classroom. Elementary school students were provided with a simpler text version of the consent form. All the consent forms can be found in Appendix A.

Interview protocols

The semi-structured initial interviews were conducted in the teachers' classrooms. I included both dichotomous (yes/no) questions and more open-ended questions. I began with a 'script' which outlined the study and methodological and ethical concerns. It began by outlining the methods I would be using and explicitly addressing concerns around our roles, our relationship and power. I wanted to make it clear from the outset my own attitudes around the researcher/participant relationship. The script which I loosely followed at the beginning of each interview, can be found in Appendix B. The questions which followed this speech were divided into two categories: methodological questions and global education questions. These can also be found in Appendix C.

The methodological questions included one on their history with research, and two on the participants' intentions and concerns. The second set of questions was very global education focused as this was the context within which this theoretical exploration occurred. I asked them about their understandings of global education, what led to those understandings, and what experiences they had had. The questions were open-ended and I encouraged the teachers to follow their own lines of thought.

There were also multiple unstructured interviews, which took place before and/or after classroom observations. These were conversations, created in the interactions between myself and the teacher within the context of her classroom. In contrast to the semi-structured initial interviews, there was little divergence from the topic; they were very much focused on the immediacy of what was happening in the classroom and the ways larger school and education systems impacted that context. When students were

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busy working, the teachers and I would discuss what was happening in the classroom. There were also conversations with each of the teachers before and after every observation period, again focused on what was happening or had happened in the classrooms. I had a small hand-held recording device, and so could record our conversations unobtrusively.

There were two group meetings, meant to be a chance for collaborative exploration. These were also unstructured interviews. When we discussed their stories, their experiences, in the first group meeting, there was a great deal of conversation. We shared ideas and the flow of conversation was smooth. In the second meeting, however, when the topic was the systems concepts I was exploring as embedded in their practices, there was less conversation. I was told that they would need time to think about it. While it may be that unfamiliar abstract ideas are not easy conversation topics, this also called into question my conclusion that, because such ideas are already embedded in familiar practices, it should be easier for teachers to explore them. Though they did talk about the ideas and expressed interest, there did not seem to be any immediate resonance with the ideas. I did not pressure them to respond more, but did suggest that they might let me know later if they had any thoughts. However, no one contacted me.

All interviews were recorded and transcribed.

Observation protocols

The observations involved my presence in the classroom with a video camera which I used to tape the teacher when they were addressing the class or interacting with students. Since the teachers' practice is the means by which the theory was to be developed and refined, the camera was not directed toward students and was turned off when students were performing tasks in front of the class, for example, presentations.

Because the observations were taking place in classrooms within the public school system, there were several layers of consents that were necessary. First, all four districts had to give consent (the teachers work in different districts). Then each school's principal had to sign permissions. Then, all of the students were asked to give their own

consents, as were their parents. The teachers were not themselves privy to who had given consent and who had not. The consent forms can be found in Appendix A.

If a student or their parents did not consent to the observation or did not return a consent form, I had to ensure that they would not appear on the camera and that I would not talk to them. In order to facilitate this, I used colour coded wrist bands (in elementary) and lanyards (in secondary) which I asked the students to wear while I was in the classroom. There were several colours of each, and certain colours identified students as those who had not given consent. Neither the students nor the teachers were aware of the codes I had assigned, so no one could guess which students might have refused consent. The use of the colour coded wrist bands and lanyards worked very well, but were mostly unnecessary as I kept the camera pointed at the teacher, and did not approach students unless they approached me.

The amount of time I spent in the teachers' classrooms varied because of their different schedules. The elementary teachers generally stay with their classes all day, so I observed in their classrooms for extended periods over two or three days, coming and going during before or after school, or during breaks so as to cause the least disruption. The secondary school teachers chose a class for me to observe, and since they would only meet either once a day or two times in a week, my observation times with them were spread over one or two weeks. In all cases, there were times when we thought it best that I not be there – during tests, when students were working on their own for much of the class, when a school event interrupted the regular schedule. The amount of time I spent in each class can be found in Table 4.1 below.

On my first day in each classroom, I was introduced to the class by the teacher, and I gave a brief explanation of my research intention and my role in the classroom. After that, I retired to a corner or the back of the room with the video camera. When students were engaged in group work, I would turn the camera off and walk around with the teacher, discussing what was happening. At these times, I would use an audio recorder, and the recordings were transcribed.

Table 4.1.   ***Observation times***

Jay: Grade 6	Deekay: Grade 12	Ella: Grade 10	Kasey: Grade 1-2
April 14 3 hours 55 minutes	May 17 1 hour 15 minutes	April 19 1 hour 20 minutes	April 29 5 hours
April 15 3 hours 15 minutes	May 18 1 hour 15 minutes	April 21 1 hour 20 minutes	April 30 5 hours
April 16 1 hour	May 19 1 hour 15 minutes	April 26 1 hour 20 minutes	
	May 20 1 hour 15 minutes	April 28 1 hour 20 minutes	
	+ 1 hour 30 minutes of time before and after classes	+ 1 hour 30 minutes of time before and after classes	
8 hours, 10 minutes	**6 hours, 30 minutes**	**6 hours, 50 minutes**	**10 hours**

There was one class in which I took the camera with me on these walks in order to video tape the students' work. I did this because the students were so eager to show me the results of their science experiments (they were working with plants) and they clearly wanted them recorded. I did not use this material for the research and I took care not to record their faces, only their experiments.

I took the role of a participant observer in the class, but based the extent of my participation on the attitudes of the students and on the invitation of the teacher. So, for example, the students in Jay's grade 6 class were eager to talk to me almost immediately and approached me many times to show me their work. The students in Kasey's Grade 1-2 class were more wary of me initially, though once they became used to me and my camera, they ignored me (though not always the camera - several children liked to jump up in front of it and wave). The students in Ella's and Deekay's secondary school classes generally ignored me, although I was invited to take a more active role in a whole class discussion of homophobic language in Deekay's class.

As noted above, the focus of attention during observations was necessarily broad. Thus I included descriptions of the physical space of observation and the institutional procedures. Within the classrooms, too, I did not focus my attention solely on the teacher, what she did, or her interactions with students, but also on the students'

reactions to what was happening in the class. However, it is impossible to take note of everything, and some guidance was needed, in the form of sensitizing concepts (Patton, 1990) to focus my attention. The sensitising concepts that I used as a focus are found in Table 4.2.

Table 4.2.   Sensitising Concepts for Observations

When I observed/talked to teachers in their classrooms, what made me note particular episodes?

1. The design and arrangement of the rooms

2. The atmosphere of the schools as I perceived it

3. The school schedules (bells, breaks, class changes).

4. They were repeated (e.g. conversations repeatedly returning to the constraints of time)

5. There was a feeling of engagement in the class (e.g. students focused on task, no off task conversations, eyes on the teacher, their assignment or each other when the task required it)

6. There was a feeling of disengagement in the class (e.g. students engaged in non-task associated conversations, looking out the window or eyes closed)

7. There was clearly expressed passion/emotion (e.g. passion in students or teacher's voices, calls for attention to her/his contribution to discussion)

8. I was surprised when something seemed to be working or not (e.g. Jay's mathematics class – students were engaged and I was surprised because I expected a more bounded approach to be less engaging)

9. I was reminded of something in the literature (e.g. Kasey's stories of the flowers reminded me of the power of models, Deekay's moving back and forth between contexts reminded me of Boulding's hierarchy of systems complexity)

Finally, as Angrosino (2005) pointed out, "interactive, membership oriented researchers are by definition intrusive" (p.736) and not only does this change the nature of what is observed, it also carries with it "all sorts of possibility for 'harm'" (p.736). To mitigate this, though I was a participant-observer in that I engaged in interaction with the teacher, I was also careful to limit that interaction. I stayed at the back of the classroom and did not move forward to talk to the teacher without permission. I ensured the camera

was only on the teacher and only when she was addressing the class (except in the one instance in Jay's class described above, when the students wanted me to video tape their science projects). I did not interact with the students unless they approached me. And I did not approach the teacher when she was speaking to a student or students unless invited to do so. I also provided for each teacher a DVD of all of the material I had collected from them (oral interviews and video-taped classroom observations) so that they could work from the same evidence as I when responding to my interpretations.

Following the interviews and observations, I wrote each teacher's story, describing my impressions and interpreting their meaning. These were provided to the participants, who were then asked to respond. The responses were incorporated into the synthesising of theory and experience.

Document protocols

The teachers were asked to provide me with copies of any material they were handing out to the students. They were also asked to provide me with overall plans (time tables, lessons, units) if they were applicable to what I was observing. I looked, too, at relevant resource material used by the teachers (a novel for Ella's class, a science text for Jay's class) when it was necessary to understand what was happening. These were not analysed in reference to the research questions, but were used as supplemental material that substantiated what participants referred to in their interviews, and what I could observe in the classrooms. In other words, the documents added to the process of triangulation and to a greater understanding of the curriculum and pedagogy under study.

Field notes were written both during and after observations, interviews and group meetings, the classroom videos, and the transcribed interviews. The field notes consisted of descriptions of what was happening (especially when I turned the camera off during observations), ideas that occurred to me that I wanted to pursue in later discussions with the teachers, notes of what the teachers were stressing in their conversations with me or the group, and my own feelings about episodes that struck me as meaningful, and explorations of those feelings.

The teachers' stories were written after having completed observations. I described the teachers as global educators, sharing how their commitment to the approach grew, what their understandings were, what they did in the classrooms and what meanings they placed on those experiences. I also included explanations of systems concepts that I had begun to identify as being embedded in their practices. These were given to the teachers and they were invited to respond to them, to clarify, expand upon or change anything they wished to.

These texts were required so that each of the teachers could be included in the interpretive process (they were provided to the teachers, after observations were completed, for comments and discussion); and they were needed to provide me with a source of thoughts and images which I had identified as key soon after the observations had finished. I did return to the interview and observation data directly over and over again during the recursive interpretation process, sometimes finding episodes which had not been highlighted in the stories but spoke to emerging ideas. The teachers were included in these later interpretations and reorganisations of the data in the group meetings, when they were again invited to respond.

4.7.2.   Introducing the teachers .

The teachers, all of whom were female, were named Jay, Deekay, Ella and Kasey (pseudonyms that protect their identity and provide anonymity). They represented teachers in urban and suburban communities in British Columbia. Their experience as teachers ranged from four years to almost twenty years. Two of the teachers worked in elementary schools (grades 1-2 and grade 6 at the time of this study) and two worked in secondary schools (grade 10 and grade 12 at the time of this study). That we had such a range was not planned, as the grades depended upon which teachers chose to participate, but it provided an opportunity to note differences between my own and their perceptions of elementary and secondary classrooms and the possible implications for global educators. The following table (Table 4.3) represents some initial information.

Table 4.3   Initial information on participant teachers

Name	Number of years teaching experience at time of study	Grade(s) taught at time of study	School	School setting
Jay	7 years full time	Grade 6	Kindergarten to Grade 7 elementary school	Multi-ethnic urban community in BC's Lower Mainland
Deekay	9 years full time	Grade 12	Grades 8 to 12 secondary school	Multi-ethnic urban community in BC's Lower Mainland
Ella	18 years full time	Grades 10 and 12	Grades 8 to 12 secondary school	European (white) Canadian rural community in BC's Lower Mainland
Kasey	4 years, teacher-on-call	Grade 1 – 2 split	Kindergarten to Grade 5 elementary school	Primarily European (white) Canadian suburban community in BC's Lower Mainland

I will now provide some background information on the participants, where they taught, which classes I observed, and for how long. Since the teachers who participated in this work have their own reasons for doing so, it seemed appropriate to include their voices in this chapter as well.

Jay

Because Jay worked in an elementary school and her class stayed with her for most of each day, we decided that I would spend partial days with her, arriving and leaving during scheduled class breaks so as not to disrupt the lessons. I was able to observe a variety of subject lessons including science, English and mathematics. I was also able to talk with Jay during scheduled breaks. I spent a total of eight hours and ten minutes over three days with Jay at her school.

Jay had been teaching full time for seven years and continued to access professional development opportunities in order to inquire into her own practice because she believed this would make her a better teacher. After completing the Graduate Diploma, she registered in a Master's program. Both programs required the participants to engage in action research, an approach to learning which she believed allowed her to explore her own values and assumptions and how they manifested in her practice. These experiences influenced her attitude toward research in general, and she gave it as a reason for her willingness to take part in this research.

> Just stopping to think 'why did I do that' or explaining how something affects my practice or how have things changed. And I think that, I would have been more hesitant if I hadn't known you, but because I know that I will probably grow as a teacher, whether … chang(ing) my whole philosophy or even reflecting on my own practice and (realizing) "you know what? That makes sense, that's why I do that," or "it doesn't make sense, I have no idea why I do that!" Because I know I'm not perfect. I know I'm not the 'ideal global educator'… I feel that there's still so much room for me to grow. I feel like just even those two years of being in a program that looks at global education (the Graduate Diploma), I just skimmed the surface of something. And where do I go from here. So I guess it's for my own growth and my own learning. (Jay, 01/03,3)

Deekay

Considering Deekay's involvement with the development of the provincial Social Justice 12 course, we decided that it would be useful to use that course as a site for my data collection. We decided that I would visit her class twice a week for two weeks. We were also able to talk before and after the class. I spent a total of six hours and 30 minutes over four days with Deekay at her school.

Deekay came to global education from a varied background. She had been a secondary school social studies teacher and had been involved in various professional development teams in her school, working on action research projects in areas such as literacy and critical thinking. When she began looking at further education, she found the

global education diploma a natural fit. She planned to continue her studies and apply to the Master's program, but in the meantime, she wanted to maintain her commitment to exploring her own teaching practice, and this research was a means to that end.

> Since the (Graduate Diploma) program ended, there have been a couple of times when I've gone back to my assignments and articles and said, okay, I know I learned something from this and I said I wanted to change or impact my teaching in some way, now how do I make sure I follow through with that? And that's part of doing this research for me as well, participating with you. (Deekay, 02/03, 2)

Ella

We decided that I would view her English 10 honours course, primarily because of scheduling (she saw the class two or three times a week). The observation took place over a two week period. We were also able to talk before and after the class. I spent a total of six hours and 50 minutes over three days with Ella at her school.

Approximately five or six years before the time of data collection, she began a new position as literacy coordinator in her school, and so had the opportunity to explore theories of and research into teaching practice. This whetted her appetite for further study, and led her to enrol in the global education graduate diploma program. Like her colleagues in the study, she intended to apply for the Master's program, and in the meantime, was happy to take part in this study, both for her own benefit and to help grow the research into global education of which she felt there is too little. She also thought that her students would benefit from the research, as it would impact her own practice.

> And I think it's important, I think educational research is not a big area. Our government does not support this kind of thing. It's not a flavourful reception when you mention educational research. And that I find really sad. And as somebody who wants to be better, and I think most teachers do, most teachers want to keep current and want to do the right thing. And when there's nothing out there, when you're not hearing it. There's definitely a dearth of material… So to that end,

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there's not enough in this area, and having been through the program I do feel a responsibility to that program now. And a sense of loyalty to my experience because it was a very positive experience. I got a lot out of it, so if I can give back to that and make that cycle work then... that's good. (Ella, 15/03, 3)

Kasey

Because Kasey worked in an elementary school and her class stayed with her for most of each day, we decided that I would arrive before class began, and leave at the end of the school day. I was able to observe a variety of activities focused on such activities as practicing reading skills, learning how to organise ideas, and developing problem solving skills. I was also able to talk with Kasey during scheduled breaks. I spent a total of ten hours over two days with Kasey at her school.

She felt the need to continually challenge herself in her practice, to ensure that she never settled into an uncritical routine which she equated with poor teaching. This was part of her reason for taking the diploma program and for participating in this study.

I think, like I said earlier about classroom sometimes being a lonely place where you get away with things that you don't want to get away with. You do things that, having been more thoughtful or critical, just cognisant, that maybe you wouldn't have done or you would have done other things. So just the opportunity to be really thoughtful, which sounds ridiculous because why wouldn't I be thoughtful all the time. Not do things just because it's the way they're done at the school, or it's the way things should be in grade one or two, or it's the way I did it last year or whatever is really important to me. And my biggest fear is becoming that crusty old teacher… who has no reasoning behind… if you just repeat yourself, fine, if you have one year that's the best year in the history of the world so nothing should ever change, then fine, repeat yourself all the time. If you can say that and justify it to yourself then fine but I don't think anybody can. So that's part of my selfish reason, just to light a fire under my butt and make sure I'm always firing like that. (Kasey, 05/03, 4)

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Their desire to be thoughtful about their own practice was reflected in their willingness to engage in multiple conversations and welcome me into their classrooms.

4.7.3.   Interpretation.

In the literature on methodology, making meaning of the data is often referred to as analysis. Within the context of this research, however, the word analysis has a specific meaning, taking apart, which is juxtaposed with the systems approach of synthesis (see Skyttner's [2005] explanation, outlined in Chapter 3).Thinking about my own processes in trying to interpret the data, I realised that I made use of both, and at the same time. That is, I did reduce the phenomena I witnessed into themes, but I also connected them to systems theoretical concepts, and vice versa. I would ask, what are the relationships between the concept of, for example, systems goals and teachers' reasons for particular practices? I explored each teacher's experiences individually, but also found multiple connections which strengthened conceptual development. When the issue of time became prominent in the experience of one teacher, I returned to other teachers' experiences to discover how time was constructed in their classrooms and then turned to the larger school system and noted the way time was constructed in different ways at different grade levels. The back and forth process of this research applies not only in the justificatory dynamics but also in the method used to explore and develop the concepts within the context of global education practice.

As was described above, the teachers' individual 'stories' were written and sent to them for comments, questions, and (re)interpretation. They responded by email and in-person conversations. We also had formal and informal meetings of the whole group, where emerging themes were discussed. Throughout this process, I was interpreting and reinterpreting the data, identifying examples of practice which represented themes coming from global education and systems theory literature, and finding themes which developed across the teachers' stories or between the stories. Data was coded, then, based on existing themes identified from literature, and on themes emerging from the data. A first draft of Chapter 5 (Systems Theory Concepts in Global Education Classrooms) was written at this time.

My understanding of the conceptual and curricular/pedagogical relationships developed inductively and deductively; that is, my interpretation might begin with the teachers' experiences, which struck me as important, and then lead me to the theory to discover if there were connections to systems concepts. This was the case for the broad categories of Critical Perspectives (Chapter 5.4) and Global Educators within Systems (Chapter 6). Or the literature might create an expectation that I would look for; I expected to see teachers contextualising the curriculum, approaching classroom content as cross-curricular, not compartmentalised in subject divisions (Chapter 5.2). I also looked for examples of a synthesis approach to exploring content (Chapter 5.1) and for examples of perspectives taking (Chapter 5.3). Whether the starting point was inductive or deductive, what ensued was a continual back and forth between the teachers' experiences and the literature, providing me with a much richer and deeper understanding of the theoretical concepts.

My computer was a very useful tool during the research process: I could make multiple files, physically placing my notes/ideas together in thematic or categorised documents to test their fit. I also used many concept maps, handwritten notes, lists, reminders. As the writing progressed, I began to use different pads of coloured paper for those notes, indicating which section of the thesis they referred to. I also used a big white board and post-it notes to keep ideas in order. At the revision stage of writing, I moved back to broad outlines, to try to ensure that I was including everything I needed to include, and to focus my attention. This helped me to catch myself when I was rambling on too much, or when some idea was not explained or no examples given. It also served as a means by which I could easily change my perspective: between focusing on the details (the paragraph level) and considering the big picture (am I actually answering my research questions?)

4.7.4.   Trustworthiness and limitations.

This study is rooted in a phenomenological understanding of knowledge creation and phenomenology does offer a response to the problem of trustworthiness of our perception; that is, our knowledge creation is always and only partial "the exactitude of consciousness' creations-projections is rendered questionable… Consciousness picks a

theory 'out of a hat' so to speak and projects it. Knowledge is a product of whatever theoretical tools are contingently available to consciousness" (Georgiou, 2007, p.74). However, consciousness also requires continual justification, and the epistemological creation of knowledge offers this as a methodological counterpart to address the problem of relativity and trustworthiness.

In a research process, however, it is not adequate to rely on the critical disposition of the researcher, the continual back and forth in order to test perception, and procedures are put in place to address issues of empirical accountability. Guba (1981), in his overview of the differences between naturalistic and rationalist methodologies, provided a description of areas of concern in the trustworthiness of data, as well as the tools researchers use to address them. He identified these areas of concern as the credibility, transferability, dependability, and confirmability of a qualitative research study. The strategies used in this study to address these concerns are summarised in Table 4.4.

The credibility or internal validity of the research endeavour involves the question of whether the interpretations can be considered as true for those involved in the research itself. Strategies to enhance the credibility of this study include peer debriefing and member checks with the teacher participants: when I worked with the teachers individually, there were continual informal conversations around my own thoughts and interpretations as well as theirs. Then, when I had written their individual stories, they were invited to respond, modify or reinterpret. Two chose to accept what I had written without comment, one chose to engage in an email dialogue with me, and one chose a face to face conversation which was taped and transcribed. Later, their stories were reorganised into thematic explorations which were shared with participants, and there were two formal group meetings to discuss my interpretations and their implications.

In addition, peer debriefing occurred when my thesis committee reviewed my thesis structure and research findings.

A key strategy to improve credibility is in triangulation of data, finding different sources in order to cross-check data and interpretations, reflecting "an attempt to secure an in-depth understanding of the phenomenon in question" (Denzin & Lincoln, 2005,

p.5). This study draws upon global education and systems theory literature, as well as the experiences of global education teachers drawn from interviews, observations, documents and collaborative interpretations to create a picture of systems theoretical concepts within teachers' practice of global education. This allows for a comparison with the abstract concepts found in the system theory literature in order to find correspondences and then a more profound understanding of the meaning of system theory in global education practice. The multiple sources and methods add "rigor, breadth, complexity, richness and depth to any inquiry" (Flick, 2002, as cited in Denzin & Lincoln, 2005, p.5).

The strategies of prolonged engagement and persistent observation were also employed in that my research relationship with the teachers and with the literature continued over a period of two years (with some breaks in between due to work and family commitments). As well, working with four teachers over time allowed me to identify what seemed essential in global education teaching practice, and what might be atypical (specific to one teacher).

The issue of transferability of the research was described by Guba (1981) as "working hypotheses that may be transferred from one context to another depending upon the degree of 'fit' between contexts" (p.81). The combination of the criteria used to identify appropriate participants, as well as the detailed multiple descriptions of episodes across school and grade lines which demonstrate the operationalising of key system theory concepts, does address the issue of transferability. Not every global educator will approach their practice in the ways these teachers do, but their stories represent meaningful manifestations of system theory within global education, and their methods can be adopted and adapted by teachers who employ a global education approach.

In order to reduce effects of instability in the research caused by the different perceptions of the participants, as well as the changing perceptions of the researcher as I learned more, overlap methods (interview, observation, group discussion) were included in the research design. In addition, an audit trail in the form of documentation and recordings was established. And finally, because this thesis is undertaken as a requirement for a doctoral degree, the defence acts as a dependability audit.

The identification and putting aside of biases and assumptions before intending/creating the perception of a phenomenon allows for a true understanding of the essence of that phenomenon. In methodological terms, the idea is to discover and critique our own biases and assumptions in order to more closely describe the phenomenon as it intends rather than as we intend it. We can never be truly objective, but we can try for a closer approximation of the truth of the object, its essence. To achieve this, strategies include triangulation of data, described above. In this instance, the teacher participants, the data I collect from them in various forms, and our discussion of it, can serve to confirm or deny my interpretations.

A second strategy to enhance confirmability is in practicing reflexivity, or openness about our biases and assumptions (at least to the extent that we are aware of them). A constant critical reflection can help to accomplish this. Certainly my intent is to be continually critically reflective: but how can I be sure that I am? The answer, of course, is that I can only try, and when my expectations are confounded or when I am surprised, I believe these are indications that I have achieved some success in this regard. I was confounded when I saw that the compartmentalisation of curriculum into separate subjects was not the barrier I had expected it to be. Indeed, at the beginning of this research project, this belief had formed one of my earlier questions (soon discarded): how do subject divisions create barriers for global educators? This shows the assumptions I began with. However, the teachers I worked with demonstrated comfort with moving back and forth between disciplines in their classes. In the two elementary school classrooms I visited, the teachers integrated science, sociology, art and language. In the secondary school classrooms, the teachers integrated language and art or sociology, history and biology.

While the procedures outlined here do improve the credibility, transferability, dependability, and confirmability of this study, there are still limitations to such a qualitative inquiry. Through situating research in the experience of the world, the boundaries are blurred, there are too many variables, and so the research loses precision and certainty. However, there are phenomena about which we can never be certain because of their complexity, and so qualitative research is the most appropriate means for exploring them. There may not be certainty, but there is a better understanding.

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Table 4.4.   Trustworthiness of the data and my interpretations

To take account of:	The following strategies are employed.
Credibility	Peer debriefing Member checks Triangulation Prolonged engagement Persistent engagement Referential adequacy
Transferability	Purposive sampling Thick description
Dependability	Overlap methods Establishing an audit trail Dependability audit
Confirmability	Triangulation Practicing reflexivity

The tools used to collect data in this research study, interviews and observations, are also limited. The design can never ensure that the teachers will share their thoughts – they will always be selective. Nor can the observations be anything other than co-created, as my presence changes the nature of what is observed. If I had not been in those classes, would the same decisions and interactions have occurred? The teachers' stories I prepared are doubly bounded, by what the teachers shared and by my limitations as a researcher. Thus, multiple data sources are included in the design to provide a great deal of data which can be compared with each other and with ideas and findings in the literature.

Finally, this research grows out of the interaction between myself, the teachers and the literature, but it is also mediated by the researcher, myself, and thus is limited by my bounded rationality and by the boundary judgements I make. Despite my best efforts, I may fall back into habits of thought which are objectivist and linear, as these have dominated my experiences in the past. As well, I have been exploring a theory which is situated in fields that are not part of my educational background: science, operations research, and management science. A lack of background knowledge might lead me to miss or misunderstand key points.

I have tried to address my own limitations by including in the design long-term engagement, member checks, and a collaborative approach with a group of global educators. I also have consciously engaged in constant critical reflection. And my lack of background knowledge has been mitigated by a great deal of reading and reflection in systems theory situated in the social sciences of operations research and management science, as these were closer to my own background. The limitations remain, but the design reduces them.

4.8. Conclusion

The use of qualitative case study permitted a research design that reflected the interaction between theory and practice which was necessary to answer the research questions. It also allowed the philosophical understandings embedded in systems theory and phenomenology to be enacted: the relational nature of knowledge and the recursive mechanism of knowledge creation.

The nature of the researcher in this process, as participant and interpreter, does call into question whether this study is replicable. However, the thick description and researcher disclosure do provide the reader with the opportunity to interpret for themselves. In addition, the sources of data (interview, observation, stories) provide the triangulation; the means by which the researcher (and the reader) in qualitative case work clarifies meaning and verifies the possible repeatability of an interpretation and the fact that the case can have multiple meanings (Stake, 2005, p.454).

As noted above, the pace of the research process was slow and often interrupted. Much of my time was taken up by a new job. Three of the participants completed Master's programs and two of them had babies. However, there was continued support as we managed to reconnect though a couple of informal gatherings, and whenever I had a question, I would always get a response, despite the fact that this process had been on-going for years. Though this thesis is my own, it is at the same time very much a collaborative effort, and a co-creation.

In the next two chapters, I present the data that were collected from the methods that I have described, and presented through themes that emerged from theory.

5. Systems Theory Concepts in Global Education Classrooms

Global education practitioners broadly agree on key ideas which constitute a global education. These are interdependence (as in a one world system), connectedness and the appreciation of multiple perspectives (Pike, 2000a). Those who advocate a holistic, transformative global education would include an orientation toward holism and criticality, both in the content and in the processes of teaching (Hicks, 2003; Pike & Selby, 1988). These foundational ideas guided my choice of four themes to explore: holism, connectedness (interconnection and/or interdependence), multiple perspectives and critical perspectives. Though these are divided thematically, conceptually and in practice they intertwine and overlap; I am creating boundaries between them in order to facilitate this exploration of the multiple implications of particular systems concepts.

Within each of the themes, I identify links between teachers' practices and systems theoretical concepts. Although I found each of these themes and their associated concepts expressed in a variety of forms in each teacher's practice, for each I will highlight one teacher, introducing her and describing my experiences with her and descriptions of the environment of her work, in order to provide a "thick description" (Stake, 2005) which will act as a context for the exploration of systems concepts in practice. I follow each description of the teacher's practices with a discussion of the potential of the systems concepts highlighted within the theme.

5.1. Holism: A synthesis approach

Holism as an approach to curriculum and instruction, as a method of knowledge creation, can be understood in systems theoretical terms as synthesis. When I entered Jay's classroom, I had just been reading about synthesis as a systems based alternative

to analysis in the exploration of the world. I had been trying to imagine how this might be expressed in practice, thinking in terms of contextualisation as opposed to compartmentalisation. It was a happy surprise, therefore, to find myself witnessing a clear example of a synthesis approach in her classroom.

I begin with an introduction of Jay, her account of what it means to be a global educator and a description of the environment in which she worked. Then I will describe the experiences of teaching which she shared with me. This is followed by a discussion of how I interpret synthesis, the systems theory method of exploring phenomena, appearing in her practice and that of the other teachers.

5.1.1.   *Jay: Global educator.*

When I think of global education, I think of it from the perspective of me as a teacher and how I'm relating with my students. No matter what I'm teaching I hope that I build a relationship with the kids and even some of the kids I struggle with building a relationship with, and we all know I'm not going to necessarily connect with 29 kids in the same way. Yet I feel that global ed is about building that communication with those kids, figuring out where they are and being flexible enough to move away from my plan and be able to have a two-way communication system…But I also think that global ed is looking at how we have connections to other people in the world, and to other things in the world. We talk so much about interconnectedness, but that's what global ed is. You think of how our actions and our behaviours, even the way that we perceive things, affects other people and vice versa. And how we're connected in a world that, though it's a big place, because of all the things we have, we all are connected and it becomes a smaller world community. (Jay, 01/03, 5)

Jay's interest in global education stemmed from her earlier post-secondary work in social geography, but after exploring the potential of the approach, her motivations changed.

I think (my motivations) changed from a selfish approach. It sounds funny, but I thought "oh I'm really interested in this stuff so I want to do this". And it turned into more like "what can I do with these kids now!" I just think of all the talk we've done around interconnectedness and making connections and I think, now those kids are learning something. So not only am I interested in it… but it turned me into a teacher that is saying well "I see that it benefits the kids, and it's interesting to the kids." They're so excited about things that are happening right now and feeling empowered in their lives. (Jay, 01/03, 4)

Her focus was always on her relationships with the students, how well they communicated, because she believed that the strength of those relationships created more than just a harmonious classroom. She believed it had impact on their self-esteem, on relationships they had outside the classroom, and on their learning. For Jay, global education was ultimately about caring relationships, with the world in general and with her students in particular.

At the time of this study, Jay had been teaching full time for five years and continued to access professional development opportunities in order to inquire into her own practice because she believed this would make her a better teacher. After completing the Graduate Diploma, she registered in a Master's program. Both programs required the participants to engage in action research, an approach to learning which she believed allowed her to explore her own values and assumptions and how they were manifest in her practice. This experience influenced her attitude toward research in general, and she gave it as a reason for her willingness to take part in this research.

I know I'm not the 'ideal global educator'… I feel that there's still so much room for me to grow… So I guess it's for my own growth and my own learning. (Jay, 01/03, 3)

Jay taught a Grade 6 class in an urban elementary school. The community in which the school was located is multi-ethnic, lower middle class and had a small immigrant population. Her school was unusual in the district as there was only one class

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for each grade, so students who attended the school from Kindergarten to Grade 7 would work with every teacher. This made for a very close knit community within the school and a sense of shared purpose amongst the teachers. They may not all have been global educators, but Jay saw the commitment to care mirrored in the approaches of her colleagues.

> We're known in the district as being a school that really embraces these kids. A lot of times they want to put really difficult kids here because they know that we cherish who these kids are. And because it's so small, there's only one grade each, we get to know those kids… it's a family!...I think even my perspective of the other teachers in the school, they're not all global educators for sure. But they all care about those kids, and they all care about what they're learning and who they are. There's not one teacher in here that you would say doesn't care or love their job. And even our principal, he wears the principal pants, but his whole philosophy is, we do what's best for kids here. He says all the time 'I'm not in the business of pleasing parents. I do what's best for these kids'… And it's funny because that is global ed, but it's also what we feel in this community. And I know that not everyone is a global educator. (Jay, 01/03, 6)

The school was built in the early 1970's and was designed as an open concept primary school. It then became an "alternative" school and then later became a regular elementary school. There was only one class for each grade (K to 7 and one Learning Support class) so the teachers worked with almost all of the students at some point.

Jay's classroom was next to the library; in fact, the library served as a central space for all nine classrooms, each with doors directly into the library as well as doors leading to the school grounds. Jay took advantage of this design, using the library as a break out space for the students when they were working in groups. The door outside provided easy access when their school work called for some time in the forest or school grounds, or when they went outside for recess, lunch break, or physical activity. The classroom was not bounded by its walls, but expanded into the space around it.

The walls and surfaces of the classroom were covered with student artwork and the products of their studies. By the window were their bean plants, part of an on-going science experiment. On one side their coats and bags hung from hooks, and across the room books relevant to their current study were displayed, leaning against the white board. Below the board were posters created by the students, and by the door were paintings from art class. Next to the sink was the birthday chart with each student's date of birth listed. The desks were arranged in pods and there was a palpable sense of community and of comfort. They were not just visitors to this room, this was their place.

5.1.2.   In Jay's classroom.

Science unit: Animal adaptations.

At the time of my classroom visit, Jay was teaching a unit on animal adaptations. One of the prescribed learning outcomes within the official curriculum for this particular topic is that students will "analyse how different organisms adapt to their environments" (British Columbia Ministry of Education, 2005, p. 41). The learning requirements are then further broken down into achievement indicators which state:

Students who have fully met the prescribed learning outcome are able to:

- o identify two or more specific adaptations of various life forms (e.g., colouration or other physical characteristics, mimicry or other behaviour);

- o suggest a plausible explanation of how particular adaptations help life forms interact in their environments (British Columbia Ministry of Education, 2005, p. 41).

The ultimate goal of the unit was for the students to understand the properties and/or behaviour of animals (the unit of focus) in terms of their adaptation to different environments. The use of the word 'analyse' suggests a particular method; however, Jay chose instead to largely use a synthesis approach.

Rather than beginning with the animals themselves and their characteristics, Jay chose to move from the larger system, (biomes, referring to a classification system used to categorise major ecosystems), to the smaller unit of focus or behaviour (animal adaptation). The unit began with a look at the definitions of biomes. The class then moved outside to the neighbouring forest. Once there, Jay asked the students to pay attention to all of their senses, to feel, hear, smell and see the forest. "When we started, they had to find a spot, and they had to stand quietly, they weren't allowed to talk. They had to listen" (Jay, 14/04, 23). They tried to make sound maps (recording where different sounds came from on a simple paper map of the forest) but the rain made this difficult (it is called the wet coast after all). Jay's purpose was to connect the students to the idea of a biome, that they are a part of a biome, and the conversation turned to an exploration of humans as part of what creates the biome.

> We had talked about the senses… Like when one group was talking about the leaves on the ground which we didn't talk about earlier, and so I said well what do you see there? And they said a bunch of brown kind of gross leaves. And I said what does that tell you about the trees that are in this area. Oh they lose their leaves… And then it actually went in to a conversation about humans encroaching on forests and habitat because they were talking about … how much garbage is in there… They think of a biome and it's hard for them. They think, oh that's the forest, (but) we're **in** the biome and we have man-made situations. So we talked about man-made… about humans' effect on our world and our natural environment. It was kind of interesting because they were thinking about all this garbage (they had seen). (Jay, 14/04, 23)

The students were immediately situated within the topic of study; they were also animals living within biomes. This placed perspective at the centre of the scientific enterprise, allowing for the picturing of the whole phenomenon at one time, the experience of the system as an emergent property, an entity in its own right rather than an amalgamation of unrelated parts. The system of which the unit in focus is a part was identified as students began with the big picture, and they were part of that picture.

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The students moved back into the classroom and began exploring a variety of biomes. Each group was assigned a biome to study and received information on its climate, features, vegetation etc. They were also assigned an animal which lives in that biome. The students were asked to identify the features of the biome - what did they know about it? Each group speculated on the relationships between the properties of the biome and the physical and behavioural adaptations of the animals in the biome. They had a series of guiding questions asking about the animal's survival within the biome; the characteristics of the animal were always explored in relation to the ecosystem in which it was situated. For example, one group looked at squirrels in a temperate rainforest and were asked, what physical characteristics help the squirrel survive? And how does the squirrel behave in order to survive? The students then were asked to fill in a chart outlining the features and behaviours of the animal and explain their connection to the biome.

Following this process of explanation, the different biome groups were given books which would allow them to check their conclusions against the accepted conclusions of science (as outlined in the class text book). The groups were then mixed so that each student could share their group's reasoning with another group of students (this group mixing process is a cooperative activity known as a jigsaw).

I was interested in her reasons for organising the animal adaptations unit in this way. She said it just made more sense to her.

> I've realized that kids learn better when they can make connections to what they already know and what better way to start a unit on biomes and animal adaptations but to take them outside and see why we already know and the questions they have. Perhaps it is too easy to say, "It just makes sense to start big and then look at the parts," but maybe that's all there is. I wanted my students to see the connections between the biome, the plants, animals, and humans but without looking at the large picture first it wouldn't make as much sense starting from the "parts of the whole". (Jay, 20/10)

While her design of this unit expresses the principles of holism, the thinking which underlay her decisions in this unit did not necessarily inform her decisions in other subject areas.

Mathematics unit: Calculating area.

Jay's planning demonstrated an expectation that the students would expand their focus to the whole rather than reduce it to the parts, and focus on how relationship creates behaviours/properties. Yet in her approach to mathematics, Jay's classroom focus narrowed to a focus on numbers skills development. In a lesson focused on calculating area, she began by asking the students to work with regular shapes on graph paper in order to determine methods for calculating area. She then asked them to calculate irregular shapes, again on the graph paper, and stressed that they stay on the lines provided. The students were actively involved in exploring number relationships. Yet when she elicited from them the examples of when people might want to calculate area in the real world (to purchase flooring or carpets, to fit furniture in a room) she stressed the fact that there would be no handy squares on a grid to count and that the irregularities would go beyond the irregular shapes they drew on the lines. The environment, in this case the calculation of area in lived experience, was not given the same kind of attention as had been the case in the animal adaptation unit, that relationship between the system under study and its environment was not at the centre. Instead, area was understood first as a calculation separate from that which is calculated.

Jay did not consider her approach to teaching mathematics to be an example of global education. Although she did have the students working together, figuring out how to calculate area for themselves, and finding multiple ways to do it, all of which might be considered strategies used in global education, she still expressed some concern with the way she teaches mathematics.

> Because I know that I believe in a more global approach, yet I still struggle with certain things. Like how do I teach math from a global education standpoint, to me it's so structured. So I struggle with that and yet I can see myself really trying to implement those ideas and

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those theories and those things because I think the kids benefit and I am a happier teacher. (Jay, 01/03, 3)

She was aware that her approach to mathematics did not have an easy fit with her beliefs about good teaching and how students learn, and yet within the confines of this more structure focused method, she found ways to incorporate her student centred and questioning approach to learning.

Five years and I'm still not 100% happy with the way that I teach math. I think I'm very linear in the way that I teach math. Based on them proving something that they know on a test. And I think to myself, I don't really like that about my teaching. How am I going to change that? But I do really try to infuse that questioning aspect so they're figuring it out and are able to come to a conclusion. Doing the real learning rather than me telling them, 'well, two time two is four because I told you so.'… And that's why, even in math, I still really try to include that questioning. Yet I would say out of all of the things that I do math is very traditional, I don't approach it from a global ed (sic) approach. It's something that I'm going to have to really revamp my whole system. (Jay, 01/03, 6)

She was aware, too, that her mathematics lessons were not integrated into other subject areas, something she had made an effort to do in science, social studies and language arts. She felt there were benefits to such integration, which is integral to global education, concerned as it is with interconnection and relationship.

I feel like in science and social studies you can pull in so many more things that make it more integrated, more interesting for these kids. And then your language arts relates to it, your reading, your writing your everything… and then you ask, what do I do with my math? (Jay, 14/4, 23)

When Jay reflected more deeply on why she narrowed the focus in her mathematics classes, she concluded that her motivations were both internal and external. She herself had learned mathematics in the traditional way, with the teacher

providing the formulas and the students practicing their abstract calculations. She found this approach to be very successful for her own learning, and she recognised that some of her students would appreciate that approach. Yet, she wanted to ensure that all of her students were given the opportunity to connect to the subject, so she tried to incorporate different methods of instruction and she felt that the students were succeeding.

> I think with my math, and this is me being completely honest, I am very structured, pretty traditional with it. And I'm not sure if it's easier for me to do it or because I think that way as a math person myself... So for me, and that's where this teaching is hard, because you have to understand that not every kid is the way that I was. And the way that I do math is not necessarily the most… And that's why I try to use strategies that I think will draw in some of those kids who need more of that experimentation and actually doing it to figure it out…. I do think that my students in math class, with me, are successful, and I think it's because I really try to break things down for them. Yet, do I think it's a holistic way of looking at math? No. I think I'm pretty linear and traditional with it. (Jay, 14/4, 23)

She also wondered whether, within the nature of the subject itself, there was always a possibility of taking a holistic approach.

> There are a lot of times to when we need to figure out how to add two negative numbers together… well, there aren't a lot of hands-on activities… So there is direct teaching in math too. (Jay, 14/4, 23)

Jay expressed similar feelings when she talked about the possibilities of using more holistic approaches to teaching writing. The teaching of skills, she felt, required a more direct teaching method, although she always tried to incorporate opportunities for students to compare, evaluate and make decisions.

> So for me I think of certain things like teaching writing … there is a lot of direct teaching and modelling and things, yet… I try to constantly throw in that questioning and that openness. Rather than me telling (the students), I say, let me read this to you, which one do you like

better, why do you like it better? So I try really hard just even change the way that I question rather than just say well this is better because... and that I think is itself global education. (Jay, 01/03, 6)

Despite her own comfort with the approach she takes to mathematics teaching, Jay would have chosen to change her method of instruction or at least offer greater variety, if it were not for the nature of the curriculum and that constant challenge: time. As will be discussed in more detail later (see Chapter 6), Jay strongly believed that she did not have enough time to do the kind of work she felt necessary in the area of mathematics. She was always conscious of this and her planning reflected it. To try a more holistic approach or to embed the mathematical explorations in more real world experience would require, she believed, a time commitment not allowed for within the current curricular and school schedule structures.

5.1.3.   Discussion.

There is little written in the literature which outlines any particular curricular organisation associated with global education; that is, the method by which knowledge is created in classrooms through a curricular structure or direction. Pike and Selby (1988, 1999) have provided a useful discussion of this issue, arguing that a systems paradigm provides a better mental framework or worldview for global education than a mechanistic one, and identifying "a preference for synthesis and divergent overview" as one of its features (1988, p.29). They differentiated between infusing existing curricula with key components of global education, and integrating curricula which would ensure a holistic approach. The former privileges existing curricula and school timetables while the latter privileges student learning and curricular commensurability with global education concepts of interdependence and holism (Pike & Selby, 1999). They offered many suggestions for student centred activities which focus on situating discussions in context via role play and simulation, connecting study to student experience, and describing webs of connection rather than linear models. Pike and Selby (1988) also pointed out the importance of the medium of instruction being in harmony with the message of the curriculum – in the case of global education, this would include creating a classroom

environment which is respectful and promotes the development of strong interpersonal skills and adopting classroom strategies which privilege cooperation and self-affirmation.

Selby (1999) argued for the cultivation of a holistic mindset through interdisciplinarity and integration. But for global educators who find themselves constrained by compartmentalised curricular structures, timetables and schedules, an interdisciplinary approach may be difficult to achieve. How then, might they incorporate a holistic mindset, an appreciation of their world and their knowledge of it as relational? What procedures or guidelines might encourage a holistic approach in any classroom lesson, regardless of subject area? Systems theory does provide a method, a medium for undertaking the study of phenomena, and it is a synthesis approach.

As has been discussed earlier, system theory is a holistic understanding not only of the phenomena under study but also its environment; this is essential because a systems approach recognises that the behaviour or properties of the phenomenon are not only a result of internal organisation and interaction, but also are intimately connected to the systems in which the phenomenon takes part. This is a different approach to that of classical science which not only removes a phenomenon from its environment but also reduces it still further to its component parts, trying to understand each as a distinct entity in order to understand the whole. As von Bertalanffy (1968) said, "this implies a basic re-orientation in scientific thinking" (p.5). A major difference between a systems approach and that of classical science is reflected in their methods, in how their knowledge is obtained.

The method of classical science is to reduce phenomena to separate parts, to identify properties or behaviours of those parts as discrete units, and from this deduce the properties or behaviour of the whole. Von Bertalanffy contended that "the only goal of science appeared to analytical, i.e., the splitting up of reality into ever smaller units and the isolation of individual causal trains" (p.45). In contrast, the method of systems theory is to begin with the whole, with organised complexities, which demands new conceptual tools (von Bertalanffy, 1968, p.93). Given the nature of open systems, which exchange energy, matter and information with their environment, it is necessary to consider that interaction when investigating such systems. Open systems are in a state of dynamic equilibrium; their existence as systems is in that interaction. That interaction,

then, must form part of the investigation. In a comparison of the approach one would take in examining a closed chemical system and an open one, von Bertalanffy (1968) pointed out that in the latter case, one would first consider general principles of open systems and then consider the interactions within the system itself.

Skyttner (2005) explained the difference between the methods of classical science (that used for closed systems) and of systems science in terms of analysis and synthesis. To investigate a phenomenon with a systems approach, a researcher must begin with its environment, and focus on the larger systems with/in which it interacts in order to understand how and why it behaves in relation to other phenomena within the system and to the larger system itself (see Table 5.1). The goal of synthesis is to provide explanation. This method does not provide the detailed description of the internal structure that classical science does; rather, it explains its function.

Table 5.1.   Skyttner's description of a synthesis approach

Systems thinking: Explaining / synthesising
Identify the system in which the unit in focus is a part
Explain the property behaviours of the system
Explain the properties or behaviour of the unit in focus as a part or function of the system

From a systems perspective, the unit or system of study in Jay's class was animal adaptation. It is a behaviour which emerges from the interaction between the animal and its environment. Jay began by identifying the environment in which the behaviour (adaptation) occurs. The properties of the biomes and the animals were identified. Then the relationships between the properties were explored. This is a synthesis method of exploring phenomena, one which seeks to explain why a property or behaviour emerges rather than simply describing it.

The synthesis approach can be understood both in terms of the contextualisation and the organisation of the content of what the teachers were teaching. Here are some examples from the other teachers' classrooms.

Deekay's class were exploring Lesbian, Gay, Bisexual, Transgender, and Questioning and Queer (LGBTQ) issues, and she organised their discussions in such a way as to have the students move from self within larger systems of meaning (what the

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issues mean to each of them, their own lived experience), to the behaviours of other actors in the system and of subsystems (individuals, the media), and then to their local community's behaviours (the school); the focus was always on dynamic relationship and explanation for behaviours, how different systems interact.

Part of a novel study in Ella's class included a simulation which allowed the students to explore the issue of drinking while driving within the context of a community meeting. The novel they had read described the act of restitution of a high school student who had killed a young girl in a drunk driving incident. The students took on different community roles and discussed a similar incident in their own community and what the punishment of the drunk driver should be. Here, the students were immersed in the big picture, intimately engaging in the relationships between stakeholders, through their roles expressing the behaviours of the different actors in the social system within which the drunk driving behaviour occurred. Within Skyttner's (2005) explanation of a synthesis, this would constitute an explanation of the properties or behaviour of the system.

Kasey's grade 1 / 2 class put a great deal of time and effort into examining, evaluating and practicing appropriate behaviours within a school community. Kasey's focus on identifying the true goals of behaviours with her students similarly fit within Skyttner's (2005) description. In her case, the students learned that being quiet within the halls or notifying the teacher when they went to the toilet were behaviours that assisted in the smooth, respectful functioning of the school system. Her overall approach reflected an open acknowledgement with her students of their behaviours in relation to each other and to the systems as a whole. The behaviour of the unit of focus (the student) was understood as relational.

In Jay's class, however, the approach she took to her mathematics lessons cannot be described as synthesis. It is important to note that relationship did remain a focus, in this case, the relationship between numbers – number of squares in the shape drawn, number of squares in the length of the shape, number of squares in its width. Rather than characterise her lesson as traditional or linear, however, I would draw upon a systems concept of boundary setting, and suggest that Jay had narrowed the boundaries of the phenomenon she and her class were exploring, in effect creating a

closed system. With open systems, the creation of a boundary is necessary to enable effective study, as it is not possible to deal with "the explosion of linkages" of that system (Churchman, 1979). The question is not whether to create the boundary, but where that boundary should be set. Whether Jay set the boundary is the most effective way is a something she was unsure of.

A question which arises from this discussion is, is it always useful to use a synthesis approach? What curricular content might best suit a synthesis approach? My own bias is always toward making the big picture, the environment of the unit of study, a major component of an exploration of phenomena, but is this always the most effective in terms of student learning or the most efficient in terms of time-use? I noted, in my observations of Jay's class, that the students were extremely engaged in the unit on calculating area, just as they were in the unit on animal adaptations. And Jay clearly found her method effective; students had demonstrated in assessments the ability to calculate area. What factors might a global educator consider in deciding which approach to take to particular content? And does the decision to narrow the boundaries to the unit of focus mean that the approach is not commensurate with that of global education? Is global education, and in particular, a transformative global education, dependant on a synthesis approach?

5.1.4.   *Summary thoughts on holism.*

The synthesis approach is concerned with wholes, how they emerge as wholes, and the relationships between wholes and their environment. A synthesis approach to curriculum would contextualise, include real life experience; this is the environment of any unit of study. In some instances, such an approach is perhaps the obvious choice. Since the unit of focus is adaptation, and adaptation is the behaviour which results from the interaction between animal and biome, then that relationship becomes the starting point – in Jay's case, she demonstrated how this understanding can be enhanced by beginning with students' lived experience as creatures interacting with/in their biome, and then moving on to the experience of other animals in their biomes.

In some cases, however, this approach may be a less obvious choice. When the unit of study is an abstract idea, like the finding of area, or writing a paragraph, the

relational focus might shift to internal structure. Attention can still be on relationship: between numbers, between parts of speech. But the scope of interaction might be confined to a more strictly bounded entity, a closed system. There can be benefits to this, but I wonder also what the benefits might be to expanding the boundary, to including the environment (in these cases, the lived experience of humans interacting with these ideas). However, as Jay noted, the nature of curriculum structure and time do place constraints on a teacher's ability to do this. Davis and Simmt (2003) pointed out, in their discussion of the potential to use principles of complexity science to organise a mathematics classroom, that "its implicit proscriptive sensibility is not always well fitted to the predominantly prescriptive project of schooling" (p.157). Where prescribed learning outcomes (PLOs), right and wrong answers, subject divisions, grading and grade levels create the structure of learning, the ability to try alternative approaches is constrained.

Although there are questions as to whether a synthesis approach is always the best method to employ when exploring any topic, the idea of relationality remains central. If the epistemology from which global education grows is relational, if knowledge creation is understood as relational, interactions between knower and known, then the roots of that understanding have to be holistic. And at its heart, a transformative global education is concerned with relation – between student and world, between places and peoples, between curricula, between ideas, between thought, values and action.

Finally, a synthesis approach requires beginning with the big picture, with the object of study within an environment with which it interacts. If global education is focused on global concerns, with appreciating the broad scope of human experience, planetary issues, the nature of the world, then should there not be the possibility of beginning any inquiry with such a broad scope, with its behaviour in lived experience, with its systemic properties (whether it be the connection between animal behaviour and environment which creates adaptation, or between measurement and planning a garden which creates a calculation of area, or between organising ideas, writing and leading the reader along a clear path which creates a series of paragraphs)? That big picture is also a system, it is the reason for behaviour, it gives meaning to interaction. Adopting such an approach in a variety of subject area contexts can serve to create a habit of thought, a tendency to shift the boundaries of attention back and forth between the focus on the unit of study to the unit of study within the world.

I now move my focus to the next theme, interconnection and interdependence.

5.2. Connectedness: Interconnection and interdependence

For many advocates of global education, global issues are central (Hicks, 2003; Mundy et al, 2007; Pike & Selby, 1988), and the concepts of interconnection and interdependence are integral to a study of global issues. A global issue, by its nature, connects people and places around the planet, and requires the focus to be global in all of the multiple senses of the word: planetary, international, inclusive of multiple perspectives, of mind, heart and body. Global issues also comprise relationships of interdependence, where cause becomes effect and effect becomes cause. And certainly for transformative global education, the focus on global issues is a raison d'être; the ideal of making the world a better place grows from the recognition and concern about our shared problems.

This orientation on wider social issues was a major focus in Deekay's Social Justice 12 class, where I knew I would be able to observe an issues-based curriculum. Since issues are by their nature contextual and cross-curricular, this became the obvious site for an exploration of interconnections and interdependence. In this section, I more fully investigate the potential of relational thinking to first engage students and then lead to the inclusion of systems thinking skills. I begin with an introduction of Deekay and her school. I then describe my observations in her classroom and discuss how three systems concepts are embedded in her practices of interconnection and interdependence: systems hierarchy, feedback mechanisms, and boundary judgments.

5.2.1. Deekay: Global educator.

(With global education), maybe there's more room for interpretation. I can make it what I want it to be in my own teaching. It's not a program: "global ed is these five things and this is how you do it". Even though it's got themes in it. It doesn't feel like a package to be sold. (Deekay, 02/03, 4)

Deekay came to global education from a varied background. She had been a secondary school social studies, English and ESL teacher for eight years, and been involved in various professional development teams in her school, working on action research projects in areas such as literacy and critical thinking. She had also been a member of the team who wrote the curriculum for the provincial Social Justice 12, a course which focused on content areas in which she was interested. When she began looking at further education, she found the global education diploma a natural fit.

She found, during her study of global education, that she had already incorporated many of its elements into her practice. She included such ideas as interconnection and multiple perspectives into the content of her teaching, and tried to place topics of study in context. What changed for her, as she started to explore the global approach further, was the development of greater awareness around her own practice, and a more reflective stance.

> I definitely became more conscious of what I was doing, and there was a shift in my teaching. Partly in just being more aware of what I was doing, being more reflective, and when something doesn't go the way I expected, not feeling like I'm just a bad teacher or I had a bad day, but just thinking about why it happened. (Deekay 02/03, 4)

Perhaps because she spent more time thinking about why her plans did not always go as expected, she had made changes in the way she explored content with her students as well.

> I've been much more explicit with the kids in terms of doing things like making connections instead of assuming they're making connections. So I'm taking the time to do that...because I think sometimes I assume they get it, and then realise that it's not actually happening for a lot of students. Not everybody, because you get those kids who get it in a second, and they hate having to go through that process because they've already gone through it in their head, but for a lot of kids they don't even (think that way)… So that's huge. So maybe that's a big change for me. (Deekay, 02/03, 4)

Spending the time to allow students to more fully understand the topics they were studying was partly a necessity of the Social Justice 12 course. The point was to explore controversial issues, and their study required less the accumulation of facts than it did a greater appreciation of complexity, ambiguity and perspective, which would take time.

> Especially when you're teaching about issues and about problems, there isn't a right answer. At the end you want them to be in a place where they can tell you what they believe and why they believe it, but understanding that what they believe isn't the right answer either because there isn't really a right answer. (Deekay, 02/03, 3)

Her focus on students exploring their own beliefs and values grew, in part, from her interpretation of global education. She was concerned with the relationship between the student and what they studied, how it uncovered and informed their identity. It is the relationship between learning and identity that she was most focused on in her continuing studies of her practice.

Deekay taught in an urban secondary school in an economically diverse and multicultural community. The buildings were fifty to sixty years old and the school was slated for replacement although plans were not yet finalised. The hallways were dark, a slate grey, and their oppressive feel was not alleviated by any examples of student work or creative projects. A fire inspector, Deekay told me, had recently visited the school and required them to strip the paper and posters from the walls. This seemed an oddly useless safety measure given the amazing clutter that I saw in the classrooms I passed.

Deekay's classroom was rectangular, with windows all along one long wall and two doors to the hallway in the corners of the other long wall. Below the windows and along another wall were cupboards, shelves, filing cabinets, and heaters. In front of the white board on one wall was some AV equipment on stands. Storage was clearly an issue. There were six sets of tables in the room: one long one between the teachers' desks with the chairs facing the white board, their backs to the windows; and in front of them, the others arranged in a horseshoe. Above the whiteboards were small signs (Be a dreamer, Creating yourself, Compassion) and abstract prints. On one wall and on the bulletin board were posters (Bob Marley, artwork entitled 'fatal women'), some notices, a population map, and a list of student and teacher roles and responsibilities obviously

compiled by a class. The atmosphere was cluttered, old, but friendly; stacks of books and a hodgepodge of AV equipment gave it a distinctly lived-in feeling. Contrast the hallways which were prison-like - grey barren walls, lines of metal lockers. Luckily her classroom had survived the 'safety' of stripped walls.

5.2.2.   In Deekay's classroom.

The course I observed was Social Justice 12, an elective offered each semester at the secondary school where Deekay taught. The focus of the course required that they explore controversial topics and thus Deekay took care to include the development of attitudes and skills associated with discussion and the expression of dissent. So, for example, the students created codes of conduct and examined their own behaviours to determine their support of effective and meaningful dialogue. She also promoted critical thinking by a constant questioning of assumptions, highlighting language which generalised, and asking the students to do the same. When students offered examples of their experiences with an issue, she asked questions like 'is this always true?' and 'why might we think this way?'

During the week in which I observed her class, Deekay and her students were beginning a unit on Lesbian, Gay, Bisexual, Transgendered and Queer or Questioning issues (LGBTQ). They would spend the next two weeks exploring their own and others' understandings, and how individual behaviours and social structures support or fail to support the rights of individuals and groups within the context of human sexuality and sexual identity. Within the provincial curriculum, the study of social justice in general is structured in terms of defining, recognising and analysing, and moving toward a socially just world, and people within the LGBT community (absent the Q, although it is mentioned in the glossary) are included as examples of groups who suffer injustice (British Columbia Ministry of Education, 2008). Their stories are used as cases to explore the experience of injustice in Canadian society.

Deekay began by asking the students to review the rights and responsibilities of the classroom in order to facilitate an effective exploration of a controversial topic. They had done work on this before, and Deekay pulled out the work they had completed in the past and asked them to work with their old groups to highlight the most important

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behaviours. These included such ideas as respecting others' rights to their opinion even if it differs from one's own, not interrupting, using respectful language, and not infringing upon the rights of others through your speech. During this activity, I noted that the students were not particularly engaged. Deekay, too, was aware of this, and later we wondered whether the fact that the activity was decontextualised may have had something to do with their lack of interest. She was careful to highlight, within the context of subsequent activities, when those rights and responsibilities were important.

Once the most important classroom behaviours had been identified, Deekay moved to the topic, and asked the students to spend some time with a partner sharing what they already knew about LGBTQ experiences and issues and any questions they might have. The students began talking immediately and clearly had things to say to each other. As well, when she asked them to report, and wrote what they said on the board, they were attentive and engaged. Throughout this activity, she had to quiet them down repeatedly because they had a lot to say and they wanted to tell her what they knew or expand on each other's comments. She handled this by acknowledging their interest in the topic and their eagerness to have their say. She asked them to take turns, listen to each other, and referred back to the classroom behaviours they had earlier discussed (i.e. let people finish what they are saying, listen, etc.)

It was during this first activity, when Deekay elicited prior knowledge from the students, that relational thinking began - and that references to what might become more focused systems thinking were made. The students' ideas and thoughts on the topic of LGBTQ issues began with definitions of homophobia, gender and sex. They then moved to social impacts of diverse sexuality (social division, exclusion) and possible reasons for negative attitudes (stereotyping). The topic was connected to law (hate crimes), social institutions (religion) and different experiences in different countries. Finally, questions were asked as to the biological explanations for diverse sexualities and gender identities. Deekay recorded these ideas on the board, sometimes drawing lines to show how one idea connected to another. Later, she referred again to the information they had generated and proposed that they investigate the potential of more connections.

The next day, the students began to explore their own experiences and feelings around LGBTQ issues. She handed them a survey of attitudes to complete, and then set

up a four corners activity. Students were asked to move around the room to one of the corners that represented their positions: strongly agree, agree, disagree and strongly disagree. Deekay read out statements from the survey and asked students to comment on their positions. Sometimes students changed positions as the discussion progressed. The statements were primarily personal in nature (I would feel comfortable working with a gay/lesbian student or a gay/lesbian teacher) but one was focused more on ethics (schools have a responsibility to teach about homophobia and homosexuality.) This statement engendered the most discussion and disagreement as students argued over whether schools should teach particular values or whether students should be left to form their own.

Deekay added that this was an important point and asked the larger question: what right does the school have to impose certain knowledge? In this case, the goal of the course (Social Justice 12) and of the school system in general was called into question. Also questioned were the means by which this goal might be achieved. In a later discussion, the class returned to this when Deekay asked them to consider the role of the teacher and whether true neutrality was possible. She also asked them to vote on whether the class would follow along this new path, the question of whether schools should impose certain ideas and values, or whether to continue with the LGBTQ topic. They chose the latter.

During these discussions, students were thoroughly engaged. They were sometimes serious, and sometimes talk was punctuated by laughter. Deekay told me that this was what she hoped would happen in the class; these kinds of exchanges were her goal with such activities.

> I think that today was interesting and I feel bad when I have to shut them down, but you can only do so much in that sort of format. I think it's all about starting the discussion, and the challenge is how do you continue it in a way that is… I keep coming back to that. I think it was meaningful for some of them, but not for everyone. I think the kids that weren't talking a lot were listening. And when they were talking they weren't talking about what they were doing on the weekend, they

were talking about the topic. And I feel really good about that… And I think they really saw how diverse the class was. (Deekay, 18/05, 2)

Following this, the class explored LGBTQ issues within the context of larger social systems, through a Norwegian PSA which showed a high school boy nervously approaching another boy and asking him to dance. They read written testimonials from LGBTQ youth in different communities, and the media story of a high-school student in the USA who was forbidden to take her date to the school dance because they were a same sex couple. They then moved back to their own community when they examined their school. In this exercise they looked closely at specific behaviours, their meaning and intention, for example, the use of the word 'gay' as a pejorative. They also discussed the distribution of power between individuals and groups.

I was unable to attend any more classes after this, but Deekay's intention was to continue the exploration of the topic with a look at the biology of sexuality and the social and political context of sexuality and sexual identity in different human societies.

Deekay acknowledged at the beginning of the study of LGBTQ issues that the purpose of the study was not to predetermine any right or wrong opinions but rather to explore the diversity of opinions, their roots and their impacts in order to better inform students' opinions. There was, however, recognition of the social justice focus of the class and its embedded progressive values. She also, like the students, came to the class with her own values and opinions, and was aware that her position as teacher meant she must be careful as to how she expressed her own thoughts.

Sometimes I don't know how to respond when they say things that I really disagree with. So that's the hard part. And which questions do you choose to focus on and take further. How do you do it all? (Deekay, 18/05, 2)

On repeated occasions during my observations, Deekay's classroom practice challenged the notion of teacher as expert and authority, both through her admissions of ignorance and her turning to her students as sources of expertise. For example, she acknowledged the expertise of a couple of students when they discussed hate crimes as they had done a project on it in another class, asking them to find out answers around

sentencing and hate crimes. She took up questions and comments made by students and asked them to decide on whether the class focus should turn in that direction. In one notable instance, she began the class with a vote on whether to follow up on a discussion began in the previous class as to the role of teachers and schools in creating (or imposing) morality, or to continue with the focus on LGBTQ experiences and issues. Deekay made a practice of the shifting of boundaries of authority; she acknowledged their right not only to have a different opinion than she did, but also to determine what was important for the class, what the class group should be studying.

5.2.3.   *Discussion: Systems concepts and interconnection.*

Pike and Selby (1988), in their global education framework, argued for a paradigm shift embodied in systems thinking, in which "phenomena and events are viewed dynamically and systemically interconnected in time and space" (p.29). The word(s) *interconnection* and/or *interdependence* appear in definitions of global education (Hicks, 2003; Mundy et al 2007; Pike & Selby, 1988). In the previous section, I explored how a synthesis approach might embed holistic thinking in practice; that is, how systems thinking and relationship might become teaching method. In this section, relationality is explored as the object of study through building upon Pike and Selby's concept of interconnection.

I had seen in my own earlier research and in literature and teacher resources that the concept of interconnection was often understood as the relationship between peoples and nations (Pike, 1996; Young, 2003, 2010). Certainly the linking of local and global, which is common in definitions of global education (Mundy, et al., 2007), would suggest space and place to be the focus. Elsewhere I have contended that this was reflected in the understanding of the word "global" as geographical, and that this encouraged a limited version of global education as curriculum content rather than a cross curricular approach to education (Young, 2010). Further, if the objects of study, the global systems and issues, are seen only as objects separate from the observer, then the agency of the individual is limited to those who have some sort of "control" or power over these objects. I argued that, with greater development of conceptual connections to systems theories, teachers, proponents and curriculum developers might produce a global education which began with the assumption that global systems are created and

therefore mutable, and that each individual, each student, has the power to make change through their involvement in those systems.

Of particular importance to this is the understanding of the word *interconnection.* In systems theory, interconnection is understood as dynamic and bi-directional; such relationships are understood as having mutual impact on the elements or participants, just as the elements have impact on the whole. There are multiple forms such interconnection can take: it can be spatial, but it can also be conceptual (ideas interacting to create patterns of thought or subject disciplines). Similar interconnections can appear in different contexts and yet behave in similar ways (for example, growth of cells or populations). Conversely, a similar relationship in a similar context might result in different behaviours (relationships between children and parents in the same family). Embedding this concept of interconnection, dynamic and multiple, in classroom practice requires moving beyond the simply spatial to an exploration of how boundaries are determined (in what we study, how we study it and who decides), how the interactions work (what are the relationships, how do they cause/influence behaviour), and how similar relationships can create different behaviours depending upon their environment.

In systems theory, the recognition of interconnection occurs simultaneously to the identification of system as phenomena to be studied through the creation of boundaries (Georgiou, 2007). Thus, the added implication of relational thinking is the recognition that there are no boundaries to open systems except those we decide upon for the purposes of our study. In terms of interconnection and interdependence, the recognition of the mutable nature of the boundaries we create is significant in that it serves to expand our thinking and remind us that reducing the phenomena under study to a single object (or closed system), disconnected from its environment, may be convenient or useful, but does not constitute a reality independent of the observer.

The activities in Deekay's class highlight how the concept of interconnection can be taken up in such a way as to encourage the development of systems thinking skills. They also point to the fact that systems thinking can be further embedded into global education practice by following up on opportunities which present themselves in classroom experience: when content or process boundaries are shifted or created, when

the answers to questions require an investigation of causal structures, and when the reasons for phenomena or events are investigated.

System hierarchies.

Deekay began by placing the topic within a context (the self), the individual system. She then connected that system to a larger system (the social context) when she asked them to identify what had influenced their beliefs and values. This reflects a recognition of the social creation of beliefs and values: their interaction across system levels. Interestingly, when asked about the sources of their own beliefs, the students identified mainly the influences of family and friends on their own beliefs, the immediate systems within which they interact. Only one identified mass media. In my field notes, I wondered whether, following the examination of social influences including media, they would appreciate the role of larger systems they are part of. I did not witness this, though Deekay's plan did include a focus on media images and their impact. As well, she intended to include a discussion of the biological and psychological experience of being lesbian, gay, bisexual, transgender or queer/questioning as well as the historical processes involved (changes through time) in social realities of people with diverse sexualities. This could enhance the understanding of human sexuality as nested within systems and embodying its own systems.

This kind of movement between individual and social experience is a reflection of the local-global interconnection discussed in global education literature. Mundy et al. (2007) reported that there is agreement between global educators on the teaching of links between local and global (p.9-10). Hicks (2003) and Pike and Selby (1988) emphasised connections between local and global issues. Such connections can be viewed in multiple ways. Pike and Selby (1999) pointed out that "local and global should be viewed not as opposite ends of a spatial spectrum, but as overlapping spheres of activity in constant and dynamic interplay" (p.13). An interconnection can be understood as causal (local behaviour has global repercussions and vice versa). It can also be understood as patterned; that is, the same types of behaviour can be observed in smaller scale systems and larger scale systems, at various levels of complexity. Thus, the bigotry of individuals is mirrored by the bigotry which permeates social institutional behaviours.

These two understandings of interconnection are present in Boulding's (1956, 1985) systems hierarchy. Boulding developed the system of systems, or systems hierarchy as a framework of coherence, to show different levels of complexity and how systems at those levels relate to each other. Systems increase in complexity as we move up the hierarchy; so, for example, a lower level system would be mechanical, a more complex would be a living or open system like a cell, and more complex still would be a human and above that a social organisation. Such a framework encourages recognition of the interaction between systems, and that understanding can grow from moving the boundary of study, since all of the systems concerned in the phenomena under study are related. Similarly, Davis and Sumara (2006) suggested the use of nested imagery in educational inquiry, to underscore that "the project of formal education cannot be understood without considering , all at once, the many layers of dynamic, nested activity that are constantly at play" (p.28). Whether hierarchical or nested, the interactions between systems are represented as varied and multiple.

Deekay's class moved from system to system, highlighting interactions between the systems themselves (individual, familial, social) and how they in turn interacted with and created the issues that LGBTQ people have to deal with. This movement between systems levels was also apparent in the classrooms of other teachers. In Ella's class, for example, the students compared the patterns of relationship they experienced in their own lives with the relationships experienced by characters in literature. In Jay's class, students recognised the impact of individual behaviour on environment (litter in the local forest) and of environment on individual (animal adaptations). Whether imaged as a hierarchical pyramid or nested systems, this shows how content boundaries are highlighted and shifted: the environment of the system becomes the system under discussion when the focus moves from individual to family, or from family to society. Similarly, the system becomes the environment when the focus shifts to the biological processes which create diverse sexualities.

Feedback loops.

Deekay's class began their study of LGBTQ issues by identifying their prior knowledge which Deekay recorded on the board. At that time, she did indicate some of the connections they made by writing arrows on the board, and she told the class that

they would be identifying more connections. She drew their attention as an example to possible causal relationships between religious beliefs, family attitudes and discomfort around people who identify as LGBTQ. By directly drawing attention to causal connections, she introduced the idea that there are types of interaction. Jay's class did this in a more formal activity, when they filled in their tables showing connections between environment and animal behaviour.

Another way to introduce interaction is through questions which require an examination of cause and effect relationships. In the course of their inquiry into LGBTQ issues, Deekay asked questions which directly referred to causal relationships, for example:

- Where do you think your thoughts and opinions about LGBTQ come from? How are they developed? How do you know what you know? Compare with others in class - any similarities?

- What are the causes of homophobia? How does it exist in different systems and institutions (society, family, religion, education, media)? How does it impact people? Whose responsibility is it to address homophobia and LGBTQ issues?

She also used conditionals in questions, asking students to explore causal relationships by considering the impact of changes in current relationships:

- If you are a gay couple at our school, can you go to grad together (the graduation prom at the end of the year) without any problem?

- If the students were social justice advocates, what would their actions have been? (This was in reference to a school event during which students did not protest against discriminatory behaviour.)

- What does the world look like if there really is no discrimination based on sex, sexuality or sexual identity? (This question was followed by a very intense discussion.)

These questions ask students to consider the causal relationships between normative structures, behaviours and attitudes. Students can begin to appreciate systems dynamics and different types of feedback mechanisms. For example, if the purpose of a school dance is to provide a social context for the strengthening of school community, then the exclusion of a same sex couple from that dance might lead to tension in the school. Students might protest discriminatory behaviour by boycotting the school dance and organising a private prom which was inclusive. Over time, poor turn-

outs at school dances and continued tension at school could lead school authorities to reconsider banning same sex couples at dances, which might lead to more students attending school dances and a strengthening of community spirit in the school. The decision to change the rule reflects an effort on the part of authorities to listen to their students and take into account their opinions. This acts like balancing feedback, a means by which a system's goals are met (Meadows, 2008). It creates a stable social system in the school context through taking into account the wishes of stakeholders. Or, in the case of system change and the establishment of a new goal, reinforcing feedback might come into play (Meadows, 2008). For example, in a system of social relationships, where people express bonding preferences through dancing together, hetero-normative rules might discourage same sex couples from dancing. However, if boys ask boys to dance, then it becomes normal, and more boys would be comfortable asking boys to dance. Eventually, a new equilibrium is reached, boys dancing together becomes a normal behaviour, and the system re-stabilises.

Once students consider such interactions, they can compare them to those they might have experienced. For example, they might have experienced a situation where school authorities changed rules because of students' stated views. Or conversely, if school authorities made rules which did not reflect the views held by the students in that school, school spirit may have been undermined and relations between students and school authorities might have been less than friendly. The balancing feedback was missing, and the goal of developing and maintaining school community would not be met. In the case of reinforcing feedback, they might have experience of the way social norms are changed, that continued exposure to a new behaviour normalises that behaviour. As well, most students will be familiar with situations where there is no reinforcing feedback, where social systems remain stable, even in the case of discrimination and marginalisation. For example, the social stigma attached to boys asking boys to dance at school functions makes such behaviour uncommon, so it is not considered normal, which causes boys who might want to dance with other boys to refrain from doing so in order to fit in, thus recreating social norms.

An important impact of this type of questioning and exploration of causality is the potential to discover opportunities to change system behaviours. It provides students with the tools to shape their world more actively, consciously, a goal of global education.

In Kasey's class, when students read *The Lorax* (Dr. Seuss, 1971), a particular type of causal interaction was demonstrated in the text. Known as the Tragedy of the Commons (Hardin, 1968, a cited in Meadows, 2008), it involves the over-exploitation of a resource, to the point where the resource is consumed or destroyed and the system collapses. In the story, the Once-ler and his family harvested so many Truffula Trees that the ecosystem collapsed, even though they had been warned repeatedly by the Lorax of the dangers of their actions. In Kasey's class, the students, after reading the story, explored the relationship between the Once-ler and the Lorax, who in systems theoretical terms, represented the escalation which occurs when feedback from a resource is missing, delayed, or in the case of the story, ignored. The students examined the change in the Once-ler's attitude toward the trees and his own behaviour, once he realised his mistake. Students can imagine how the story would have been different if the Once-ler had been less greedy and more aware of the potential consequences of his actions.

The notion of causality and its connection to change is embedded in the transformative version of global education, in the temporal dimension (Hicks, 2003, Pike & Selby, 1988) where possible, probable, and preferable futures are explored through imagining "what would happen if" (Pike & Selby, 1988). Several of the activities suggested by Pike and Selby (1988, 1999) in their books aimed at teachers and teaching practice focus on causal relationships. Students fill in charts and/or answer questions to follow the potential impacts across time and space of particular decisions. An activity like Considering Consequences (1988, pp.158-159) asks students to consider how events or developments impact different sectors in multiple ways; Made in Canada (1999, pp.75-76) draws students' attention to the multiple impacts, at different social and economic levels, of choosing to buy a Canadian-made car. The futures orientation in global education encourages the type of conditional questioning which highlights the mechanisms of relationship, how feedback loops create, maintain, or change system behaviour (Hicks, 2003; Pike & Selby, 1988, 1999).

Systems thinkers recognise interaction in systems as bi-directional; causes become effects, effects become causes. Known as feedback loops, this is the mechanism which creates system homeostasis, a state of dynamic equilibrium (von Bertalanffy, 1968; Meadows, 2008; Skyttner, 2005). The mechanisms of interaction are

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essentially the system, as the system is its interaction. To remove or change one of the mechanisms is to change the system – their connection is such that they are dependent upon each other to create the system behaviour. Understanding how these interactions function is a goal of systems theorists, and it allows for the identification of points for potential change. For global educators whose goal is the understanding of harmful systems behaviours (global issues) and the identification of ways to change them, recognising the role of feedback in systems behaviour would be useful.

5.2.4. *Summary thoughts on connectedness.*

The concern of global education with interconnection and interdependence can be informed by a systems theoretical concept of boundaries: where they are placed in the identification of the system, and the identification of the interactions within those boundaries and with systems outside those boundaries (the system environment). This provides the global educator with a ready-made framework for continued and deeper exploration, which complements the work they are already engaged in. Interconnections between people and places are key to the study of any global issue, but there is potential for deeper understanding – and an increased sense of agency – when students are embedded in the systems through a shifting of boundaries, a vertical and horizontal movement on the hierarchy of complexity. Students can realise their roles in the creation of systems through conscious boundary judgements, and can begin to appreciate the types of interactions which create systems behaviour, and thus the reasons for that behaviour.

There are also, within these contextual and explanatory practices, opportunities for further exploration of the mechanisms which create system behaviour. For example, once the reasons for a behaviour are identified (the school seeks to impose certain values or people reproduce behaviours because it is easier) the mechanisms which produce that behaviour can be mapped. Showing how feedback loops create and maintain behaviour, showing mutual causality, is the kind of modeling practiced by systems theorists in multiple fields. They use such models both to understand why systems behave as they do and to identify where interventions might most effectively occur if they are needed. Models are also used to design systems. Complex systems

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have multiple interactions and modeling provides a tool which allows for a focused and in-depth examination.

The practice of modeling can also lead to two further systems theoretical concepts. First is the recognition of repeating patterns of relationship. Called homologies, such patterns can be found in completely different contexts with a wide diversity of elements. It is the organisation and the behaviour of the whole which repeats. Well-known patterns of behaviour, called systems archetypes (Senge, 1990), appear again and again, and familiarity with them allows students to recognise them in a variety of situations. They provide shortcuts to understanding phenomena.

The second concept modelling can highlight, and one I did not make note of in any of the classes I visited, involves the appreciation of the role of time in systems interactions and systems behaviour. A characteristic of many complex systems is a time lag between changes in interactions within the system and changes in the behaviour of the system as a whole (Meadows, 2008). The more complex the system, the more interactions, and the greater length of time it may take for any change in behaviour. A young student may learn many lessons from their parent, but their behaviours do not reflect this until they are adults. A new tax on gasoline may not result in changes in consumer behaviour for years. Decades (or more) of advocacy and protest may be necessary to change laws which are unjust.

This may be a very difficult concept to understand and accept in societies which privilege immediacy. Many global educators have found themselves struggling with a perceived lack of impact; impact on their students' learning, or impact of their own and their students' actions to make change in the world. An appreciation of the role of time in systems change may reduce frustration and increase a sense of agency, both by discovering analogous situations (how long did it take for women to get the vote in Canada?) and by examining how interactions work through modeling system interactions. The fact that I did not perceive it in the classes I visited may be because it was not a concept that I was aware of at the time, or it may be that the teachers were not actively highlighting this during the time I worked with them. It may be that they, like many of us, have difficulty with the idea of time lags. "We are surprised over and over again at how much time things take" says Meadows (2008), even though "delays are

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ubiquitous in systems" (p.103). These delays can be sources of stability but when it comes to changing the world, they can cause a sense of hopelessness or disempowerment. If students are introduced to the idea of modelling systems, it may be that the appreciation of time lags, which accompanies modelling, will have an unexpected benefit: acceptance of the idea that, although you might not see the change soon, it does not mean the change is not coming.

The contextual and explanation focused approach taken by global educators like Deekay provides students with tools they can use immediately in their studies. It also provides the tools needed to explore further the nature of systems in the world and to apply systems theoretical practices. This constitutes a beginning of the kind of paradigm shift, a change in the way students and teachers understand their world, a change which global educators - and systems thinkers - are calling for.

As was noted above, interconnection is a central concept in global education. I now turn to another key concept, perspectives consciousness.

5.3. Multiple perspectives

In my visit to Ella's class, I had the opportunity to see the students prepare for and engage in a simulation. I use this as an example of multiple perspectives because it is a common means by which students can discover and experience the multiple perspectives of a difficult topic. It serves to highlight the potential of systems theoretical concepts to inform our understanding of diverse points of view: what they might encompass and what they might exclude.

After introducing Ella and describing the simulation, I will discuss the two ways perspective might be embedded in practice. In global education this might be understood as individual points of view and learning/acting with the whole planet in mind. In systems theory, this could be examined in terms of bounded rationality and boundary judgements.

5.3.1. Ella: Global educator.

> Are you consistently asking those questions? Are you always saying, is this relevant to the world? What effect are we having on others when we teach this and do this? Are you mindful, are you bringing in multiplicity…? So if you're consistent in asking those questions, you're probably a global educator, even if you don't know you are. (Ella, 15/03, 6)

For Ella, global education was a process, one which required on-going consciousness of her own thought processes, decision making processes, and which may easily lead to places of discomfort: discomfort with her own choices, with the workings of the system she practices in, and within the classroom when the work leads to uncomfortable places.

> I think consistency… being mindful of those principles all the time and being willing to let that infect what you do, even if it hurts. And I mean that, infect. Because sometimes it's very unpleasant. And that's okay, I don't mind that any more… The consistency is in the inconsistency. The turmoil is always going to be there. That is the consistency of it. A bubbling or a brewing. I think you give yourself over to it, it's always there, brewing, bubbling, changing. (Ella, 15/03, 6)

Ella had been teaching for eighteen years and at the beginning of her career, it was simply a matter of keeping up, of trying to understand what she was doing, and slowly building some confidence. Once she reached a place of some stability, her perspective began to change.

> When I actually felt like I could breathe again I started to get bored with what I was doing, and started picking holes in what I was doing myself instead of just surviving. When the focus came on to the students and away from the stuff that I had for them, that was a luxurious time when I said 'are they really learning anything from me? Am I really any good at this? Or is this just all garbage?' So I started to dabble around and that's when the idea of looking in to Field

Programs really occurred to me because then I started to feel like I needed it. (Ella, 15/03, 2)

Her intention to return to her studies took a different turn when she was offered the opportunity to become the literacy coordinator for her school. Through this position she was able to review research, work with a team of facilitators, and receive generous institutional support for her work. It was a chance to explore practice and try to understand the impact of different pedagogical decisions.

When she returned to the idea of professional development within an academic community, global education was not a direction she considered; she was thinking of something in the area of literacy. When she was researching the various graduate programs available, she stumbled upon the global education field program and found herself drawn to it, over and over again. At the last minute, she decided to register in it.

I think the idea that it was bigger than most of the programs that I saw. The notion that it was going beyond education somehow. And beyond something fleeting, that might come and go. Best practice is always changing. (Ella, 15/03, 3)

One of the results of her years studying and practicing global education was a confirmation that the system she was working in was extremely flawed.

I am so aware that the whole system is counterproductive. Look at these classes, and the timetables, and the way the course are divided and spread out. The bell rings and all of a sudden what we were doing isn't important any more. That kills me. There's a lot wrong that you're fighting all the time.

And there's so much bureaucracy, there's no support, there's no money…. You try to function within this really stiff, intransigent system. Teachers are the only thing that can move within this system. Nothing else can budge. We know that. They've told us that. So they're always coming to us to ask us to move a little more, to bend a little more, can you do this and can you do that. The waste of time to do attendance on line, you're supposed to check your email a number

of times a day… If we really cared about education, would our schools be like this? Would they really? I doubt it. Why doesn't anybody want to stop and revamp the whole system. That's never on the table. (Ella, 15/03, 7)

She often became tired, fighting all the time. And yet she made a conscious effort to become more involved rather than less. Her understanding of global education led her to make choices she might not have made before. She became the union representative at her school. And when staff members came to her with their problems, her response was to work with them to find solutions.

And it's really changed some of my dealings with the staff because I'm on staff committee as well, and now I say "look don't complain about things, what can we do about that. What do you want to do, how can we make this better?" Before I would have said yeah, I hear you. (Ella, 15/03, 6)

She was also taking action in her relationship with the students. A discussion in one of the global education classes led her to bring in to her high school film class a newspaper article recounting the beating two gay men suffered because they had been holding hands in public. A student in the class said they wished there was a gay club in the school because she was feeling lonely. Ella said that in the past, she would have found ways to support that student as an individual (talking to her, helping her find friends) but her response at that time was to suggest starting a group.

And we did. And that was hard for me. Not that I've never been not vocal, but to start from the ground floor in this district, and there isn't another one. To put myself out there, I was kind of nervous about it. Because you don't know the response. (Ella, 15/03, 6)

They kept it fairly quiet at first, following the recommendations of various experts. But it has since grown into a Gay Straight Alliance, with 16 members, and the students have spearheaded fund-raising initiatives in the school for charities supporting victims of AIDS.

The global education experience helped me to put a lot of that into perspective and to understand that it is a hard fight but you have to be doing something. Part of global education is activism. You have to do it, or else you're not really doing it. So with those two things have been an incredible time pressure and it's a lot of work, but I feel good about it. (Ella, 15/03, 6)

The school in which she taught had just opened a new building, replacing the old school. The hallways were bright, but narrow because of student lockers which lined either side. At lunch time, the hallways were also lined with students, sitting on the floor eating. Apparently the cafeteria was too small for all of them.

Her classroom was a long rectangle with a very high ceiling, almost hall-like. The walls were mostly bare. It being a new building, there were concerns that taping student work to the walls will rip off the paint. The desks were arranged in rows of five or six desks, five rows in total, facing the whiteboard. Ella compared the set up to an airplane. There was very little space between the rows, and the desks themselves seemed strangely small for a high school - but perhaps this was because they were not any bigger than the desks in the elementary classroom where I had been in previous weeks. When the students came in to the class, they seemed packed tightly into their rows, their bulging backpacks often blocking the narrow aisles because they were too big to fit under the desks.

5.3.2.   In Ella's classroom.

When I began working with Ella, her English 10 class was just finishing a study of Shakespeare's *Julius Caesar*. Students were presenting the results of group art projects which connected their own personal and social experiences to major themes in the play.

They then began a novel study of *Whirligig* by Paul Fleischman (1998). In the story, a teenage boy who had been drinking causes a car accident which results in the death of a teenage girl. The boy wanted to make some sort of restitution, and his life was transformed when he fulfilled the request of the dead girl's mother and traveled across the country erecting whirligigs in her memory.

The students explored the themes in the story and the techniques employed by the author through writing, discussion and an activity which focused on the temporal and spatial movement of the main character within the novel. The story was not written chronologically, so when the students charted his movements on a projected map of the United States, they would refer back to the text to determine where he went first, second, etc. Once they had numbered the sites on the map and drawn connecting lines, the image which appeared clearly represented the movement of a whirligig. The students' response to this was mostly mild interest, while I was fascinated. I wrote in my notes that the thought put into this by the author was impressive, and that the activity was great – it highlighted the layers of meaning in the novel.

At the end of the novel study, Ella set up a simulation designed to allow the students to explore in some depth the practice of restitution within the context of a similar situation, and how different stakeholders might feel about it. She began by asking the students, in the previous class, to answer the question "what is restitution?" for homework.

At the beginning of the next class, she asked them to write about restitution for five minutes. They could define it or give examples; they should write about what they had discovered. After they handed it in, Ella read aloud a few examples anonymously. She then set up the simulation: an accident caused by a high school student driving after drinking. This scenario took place in their own school community. Five groups, each representing different points of view, would come together and express what they thought was important, what they would have liked brought to light, what their perspectives were on the case. The groups represented police officers called to the accident, together with an emergency medical team, and representatives from Insurance Corporation of British Columbia (ICBC); friends of the driver from the same school; student government leaders from a different high school; a group of people from Mothers Against Drunk Driving (MADD); and a group of parents whose children have been involved in serious car accidents while drinking.

In the simulation, the students were not passing laws or setting the punishment, but they did have some input in that their perspectives would inform the justice process. They were to offer their opinions as to what charges should be made against the driver

and what punishment he should receive. Two other students acted as facilitators and provided legal information. While the five groups had been constructing their positions, the facilitators conducted research on what restitution looks like in Canada. After approximately half an hour of preparation, each group presented their view of the case from the perspective of their assigned roles. The conversations were lively and sometimes emotional; it seemed that students had given thought to the perspectives they were meant to represent, but were also swayed by personal feelings, perhaps connecting the situation to something in their own experience. In the end, the group which represented the students from the other high school suggested a very harsh punishment for the driver (prison). Other groups were more lenient but still placed responsibility with the driver (some combination of probation and community service). The group representing MADD shared some of the responsibility with the driver's parents, saying bad parenting must have played a role.

This activity was clearly an example of the perspectives taking which is described in global education as considering multiple points of view. It was an opportunity for students to better understand a situation through considering the information available to and the interests of a variety of actors. It was also an opportunity for the students to explore their own perspectives, both through the inclusion of a group representing their positions (fellow students and friends of the driver) and through the process itself. As the students worked in their groups, they had to differentiate between their own opinions and those held by the group they represent. As well, when the discussions began, the students had to maintain their roles even when they represented views different from those put forward by other groups but that they actually agreed with. Such activities bring to light their own positions so they can be evaluated and justified.

5.3.3.   Discussion: Worldview.

According to Pike (2000a), perspectives consciousness in the global education literature can be understood in two ways. The first is based on an acknowledgement of the individual, and thus the individual point of view. Since there are different people with different backgrounds and in different positions, it stands to reason that there will be different points of view and we should consider them when exploring a topic or phenomenon. This is reflected in global education resources, where common activities

include role plays, simulations and student projects researching and presenting multiple perspectives on an issue (see, for example, British Columbia Teachers' Federation Global Classroom resources). This understanding of perspective also encompasses the position of the observer, of the self, and one's personal assumptions and biases. Pike and Selby refer to this understanding of perspective directly as one of the aims of global education (1988, p.34) and it is embedded in their global education activities.

The second understanding of perspective deals with how we view things, and in the case of global education, the idea is that our perspective should encompass the planet as a whole; we should expand our horizons beyond the parochial. This understanding of perspective in global education appears in the topics that typically are the focus of teaching resources, for example international development and global poverty, child labour, human rights, climate change, and global health. These topics easily cross national boundaries and are global (in the geographic sense) in scope. A more holistic understanding of planetary focus appears in the transformative version of global education, most notably in the work of Pike and Selby (1988) but also in some others (Greer 1996; O'Sullivan, 1996; Toh, 1993; Young, 2010).

There is some question as to how the understanding of perspective is embedded in the practice of global education. As was noted in Chapter 2, some conceptions of perspective focus almost entirely on the individual point of view in relation to some fixed reality. Missing from such an understanding is the observer's role in the creation of the observed, that point of view alone fails to take into account the interaction between knower and known. This is embedded in the dual notion of perspective, where the observer is not only responsible for uncovering her and others' own biases and generalisations when considering a phenomenon or issue, but is also responsible for acknowledging and justifying the scope of what she is considering. That is, if the issue in question is poverty, and the focus is on a particular developing country (or indeed developing countries in general), then the reasons for excluding poverty in developed countries, local poverty, should form part of the discussion. An issue is global because it is pervasive, it is interconnected with people and places, systems around the world, it is not simply appearing somewhere (else) in the world. Might the narrowly focused practice of fund-raising found in schools across Canada (Mundy et al., 2007) be a result of an understanding of perspective as individual point of view and attitude?

Systems theory offers concepts which complement the global education notion of perspective and may serve to address the narrowing of focus to simply 'point of view'. Both understandings outlined by Pike (2000a) can be informed by the notion of boundary (Georgiou, 2007). The global focus, the concern with the planet as a whole, is embedded in the concept of systems hierarchy, the dynamic interconnection of systems, discussed in the previous section. Moving up the hierarchy of complexity (Boulding, 1956), shifting boundaries or making boundary judgements, students find their object of study is entangled in a web of interrelation, having impact around the world. The global perspective can be explored through multiple global systems (economic, political, social, environmental, technological), each interacting with the others and each providing a different viewpoint from which to engage with the topic. In each of these cases, the goal can be the good of the planet as a whole – though, determining what is "good" will never be easy, and each of these perspectives may suggest a different idea of "good". The subjective perspective, that of stakeholders (individual, group, national) and their multiple points of view, is also bounded, by position and knowledge. That is, the subjective perspective, called bounded rationality, is always limited to what the subject perceives and what the subject values. Individuals are not only informed as to what they see and how they see it by existing mental frameworks. Together, the what and the how constitute a worldview or *weltanschauung,* by which an "observed activity is only meaningful to us… in terms of a particular image of the world" (Checkland, 1981a, 215), and where consensus on what that activity is, how we determine what makes it meaningful, will be rare.

Soft systems thinking, in the interpretive, constructivist stream of management science and operations research, emphasises the importance of worldview, specifically the worldviews of stakeholders, when systems are explored. This concept is part of what differentiates soft systems thinking from a different application of systems theory, known as hard systems thinking (Checkland, 1984; Georgiou, 2007). According to Checkland and Poulter (2006), hard systems thinking does not pay "attention to the existence of conflicting worldviews, something which characterizes all social interactions" (p.21). Hard systems thinkers posit all systems (including human activity systems or social systems) as objectively identifiable entities rather than as subjectively definable and "continually being created and recreated by people thinking, talking and taking action"

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(p.22). Soft systems thinking places worldview at the centre of the inquiry, and defines the system based upon the worldviews of the humans engaging with the situation.

> A social situation, constituted by any number of interrelations, cannot be solely defined as a system of such and such because any number of human beings will have any number of views of the situation which, in turn, define any number of systems, along with their respective boundaries and purposes and, hence, posit any number of understandings of the situation. (Georgiou, 2007, p.29)

When perspectivity is understood as worldview, the option of focusing only on individual points of view is reduced.

The idea of worldview combines two definitions identified by Pike (2000a) in global education: different individual points of view and a view of the whole, a planetary perspective. The worldview referred to in soft systems thinking also encompasses both individual point of view (the position from which the system is viewed) and how the system is itself defined by the stakeholder (the boundaries placed upon the system), whether local, institutional, social or planetary. In systems theory, one way these two interrelated and simultaneously occurring perspectives are examined is in terms of bounded rationality and boundary judgements, which will now be explored in more detail and in relation to teaching practice.

Bounded rationality.

Perspective in systems theory can be understood as bounded rationality, a concept which is described in economic theory (Meadows, 2008). A response to Adam Smith's notion of the invisible hand of the market place, bounded rationality is the theory that the choices of individuals within a system are only reasonable within the limits of what they know and experience. That is, rational decisions are limited by the information individuals have, by their individual perspective. They do not have perfect information, especially about more distant (in relation and time) parts of the system in which they are operating or about impacts of their own actions on the system. Therefore, they make what are, within their understanding, reasonable choices and stick to them, changing

their behaviour only when forced to (Meadows, 2008, p.106). Though he did not label it bounded rationality, Checkland (1981a) described, as part of his explanation of *weltanschauung* or worldview, an example of this mode of thinking. Ptolemy observed the movement of objects in the night sky and used the data to develop a cosmology which explained these movements. Mars appeared to reverse direction at times, so he posited that its motion was epicyclic "making a small circular motion around a point which itself circled around the earth" (p.215). His cosmology made perfect sense within the bounds of his picture of the solar system, with the earth at the centre. When the movement of a planet did not fit this picture, he would find an explanation which left his worldview intact. This process of finding explanations which fit the cosmological picture continued for hundreds of years after his death, until a different worldview, that the earth was not at the centre, informed the study of planetary movements.

Georgiou (2007) likened bounded rationality to the mode of development of intuitions in phenomenological intending. Consciousness is driven by intention, acting as input, and leading to continuous reasoning as to intention. It is the deductive mode, one which leads to phenomenal determinism because it is "a system of purely negative epistemological entropy, with intuiting only ever referring to the singular intentional import into the system" (Georgiou, 2007, p.146). In systems theory this is illustrated in the over-riding focus on singular goals or on quantitative approaches. Von Bertalanffy (1968) in his discussion of methods of general systems research, claimed this "deductive" approach leads to "feverish 'model building' as a purpose in itself and often without regard to empirical fact" (p.101). Ultimately, bounded rationality is theory without experience.

To address bounded rationality, the limitations of our individual positions within a system and our belief in the rationality of our choices, systems thinkers must step outside the boundaries of their place within the system and gain a wider perspective, to enlarge their bounded rationality even slightly in order to acquire better and more complete information. This can be through trying to take on the perspective of others, to understand the reasons for their choices, their bounded rationality. This was a purpose of the simulation activity in Ella's class.

Another way Ella included perspective taking was in asking students to imagine the thinking behind the actions of characters in Julius Caesar (work they were finishing when I first began my observations). Deekay's students noted how others might view LGBTQ issues, based on the influence of their families, friends and larger social systems. Jay described an activity in her grade 6 class, when the students were practicing having a large group discussion without the facilitation of the teacher. The topic was homelessness, and they were able to voice their opinions on the topic, even opinions which might have been controversial (that homeless people were all drug addicts). During the discussion, the students considered different viewpoints and expanded their knowledge based on new information. In the end, critical dialogue led to changes in some students' perspectives. Kasey's grade 1-2 students identified how characters in *The Lorax* changed their perspectives based on changes around them, in environment and in the perspectives of others. This kind of perspective taking seems to be embedded in a number of classroom practices, at all grade levels.

Boundary judgements.

Worldview also encompasses the boundary judgements made by those stakeholders, those individuals with their bounded rationality. In systems theory, the key to boundary judgements is in understanding what they are: divisions between system and environment created for our convenience.

> There is no single, legitimate boundary to draw around a system. We have to invent boundaries for clarity and sanity; and boundaries can produce problems when we forget that we've artificially created them. (Meadows, 2008, p.97)

Systems are mental constructs of the observers. To avoid those constructs becoming mistaken for reality, with all of the deterministic causality that would entail (the outcome soft system thinkers seek to avoid), critical systems thinkers suggest a constant questioning, a critical stance toward both where a boundary is set and what is included in and excluded from a system (Georgiou, 2007; Jackson, 1991).

One way to explore this notion of boundary setting is by considering the boundaries in terms of the complexity of the systems they enclose in comparison to other systems nested within or encompassing them. The hierarchy of systems complexity, developed by Kenneth Boulding (1956, 1985), acts as an over-arching language of concepts and constructs to allow for communication between scientific areas of study (which tend to focus on particular levels). As was described in the previous section focusing on interconnection and interdependence, the shifting of boundaries, up and down the systems hierarchy, can serve to make explicit the notion that what is included and what is excluded from our view of a phenomenon or event is our choice. We can choose to focus on the local, but that does not mean the local is actually separate from the environment in which it is embedded. Similarly, a focus on the planet does not exclude the local, though it might shift the understanding of the local.

When we seek to understand more fully any particular situation, we create a mental model of the event or phenomenon so that we can more easily grasp it as a whole - we create the system through our perception of it (Georgiou, 2007). Yet the very process of doing so reduces the event or phenomenon to a construct - it is a created reality. To remain aware of how we simplify and to try to better understand what we are focusing on, it is necessary to consider that there are systems we are excluding, that the situation is not existing in a vacuum, that all of the messy bits we have removed for our own convenience still exist and have a dynamic relationship within our area of focus. Our perspectives must include a consciousness of the unreality and inherent limitations of the boundaries we create.

This understanding of perspective corresponds to the planetary perspective identified by Pike (2000a) in global education literature, though it does not necessarily include the values component (understanding and acting in the planetary interest). The planetary perspective in systems terms is the expansion of boundaries, the inclusion of environment in consideration of any phenomenon. The process of enlarging and narrowing our boundaries regularly may provide the kind of awareness that reminds us that boundaries are created for convenience and systems interact with their environment: ultimately, everything is connected and impacts on everything else.

The movement back and forth between system levels occurred in all the classes I witnessed. In their study of LGBTQ issues Deekay's class moved from self, to group, to societies, and back again. Jay's class explored the animals in terms of their relationship to environment, how the interaction between system levels (animal, biome) can create species characteristics and/or behaviour. Kasey's students discussed their own behaviours in relation to the community. And there was some recognition of the role of boundary judgements in the simulation activity in Ella's class, as the roles included a number of actors from different social systems, some unexpected. For example, the student government representatives from another town enlarged the activity system beyond the local community scope, as did the inclusion of the parents of other youth who had been involved in such accidents. The institutional systems involved were represented by the police, medical and insurance groups. MADD represented larger community interests.

In the end, the students participating in the simulation in Ella's grade 10 class focused almost exclusively on the responsibility of the individual (the driver) and how the justice system should deal with the case. There was no acknowledgement of the larger systems creating the situation, except reference to bad parenting made by the MADD representatives. The only impact of systems outside the narrow confines of the situation in question was that students felt it was the responsibility of the justice system to send a message regarding the consequences (punishment) for bad behaviour. As to the behaviour itself, the teenager (and perhaps his family) was solely responsible.

Working within the confines of the classroom situation, the activity required the students to expand their individual boundaries, their bounded rationality, to imagine other bounded rationalities. It also included an expansion of boundary beyond the merely local, moving to more complex systems (institutional, community), but not too far from the situation being explored. What seemed to be missing from the discussion – and this was also the case in Deekay's class – was the impact of larger systems on individual human behaviour and attitudes. Students would expand the boundary of influence to family and friends, but would give little attention to cultural, social, media, and technological influences on individuals. Ella's students did not consider the role of media, and in particular advertising, on individuals choices regarding alcohol. In Deekay's class, the students once mentioned religion as having an impact on attitudes

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toward LGBTQ issues, but social and media influences were not a focus of their discussions. Local relationships, both in space and in time, may be easier to grasp – or it may be that repeated focus in their school and social experiences make this a feature of their worldview.

5.3.4.   Summary thoughts on multiple perspectives.

Recognition of the role of worldview in exploring any curricular content is key to global education. However, though it did include some boundary shifts on the hierarchy of complexity, simulations like the one in Ella's class focus primarily on point of view, the bounded rationality of individuals. To try to include the breadth of "worldview" in this one activity would certainly change its nature and might make it unwieldy. The focus, after all, is on students placing themselves in the shoes of another, imagining another's perspective. Asking students to imagine the perspective of a larger social system would not make sense in such a context – though I could imagine using the simulation format to ask anthropomorphised social systems to engage in dialogue (for example, media, the liquor industry, family values, youth culture).

Further exploration of the topic might focus more on boundary judgements, moving between system levels. For example, students could examine the role of media advertising and imagery of alcohol. Similarly, social attitudes toward alcohol in general and drinking and driving in particular could add to the understanding of this particular situation, as might historical and anthropological explorations of the role of stimulants in human societies. At a completely different level of the hierarchy of complex systems, the students might explore the biological and psychological impacts of alcohol, investigating why a person who is upset might choose to drink at all and how it might affect their judgement. This, in turn, could connect to legal arguments around the nature of responsibility for acts committed while under the influence. There are many possible systems levels which could be included, many possible boundary judgements available.

This suggests opportunities for further research. Questions might be, how might teachers decide on whether to focus more on bounded rationality or more on boundary judgements? What are the costs and benefits of either focus when it comes to student learning? Is it possible –or advisable, or necessary - to include both in one activity? How

do the institutional processes of curriculum deadlines, standardised exams and school schedules constrain a class' ability to truly consider worldview in their studies?

Perspectives have been framed in two ways in this discussion: bounded rationality and boundary judgements. This could be characterised as a horizontal movement, between individuals, or a vertical movement, on the hierarchy of complexity. Missing from this discussion is the horizontal movement at different levels of complexity, for example, the conceptual or cross curricular, perhaps viewing a topic from an ethical, cultural, economic, scientific, historical or geographic perspective. Boulding (1956, 1985) identified the transcendental as the most complex of systems on the hierarchy – this is called the level of the "unknowable" and it is suggested that religious or philosophical experiences may be exemplars of this level of complexity (Skyttner , 2005). This could be the realm for some exploration as to how knowledge creation systems might inform global education practice and what might be the benefits (and costs) of shifting between such perspectives.

A global education notion of perspective informed by the systems concept of boundary leads to a change orientation in two ways. First, the understanding of perspective as boundary requires recognition of the multiple kinds of boundary there are. Boundaries are not only between people, they are also between countries, ideologies, subject areas, systems. To confine consideration of multiple perspectives only to the differences between individual points of view is to ignore all other boundaries creating our world and our understanding of it. Thus, the role of systems larger than the individual in the creation of global problems is highlighted, drawing attention to the need to change more than personal attitudes. Second, the boundaries we choose to consider not only determine the scope of the phenomenon under consideration but also its nature. That is, the boundaries we select will lead to the inclusion of an issue or its exclusion from consideration. It will show how our participation in global systems serves to create and maintain those systems, or will show only one aspect of our participation, or will remove us from the picture altogether. This has implications for how we view systems (that our boundary judgements create their identity) and how we view our role in those systems, our options for making change. Bounded rationality requires the consideration of other people's points of view, and of our limited knowledge and experience of the world. This,

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coupled with recognition of boundary judgements, can create the change orientation of transformative global education.

But there is one aspect of the recognition of boundary judgements, which has not yet been discussed, that is necessary to the change orientation. Boundary judgements must be open to justification. This is explored in the next section.

5.4. Critical perspectives

A critical orientation was manifest in all the teachers' approaches: they each included a questioning of their own and their students' assumptions in their classroom dialogue. However, I chose to highlight Kasey in the discussion of critical perspective for two reasons: first, her situation was new to me, as I had not spent time in a primary class before, so the way criticality appeared was unexpected to me. Second, the challenges she faced as a result of her criticality were more personal and social rather than institutional – again, a surprise to me. That is, the pressures of school structure to conform (timetables, pre-set ends, exams, compartmentalised curriculum) featured less in her interactions than did her relationships with other individuals and her construction of knowledge in her classroom.

I begin with an introduction of Kasey, her history and her teaching situation. I then discuss the role of a critical orientation in global education as observed in her classroom and in the examples she cited from her practice. Finally, a critical perspective is examined in terms of boundary judgements, the justification of which forms the basis for critical systems theory.

5.4.1. Kasey: Global educator.

I think in a classroom global education is bringing more than just what's in here (the classroom) into our learning. I think it's the connection, particularly to community and to what's going on out there in any way that we can, any way that it comes in. And I think it's the connections between the things that we're doing, even if it's not a theme. If we're talking about force and friction in science, where else

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do you see that? Can we only talk about it in science? No. If we're reading a story and you make a connection … it's all learning and it doesn't matter when or where or how it happens… (Kasey, 05/03, 5)

Over and over in our conversations, Kasey used the word *connection* when she referred to global education in general, and to her own goals in the classroom in particular. She wanted to connect the students' learning to the world. Everything in the class was intended to help students progress towards that cliché school goal: preparation for the world. For Kasey, though, it really was the goal; there were no intermediate steps. She was not focused on preparing them for the next grade, or preparing them to be students in the school. She wanted their learning to be immediately relevant to their experiences outside the classroom, in the present and in the future.

Kasey was drawn to global education after having studied environmental education in her initial teacher training, and then working on the diversity team in her school district. Her focus had been social responsibility, so to her, a move to global education seemed a natural progression, and something she was already familiar with. She admitted laughingly that she thought studying global education would be pretty easy for her because she already knew what it was all about.

Then when I saw the diploma program come up I thought, this is social responsibility, and I already know everything there is to know! I do this all the time… when really (what I did was) I worked off of this one provincially mandated document and did everything it said in there all the time and didn't go outside of that and thought that was it. I can remember my application letter: "well I am on the Valuing Diversity Team, so I think we all know what that means, right?" But then I got in so it worked (laughter). (Kasey, 05/03, 5)

But the study of global education proved to be rather different than what she had expected and called into question what she thought she already knew.

(In the beginning of the program) we were confused and wondering and questioning, and then finding ways we could make connections to things that had happened in our own experience, and that went

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backwards, forwards, maybe middle out, instead of front to back… And from there we got into our field studies and we had that challenge of taking all of this new information and all these new ideas and thoughts and connections and questions and feelings and bringing it here. And that was really hard, and still is really hard. But I think that beginning was important. And the papers, one of your papers you said, growing the beans in the Styrofoam cups, that was a big thing. That happens everywhere all the time, and I knew I didn't like it, I knew it was bad, but I didn't know why. I knew it was a crazy idea, but I didn't know why. (Kasey, 05/03, 5)

The realisation that she did not know what she thought she knew, instead of making her more hesitant to further inquire into her practice, had the opposite effect. She found herself questioning everything about what she did, why she did it, and what the real (rather than assumed) effects were. She seemed to receive a real sense of empowerment from exploring the complexity and ambiguity of her own practice, from challenging herself. This, she felt, was perhaps the only way to prevent herself from becoming "that crusty old teacher… who has no reasoning behind (what they do)" but just repeats themselves, year after year (Kasey, 05/03, 4). She seemed to be very aware of how easy it might be to slip into that identity, primarily because of the nature of the individual teacher, alone in her classroom. This was evident when she compared the experience of the practicing teacher with her experience as a student teacher.

The first time I engaged in my own research was in PDP in a practicum with the faculty advisor and school associate. And you as a teacher with all of those eyes and a busy classroom and I think when you learn that way, when you don't have it anymore, it can be a really lonely place. It forces you to be on your game and to really think about what you're doing and why. And I think our profession typically doesn't have that built in, you don't have to think about what you're doing. You don't have to justify it to anyone. I'm not saying that you should have to all the time, but not even to yourself. So I think that a deeper level of thinking about why am I doing this, how am I doing it why am I doing it in this way, is really important. And you do get it in your

teacher education and then it's gone forever unless you seek it out. (Kasey, 05/03, 4)

And so she did seek it out. The best way - and perhaps the only way in her opinion - to maintain an approach of inquiry into the goals and effects of her own practice was through membership in communities of inquiry. Both her professional development experiences and her participation in this research process served this purpose.

So one way I've done that is with the diploma program which was great because it forced me to find an area that I was interested in, do the research that's out there and then find a way to bring it into my own practice. And I've learned that there's other ways to do that too like being in district research groups, and school based team things, but that was the most intense thing I've ever done and it was all on me. I like it when there are other people to share the burden. To be part of a team. And with this (research study) the way it's set up to have a chance to talk out what I'm doing and what we're doing and what you see and what I see I think will be really useful and interesting to me. To me that counts as classroom research for my own self, not for just what you do. (Kasey, 05/03, 4)

I think, like I said earlier about classroom sometimes being a lonely place where you get away with things that you don't want to get away with. You do things that, having been more thoughtful or critical, just cognisant, that maybe you wouldn't have done or you would have done other things. So just the opportunity to be really thoughtful, which sounds ridiculous because why wouldn't I be thoughtful all the time. Not do things just because it's the way they're done at the school, or it's the way things should be in grade one or two, or it's the way I did it last year or whatever is really important to me… So that's part of my selfish reason, just to light a fire under my butt and make sure I'm always firing like that. (Kasey, 05/03, 4)

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Kasey had been teaching for just four years, and she had yet to be given a regular contract. She moved to different schools in the district, sometimes teaching for just a day or two and sometimes for several months, depending on the needs of the district. At the time of our research, Kasey had a long term contract in an elementary school, covering a maternity leave. She knew the school well, having taught here before. She was teaching a Grade 1 / 2 split. Although she had taught Grade 2 before, this was her first long term work with a Grade 1 class.

The school in which Kasey taught was in a new development in a bedroom community outside a large city in British Columbia. It was surrounded by detached homes and row housing. Both the school and its playground were clean and new: it seemed to fit the well-off middle class neighbourhood in which it was situated. It was a single story building, approximately ten years old.

My first day at Kasey's school began in the gymnasium where the whole school participated in a dance session called Bounce at the Bell. Three teachers on the stage performed a very energetic dance with a Bollywood theme to upbeat popular music. Below them the whole school community followed their lead, and for 15 minutes we all danced. This was a daily occurrence at the school, with different teachers taking turns to select the music and the dance, and lead the students.

After this active start to the day, we walked down two bright hallways to the classroom. It was a typical rectangle with windows along one wall, chalk board along another, coat hooks and spaces for their bags along a third. The fourth wall was where I set up my camera. It too had a chalk board covered with Fabulous Fairytale Language like "emperor", "treasure" and "weep". The 'front' of the class, facing the coat hooks, also had a bulletin board covered with words: powerful words according to the title. Some of the words were 'splattered', 'squirmed', 'scurried', 'wispy'. Every space on the walls was covered with the students' work: words, artwork, paintings.

In one corner, with the windows on one side, was the carpet area where the class could gather for calendar work, stories, and discussions. There was also a big chart with songs from which the students could choose when it was time to sing. On my first morning there, the student leader for the day chose a song about losing teeth. The

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teacher's desk was in the back corner of the room, next to the coats; in front of it were drawers where the students kept their notebooks. In the centre of the room were desks set up in pods of four, as well as two tables used as breakout space.

5.4.2.   In Kasey's classroom.

During a classroom observation, I commented in my field notes on the energy Kasey brought to her class.

> I am tired just watching Kasey. The level of attention that is required of her - or that she chooses to give! I guess it depends on the teacher - is enormous. There is no down time, no mind wandering time for her. Not like… my classes! She is constantly asked for attention, despite the independence of her students (their ability to organise and self-direct). (Field notes, 30/04)

I had never spent so much time in a Grade 1 / 2 class, and was frankly amazed at the activity of the class. As I discuss in more detail later, the students were remarkably independent - they knew what to do and when to do it. And yet it seemed to me a vision of organised chaos, filled with a sense of purpose, each member of the class confident in themselves and each other. Kasey was continually engaged with students, checking on their progress, answering questions. Her hand on a shoulder here, bending down to listen there, her whole body turned toward a student she spoke to, all attention, full participation in the exchange. I am not sure whether other elementary classes look like this - and from what Kasey shared, I suspect many do not. I do think that what I witnessed told of her commitment to her students. Teaching was not just an intellectual exercise for her, it was a full body experience.

The children were somewhat distracted by my presence, but mostly by the camera and the wristbands I was using to identify them. Some of them jumped up and down in front of the camera when they were supposed to be reading - until I told them the camera was not on. They quickly got used to me and the camera - not so the wristbands. These proved a constant distraction (you can twist it, stretch it, put it around

your knee or your head). Kasey had to ask them to treat them gently as one soon broke (luckily we could easily fix it).

Kasey used the whole room during my visit - the carpet area was used several times through the day, the children worked at their desks on some tasks, and the extra tables were used during reading time and when Kasey took small groups aside for spelling tests. While the school grounds were not utilized much as a learning environment, the school building included places of learning beyond the classroom, as the students went to different rooms for music and library classes.

There was a special kind of learning involved in use of the school building: the children learned that specific behaviours were required in different places. When walking down the halls they had to walk quietly and, if they had to speak, did so softly. Kasey's students also learned that behaviours were associated not just with place but also with authority - specifically, whose authority they should recognize. Other students in the school were not only expected to be quiet: they were chaperoned when they walked the halls between classes and they had to walk in single file. Not so the students in Kasey's class. They were expected to take responsibility for themselves, get to the place where they are supposed to be, and demonstrate respect for other students by not disturbing their classes. In Kasey's class, the primary motivating factor for social behaviours were the reasons behind them, rather than the authority of the teacher or the school.

At the front of the room she displayed on the board the Shape of the Day, a list of activities students could expect to engage in that day, but on the morning of my first visit, she discussed with the class the changes they would make to that schedule. Since an activity they had with another class on the previous day meant that they had not attended to their word hunt, some rearranging was required. The students asked when they would do the work that was scheduled for that day and Kasey promised that it would all get done. The routine of the day was important to them; they knew when things were supposed to happen and they questioned any changes.

Making boundary judgements transparent

Questioning seemed to be the norm in Kasey's class. For example, in the approach to knowledge construction, an exploration of the "why" of things was evident.

Kasey tried to create a questioning atmosphere in the class, not providing easy answers but examining with students the models that we create about the world and testing them in reality. She noted the power of these models when she showed me some flowers the students had painted. She had brought in real flowers and asked them to paint them, and was dismayed when many of them began to paint the traditional "flower" shape, the model flower of five petals surrounding a circle, without stamen or pistil, even though she had pointed these out. Why had they done this? she asked. Even with the reality in front of them, the model dominated their work.

In another example, she described one way she tried to differentiate between reality and the models we create. Student work, from Grade one, is divided into subject disciplines. During a visit to her classroom, she said that when we looked around her room one would not think she was a systems thinker and I asked her to explain. She pointed to the boxes with subject area note books, and said her students would write something about the environment and then ask whether the notebook goes in writing or science. Then she would discuss this with her students. She felt that we create constructs, like subject divisions, and they did not fit the reality - or perhaps more appropriate in this instance, the reality did not fit neatly into the construct. In her classroom she did not try to dispense with the models of the world; rather she tried to highlight the fact that the models are created by us and that things do not always fit, the boundaries are not clean, reality is messy. She showed the students that we cannot accept the models themselves as the reality, we must ask why they are there and question as to whether they work.

She was careful to acknowledge multiplicity in the tools that used to create frameworks for knowledge as well. In a story mapping activity, she asked them to use arrows to represent the movement through time and the connections between story events. When many did not use arrows, but rather organised their thoughts with boxes, bubbles or lines, she did not correct them. On the contrary, she pointed out that they were using the same parts of the story but showing it in different ways. She commented on how interesting this development was, and then asked them to change partners so they could compare the ways they had structured their retelling of the story.

Questioning boundary judgements

Making boundary judgements transparent throughout curricular decision making allowed the focus on explanations, on asking the question "why?" Activities had to have meaning that went beyond the banal or routine in Kasey's class, and the reasons for them had to be part of the student learning. She was mindful of the goals of activities, of their relevance, and she shared this approach with her students in several ways.

> I think that a lot of global ed is taking something that we do anyways or that's already around and finding out why it's important or making a connection to it in a new way. (Kasey, 05/03, 6)

The content of Kasey's lessons had purposes beyond skills development. For example, there was a message printed on the board which greeted students on Monday mornings. This was an opportunity to practice spelling and particular sounds they had been working on. They would copy this message from the board and print it in their notebooks, filling in the blanks with the appropriate letter combinations (Kasey used a phonics program to teach reading). Kasey made this more than just printing practice: she incorporated content into this exercise by making the message about a topic they had been studying or a topic they may have wanted to discuss. This might seem an obvious thing to do, but for Kasey it resulted from an exercise in critical reflection. When she re-examined her own practices and started thinking about what was intended, what their goals were, she found that some activities were isolated from each other, compartmentalized, and thus meaningless. In this case, she had been writing empty statements for the students' printing practice.

> And that's where I'm thinking how can I bring something that's important. That's not "good morning boys and girls, this week we'll have fun. We will be reading and writing and thinking. Happy Monday to you. Love Miss S." How can I tell them something important? (Kasey, 05/03, 6)

Students were also faced with statements in the hallways of the school which Kasey considered empty because they had been reduced to slogans (Take care of yourself, take care of others, take care of this place). That is, there was no school-wide

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effort to explore the reasons for these behaviours; rather, there seemed to be an assumption that everyone understood. She determined to add meaning there as well by connecting it to students' lived experiences, finding ways to make it relevant to them so that they could own the slogan rather than having it imposed upon them.

> One thing that's really been big here at our school all year is our slogan which is "Take care of yourself, take care of others, take care of this place" that you see everywhere. We're really into branding here, some people are, and there's stuff everywhere. It used to be all kid done which is better but now it's all these official "corporatey" kind of signs, just because they use the curly letters doesn't make it cute. And we talk about that all the time. These kids go to power hours, and gatherings and… So I thought okay, they get it, it's a slogan that we do here. But then I thought, well, if it's in your face all the time, let's find a way to make it important. So it's not just on the windows, it's not just forced on you. So what does it mean, what does it look like, what does it sound like. What does it mean here, what does it mean in your community. Does it mean the same thing somewhere else. One of our students has just returned from two weeks in Korea, so did you see the same things. Or does it always mean the same thing. What does take care of yourself mean at home, or at school. And with these little suckers, it is a big question. How can it mean something different here than it does at home? How can taking care of others sometimes be the same thing as taking care of yourself? (Kasey, 05/03, 6)

Kasey wanted the students to be aware of the reasons for particular social behaviours, not to accept them simply because authority requires those behaviours. She wanted them to think about their actions and become self-directed and so she did not use the simple rhymes designed to make rules softer: singing songs about putting marshmallows on their feet before they walked down the hall (translation: do not stomp), or criss-cross apple sauce (translation: sit down).

> I want children that I teach to do things because they're thoughtful about them and to learn to do things that are important. I realise how that sounds, but to me I don't care that they walked back from music

alone, I'm not going to sing about putting marshmallows on your shoes when we leave the class because I think that's crazy talk… or something in your mouth so you can't talk. … we're not going to put marshmallows on our feet to walk down the hall. We're just going to walk down the hall in a way that respects the other people around us... because that's not the message I want them to get. I want them to be able to sit down so the person behind them can see, be thoughtful. They're so capable. (Kasey, 05/03, 5)

Similarly, she created opportunities for the students to practice joining a conversation politely, without raising their hands.

Sometimes at the carpet, we don't do hands up, we just do "let's just have a conversation" and it's hard to have a conversation with 20 people. And it's hard to have a conversation with 20 grown-ups at a party too. But you can't always clap or give a signal or do a pattern when you want to talk to somebody. And I think that's important to have that in here too. There shouldn't be a difference of social rules in a classroom just because they're six years old. (Kasey, 05/03, 6)

And my personal favourite, the students did not have to get permission to go to the toilet. Instead, there was a washroom board, with each of their names written on it. When they needed to go, they simply left what they were doing, placed a marker in the 'washroom' column, and went. When they returned, they replaced the marker. She explained the reasoning for this to them, saying that she just needed to know when they were out of the room.

The students in Kasey's classroom were remarkably responsible in their behaviour - more so than many university students I have seen. This is clearly a focus of hers, and I was impressed by her success, as I noted in my field notes and in our conversations.

Melanie: I noticed also when you were doing your activity here, at the carpet, when one of them needed to get up to do something, they didn't ask you. They just got up, they did

it, and then they moved back, with the minimal amount of
fuss. Was that something you worked on with them?

Kasey: Yes, very hard.

Melanie: Well it was just amazing, I'm so impressed. Some older kids
couldn't do that.

Kasey: That's nice to hear. That's part of my philosophy, trying to
not have our classroom as a separate place that's not in the
real world. You need to know how to leave and come back.
And you don't need to ask me if you need to go to your
desk and get a pencil. A lot of teachers like that or need
that just to know what's happening, a sense of control, and
so it's not disruptive to other children. I think I do balance
on that line with giving them the freedom to take
responsibility for their own jobs but then have it also not
take away from what other kids are trying to accomplish. So
it's a bit of a balance, but I err on the side of giving them a
bit more autonomy. And that's our journey right now is
taking responsibility for our own learning, so deciding
what's going to be best for you and making sure it's not
going to take away from what someone else is doing, and
doing it. And that's something I do encourage in these
children. (Kasey, 29/04, 11)

Working with the students to ensure they understand the reasons for behaviours
and their goals gave them responsibility for decision-making as to their own behaviour. It
also introduced them to the idea that making such decisions is itself relational, an
interaction between the goals of different people or systems.

5.4.3.   Discussion.

The role of critique.

In global education, criticality can be associated with self, the education system
as a whole, and the subject of study. Each of these contexts for criticality – a critical

perspective - appear in global education literature to a greater or lesser extent, depending upon the version. Although I will try to examine them individually, in the context of this study and viewed through a system thinking lens, they are intertwined and growing from decisions around boundary judgements.

The encouragement of a critically reflective stance on the part of the students is found in the notion of global perspective, specifically in its inclusion of multiple perspectives, differences of opinion and attitude, and the need to understand and consider diverse points of view, perhaps leading to a change in one's own stance. This is evident in Case's (1993) perceptual dimension, and in Pike and Selby's (1988) perspectives consciousness. Definitions of global education generally include commitment to intercultural understanding and tolerance of differences of opinion (Mundy et al., 2007). A welcome expansion of this focus on students is the need for a stance of critical reflection for teachers, which was included in Pike and Selby's (1988) profile of the global teacher. A global teacher, they contended, needs to be congruent, aware of the disharmony created by "dissonance between her professional and personal life" (p. 274). Thus, if she is teaching students to consider diverse points of view, she must model this behaviour herself.

Critiques of the education system as a whole are not a focus in the global education literature, nor are the structures of education systems listed as one of the global issues that are a concern. However, such critiques might appear in the context of global issues such as poverty, human rights, or international development. Within the holistic and transformative global education stream, there is an implicit critique of the education system in that it offers an alternative to the status quo, citing as rationale the costs of subject compartmentalisation, of standardised tests and right and wrong answers, of the hidden curriculum in liberal technocratic approaches (Pike & Selby 1999; Selby, 1999; Toh, 1993).

A critical stance toward the object of study, critical thinking, is also a skill that global education aims to develop in students. Mundy et al. (2007) reported that global educators include critical thinking as one of the skills global education teaches (p.10). Oxfam (1997) listed it as one of the skills of global citizenship. Pike and Selby (1988) did not identify 'critical thinking' by name amongst global education objectives; however,

they did include questioning, evaluating information, and recognising bias and perspective (see, for example, Global Education Objectives, pp.63-69). As well, in terms of that most basic understanding of critical thinking described above, their description of global education and the activities they suggested have embedded within a questioning attitude and willingness to change ideas when warranted.

The global educators who participated in this study demonstrated critical approaches in several ways. The teachers were critical of themselves; they shared their concerns and doubts about the curricular and pedagogical decisions they made, wondering whether their choices were in the best interests of the students, whether some other strategy might have been more effective, or whether they were complicit in the creation of types of thinking they rejected (for example, compartmentalised thinking, or uncaring, self-interested thinking). They each, at different times, raised concerns which they had about their own decision making. For example, Jay, questioned her teaching of mathematics and Deekay, wondered whether reducing time spent on one topic (by not contextualising) for the sake of giving more time to focus on another topic was the most effective decision. Though not the focus of this study, such a self-reflective stance intertwines with the stance they encouraged in their students. Not only did they model critical reflection, they perhaps had greater understanding of and empathy for students engaged in such a practice. In addition, teachers were critical of the curricular and pedagogical boundaries placed upon their work with the students. Social, educational and school normative structures sometimes served to constrain their abilities to serve students in ways they perceived to be most beneficial. A critique of the experience of global educators within the education system is explored further in Chapter 6.

Finally, critical thinking was an orientation in each of their classrooms, embedded in almost every activity I witnessed or was told of. Students in Jay's class were given the opportunity to question each other's opinions on the topic of homelessness, and were encouraged to test different methods for calculating area rather than taking any formula on trust. Deekay's students questioned everything, from personal and social stances on LGBTQ issues to the school's role in influencing their opinions of the subject. Ella's classroom simulation required students to test conflicting opinions in dialogue. And Kasey's students were invited to explore the reasons for constructing knowledge in

particular ways and for particular behaviours. The "truth" was not provided; rather they engaged in its creation. This understanding of multiplicity develops an orientation toward critique of simple answers or single truths.

From a systems theoretical perspective, understanding that the study of the world necessitates the making of boundary judgements is key to a critical perspective. The nature and role of boundary judgements highlights the multiple identities of phenomena/systems under study, and perspective plays a role in that understanding as it is itself an inter-subjective phenomenon resulting from the interaction of the observer/subject with the phenomenon/system under study. All of this calls into question any claim to a single "truth" or "reality" – of the institutional system in which the teachers practice, in their own perception and judgement of their work, and in the nature of the ideas they explore in their classrooms. Such an understanding of the role of boundaries requires a questioning stance. This is at the heart of a critical perspective.

Justifying system boundaries.

In making transparent and questioning boundary judgements, Kasey was first of all engaging her students in the creation of knowledge, making it clear that there are multiple approaches to understanding (how flowers are drawn, whether student work is science or language, how the relationships between ideas can be represented). Further, she was helping to develop an understanding that knowledge is not something which exists, out there, waiting to be discovered, but rather is something to be created in interaction. This places responsibility on the students for the knowledge they create and for their subsequent behaviours. Knowledge and behaviour are relational in nature, related to the knower not only in terms of acknowledgment (I see the flower, it exists) but also in terms of action (my relationship to the flower creates it in this drawing I make, and the way I have chosen to create it has implications for what I do next).

It is in this notion of action and responsibility that Kasey's work with her students moved beyond the recognition of multiple understandings and truths. Kasey was introducing her students to a process of unfolding, which is the conscious consideration of decisions around where justification break-offs occur (Churchman, 1979; Ulrich, 1988). At what point are the boundaries set? And what is involved in this choice? How can such choices be made conscious and transparent? Ulrich (1988b, 1991) argued that

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there are both rational and moral judgements at work in such decisions. For example, the decision to walk quietly down the halls when other classes are in session is based on identifying a system of relationships (how we behave in social environments like the school). Included in that system is the goal of not disturbing others (based on practical recognition of shared space and optimising its use for all), as well as the criterion for successfully reaching that goal (walking down the halls quietly). Also included in the goal is the students' understanding of this system, and the reasons for their behaviour. Not included in this system – or at least, not stressed - is the requirement to follow rules or submit to authority. They have created a system, which they use to guide their behaviour, and have included in their creation both reason (to meet broader social goals) and values (to be personally responsible). This may not be the system identified by other teachers or students in the school, as is shown below.

The boundary judgements made by Kasey, which guided her and her students' behaviour, did not represent what appeared to be the judgements made by some in the school community. This became clear when she found a paper in her mailbox. It was a copy of the school rules, called Expectations for Students, and highlighted was the instruction that students should walk single-file down the hallway. The colleague who had put it in her box had not identified her or himself. Kasey had not asked her students to adhere to this rule; she felt that people outside of the school did not behave in this way so it seemed to her an arbitrary instruction and not necessary to the goal of not disturbing others. That goal could be achieved in different ways: by walking down the hall in single file or simply by walking down the hall quietly.

If someone in the school community identified the criterion for success of the system (relationship between students and the larger school community) as not only achieving the goal that the rules were meant to achieve, but also as following rules as a goal in itself, then there is conflict between Kasey's boundary judgements (and by extension, those of her students) and the judgements of that person. In order to address this conflict, that person's boundary judgements would have to be open to evaluation, so as to lay open their normative basis (Ulrich, 1991). This is the role of dialogue, but in this case there was no opportunity, as the individual did not engage. Where such conflicts may become more difficult is when there is a difference between the system identifiers/creators in terms of power or scale.

Kasey was made to feel the impact of creating a system different from one which was socially constructed and perhaps dominant, when she chose to read a book about war in her class. In the story, there was a war in a pond and a frog got blown up. The book was only pictures, and Kasey looked at the pictures with the students and asked them to guess what might be happening. At the time, she thought it was an appropriate book and her teaching strategy allowed the students to interpret it in a way that worked for them. But the reactions of some people around her made her doubt herself.

> And I had some parents, I had my own Dad, (saying) that's not what childhood is for, that's not what children should be doing in school. Why are you giving them these ideas? And my answer is, well, I'm not giving them ideas, these ideas exist and are happening. These things are happening and I'm making the world a little bit bigger and hopefully… (they are developing) some strategies to process some of this information in a structured, friendly, caring kind of way. But then I think, should I be bringing these kids down with war or poverty or some of these topics … and I do feel guilty for that. (Kasey, 05/03, 7)

She was visibly upset as she recounted this. Yet when I asked her whether the children were at all shocked by the story, or if war seemed to be a new concept for them, she said they already knew about it.

> They were fascinated. I don't think I totally scarred any of them but I did question that afterwards… They already knew (what war is). They knew the word even if they don't know what it is or what it has been, the associations that go with it. At least they knew the word and that it was associated with violence and death. (Kasey, 05/03, 7)

Although she defended her actions to those who questioned her judgement, and did feel that the children were learning, not something new, but rather how to talk about such topics, she still had the nagging feeling that she had done something wrong. The justification for such acts may not be enough to quiet the powerful voices of cultural and social beliefs.

Ackoff (1974) pointed out that both social systems and the parts of those systems (humans) are purposeful, but their purposes might not be the same. When the larger system does not serve the purposes of the parts, the result can be alienation or even revolt (Ackoff, 1974, p.11). Teachers who may be questioning the normative basis of boundary judgements with their students, could find themselves in a position of resistance, a stance that is difficult to maintain.

5.4.4. Summary thoughts on critical perspectives.

Although she might have found herself at times challenged and challenging the norms of her school or schooling in general, Kasey infused her practice with a questioning orientation, one which uncovered the boundary judgements and led to a more critical decision making process. She created meaningful systems out of meaningless (practicing spelling), arbitrary or suspect (control) systems (the school slogan, quiet hallway walk). The fact that a product of interacting systems may at times lead to conflicting goals was uncovered and discussed, and the students made their own judgements. Getting a pencil to finish your work was a goal of the individual, while respecting others' need for uninterrupted time to work was a goal of the class. Their knowledge was also recognised; that is, the assumption that children's knowledge is developed in schools was challenged. She chose to include in her class a topic which some considered inappropriate, judging that her students were familiar with the roles of power, greed and the settling of scores in human interaction through their lives on the playground, in their homes and communities. The critical awareness of boundary judgements that these practices entail highlighted Kasey's understanding that the goal of schooling is an exploration, not just of the ideal world, but of the experienced world. The critical orientation, modeled by Kasey, also led to the students' participation in evaluating boundary judgements, perhaps leading to the development of habits of thought, an expectation of multiplicity and meaning.

This suggests avenues for new research: are students developing such habits of thought through experiences like these? Do these habits follow them into other environments? And as to Kasey's understanding of her practices as a global educator, does she see any congruencies between her decision-making and the concept of

boundary judgements through which I have interpreted her experiences? Would other global educators?

There are risks in making decisions based upon a critical awareness of boundary judgements, for the students and for Kasey. What happens to students, accustomed to being responsible for their own behaviour, when they find themselves in situations where they are expected to follow rules without knowing the reasons for them or when the rules themselves are arbitrary? What happens when students are expected to give the 'correct' answer, when there is no recognition that there may be more than one? What happens when students find themselves in environments where questioning is not valued? What tools might they need to navigate the diverse expectations of behaviour they will meet?

For teachers such as Kasey, who resist dominant discourses, how do they cope with the pressures from school and community? What kind of supports do they receive? What kind of costs do they pay? How do they benefit? These are questions which are beyond the scope of this thesis, though systems theory might provide an effective framework for such investigations.

5.5. Conclusion

Drawing upon the systems theoretical concept of boundary judgements leads to an understanding of systems as created, both as concrete entities created through interaction, and as ideas created through identification. This places the individual in a position of having agency in multiple ways. As a framework for global education, it supports a version which not only highlights the need for change, it also provides possible means and consciousness of the responsibility to affect change.

The notion of open systems clarifies at the outset that living systems are not separate from their environment and that boundaries are created by observers for convenience. Thus, the environment of a system must be considered, even if it is not the focus. This allows for – even causes – the identification of problems or issues associated with the system. After all, it can be a connected system which experiences problems as a result of interaction with the system under investigation. Recognition of open systems

and associated boundary judgements, then, highlights both relationality and possible issues within or between systems. It points to where change might be needed.

The shifting of boundaries allows for the inclusion or exclusion of perspectives: of people, of subject areas, of levels in the hierarchy of complexity. It shows the multiple nature of knowledge of the world. Again, shifting causes problems to be highlighted and recognition of the need for change.

Interconnections and interdependence are identified through boundary shifting and this allows for the investigation of the mechanisms of relationship. Recognition of such mechanisms can point to patterns, homologies, and possible areas of leverage where change can be effective. Understanding of how relationships create behaviour can provide the means for change.

Learners are connected to the systems under investigation both concretely, through their roles as participants in systems (when boundaries are shifted to include them), and subjectively through their identification of system boundaries. This highlights the agency of the students, their ability to affect change. And it also points to individual responsibility; once their multiple roles in creating the systems which both support and harm are acknowledged, there is an obligation to justify that creation. To ignore this responsibility is to deny the relational nature of the world and their knowledge of it.

There are systems theoretical concepts that did not appear much or at all in the practices of the teachers I observed. Though there was vertical movement up the hierarchy of systems complexity, there was little horizontal movement. That is, though teachers moved from the level of individual to the level of social systems, I did not see the multiple types of system at that level of complexity (economic, political, cultural, technological, etc.). I also did not witness movement below the level of the individual (for example, biological systems). Nor was there evidence of the use of homologies to understand or compare systems behaviours. As well, there was little mention of the role of time in systems behaviours and in the changes systems might undergo, except in Jay's class, where it was briefly mentioned in regard to animal adaptations. Since the focus of this thesis is not the teachers' practices themselves, but is rather the concepts that their practices led me to, I did not inquire into why they might be missing. They are

useful to note, however, because these are areas where I did not find the practical examples of how they might be embedded into curriculum and pedagogy, and so offer another avenue for further research and development.

The teachers who participated in this study demonstrated, in a variety of ways, how the systems concept of boundary judgement can appear in the practice of a global approach, an approach which supports a transformative global education. They also shared some of the struggles they faced within the larger education system. As they and their classrooms constitute open systems, it is appropriate, given the nature of this discussion, to consider the relationship between the teachers and their environment. To that end, the next chapter describes the ways the teachers who participated in this study perceived some of the conflicts they faced within the education system. And, most relevant to this thesis, they framed their perceptions and concerns in systems theoretical terms.

6.   Global Educators within Systems

In the previous chapter, I explored the ways in which global education practices in the classroom can be understood in terms of systems theory. The focus has been epistemological: the ways that knowledge is constructed in the classroom, and the implications of that on what knowledge is constructed. In this chapter, I am shifting the focus away from the knowledge construction in classrooms to the learning communities themselves as the phenomenon of exploration; that is the teachers, their students, their classrooms and the school and education systems that constitute their environments.

This might be considered a divergence from the questions of this study, which are concerned with how systems theoretical concepts are embedded in global education practice. However, there is a clear connection; after all, the practice of global education does not occur in a vacuum. It is an open system nested within multiple larger and more complex systems: institutional, political, social, overlapping in multiple ways and represented in the students, the parents, the school administrations and in the teachers themselves. The impacts of those larger systems can be seen in the topics that educators explore with their students (for example, LGBTQ issues, drinking and driving), as well as in the ways teachers evaluate their own pedagogy (comparing themselves to external standards of grade requirements and social expectations) and in their need to constantly negotiate between their goals for their students and an environment which they may perceive as not supporting those goals.

Furthermore, to focus on how the concepts inform practice without consideration for the environment within which the practice of global education occurs would be an example of the environmental fallacy identified by Churchman (1979) and explored in critical systems theory (see, for example, Ulrich, 1991). To argue for the recognition of boundary judgements and the need to justify them requires that I justify them myself.

Another reason for the importance of this chapter comes from the experiences of the teachers themselves; the most common challenge they faced (a focus of many of

our discussions) came from their environment as manifest in student, institutional, and social discourses and practices. The ways that the environment emerged in our collaborations came as a surprise. I had expected global educators to face direct struggles in trying to teach across curriculum, that they would find it difficult to challenge the compartmentalisation of knowledge that is the norm in schools. This was not the case however; the struggles were much more concrete and the messages which they felt conflicted with their goals for their students were embedded in places which were unexpected to me. It was necessary, both for myself and for the teachers, that their relationship with the environment in which they practiced be explored.

This chapter describes issues teachers had with the structures of space and the organisation of time within which they practiced. Teachers' impressions and my own point to some of the unintended behaviours within the education system, as well as the differences the teachers perceived in their priorities and those of the decision makers or system designers. The tension between the goals of the larger system and those of teachers aligns with the critique of current education systems appearing in the more radical or transformative version global education.

This chapter is not meant to be a comprehensive examination of the multiple ways physical design, timetables and institutional behaviours impact teachers' or students' learning experiences. Rather, it is an attempt to interpret the ways, from the teachers' perspectives, school systems created unintended consequences and the ways the goals of teachers and institutions were perceived to conflict, and the impact this may have on teachers. From their vantage point, the idea that student learning is the first consideration of all stakeholders in education comes into question. As Meadows (2008) contended, "purposes are deduced from behaviour, not from rhetoric or stated goals" (p.14) and in the cases of these global educators, the behaviour of the school system that structured space and time in specific ways suggested purposes of schooling that were different from their own.

6.1.1.   *The place of teaching and learning: Physical space.*

Because I had adopted a strategy of 'sweeping in' advocated by Churchman (1979), I included in my observations the school structure and atmosphere, and the

layout and design of the classrooms. This drew my attention to the way the physical structure of the classrooms was shaped by teachers and how that same structure shaped the teachers' practices. Striking in this regard were the differences between elementary schools and secondary schools I visited.

The atmosphere of the classrooms in both elementary schools I visited was warm and inviting. The students' coats and bags were stored in the rooms and they could keep supplies in their desks. The desks were arranged in pods and there were break out spaces in each room: Kasey had a carpet area where students gathered for calendar work, stories, and discussions; Jay had a sink next to the door where science experiments could be conducted. In both classrooms there were places for individual students to work, and places for partners or groups to gather. The furniture allowed for multiple arrangements (single desk, two desks pushed together, groups of desks making a pod). In both rooms, student work adorned the walls. Each room had a library of books available to the students, and there were spaces where student resource materials were stored. These students had ownership of their rooms. They could store their 'stuff', display their achievements, and arrange the components to suit their needs. There was a palpable sense of community and comfort in both classrooms; the students were not just visitors to these rooms, it was their place.

The teachers tried to use the space available to them as much as they could, both because of the opportunities it provided, but also, according to the teachers, to acknowledge students' bodies and need to move. Kasey's grade 1 / 2 class moved around the room throughout the day. They utilised all of the areas of the room, and used the outdoor space for learning as well. They were not expected to spend long periods of time remaining seated at their desks. In Jay's grade 6 class, they began their unit on biomes by spending time in the forest next to the school. They made use of breakout spaces in the classroom and in the library next door when they moved into groups. Their place and their relation to it were explored, both in terms of their physical location (in the forest and in the classroom), but also in terms of their relationship to it. They discussed how they contribute to (and thus create) their outdoor space (the biome) while sitting in a classroom, the walls and surfaces of which were covered with their artwork and the products of their studies.

The physical spaces of the elementary classrooms and schools were a sharp contrast to the spaces and their use in the secondary schools I visited. Deekay's classroom was in an older school. It contained two teacher's desks (it was a shared space), filing cabinets, a cupboard and a bulletin board filled one wall. Another wall had a whiteboard mostly hidden by the AV equipment on stands placed in front of it. With the variety of equipment and 'stuff' stacked in the room, it seemed storage was an issue. There were six sets of tables in the room: one long one between the teachers' desks with the chairs facing the white board, their backs to the windows; the others were arranged in a horseshoe facing another whiteboard. Though there were posters on the walls, they belonged to the teachers; they were not the students' work. I felt that the atmosphere of the space was cluttered and old, but it was still friendly; stacks of books and a hodgepodge of AV equipment gave it a distinctly lived in feeling. However, there was very little space to navigate between tables, cabinets, and equipment, and when the students entered the class, with their bags and books, there was a feeling of being crowded.

In Ella's classroom, the situation felt a little bleaker. Because it was a new school building, the teachers were not allowed to put anything on the walls. My impression was that the room was a space almost devoid of passion, imagination, and creativity. There was nothing to break up the bare spaces of the dark brownish grey bare walls, which felt oppressive, towering over the class, perhaps the effect of a long narrow room with high ceilings. Ella likened it to an airplane. What might have been airy appeared ponderous, heavy. Like Deekay's room, there were two teachers' desks, as the room was shared. The student desks were arranged in long rows. Ella had plans to change the space, make it more inviting, but the design of the room made it difficult. Again, it was very crowded – there was little space between the rows of desks. When the students entered with their backpacks, it became almost impossible to move, as their bags did not fit under the desks, but instead clogged the aisles.

Ella explained that when the new building was designed, the teachers were not consulted much - and the students were not consulted at all. The bookshelves were attached without her input. They only received one bulletin board for the room – the only place to display anything. Even the placement of the white boards was a problem.

All the new rooms were like that. We were all so disappointed. My colleagues were saying, we feel like we have to stand in the middle of the room, otherwise it's like a bowling alley. It's really not a nice situation. When we complained about it, well you can tell a teacher didn't design this room. We have no say over that. They consulted us definitely about some things, but not about lots of things. Really practical things, like where the boards go, they never came and talked to us. They're all way to high. I am a tall woman. We have many women on staff who are much shorter than I am. (Ella, 26/04, 8)

Ella walked to the board and showed me - there was thirty centimetres of space between her raised hand and the top of the board, representing a significant amount of wasted space.

Both Deekay and Ella asked their students to move at different points during their lessons; there was not much space for movement, but the students worked around this. They moved into groups for different activities – in Deekay's classroom, because of the tables, it was a little easier. In Ella's classroom, however, the type of desks (one piece with seat and small table top) made it impossible to fit them together to make a shared workspace. In any case, the lack of available space would have made moving the desks very difficult. Despite the crowding, the teachers incorporated movement into their lessons, requiring students to stand for presentations and providing brief breaks in the middle of class, for physical and mental refreshment. They each found ways to make their spaces work for their students and acknowledge their physical needs. The body was not just a transportation device for their brains.

The secondary school teachers experienced problems with the physical environment in three ways. First, the impact of crowding in the classroom on students was a concern. Constraints on teachers' ability to include the kind of activities they would like in their classes, coupled with the feeling of being overcrowded, might have negative impacts on students. Second, the teachers' decision-making was affected because the lack of space in their classrooms and its impact on student mobility served to determine to some extent what teachers could do, what variety of activities they could include in the class. The potentially negative impacts on students and teachers speak to a number of

decisions which are not made by teachers: decisions about class size, room size, amount and type of furniture in the rooms, and storage options in the school and the classroom. The lack of teachers' input (and students' input) into design decisions, then, was a third area of concern.

The role physical space and its use played in shaping curricular and pedagogical decisions was further complicated by the prescriptive role of curricular "schedules" and goals, timetables, and the association between learning and time limits; that is, the way time constructed classroom activity.

6.1.2. The time of teaching and learning: Coverage, timetables, and how learning is shaped.

Unlike the stark differences between the elementary and secondary classrooms I visited regarding how physical space was structured, the influence of how time was structured appeared in all of the classrooms, though there were differences in intensity. The elementary and secondary school teachers shared concerns about covering the curriculum and about the effect of interruptions on student learning. There was, though, a purposeful relationship between elementary and secondary in regards to time limits and learning; that is, it seemed that amongst the goals of the elementary school classes was the preparation of students to focus their attention within the confines of time limits.

Covering the curriculum

The pressure to ensure that the curriculum was covered was present in each of the classrooms I visited. Even in the elementary schools, where there were no standardised exams looming at the near future, there was a growing sense of urgency; less in Kasey's grade 1/2 class (though still present) and increasing in Jay's grade 6 class. In fact, time seemed to be a constant challenge for Jay. She was required to teach a wide variety of topics within six general subject areas (mathematics, language arts, science, social studies, physical education and art). She was aware that students might not be learning as much as she hoped, that more time might be the difference between real understanding (and long-term retention) and just learning enough to complete the task or demonstrate some knowledge, and little or no retention of the learning. So she

found herself regularly having to balance depth of understanding and 'covering' the prescribed curriculum.

> I think it's because I feel like I have so much to cover, often I spend two weeks on one unit, and this makes me not get through the entire math curriculum. So I think that's what holds me back from going a broader approach and then narrowing it down and figuring it out. Because I feel as much as I would love to focus on area for a month, I know I can't do that. (Jay, 14/04,23)

While it might be argued that, as there were no standardized tests for grade 6, she could skip some topics and spend more time on others, this would require that she ignore the curriculum design which assumes a vertical integration; the skills and knowledge learned in one year are required for the work of the next year which will build upon them. However, there was some question as to whether this vertical integration actually achieved the effect it was designed to. If students easily forgot what they had learned in the previous year, then the teacher had to give time to revisit the topic or review the skills anyway. Had any time actually been saved?

> So many times I'm teaching the same things that they were taught last year but they're not remembering it. Do you know what I mean? Last year they did perimeter, area and volume. Yet they come in here every year and I feel like I'm starting from scratch. So we are doing (something) wrong somewhere along the line. (Jay, 14/4, 23)

Even if she decided that the students' learning within her class was more valuable than what they might (or might not) need to know for next year, if she questioned the efficacy of this vertical integration and decided to resist the determinism of the larger system, she had to consider the expectations of the students' future teachers. They worked within the same system, and they would (very reasonably) argue that they had a right to expect her to cover all of the material assigned to her grade level. She was, after all, a member of a community. To change the behaviour of one part of the system is to affect all parts of the system.

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And I feel like it has to be a complete system change in order for it to function properly. If the grades 1, 2, 3, 4, 5 teachers are doing it in a certain way, and I come in and say, you know what, I'm going to spend three months on measurement so that they get it, they can understand it, they'll remember it for the rest of their lives, and then they go on to grade 7 and it's different. So that's where I feel like I am pressured in the system… So I feel like it's such a big system and there's so many parts to it that you have to follow. (Jay, 14/04, 23)

Covering the curriculum was also a concern in the secondary classrooms I visited, even in the stand-alone course, which does not have a next level in the following year. Deekay still felt pressure to cover the content prescribed in the curriculum - a curriculum she herself had helped to write!

You need to spend the time getting set up so that it has more meaning later. But there's this time stress of 'I have to get through this' every day because we don't have a lot of time left and there's lots of things we haven't covered that I would like to have covered. But the other side is, well, you do less and you do it more in depth. (Deekay, 19/05, 1)

The need for coverage seemed to be internalised to such an extent that, even when the external demands of the system did not require it, the feeling of being pressed to complete some prescribed list of topics remained. The pressure to cover curriculum, then, may come not only from external forces, but from internal ones as well. Yet teachers may have some power in this regard: Ella's students had recently completed their provincial exam in English, and when she discussed with them the next topic they would be exploring in class, she referred to the flexibility they now had, since the exam was past. She had made a conscious decision to slow down, to reduce "coverage" as she had become aware that she had not been taking the time to revisit learning, to give the students a chance to understand, to absorb ideas. This meant that she had assigned more time for the study of Julius Caesar, but had omitted one major novel study from the curriculum. She felt supported in this decision by the district superintendent's call for a

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greater emphasis on depth than on breadth. Ella's decision to resist the pressure to cover did receive some tangible support from within the system.

Schedules and interruptions.

There was a second way that time became an issue for the teachers. Because of class and school schedules, student study was regulated by the clock. Learning activities began and ended with a bell or buzzer. For the secondary school teachers, this meant that they saw the students in the class I visited two to four times a week for seventy-five to eighty minutes at a time, which sometimes seemed less than ideal to support the depth of thought and concentration the teachers wanted to foster. For example, after my first visit to Ella's grade 10 English class, I noted,

> This class went amazingly quickly and only meets twice a week. Not much time. All she managed were seven presentations and one group activity, some whole class discussion about assignments, not about content. (Field notes, 19/04)

The eighty minute block for the class was not optimal according to Ella. In addition, the schedule was such that her English class always met in the afternoon, when they had lost energy and found it difficult to concentrate for such a length of time.

> After an hour, they're done… So it's really hard. We're losing time because they crash. They've lost it. You don't have their active attention like you do in the beginning. So most of us know and that's how we're teaching now. Forty five minutes at the beginning, and then you have to coast a little bit. So sometimes you use the last 20 minutes for homework… they need to get up and move. That's why I always try to build in some movement in the class. (Ella, 19/04, 6)

Deekay, too, built some movement or pauses into her class time, often giving a two-minute break in the middle. This happened naturally, when they were ready to move to the next step in their explorations (change from one activity to another, or when one conversation died down and the next looked set to begin). Deekay chose when, or even if, a short break was necessary.

Though they, too, had to deal with the division of the day into blocks of time, the elementary school teachers had greater flexibility than the secondary school teachers when it came to timetables because they stayed with the students almost all day and taught them most of the subjects. For example, Kasey moved things around and added time to tasks when she felt it was needed. Moreover, the school where Kasey was teaching was a little different from others. There were no bells or buzzers to interrupt the day. Rather, when recess or lunch time approached, teachers began to wrap up activities and students were sent outside when the class was ready. This meant that some might be out a little earlier than others; some might be out a little later. It was assumed that it all balanced out. As well, when it was time for classes to begin again, students tore around the playground with hand-bells. This was apparently a sought after job. It made for a much softer imposition of school day schedules than is the case in other schools, where harsh and abrasive buzzers may interrupt every class at pre-set times, regardless of what students might be engaged in.

Jay also had some flexibility in her grade 6 teaching schedule, but less than Kasey. Her class' daily timetable required that she give time to particular subjects each day, for example, physical activity, Language Arts (reading and writing), Mathematics and Science or Social Studies. Should Jay decide that it would not be beneficial to interrupt the students as they concentrated on one particular topic or skill practice, she could choose to let the students continue, ignoring her timetable and sacrificing one lesson in another subject (always keeping in mind the need to 'cover' the whole curriculum.) What she could not do was decide when the students should take a recess or lunch break, leave the class for club or sports activities, or take advantage of the librarian's school visits to check out or return books.

I witnessed an example of this on one of my visits to the class. The students were engaged in a jigsaw activity, sharing the results of their science experiments with different groups, and they had not quite finished when the recess bell interrupted them. Half an hour later, after recess and the school-wide walk (a daily physical activity the whole school took part in) the students had clearly lost their trains of thought. Jay then had to devote some time to helping them review what they had already learned in their groups and (hopefully) recapture any ideas they had had while they were sharing results earlier, before asking those who had not yet had a chance to report on their

experiments. All of this meant that the math lesson that followed was significantly shorter than she had planned.

> And it's those times when you're doing something really cool and they're all in to it, and you think, you know what? These kids don't need a break right now. And then you start to see all the kids outside, and it's recess, it's 10:15, we gotta go we gotta go, and you lose them. If it was a situation where, every day (recess) was a different time… it wouldn't be such a big deal. And they (would) realize when there's something really exciting we keep doing it, and when we need a break, we go have a break. (Jay, 15/04, 10)

Her response to interruptions like recess was to always ask the students to regroup and spend a little time reviewing together before moving on in their work. This, she hoped, would give them the chance to recall any ideas or lines of thought that they may have been following before the interruption occurred. This also meant that more time was taken from an already full schedule.

The secondary school teachers experienced the same types of interruptions (break time, lunch time, students called out for sport meetings or events) with the added complication of students changing classes at set times, regardless of what they were engaged in or how engaged they were. Organising time is a challenge within any educational community, since different priorities take precedence (for example, library time) or it must be ensured that students do have down time, time to eat, time for extra-curricular activities. But when interruptions occur every day, several times a day, teachers might begin to feel like learning is not always the priority in the system, or at least any learning that requires sustained thought and/or activity. Though they may have been the thoughts of the moment, the teachers did share such perceptions.

My visit to Ella's class provides perhaps an extreme example of the types and frequency of interruptions which can occur, though Ella felt her experience was not unusual. First, there was a loudspeaker in her classroom, which did, when I was there, interrupt everyone's work while class was in session in order to address a few people. This became even worse after school, when teachers were working or in meetings,

when students were studying, getting extra help or having club meetings. Then the loudspeaker interruptions were almost every five minutes - and it was unbelievably loud. Second, there was also a telephone in the classroom which might interrupt the lesson. Though this did not happen while I was there, Ella assured me that it occasionally did ring during lessons. As a rule, she did not answer it when class was in session, but the ringing would still serve to disrupt and possibly derail promising lines of inquiry. Third, I saw students leave in the middle of class for sports events, which disrupted not only individual learning but also any group activities.

The fourth example involved a visit from an administrator, which occurred during my second day of observations. He had come to talk to Ella about maintenance on a blind which covered a window to a hallway (next to the door). There were, it seemed, ongoing concerns about theft at the school, and they liked to keep windows covered. The doorknob was also loose. When he came to the door, the students were engaged in group work, and Ella was easily able to leave them and go talk to him.

In my field notes I wrote:

How weird is it that this guy comes in the middle of a class to discuss such a thing? Note his walkie-talkie - very much looking like a security guard rather than an educator. (Field notes, 21/04)

I wondered whether he would have felt it appropriate to interrupt Ella to ask about maintenance if she had been engaged in didactic instruction or been leading a discussion. Ella felt that, though he would have been polite, he would have done so.

The number, variety and frequency of interruptions which seemed to constitute a normal part of the teachers' days were accepted by the teachers, but not very happily. They felt that the priority shifted away from learning too often.

Timed tasks and the focus on right answers.

The impact of time on curricular (not enough time to cover everything!) and on pedagogical (how to create and maintain engagement) decisions seemed to have a secondary effect – one also associated with the structure of schooling in terms of pre-set

ends, right answers, and standardised exams. That is, the way time was structured in and structured schooling influenced the nature of learning as well.

In my observations in the secondary schools, it seemed to me that, for the students, learning was associated with discrete tasks which were valued mainly in terms of the "right answer" and by extension, the grade received. Learning was seen to have an end which could be evaluated; learning happened in chunks, in blocks, which, when finished, could be put aside (or forgotten) so that attention could be paid to new blocks. During my observations of Ella's class, I noted that whenever students completed a particular task or were between activities (Ella setting up for the next activity for example), I did not once hear the students discussing the topic they were studying in that class. They immediately switched to social topics. The 'learning' was finished. Similarly, in Deekay's grade 12 class, there were several instances of students 'answering' the question in their groups (i.e. determining what the right answer was) and then chatting about their lives. This happened despite the open-ended nature of the questions or Deekay's assurance that there was no right answer.

The teachers shared this perception. Ella noted, when commenting upon the way her students engaged in activities,

> The kids are sucked into "this is the only way". I teach seniors, and by the time I get them they are set in their ways. They're like little old people. (Ella, 15/03, 7)

In what ways might education systems create these behaviours, create "little old people"?

Though my experience in the elementary classrooms was quite different in that the students seemed much more willing to follow a train of thought and were much slower to switch to a new topic, the seeds might have been planted for these future behaviours to grow. Elementary school teachers were preparing students for what they would experience when they reached secondary school. As has been described above, though she was flexible, Jay did put time limits on activities and subject focuses. Even at the Grade 1-2 level, Kasey introduced the students to the idea that learning occurs within specified times. Subject areas were clearly defined with the "Shape of the Day"

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schedule on the whiteboard every morning. As well, a large hourglass let students know that the thinking and activity of learning was compartmentalised not only in content but also in duration. The clear distinctions between subjects and the time devoted to each became more set as students moved to the senior grades of elementary. In secondary the idea that learning was a time regulated activity seemed to be the norm.

The teachers pointed out that there were benefits to timing activities and scheduling subjects in time blocks. For example, students explore a variety of subjects through the day, they might be less likely to become disengaged when there is a change of focus, and they may learn that there are, indeed, limits to the amount of time people can typically spend upon one task. Perhaps they also learn to manage their time. But the teachers also highlighted the possibility that, when activities are timed, when learning is associated with discrete tasks, then the focus may become outcomes and right answers. And the behaviours they witnessed might be the unintended consequences when conditions do not encourage curiosity, inquiry, and questioning the very notion of the "right answer".

6.1.3. *Discussion: Unintended systems behaviours and conflicting goals.*

Global education proponents have noted the difficulty teachers face in enacting a global approach in their classrooms. Marshall (2007b) pointed out that:

It is widely known that where curriculum subjects (at least those that are more dominant in the school curriculum) are forms of selected knowledge, tightly bounded and intimately aligned to an examination form of assessment, alternative interdisciplinary curriculum forms that emphasise horizontal learning come up against fundamental obstacles. (p.45)

Such obstacles might be in teachers' ability to integrate curricula or to acknowledge ambiguity and uncertainty. It might also appear in the physical structure of the school which may not create an environment supportive of the development of classroom community, a characteristic goal of global education (Pike & Selby, 1988,

1999). In addition, the larger school system might have an unintended impact on student learning. As Pike and Selby (1988) noted:

> There is plenty of evidence to suggest that… the rampant curiosity and enthusiasm for learning of the five year old is slowly but surely subdued during a rigid process designed to convert unruly raw material into neat and tidy finished products. (p.39)

The teachers who participated in this study were keenly aware of the constraints placed on their decision-making by some aspects of the school system and the associated negative impacts on students. When we discussed specific problems they faced, they described them in systemic terms. Some problems were framed as unintended consequences of the system. For example, standardised exams and the vertical hierarchy of grade levels demanded that teachers 'cover' material in preparation; some of the interruptions during class resulted from trying to support students (academic assistance) or from giving students opportunities (sports activities). The students' behaviours in some learning activities, focused on right answers within a given time, might be a result of structures intended to support diverse learning opportunities. Other problems were described in terms of the goals of decision makers, which the teachers perceived as different from their own: cost-savings guided school building design decisions; class interruptions for administrative matters showed the priority was not always on learning; the standardised exams as a design decision.

Unintended consequences of design, also known as emergent behaviour, are a common concern of system designers and system analysts. They are a product of the relationship between parts of the system (Georgiou, 2007), but whether or not they are considered problematic may depend upon the stakeholder. In some cases, an unintended consequence can be viewed by most actors within a system as problematic. For example, it is likely that few stakeholders would want to devalue open-ended, curiosity-driven inquiry, or would consider learning to be time dependent or ever "finished". Yet, the way time functioned in the classrooms, both in terms of how it was structured in curriculum and was destructured through interruption (subject changes, classroom changes, random interruptions), suggested to the teachers that student

learning was not just organised but, in a profound way, shaped by time. Could it be that when time is structured in such ways, especially when it is coupled with pre-set answers and grades, it not only determines when and for how long we learn, but also how and what we learn? When students are given a task and a length of time to complete it, to engage in learning and then demonstrate that learning at the end of the pre-determined time, they may immediately search for the answer and then stop; after all, if there is a set time, it must be expected that the answer would be found within it. And when the grade is the focus, and that grade is determined by a "right" answer, what need is there to do more? The unintended consequence of the way time is structured within schools, in its interaction with the focus on grades, may result in the development of a habit of mind whereby learning is associated with ends-driven, discrete tasks. For these teachers (and perhaps any educators), this was a problem.

This kind of emergent behaviour may be an example of what Ackoff (1998) called doing the wrong thing better. If the goal is better grades, then this could be considered both efficient and effective. However, if knowledge is not a function of 'right' answers, if learning is the goal, then this structure is not effective, it is only efficient. Effectiveness, however, is a value judgement. As Ackoff noted,

> Efficiency is a measure of how well resources are used to achieve ends; it is value-free. Effectiveness is efficiency weighted by the values of the ends achieved; it is value-full... For example, the more efficient our automobiles have become, the more of them there are on city streets. The more of them on city streets, the more congestion there is. The efficiency of an act can be determined without reference to those affected by it. Not so for effectiveness. It is necessarily personal. The value of an act may be, and usually is, quite different for different individuals. (Ackoff, 1998, p.25)

If achieving high grades on standardised exams after twelve years of schooling is the goal, then the system should ensure that students learn in class to provide the answers which will be on those exams, to absorb pre-set answers in a given amount of time and then regurgitate them. This can easily be measured at the end. Yet, as Ackoff

said, whether this is effective depends upon the individual point of view. And in the case of these teachers, there is some doubt as to whether the current system is the most effective in terms of learning.

Since social systems are purposeful, and the parts of those systems (humans) have purposes of their own, when the larger system does not serve the purposes of the parts, the result is what Ackoff (1974) called the humanisation problem. In these cases, the people in the system can feel alienated from the larger system, leading to resistance and perhaps revolt. When the teachers discussed the challenges they faced within the areas of physical space and time structures, they seemed to be more resigned to those they considered to be unintended or emergent behaviours, perhaps not desired by anyone, but endured. However, when they perceived the problem as resulting from the decision makers having different goals and not caring about the teachers' goals, their attitudes were not forgiving; rather, they were angry. In their discussion of how organisations achieve effective social integration, Gharajedaghi and Geranmayeh (1992) pointed out that:

> The effectiveness of an organisation as a voluntary association of purposeful systems, depends on the degree of commitment of its members and on their sense of belonging… alienation is a serious obstruction to an organisation's development, a constant threat to long-term viability. (p.170)

To address the environmental problem, Ackoff (1974) suggested organisational changes which would increase the participation of all levels of the hierarchy in decision making. Similarly, Gharajedaghi and Geranmayeh (1992) called for a continual re-creation, between different levels of a social organisation, of compatibility of performance criteria; that is, how effective systems' functioning is determined. The alternative is frustration and recurring dilemmas.

As Meadows (2008) pointed out, the purposes of a system are "deduced from behaviour, not from rhetoric or stated goals" (p.14). If it appears to teachers that decisions are made with cost or efficiency as the primary criteria, then the behaviour of the system indicates that learning is not the goal. The teachers who participated in this

study found themselves, in some situations, to be directly at odds with the larger system, making their jobs more difficult, and perhaps creating a less effective education system.

6.2. Conclusion

The challenges the teachers encountered were not specific to global educators. Any teacher might find crowding or poor physical design to be problematic, and interruptions could interfere with any teachers' efforts to encourage concentrated attention. It seemed to these teachers that some of these may have been considered unintended consequences while others seemed to result from a difference between their values and goals and those of decision makers. The teachers, then, worked in environments where they felt both the frustrations associated with any work environment, as well as the alienation that resulted from perceiving that their goals as teachers were not shared by decision makers, and that they were not consulted in decisions which affected them. Compounding this was the difficulty faced when the system in which they practiced seemed to actively work against their understanding of knowledge and learning as open-ended and relational.

To what extent might the pressures of 'covering' the curriculum impact a teacher's ability to take a systems approach to teaching and learning? The structure of the curriculum reflects a reductionist view of knowledge: compartmentalized into separate subject areas, requiring that learning occur as a step by step process focusing on the parts in order to (presumably) comprehend the whole (Doll, 1987). Add to this the notion that learning should occur within particular time periods for the entire group, as evidenced by grade levels organized by age rather than knowledge, as well as the Prescribed Learning Outcomes of the provincial curriculum, report cards and standardized tests. And how might teachers cope with the alienation that may result from perceiving that they do not share the purposes of the system in which they practice? How might secondary school teachers, in particular, motivate students to explore open-ended questions and resist the training (to find the "right answer") they may have experienced? These questions offer potential for further research.

In the case of these teachers, they had found some ways to navigate within these structures. The secondary school teachers consistently required their students to move around the room during class time and included regular group activities, despite the constraints of room crowding. They explained that this reflected their acknowledgment of the whole student, not just their heads, as well as their desire to develop classroom communities through student interaction. All of the teachers reported making decisions to revisit content when they found their students needed more time or to slow down when the topic demanded it, even if this was at the expense of other content that needed to be 'covered'. Jay, for example, gave time for students to review when they were interrupted, and Deekay explored topics with her students in ways that acknowledged the contextualised and multi-layered nature of knowledge, or from a systems perspective, its relational and embedded nature. The teachers did not make such decisions easily, however; they each shared their concerns about the time they might be giving up to do this, questioning whether they were doing the right thing for their students.

A less difficult decision was in regards to their openness with their students about the goals of classroom activities. Kasey made it clear that there were reasons for the behaviours they were practicing, and following the rules was not the primary goal. Ella made the goals of rewriting exams and choosing to spend more time on a novel study transparent: the first was for improving grades and the second was for exploring the novel and its themes. The openness with their students provided models of behaviour and created the kind of relationships they felt might mitigate the negative effects of a school system they perceived as having different goals than their own.

All of the teachers also reported that they turned to relationships developed with colleagues, participating in professional development opportunities to provide support, guidance and affirmation.

All of these ways that the teachers interacted in their classrooms and communities offer possibilities for change. From a systems perspective, their consistent questioning of their own goals as well as those of the systems in which they were embedded suggests that they may continue to justify their own boundary judgements and look to others to do the same. The transparent justification of boundary judgements

creates possibilities for changing their own values and beliefs. In addition, systems theory would suggest that their behaviour in their classrooms and their interactions with colleagues had impacts on those round them; they modelled the habits of thought that they wanted their students to develop, and shared their perspectives with colleagues. It might be that, over time, the multiple effects they had on others' thinking will contribute to changes in the way education is viewed and in the education system itself.

7.   Conclusions

Having described the findings of this study and discussed my interpretation of their meaning for global education, I will now return to the initial questions and review the investigation that was generated by them. My work began with a desire to promote a global education which seeks to maximise student agency to create a more socially and environmentally just world, and this study provided one way to support this goal. Global education should provide an approach, applicable across curricular lines, which would serve to support these social justice goals. I wanted to further embed global education (or find embedded within it) epistemological concepts which would nurture the transformative version of global education. Systems theory seemed to provide such a philosophy; concerned with wholes and holism, systems theory requires recognition of interconnection and interdependence, and of the role of perspective in making boundary judgements, thus determining the identity of the system. Similarly, in global education, key components include relations between people and planet, and awareness of global perspectives both in terms of the whole planet and also in the multiple lives which make up the planet. This 'big picture' idea underlies and encompasses both global education and systems theory. However, when the ideas are explored in depth, do systems theory concepts still complement global education?

At the start of this study, I wanted to investigate whether systems theory concepts could serve as an effective theoretical framework for a transformative global education, in what ways it could provide a conceptual foundation for scholarship and practice of global education. I also wanted to investigate whether and how global education teachers could enact such an approach in their classrooms. Through the exploration of the systems theory concepts contributed by its early developers, and those concepts developed within management science and operations research, coupled with the practice of global education by committed global educators, this thesis suggests that there is the potential for systems theory to provide an effective theoretical framework for the key ideas and practices of holism, interconnection and

interdependence, multiple perspectives, and critical mindedness in a transformative global education. Among the teachers who participated in this study, it appeared that systems theory concepts were already embedded in their practices at varying levels.

In this chapter, I begin with the environment of a transformative global education and how concepts of systems theory affect the understanding of knowledge and its relationship to change. This leads to a review of the key global education concepts and how they can be informed by systems theory. I will also highlight the practices that can be associated with those concepts, as demonstrated by the global educators who participated in this study.

7.1. Knowledge and change

In this study, systems theory provided a sound justification for a transformative global education, embedded in knowledge of relationships with/in the world and the means by which that knowledge is created. It does so through the knowledge that the systems under study are created in the interaction of the elements or sub-systems that make them up, as is explicated in the systems theoretical literature. This provides the opportunity to discover how the world works and why we have the issues that we face. This explains, as well, how people create and maintain systems which benefit some and harm others. In classrooms, it can be used to graphically demonstrate how teachers and students are part of the systems around them. Understanding how systems work in the world can show students that systems can be changed, how they can be changed and how their own actions might contribute to that change.

Through systems theory, knowledge can itself be understood as created through interaction: between idea and experience, between system, elements and environment, between goals at different systems levels, and between the perspectives of all stakeholders in a system. In this way, knowledge is conceived of as multiple, messy, and dynamic, just as the systems explored are multiple, messy and dynamic. When it is recognised that the individual develops knowledge through interaction with their world, not just as a passive receiver or sponge but as an active decision maker through boundary judgements, the responsibility for how the world is understood is placed on

both the individual and that interaction; their role is not just as observer, it is as creator. Again, in the case of global education classrooms, the teachers' and the students' act of learning creates the opportunities for change in the world.

The teachers who participated in this study demonstrated some possibilities for enacting a transformative global education embedded in systems theory. They also helped me to imagine the potential tools global educators could use to infuse their practice with this understanding. This is outlined in the review of key global education concepts below and in Table 7.1.

Holism.

Global education is generally characterised as being oriented toward a view of the world as one system (Pike, 2000a; Mundy et al., 2007). This is the beginning for global education – indeed it may be the reason for the word 'global' in the name. The focus on global issues in global education is both a cause and effect of this whole world orientation. To explore global issues is to include a planetary focus, and to include a planetary focus is to explore that which the world shares, including the problems.

Similarly, in systems theory, the beginning is with the whole. Indeed, the system identity as a 'system' emerges at the same time as the relations within are identified (von Bertalanffy, 1968; Georgiou, 2007). However, that identification of a system as a system is understood within the context of an environment, and in an open system, where there is an exchange between system and environment, to identify the system is to focus on a particular behaviour or set of relationships. That identification is always a decision. That is, systems are nested in hierarchies of increasing (or decreasing) complexity. Animal behaviours or characteristics can be identified as a function of their species identity by choosing to place a boundary in a particular place, around a particular set of relationships. Expanding that boundary to include the environment leads to the identification of a different system and behaviour: the biome and animal adaptation. Narrowing the focus leads to a different system again: a single animal and its behaviours or characteristics. Similarly, a human activity system or ecosystem can be understood as a sub-system in a larger system, or as a system made up of multiple sub-systems.

A systems approach to inquiry is to begin with the whole system, to identify its behaviour in its environment, to explore the systems dynamics in order to understand why it behaves this way; this is the synthesis process described by Skyttner (2005). A global educator begins with the world as one system and explores how the interactions within that system create interconnections and interdependencies between and among peoples and environments.

Expressions of such a holistic / planet focused understanding in practice can be found in the "how" of teaching, in how curriculum is structured. When global education teachers begin with the whole they immediately situate the phenomenon under study within lived experience, within the world that students themselves experience. Our experience of the world is not compartmentalised or linear, nor need our learning about the world be compartmentalised and linear. Within the classroom, moving back and forth between environments to systems to sub-systems is reflective of the nested, dynamic complexes which we study, which interact in multiple ways. When global educators' practice includes beginning with the whole, then the understanding that there is a whole, that systems are nested, that the unit of study has an environment with which it interacts, becomes part of students' perception. Thus, even when the means of study is analytic or when the phenomenon is reduced through boundary identification, students can recognise that this is for convenience rather than because this is the only way or the reality.

Such a holistic framework supports a transformative global education in two ways. First, because it requires students to consider the multiple interactions between the system or phenomenon they are exploring and other systems in its environment, and potentially identify where such interactions may be creating a harmful behaviour, for example, in the creation or maintenance of a global issue. It helps students to establish whether there is a need for change. Second, being aware of the fact that a shift in boundary can highlight the real world connections students have to systems under study establishes students' ability to influence system behaviours, to influence global issues. Their connection gives them agency. It also places upon them some responsibility to act.

Interconnections and interdependence.

Among the common elements of global education, in its many versions, are the concepts of interconnection and interdependence (Pike, 2000a). However, these concepts might be understood simply as linear connections between people or countries (Mundy et al., 2007; Reimer & McLean, 2009; Young, 2003), rather than as complex interrelationships. The seemingly wide-ranging practice of fund-raising for projects in developing countries, without the critical investigation as to why people might need help, how their 'misfortune' is created and maintained, or what kind of help might be given (see Mundy et al., 2007) suggests a focus on dependence rather than interdependence.

In systems theory, interconnections and interdependence can be understood in terms of shifting boundaries. Once system identity is understood as relationship, it is clear that an open system is engaged in a multitude of relationships, an infinite number (von Bertalanffy, 1968; Churchman, 1971). Shifting the boundaries changes the relationships and systems behaviours that are identified (Ackoff, 1974; Midgely, 1995). Thus, the environment of the system becomes as important as the system itself (interactions between system and environment) and the interactions within the system which is bounded are understood as creating its behaviour within its environment (interactions which create the system). Our understanding also shifts with the boundaries; there is no single "correct" identity for the system.

How interdependence can be explored within the global education classroom is most evident in the study of global issues. Such issues are understood as global because they are shared problems which cross national boundaries and are often created in part by those boundaries (geo-political boundaries). More than this though, the setting of the boundaries around the knowledge of the issue changes the nature of the issue (perceptual boundaries). A phenomenon explored within one particular discipline alone is understood differently when explored in another discipline. The way a sociologist investigates human sexuality is different from a biologist. Within a particular family, human sexuality might not be an issue at all, but within the family's community it may be. Thus, shifting the boundaries of an issue may uncover the disagreement or controversy, and exploring controversial issues may require a shifting of boundaries to discover where the controversy lies.

Global education teachers can explore global issues with their students by shifting the focus from one discipline to another (e.g. sociology, economics, psychology) or from different positions on the hierarchy of complex systems (e.g. individual, social, ethical). Authority over the exploration can shift as well: students can be experts in areas the teacher is not; teachers can join students in an exploration from a position of shared discovery; the group as a whole can determine the course of the exploration. The pressure to be "correct" or to know the answer is reduced or removed; answers shift as boundaries shift, and since disagreement is the nature of issues, justification becomes the goal. Students and teachers have the power (and the responsibility) to consider the complexity of an issue and then make an evaluation as to the best course of action.

What action should be taken can be determined through investigation of the type of relationships which create the harmful behaviour. In systems theory, relationship is explored in terms of the interactions which create the system itself (von Bertalanffy, 1968; Georgiou, 2007). The relationships can be understood as spatial, causal or homological. A group of people, such as those self-/identified as lesbian, gay, bisexual, transgender and queer or questioning (LGBTQ), can be marginalised in one context (a particular country or a school) but not in another. A school rule might reflect a social norm, allowing only heterosexual couples to attend a school dance, causing only heterosexual couples to do so, thus re-establishing a social norm. Dynamics in social relationships establish heterosexuals as those with the power to make rules, and similar dynamics establish English speakers, or Christians, or males with such power. Shifts in power, too, can follow similar patterns (the LGBT liberation movement, the Civil Rights movement, the women's suffrage movement).

Uncovering feedback mechanisms when exploring causal interactions assists in understanding system behaviour, and is a first step toward systems modeling (Meadows, 2008). One method global education teachers can use to discover these relationships is through concept mapping on the board and drawing arrows to show the causal nature of relationships. In her Social Justice 12 class, Deekay used the board to note students' prior knowledge, and as she added to it, a concept map started to form and relationships (some causal) between concepts could be identified. The key is to follow through on the interaction; do not stop once one causal relation is discovered.

Causal chains can begin to show the cyclic nature of many causal relationships, where cause becomes effect.

A second method global education teachers can use to highlight feedback mechanisms is to ask conditional and cause and effect questions (Booth Sweeney, 2001). These types of questioning techniques are also highlighted in the futures dimension of Pike and Selby's (1988) four-dimensional model of global education. In her work with students on LGBTQ issues, Deekay asked conditional questions, a common feature of the futures focus of global education. Asking "what if" questions allow for the exploration of possible, probable and preferred futures. Such questions also have the effect of highlighting interconnections between elements of a system. In particular, they can highlight causal relationships and feedback mechanisms (features of interdependence). Once types of relationships are identified, their patterns can be recognised in other contexts. In addition, the fact that time is a factor in feedback relationships can be explored through questions.

Approaching the global education ideas of interconnection and interdependence through the systems theoretical concept of boundary shifting supports an orientation for change of self, school and world. As in the holistic approach described above, the shifting of boundaries highlights whether harm is occurring and where. Once harm is identified, boundary shifting can also show how students are connected, providing them with the possibility to make their own changes. The shifting of authority between students and teachers, between different 'right' answers, is enacting an educational change. And, finally, an examination of feedback mechanisms creates possibilities as to the means of change, the leverage points within systems which could impact system behaviours, and the recognition of and patterns of interaction in different contexts.

Perspectives.

In global education, the inclusion of multiple points of view when investigating issues is standard. Pike (2000a) identifies this as one of the meanings associated with "perspectives consciousness", a key element of global education. A second understanding of perspectives identified by Pike (2000a) is in regards to the scope of perspective; the idea is that a global view of perspective is one which encompasses the world, considering the planet as a whole and planet-wide impacts of human behaviour.

The critical element of global perspective appears in the encouragement of a questioning attitude and the uncovering of assumptions and biases which may underlie individual points of view and decision making (Case, 1993; Hicks, 2003; Pike & Selby, 1988) and systems behaviours (Cook, 2008; Hicks, 2007; Pike & Selby, 1988; Toh, 1993). In versions which advocate a transformation of existing social, technological, economic, and political structures, a critical element is also evident in the focus on possible and preferable futures, and in the recognition of the role of the observer in creating the observed, embedding a need for justification not only of one's stance on an issue, but also on one's definition of that issue.

Multiple perspectives: In systems theory, the two understandings of perspective in global education, as points of view and as consideration of the planet as a whole, are encompassed in what Checkland (1981a) identified as "worldview" or "weltanschaung". As explained in Chapter 3, Checkland's use of this term is specific to his Soft Systems Methodology, which requires that consideration be given to the worldviews of stakeholders in any systems design or analysis. Worldview is understood as both the position from which the system is viewed by the stakeholder and how the stakeholder defines the system (what is system and what is environment). One way the position and the system-definition of stakeholder worldview can be understood is in terms of bounded rationality and boundary judgements (Georgiou, 2007).

In the classroom, both bounded rationality and boundary judgements can be explored – and challenged – through activities such as simulations and role plays. For example, Ella's class explored the multiple perspectives of different representative groups in the case of a student who kills someone in a drunk driving incident. Key to such activities is the consciousness of the limited perspectives of individuals and the need to include multiple perspectives in order to better understand any phenomenon or system. In Ella's class, the students considered the points of view of other students, parents, community members, and representatives of the justice community. As important as the multiplicity of perspectives is the recognition of the role of boundary judgements; that the identification of a system as system is a choice of where to place the boundary between system and environment. Thus, the inclusion of such a group as Mothers Against Drunk Driving (MADD) in the simulation increased the scale of the issue under study from single event to patterned behaviours. Exploring multiple possible

boundaries of the system in question can yield a broader understanding, just as exploring multiple positions of stakeholders can.

The active consideration of bounded rationality, both their own and other's, draws attention to the reasons for opinions and behaviours, as well as the limitations of the reasoning. This has the potential to promote a willingness to consider different opinions, a habit of thought which is inclusive of diverse perspectives. Whether this constitutes a change in students' thinking will depend upon the student. The change that is promoted is in the school and in the world. When multiple perspectives, of individuals and of systems, are part of common discourses, decisions and actions become subject to the need for justification. Just as students who drink and drive must defend their actions against community organisations like MADD, communities must defend the promotion of alcohol and the normative influence of advertising. If systems had to justify behaviours just as individuals do, how might that change the perception of an individual's actions within systems?

Critical perspectives: In systems theory, the critical perspective appears in the examination of the nature and role of boundary judgements, and the associated identifications of system goals. In critical systems theory, such examination allows for two connected realisations: the choice of boundaries can serve the rationale for behaviour, so people can identify boundaries which serve their purposes (Ulrich, 1991); and, since systems are nested and interact, different systems which are embodied or overlap can have different and sometimes conflicting goals (Ackoff, 1974).

The global educators in this study included such critical perspectives in their classrooms primarily through openness about boundary judgements and goals. Kasey, for example, shared the arbitrary nature of boundary setting when she questioned subject divisions or ways students represent concept maps. She asked students to question their own mental models when drawing flowers. Once goals were made apparent, students were invited to make their own evaluations as to how to behave when personal and social goals might conflict.

The consistent reference to reasons for behaviours, asking why we think or act the way we do, serves to create an atmosphere of questioning and making decisions

based upon justification rather than acceptance of habit or the dictates of authority. How power works, in our heads, in our schools, in our societies, becomes a focus of inquiry

Table 7.1. **Correspondences between global education and systems theoretical concepts and associated classroom practices**

Global Education Concepts	Systems Theory Concepts	Classroom Practices
One world orientation, focus on global issues	Holism, Synthesis approach Emergent behaviour of systems	Beginning with the environment of the system/phenomenon under study Exploring the relationships between the system/phenomenon, its environment, and the relationships between its subsystems/elements Moving back and forth between phenomenon and environment Beginning with real world contexts
Interconnection and interdependence Local and global Futures orientation	Hierarchy of complex systems Emergent behaviour of systems Causal structures / Feedback mechanisms	Shifting between self, community, world Shifting between subject areas Questioning: o Cause and effect o Conditionals
Perspectives (multiple and critical)	Bounded rationality Boundary judgements Hierarchy of complex systems Recognising goals of different systems Recognising conflicts between the goals of different systems	Simulations and role plays Shifting between subject areas Shifting between levels of complexity on system hierarchy Questioning: o Why do we think this way? o Why do we organise our studies this way? o Why do we behave this way? o What are our goals? o What are the goals of others? o How do we determine what to do when goals conflict? Acting: o Being open about differing goals. o Practice making decisions given recognition of conflicting goals. o Practice in justifying those decisions.

and open to questioning. When ineffective or harmful behaviours are uncovered through such questioning, a point of leverage for change may be identified.

The correspondences between global education and systems theoretical concepts and the associated practices global education teachers might employ are outlined in Table 7.1.

7.2. Implications for the global classroom

The findings of this study show that systems theory concepts can provide an effective theoretical framework for the key ideas of interconnection and interdependence, multiple perspectives and critical mindedness in a transformative global education. Following from the work of Pike and Selby (1988, 1999) and Selby (1999, 2004), the further investigation of systems theoretical concepts, specifically holism, open systems, systems behaviour and systems goals, worldview, and boundary judgements, support and encourage a holistic global education oriented toward transforming self, school and world. It does so by drawing attention to what needs to be changed, why it needs changing and how that change might be accomplished. The first question, then is answered; systems thinking can, through these concepts, provide a conceptual / theoretical framework for scholarship and practice of a transformative global education.

The findings of this study also provide an answer to the second question; that is, the teachers' stories show the ways that systems theoretical concepts can be embedded in practice. They contextualise the topics under study by: including consideration of how behaviour is created; moving back and forth between the individual, community, international and between subject areas; incorporating multiple perspectives into content; and being open about making boundary judgements and implications of such judgements.

That these concepts are embedded in their practice suggests that this might be the means by which global education teachers can come to know them. That is, it seems that the global educators who participated in this study did not require any profound knowledge of systems theoretical concepts before they infused them into their practice.

They had not made a study of systems theory, nor did they include systems thinking in their definitions of global education, yet those concepts appeared in multiple ways. It may be that systems concepts are integral to a transformative global education, that to be transformative is to be infused with these concepts just as being guided by these concepts creates a transformative global education. In any case, there seems to be considerable potential for these concepts to be accessible to global education teachers when they need principles to guide their decision making. It seems to me, therefore, that this should be a goal, that teachers who have chosen to include global education in their practice should be encouraged to explore these concepts and their meaning for their practice. It is my contention that knowledge of systems theoretical concepts could encourage awareness of when a global educator is or is not shifting boundaries or questioning boundary judgements, making conscious the act of boundary shifting and questioning. This could help support the development of an orientation toward such thinking throughout teaching practice. Such knowledge can also provide direction when a global educator is unsure of what decision to make. The fact that these concepts are already embedded in familiar practices suggests that global educators could use practice to learn about the concepts, the method I have used in this study.

Another potential benefit found in the adoption of system theoretical concepts as a framework for a transformative global education lies in the potential impact on tensions identified in the field. That is, for those who have chosen to include global education in their practice, there might be a positive impact on the problems associated with teacher knowledge and confidence, and on the uncritical practices of "global ed lite".

7.2.1. *Potential impacts on teacher knowledge and confidence.*

Research shows that some teachers have vague or limited understandings of global education (Mundy et al., 2007) or choose to reject some aspects because they do not suit their beliefs or their level of comfort (Marshall, 2007a; Young, 2003). Teacher education students also profess a lack of confidence about the content and practice of global education; they feel they do not know enough about the topics or about how to teach them (Holden & Hicks, 2007; Reimer & McLean, 2009). It would seem that further clarification of concepts which underlie global education might help to address this.

Embedding systems theoretical concepts of boundary shifting and boundary judgements in global education would move that understanding beyond simple clarity to a shaping of approach that recognises that uncertainty is expected, accepted and its benefits appreciated. First, the act of systems identification through boundary judgements in itself creates multiplicity. Not only does the position from which a system is viewed determine the understanding of it (bounded rationality), but the act of identification, creating a boundary around an open system, means that choices are made as to what to include and what to exclude (boundary judgements). Worldview becomes paramount, and thus perspectivity must be recognised as always multiple. Acceptance of this creates the inclusivity, the recognition of multiple perspectives which appears in most versions of global education, so a clear connection between such multiplicity and its associated uncertainty and ambiguity might serve to both relieve some discomfort associated with it and even celebrate the multiplicity it represents. Ella's class could appreciate this when they considered the multiple perspectives associated with the issue of high school students drinking and driving. Not everyone shared the same view of the issue, but they did not question the validity of other perspectives even if they did not agree.

Second, the shifting of boundaries and recognition of boundary judgements serves to highlight the limited nature of expertise, as it is determined to some extent by where a boundary is placed. No one is expert in everything, and the open nature of human activity systems in particular means that the role as expert can shift even as the boundary shifts. This would not mean that the teacher no longer has anything to offer, but it would mean that expertise is not absolute. From the perspective of a teacher like Deekay, this would mean that she was not expected to be expert in all aspects of the LGBTQ issues, and could even share with her students responsibility for informing the class.

Third, recognition of the shifting nature of boundaries and of authority requires the justification of boundary setting. That is, when a judgement is made as to where a boundary must be placed, the reasons for that judgment must be transparent, must be open to scrutiny. This would increase the credibility of the decision as to where to set the boundary in cases where the teacher makes the decision and in addition would allow for a boundary setting negotiation between teachers and students, embedding within

practice an explicit recognition of the shared nature of knowledge construction, again reaffirming the validity of multiple perspectives and modelling the means by which differences can be creative opportunities. For example, Kasey and her students discussed what their goals were within the community (to respect others) and reached agreement as to how best they might meet those goals (walking quietly down the halls).

Finally, awareness of the shifting of boundaries can serve to assist global education teachers in their decision making. The necessity to consciously justify their own boundary judgements can create a consistent habit of thought, and orientation toward testing their decisions to see if they meet their own goals. Jay engaged in this kind of justification when she questioned the differences between her approaches in different subject areas. This led her to sometimes change her practices (allowing the students to direct a controversial discussion about homelessness) and at other times to continue practices which she was not sure about (teaching mathematics as a closed system). Such continual critical reflection on practice decisions can lead to a deeper understanding of the principles which guide practice, and in turn clarify those principles so that they offer clearer direction.

7.2.2.   Potential impacts on the lack of critical focus or 'Global ed lite'.

The conscious and transparent recognition of boundary judgements also has ramifications for the practice of 'global ed lite'. As was noted in Chapter 2, there is evidence suggesting a widespread practice of excluding controversial issues from global education classrooms, removing the examination of the 'whys' and 'hows' of the injustices and structural violence endured by many, and focusing instead on de-politicised fund-raisers and lifestyle changes (Cook, 2008; Jefferess, 2012; Mundy et al., 2007; Young & Cassidy, 2004). Such versions of global education do little to support the transformative goals of changing self, school and world. Would they be possible, however, if the boundary judgements made to exclude the issues, remove the examination of reasons and causes, and focus on charitable acts were made transparent through a holistic approach and the shifting of boundaries?

The holistic approach to a topic, as informed by a systems orientation to the exploration of phenomena, would require beginning with the environment of the phenomena under study and then examining the relationship between the phenomena and its environment and finally explaining the behaviour of the phenomena as a function of the interactions which create it. For example, to begin the common global education project of investigating the everyday lives of people in a developing country coupled with a fundraising activity (Mundy et al., 2007), would necessitate the consideration of their situation within that country. What are their relationships with the government, with the elites? They might expand their frame of reference to an even larger environment and consider that country's position in the world, its interactions with other countries. Finally, if the people under study were identified as coping with some misfortune (poverty being the typical focus), then the next step would be to identify the interactions which create the poverty. The act of identifying those interactions is to begin making transparent the causes of poverty. To take a holistic approach as described above to the study of people in a developing country would require examination of reasons for and causes of the disadvantages people face through the process of deduction. Examining poverty itself as a systems behaviour, as an issue, would be unavoidable.

The shifting of focus between different systems boundaries (from world, to community, to individual and so on) would also create an inductive requirement to consider causes. The act of shifting boundaries highlights the experiences of peoples and nations within different contexts, and this recursive exploration would simultaneously highlight interactions, relationships concerned with the distribution of wealth and power, which create the phenomenon of poverty. The repeated experiences would lead to the recognition that there are causes of particular behaviours – the 'whys' and 'hows' of social injustice become central.

Finally, both the deductive processes of the holistic approach and the inductive processes of boundary shifting serve to make transparent the act of boundary judgement itself, an act which demands justification. Once it is recognised that a boundary is placed around the phenomenon, the reasons for that judgement become open to question and thus the likelihood of that questioning increases. It may be the teacher or the students who take on this questioning role. While it is possible that, despite the highlighting of the issue of poverty and its causes, a global education teacher and her

class may choose to conduct a fund-raising project, it would likely be linked to classroom teaching around social and international systems and interactions with recognition of the local manifestations of those systems. That is, it would have a greater chance of including a critical orientation.

7.3. Limitations and new questions

The first boundary placed upon this study was to limit my focus to teachers who had already identified global education as an approach to which they were committed. They had previously decided that the goals of global education reflected their own values and they had devoted time and effort to exploring and practicing the approach. The guidance this study may provide, then, is directed toward those who have a professed interest in infusing their practice with a global perspective, particularly one which is more transformative. This study does little to promote global education to those who do not have such an orientation.

In addition, though I included descriptions of global educators' practice gathered and interpreted through the methods of case study, this study is limited to an investigation of systems theoretical concepts themselves and their potential within the limits of the one case. That is, the cases served specifically to guide me in my identification and exploration of those concepts rather than acting as sites for the study of teachers' understandings and practices. Because of this, there is no analysis of what the teachers themselves did or did not do in terms of the practices themselves. I did not inquire into their reasoning in regards to the concepts, as I was still in the process of discovering those concepts. I did not compare the teachers' practices, or note if one teacher's practice reflected a theme more than another's. I did not inquire into how global education is understood or implemented by these teachers. Nor did I examine in any meaningful way how the powerful forces of neoliberalism that currently pervade educational practice might impact teachers' choices to adopt a transformative global approach. This study, therefore, is limited by its narrow focus on the concepts rather than the teachers.

Finally, while this study does continue on from work on the connections between systems thinking and global education already begun by Pike & Selby (1988), it by no means finishes the task. Rather it leads to new questions and opens up several potential directions for further research in areas such as global educators' interpretations of the system concepts and their relation to practice; whether the global approach developed here should guide all teaching, or if some content, for example skills development, might not benefit from a different approach; what impact such an approach might have on student learning; and the potential to use systems theory to examine educational policy, particularly around design of school buildings and procedures.

Guidance for teacher decisions.

One of the goals of this study was to discover within systems theoretical concepts principles that can guide global educators in their decision making so they can adopt an approach, across curriculum boundaries, which is commensurate with a transformative global education. The hope is that, because the teachers who participated in this study engaged in practices that can be interpreted in systems theoretical terms, they may find the concepts themselves accessible without having to first undertake a comprehensive study of systems theory. That is, the teachers may be able to explore theory through examination of their own practice. However, a framework for such an exploration has yet to be created, and once created would have to be tested. Whether this hope can be realised is as yet unknown, but this study has demonstrated the possibilities.

Assuming that global education teachers are able to explore the concepts through practice and then articulate them in a way that creates guidelines which suit their needs, there are still questions as to whether the global approach outlined here is appropriate for all curricula. Jay preferred to teach the calculation of area in mathematics largely separate from the context of how such calculations are used in the world, essentially creating a closed system of abstract thought. Kasey employed a similar approach in her teaching of phonics. Might the creation of closed systems serve to focus attention on skills, removing that which might be distracting? Should a mixture of methods be employed and if so what might that look like? Can incommensurate

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philosophies about the nature of reality and knowledge be purposefully included in a meaningful way?

Finally, the guidance that systems concepts provide will never provide certainty; indeed, they require an acceptance of uncertainty. How, then will global educators decide where to place boundaries in their teaching, where multiple viewpoints might best be included or whether it is better to focus on boundary shifting between systems? This will always be a negotiation, requiring justification, and without any clear assessment to measure effectiveness. It is not only the students who will be asked to learn a different way of thinking; the teachers may experience the same changes, and may find this a daunting task.

Impact on students.

Though not the concern of this study, there is an underlying assumption the practice of a global approach will have particular impacts on students. First, it is assumed that it will lead to the development of habits of mind which will transfer to all of their learning and to their interactions outside of the school. This is a potential direction for future research. A second potential impact which requires further study concerns the larger goals of transformative global education, changing students, schooling and world. Do particular versions of global education have a greater impact on students than others, and if so in what ways?

Responses to pressures.

As has been discussed, teachers and students are not working in a closed system; they practice global education within an environment governed by views of learning and knowledge which are largely mechanistic, and by social and institutional norms which may conflict with their methods and goals. How do global education teachers perceive these conflicts? How do they respond to the pressures this creates? The teachers who participated in this study referred to the challenges they faced in the larger education systems in systemic terms, as the unintended consequences of reasonable design decisions or as a difference in priorities or goals of decision makers (see Table 7.2). Their responses, too, could be interpreted in systems terms; they were open with students about their own goals, the students' goals, and the goals of the school. A

possible direction for future research might be to discover whether other global education teachers also frame such challenges in systems terms, and whether they respond with openness about goals. Do teachers' react differently to challenges they perceive as unintended outcomes and those they perceive as resulting from different goals of decision makers?

Table 7.2.   *Global educators within systems: System theory concepts and teachers perceptions of and responses to the education system*

System theory concepts	Teachers' perceptions and responses
o Relationships between systems and sub-systems o Emergent behaviours of systems o Recognising goals of different systems o Recognising conflicts between the goals of different systems, larger systems and sub-systems	o Perceived some consequences of systems design as unintended (e.g. interruptions for direct student benefit, some aspects of content coverage, student focus on 'right answers') o Perceived difference in goals of decision makers (e.g. building and facilities design, interruptions for administrative purposes, standardised testing) o Openness with students about goals

Another potential area of future research involves the use of a systems theory framework to investigate education policy. Questions might include, what are the goals of decision makers when it comes to the design of school buildings and facilities? Are elementary and secondary schools designed differently, and if so, what informed those decisions? What understandings of knowledge and learning underlie decisions to implement standardised exams? Were the potential costs (in terms of curriculum coverage and learning) associated with standardised exams factored into the decision making process, or were they unintended consequences?

Though this study may offer more questions than it answers, it does provide a theoretical space within which practice and research into transformative global education can be situated. It provides a potential means of clarification for teachers and researchers as to the transformative version of global education, allowing for classification, comparison, and evaluation. In addition, it offers global education teachers the opportunity to create their own guiding principles for practice based on concepts which support a transformative global education.

7.4. Contributions and recommendations

The study contributes to the development of a global approach, one which might underlie global education but is independent of global education content. With the adoption of such an approach to curriculum and pedagogy, global education may more seamlessly be infused into standard curriculum. Moreover, the version of global education which would appear when embedded in such an approach would be one oriented toward change, of self, of schooling, of world: a transformative global education.

This global approach is one which centres on the systems theoretical notion of boundary judgements. Boundary judgements underlie the themes of holism, connectedness, multiple perspectives and critical perspectives. The boundaries determine which relationships will be considered, and shifting boundaries create opportunities and understanding of systems (that they are embedded within each other and interaction) and of the nature of the boundaries themselves (that they are created). Those boundaries, then, determine the objects of study and the perspectives from which the study is undertaken; they are content and process. Understanding of boundaries provides guidance as to the why, where and how boundaries are placed, so global education teachers know that they must be used, that they are for convenience, that one boundary is not necessarily better or more "right" than another. However, their placement should be subject to a continual justification; the justification of the teacher, the justification of the class (the teacher in collaboration with students), and the justification of the community.

My work with the teachers who participated in this study left me feeling very positive. Though their experiences cannot be generalised to the larger population of global education teachers, their practices were not unfamiliar. That is, their teaching strategies were easily recognisable, though the thinking underlying the may not be. The teachers were engaging their students, were highlighting relationality and perspective, were critically reflective of their practices and of the larger school systems in which they interacted. This led me to think that the global approach described here, one based on systems concepts, is accessible to teachers through practices they would recognise, making possible a shift, amongst global educators, to practices which support a

transformative global education. And the thinking might be accessible through those practices.

To this end, some of the recommendations for practice prompted by this study are that global education teachers:

- Try an organisational structure which begins with a complex whole within and in relation to its environment;
- Shift the boundaries of systems under study through such means as considering how they appear at different levels of systems complexity and in different subject areas;
- Consider the relationships between the topic of study and its context, its environment. How does one affect the other?;
- Identify the types of relationships through concept mapping and questioning;
- Identify similar patterns of relationship to take advantage of the possibilities for understanding and prediction that this offers;
- Identify personal connections to topics of study through shifting the boundaries of what is under consideration;
- Identify opportunities for change by modelling systems behaviours and searching for points of leverage;
- Consider the role of point of view – bounded rationality – in framing the topics, problems, issues through boundary judgements;
- Make transparent, negotiate and justify any boundary judgement; and
- Make transparent and question goals through identifying system behaviour.

Creating a more accessible form for these recommendations, one which would encourage exploration of the concepts, has yet to be done. This, along with identification of the most effective means to share these ideas with global education teachers, constitutes next steps arising from this study.

7.5. Conclusion

Pike and Selby (1999) outlined two models for implementing global education: integration or infusion. Integration, a more holistic process, involves reorganisation of curriculum around themes or issues, to reflect real world situations where experience is not divided into separate subject areas. Themes might include population, racism,

technology or water. Such integration would create a rich and supportive environment for the implementation of a holistic global education. However, as they noted, current educational structures of separated subject areas, textbooks, timetables, and tests, and the teacher education, which supports such structures, suggest that an infusion model may be the more common scenario. Infusion calls for an emphasis, in each subject area, on connections with other subjects. Thus, real world situations might be included in separated subject classes. The problem is that this model creates an incongruency: a holistic view of knowledge within a system which compartmentalises knowledge. It may also result in an acceptance of global education as the concern of social studies (Pike & Selby, 1999).

The identification of an approach within global education, one which can be applied across subject areas regardless of topic, can help address these concerns. This global education approach, not tied to content, could be adopted across curriculum boundaries. Its adoption might serve to create the habit of mind, the orientation toward knowledge creation, which would support the investigation of global education content when teachers decide to focus in that direction. Indeed, it might guide classroom explorations toward the inclusion of global issues even where it was not intended.

Would this mean that when a global educator takes this approach, one which is holistic, which shifts in perspective and authority, which encourages the recognition and justification of boundary judgements, that they are infusing their practice with a global perspective, even if there are no international or global issue elements included? For me, the answer is yes. This is a global approach which is not bound by content, but is supportive of – and indeed encourages the inclusion of – a transformative global education.

References

Ackoff, R. L. (1974). The systems revolution. *Long Range Planning, 7*(6), 2-20.

Ackoff, R.L. (1979). The future of operational research is past. *Journal of the Operational Research Society, 30*, 93-104.

Ackoff, R.L. (1995). 'Whole-ing' the parts and righting the wrongs. *Systems Research 12*(1), 43-46.

Ackoff, R.L. (1996). On learning and the systems that facilitate it. *Reflections, 1*(1), 14-24.

Ackoff, R.L. (1998). A systemic view of transformational leadership. *Systemic Practice and Action Research, 11*(1), 23-36.

Ackoff, R.L., & Emery, F.E. (1972). *On purposeful systems: An interdisciplinary analysis of individual and social behavior as a system of purposeful events*. Chicago: Aldine-Atherton.

Alladin, I. (1989). Teaching for global awareness. *The ATA Magazine, 69*(4), 6-11.

Anderson, L. (1979). *Schooling for citizenship in a global age: An exploration of the meaning and significance of global education*. Bloomington: Social Studies Development Center.

Angrosino, M.V. (2005). Recontextualising observation: Ethnography, pedagogy, and the prospects for a progressive political agenda. In N.K. Denzin and Y.S. Lincoln (Eds.) *The Sage handbook of qualitative research* (3rd ed.), (pp.729-746). Thousand Oaks, CA: Sage Publications.

Apple, M. (1979). *Ideology and curriculum*. London, England: Routledge.

Bacchus, M.K. (1989). The concept of global education. *The ATA Magazine 69*(4), 19-22.

Bai, H., & Banack, H. (2006). To see the world in a grain of sand: Complexity ethics and moral education. *Complicity: An International Journal of Complexity and Education, 3*(1), 5-20.

Bastrup-Birk, H., & Wildemeersch D. (2013). A fresh take on democratic education: Revisiting Rancière through the notions of emergence and enaction. *Complicity: An International Journal of Complexity and Education, 10*(1/2), 111-129.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report, 13*(4), 544-559. Retrieved from http://www.nova.edu/ssss/QR/QR13-4/baxter.pdf

Becker, J. (Ed.). (1979). *Schooling for a global age.* New York, NY: McGraw-Hill.

von Bertalanffy, L. (1968). *General systems theory: Foundations, development, applications.* New York, NY: George Braziller.

Bickmore, K. (2009). Global education to build peace. In T. F. Kirkwood-Tucker (Ed.), *Visions in global education: The globalization of curriculum and pedagogy in teacher education and schools* (pp. 270-286). New York, NY: Peter Lang.

Bohm, D. (1985). Hidden variables and the implicate order. *Zygon: Journal of Religion and Science, 20*(2), 111-124.

Bohm, D. (2003). *The essential David Bohm.* L. Nichol (Ed.). London, England: Routledge.

Booth Sweeney, L. (2001). *When a butterfly sneezes: A guide for helping kids explore interconnections in our world through favourite stories.* Waltham, MA: Pegasus Communications.

Booth Sweeney, L. (2005). How is this similar to that? The skill of recognising parallel dynamic structures on centre stage. *The Creative learning Exchange 14*(3), 1, 3-8.

Booth Sweeney, L., & Sterman, J.D. (2007). Thinking about systems: Students and teachers conceptions of natural and social systems. *Systems Dynamics Review, 23*(2/3), 285-312.

Boulding, K. (1956). General systems theory – The skeleton of science. *Management Science, 2*(3), 197-208.

Boulding, K. (1985). Systems research and the hierarchy of world systems: General systems in special chaos. *Systems Research, 2*(1), 1–5.

Boulding, K., Khun, A., & Senesh, L. (1973). Systems analysis and its use in the classroom. (SSEC Publication No.157) Social Science and Education Consortium, Boulder, CO.

British Columbia. Ministry of Education. (2005) *Science K-7 (2005) Grade 6 Integrated Resource Package.* Retrieved from http://www.bced.gov.bc.ca/irp/pdfs/sciences/2005scik7_6.pdf

British Columbia. Ministry of Education. (2008). *Social Justice 12 (2008) Integrated Resource Package.* Retrieved from http://www.bced.gov.bc.ca/irp/pdfs/social_studies/2008socialjustice12.pdf

British Columbia Teachers' Federation. (n.d.) Global Classroom. Retrieved from
        http://www.bctf.ca/GlobalClassroom.aspx

Burris, E.D. (2005). Classrooms can use therapy, too. *Complicity: An international
        Journal of Complexity and Education, 2*(1), 5-17.

Capra, F. (1982). *The turning point: Science society, and the rising culture.* New York:
        Simon and Schuster.

Case, R. (1993). Key elements of a global perspective. *Social Education, 57*(6), 318-
        325.

Case, R. (1999). Global education: It's largely a matter of perspective. In R. Case & P.
        Clark (Eds.) *The Canadian anthology of social studies* (pp.75-82). Vancouver,
        BC: Pacific Educational Press.

Castenell, Jr., L., & Pinar, W. (1993). Introduction. In L. Castenell, Jr., & W. Pinar (Eds.),
        *Understanding curriculum as racial text: Representations of identity and
        difference in education* (pp. 1-30). Albany, NY: State University of New York
        Press.

Checkland, P. (1979). The shape of the systems movement. *Journal of Applied
        Systems Analysis, 6*, 129-135.

Checkland, P. (1981a). *Systems thinking, systems practice.* Chichester, England: John
        Wiley & Sons Ltd.

Checkland, P. (1981b). Rethinking a systems approach. *Journal of Applied Systems
        Analysis 8*, 3-14.

Checkland, P. (1983). O.R. and the systems movement: Mappings and conflicts. *Journal
        of the Operational Research Society, 34*(8), 661-675.

Checkland, P. (1984). Toward a global systems thinking? *Journal of Applied Systems
        Analysis, 11*, 105-109.

Checkland, P. (1985). From optimizing to learning: A development of systems thinking
        for the 1990s. *Journal of the Operational Research Society, 36*(9), 757-767.

Checkland, P. (1988). Churchman's "anatomy of system teleology" revisited. *Systems
        Practice 1*(4), 377-384.

Checkland, P., & Poulter, J. (2006). *Learning for action: A short definitive account of soft
        systems methodology, and its use for practitioners, teachers and students.*
        Hoboken, NJ: Wiley.

Choldin, E. (1992). Methods and goals of global education. *Orbit, 23*, 13.

Choldin, E. (1993). The practice of global education: Cooperative, democratic, community based, experiential, and interdisciplinary. *Global Education, Global Literacy, 1*(1), 28-30.

Churchman, C.W. (1970). Operations research as a profession. *Management Science, 17*(2), B-37-B-53.

Churchman, C.W. (1971). *The design of inquiring systems: Basic concepts of systems and organisation.* New York: Basic Books.

Churchman, C.W. (1979). *The systems approach and its enemies.* New York: Basic Books.

Churchman, C.W., & Ackoff, R.L. (1954). An approximate measure of value. *Journal of the Operations Research Society of America, 2*(2), 172-187.

Clipsham, D. & Charbonneau, L. (1994). Growing an integrated unit – organically! *Green Teacher, 40*, 13-17.

Cook, S.A. (2008). Give peace a chance: The diminution of peace in global education in the United States, United Kingdom, and Canada. *Canadian Journal of Education 31*(4), 889-914.

Council of Ministers of Education Canada (in collaboration with the Canadian Commission for UNESCO). (2001). *Education for peace, human rights, democracy, international understanding and tolerance.* Retrieved from http://www.cmec.ca/Publications/Lists/Publications/Attachments/32/pax.en.pdf

Davidsen, P.I., Bjurklo, M., & Wikström, H. (2006). Introducing system dynamics in schools: The Nordic experience. *System Dynamics Review, 9*(2), 165–181. doi: 10.1002/sdr.4260090206

Davies, L. (2006). Global citizenship: Abstraction or framework for action? *Educational Review, 58*(1), 5-25.

Davies, I., Evans, M., & Reid, A. (2010). Globalising citizenship education? A critique of 'global education' and 'citizenship education'. *British Journal of Educational Studies, 53*(1), 66-89. doi: 10.1111/j.1467-8527.2005.00284.x

Davis B. (2005). Interrupting frameworks: Interpreting geometries of epistemology and curriculum. In W. E. Doll Jr., M.J. Fleener, D. Truitt & J. St. Julien (Eds.) *Chaos complexity, curriculum and culture: A conversation* (pp.119-132). New York, NY: Peter Lang.

Davis, B., & Simmt, E. (2003). Understanding learning systems: Mathematics education and complexity science. *Journal for Research in Mathematics Education, 34*(2), 137-167.

Davis, B., & Sumara, D. (2006) *Complexity and education: Inquiries into teaching, learning and research.* Mahwah, NJ: Lawrence Erlbaum Associates.

Davis B., & Sumara, D. (2008). Complexity as a theory of education. *Transnational Curriculum Inquiry 5*(2), 33-44. http://nitinat.library.ubc.ca/ojs/index.php/tci

Dellar, G.B. (1994). Schools as open social systems: A study of site specific restructuring. Paper presented at the Annual Meeting of the American Educational Research Association. New Orleans, LA April 4-8, 1994.

Denzin, N.K., & Lincoln, Y.S. (2005). Introduction: The discipline and practice of qualitative research. In N.K. Denzin and Y.S. Lincoln (Eds.) *The Sage handbook of qualitative research* (3rd ed.), (pp.1-32). Thousand Oaks, CA: Sage Publications.

Doll, W. E. Jr. (1987). Foundations for a post-modern curriculum. Paper presented at the Annual Meeting of the American Educational Research Association. Washington D.C. April 20-24 1987.

Dr. Seuss. (1999). The Lorax. New York, NY: Random House.

Draper, F. (1993). A proposed sequence for developing systems thinking in grades 4-12 curriculum. *Systems Dynamics Review 9*(2), 207-214.

Evagorou, M., Korfiatis, K., Nicolaou, C., & Constantinou, C. (2009). An investigation of the potential of interactive simulations for developing system thinking skills in elementary school: A case study with fifth-graders and sixth-graders. *International Journal of Science Education 31*(5) 655-674.

Evans, M. & Lavelle, J. (1996). Participants in change: Learning for responsible citizenship, locally and globally. *Orbit, 27*(2), 27-30.

Evans, M., & Reynolds, C. (2004). *Educating for global citizenship in a changing world: A teacher's resource handbook*. Toronto, ON: OISE/UT.

Fels, L. (2004). Complexity, teacher education and the restless jury: Pedagogical moments of performance. *Complicity: An International Journal of Complexity and Education 1*(1), 73-98.

Fenwick, T. (2009). Responsibility, complexity science and education: Dilemmas and uncertain responses. *Studies in Philosophy and Education, 28*(2), 101-118. doi 10.1007/s11217-008-9099-x

Ferns, D. (1992). Global education resources in print. *Orbit, 23* 8-19.

Fleener, M.J. (2005). Introduction: Chaos, complexity, curriculum and culture: Setting up the conversation. In W. E. Doll Jr., M.J. Fleener, D. Truitt & J. St. Julien (Eds.) *Chaos, complexity, curriculum and culture: A conversation* (pp.1-20). New York, NY: Peter Lang.

Fleischman, P. (1998). *Whirligig.* New York, NY: H. Holt.

Flood, R.L. (1999). *Rethinking 'The fifth discipline': Learning within the unknowable*. London, England: Routledge.

Flood, R.L., & Carson, E.R. (1993). *Dealing with complexity: An introduction to the theory and application of systems science*. New York: Plenum Press.

Flood, R.L. & Jackson, M.C. (1991). *Critical systems thinking: Directed readings*. Chichester, England: John Wiley & Sons Ltd.

Flood, R.L., & Ulrich, W. (1991). Testament to conversations on critical systems thinking between two systems practitioners. In R.L. Flood & M.C. Jackson (Eds.) *Critical systems thinking: Directed readings* (pp. 185-206). Chichester, England: John Wiley & Sons Ltd.

Foley, D., & Valenzuela, A. (2005). Critical ethnography: The politics of collaboration. In N.K. Denzin & Y.S. Lincoln (Eds.) *The Sage handbook of qualitative research* (3rd ed.), (pp.217-234). Thousand Oaks, CA: Sage Publications.

Fontana, A., & Frey, J.H. (2005). The interview: From neutral stance to political involvement. In N.K. Denzin & Y.S. Lincoln (Eds.) *The Sage handbook of qualitative research* (3rd ed.), (pp.695-728). Thousand Oaks, CA: Sage Publications.

Forrester, J.W. (1961). *Industrial dynamics*. Waltham, MA: Pegasus Communications.

Forrester, J.W. (1968). *Principles of Systems*, 2nd ed. Pegasus Communications.

Forrester, J.W. (1992). System dynamics and learner-centered-learning in kindergarten through 12th grade education. Retrieved from http://www.clexchange.org/ftp/documents/whyk12sd/Y_1993-1SD&LearnerCentered.pdf

Forrester, J.W. (2009) Learning through system dynamics as preparation for the 21st century Retrieved from http://clexchange.org/ftp/documents/whyk12sd/Y_2009-02LearningThroughSD.pdf

Freire, P. (1970). *Pedagogy of the oppressed*. New York, NY: Seabury.

Fuenmayor, R. (1991). Between systems thinking and systems practice. In R.L. Flood & M.C. Jackson (Eds.) *Critical systems thinking: Directed readings* (pp. 227-244). Chichester, England: John Wiley & Sons Ltd.

Gall, M.D., Borg, W.R., & Gall, J.P. (1996). *Educational research: An introduction* (6th ed.). White Plains, NY: Longman Publishers.

Gharajedaghi, J., & Geranmayeh, A. (1992). Performance criteria as a means of social integration. In J-M. Choukroun & R Snow.(Eds.) *Planning for human systems: Essays in honour of Russell L. Ackoff* (pp.162-178). Philadelphia: The Busch Center, the Wharton School of the University of Pennsylvania.

Georgiou, I. (2007). *Thinking through systems thinking*. London: Routledge.

Giroux, H. (1981). *Ideology, culture, and the process of schooling*. Philadelphia, PA: Temple University Press.

Greer, S. (1996). A transformative vision for educators. *Orbit, 27*(2), 5-7.

Grumet, M. (1988). *Bitter milk: Women and teaching*. Amherst, MA: University of Massachusetts Press.

Guba, E.G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. ERIC/ECTJ Annual Review Paper. *Educational Technology Research and Development, 29*(2), 75-91.

Guba, E.G., & Linclon, Y.S. (2005). Paradigmatic controversies, contradictions, and emerging confluences. In N.K. Denzin & Y.S. Lincoln (Eds.) *The Sage handbook of qualitative research* (3rd ed.) (pp.191-216). Thousand Oaks, CA: Sage Publications.

Gulyaev, S.A., & Stonyer, H.R. (2002). Making a map of science: General systems theory as a conceptual framework for tertiary science education. *International Journal of Science Education 24*(7), 753-769.

Hammond, D. (2003). *The science of synthesis: Exploring the social implications of general systems theory*. Boulder, Colorado: University Press of Colorado.

Hanvey, R.G. (1976). *An attainable global perspective*. Denver, CO: Center for Teaching and International Relations.

Hicks, D. (2003). Thirty years of global education: A reminder of key principles and precedents. *Educational Review, 55*(3), 265-275.

Holden, C., & Hicks, D. (2007). Making global connections: The knowledge, understanding and motivations of trainee teachers. *Teaching and Teacher Education, 23*, 13-23.

Jackson, M.C. (2003). *Systems thinking: Creative holism for managers*. Chichester, England: John Wiley & Sons.

Jacobson, M.J., & Wilensky, U. (2006). Complex systems in education: Scientific and educational importance and implications for the learning sciences. *The Journal of Learning Sciences 15*(1), 11-34.

Jefferess, D. (2012). The "Me to We" social enterprise: Global education as lifestyle brand. *Critical Literacy: Theories and Practices, 6*(1), 18-30.

Kentel, J.A. & Karrow, D. (2007). Mystery and the body: Provoking a deep ecology through the situated bodies of teacher candidates. *Complicity: An International Journal of Complexity and Education, 4*(1), 85-101.

Khan, S.K. (2006). Harnessing the complexity of children's consumer culture. *Complicity: An International Journal of Complexity and Education, 3*(1), 39-59.

Kniep, W.M. (1986) Defining a global education by its content. *Social Education, 50*(6), 437-446.

Kniep, W.M. (1989). Essentials for a global education. *The ATA Magazine, 69*(4), 12-15.

Kunsch, P.L., Theys, M., & Brans, J.P. (2007). The importance of systems thinking in ethical and sustainable decision-making. *Central European Journal of Operations Research, 15*, 253-269.

Laroche, L., Nicol, C., & Mayer-Smith, J. (2007). New venues for science teacher education: Self-organizational pedagogy on the edge of chaos. *Complicity: An International Journal of Complexity and Education, 4*(1), 69-83.

Laszlo, E. (1975). Forward. In E. Taschdjian (Ed.), *Perspectives on general system theory by Ludwig von Bertalanffy*. New York, NY: George Braziller.

Lousley, C. (1999). (De)politicizing the environment club: Environmental discourses and the culture of schooling. *Environmental Education Research, 5*(3), 293-304.

Lyons, T. (1992). Education for a global perspective. *Orbit, 23*, 10-12.

Marshall, H. (2007a). Global education in perspective: Fostering a global dimension in an English secondary school. *Cambridge Journal of Education, 37*(3), 355-374.

Marshall, H. (2007b). The global education terminology debate: Exploring some of the issues. In M. Hayden, J. Levy and J. Thompson (Eds.) *The SAGE handbook of research in international education* (pp. 38-50). London: SAGE Publications.

Maxwell, J.A. (1996). *Qualitative research design: An interactive approach*. Thousand Oaks, CA: Sage Publications.

McKenzie, M. (2006). Three portraits of resistance: The (un)making of Canadian students. *Canadian Journal of Education, 29*(1), 199-222.

Meadows, D.H. (2008). *Thinking in systems: A primer*. White River Junction, Vermont: Chelsea Green Publishing.

Merryfield, M.M. (1993). Reflective practice in global education: Strategies for teacher educators. *Theory into Practice, 32*(1), 27-32.

Merryfield, M.M. (1998). Pedagogy for global perspectives in education: Studies of teachers' thinking and practice. *Theory and Research in Social Education, 26*(3), 342-379.

Merryfield, M.M. (2009). Moving the center of global education: From imperial worldviews that divide the world to double consciousness, contrapuntal pedagogy, hybridity, and cross-cultural competence. In T. F. Kirkwood-Tucker (Ed.), *Visions in global education: The globalization of curriculum and pedagogy in teacher education and schools* (pp. 215-239). New York: Peter Lang.

Mgombelo, J. (2006) Teaching and ethics in complexity science: The ethics of absolute unitary being. *Complicity: An International Journal of Complexity and Education, 3*(1), 21–38.

Midgley, G. (1995). What is this thing called CRITICAL systems thinking? In K. Ellis, A. Gregory, B.R. Mears-Young, and G. Ragsdell (Eds.), *Critical issues in systems theory and practice* (pp.61-72). New York: Plenum Press.

Moore, R. (1992). Education for planetary living: CIDA initiatives. *Orbit, 23*, 8-9.

M'Pherson, P. K. (1980) . On understanding, modelling and improving human systems . *Journal of Applied Systems Analysis 7*, 131-150.

Mundy, K. , Manion, C., Masemann, V., & Haggerty, M. (2007). Charting global education in Canada's elementary schools: Provincial, district and school level perspectives. Report for UNICEF Canada. Toronto: OISE, University of Toronto.

Nelson, C. (2004). Building blocks and learning. *Complicity: An International Journal of Complexity and Education, 1*(1), 39-55*.*

Orr, D. W. (1994). *Earth in mind: On education, environment, and the human prospect.* Washington, DC: Island Press.

O'Sullivan, B. (1995). Reconciling paradigms: Global economic competitiveness and global education as alternative approaches for constructing curricula. A review of the current debates as they apply to secondary schooling in Ontario. unpublished Doctor of Education thesis. University of Toronto.

O'Sullivan, E. (1996). The need for a holistic global perspective: In anticipation of the millennial turning point. *Orbit, 27*(2), 3-5.

Parchment, E., & Vahed, Z. (1996). Faith and global citizenship: Principles and strategies for educators. *Orbit, 27*(2), 24-25.

Patton, M. (1990). *Qualitative evaluation and research methods* (2nd ed.). Newbury Park, CA: Sage.

Perinbam, L. (1989). A new frontier for teachers. *The ATA Magazine, 69*(4), 23-25.

Perkins D.N., & Grotzer, T.A. (2000, April). *Models and moves: Focusing on dimensions of causal complexity to achieve deeper scientific understanding.* Paper presented at the Annual Meeting of the American Educational Research Association New Orleans, LA, April 24-28, 2000.

Petrie, J. (1992). Global studies in the social science curriculum. *Orbit, 23*, 20-21.

Phelps, R. (2005). The potential of reflective journals in studying complexity 'In action'. *Complicity: An International Journal of Complexity and Education, 2*(1), 37-54.

Phenomenology. (1999). In R. Audi (Ed.), *The Cambridge dictionary of philosophy* (p.644). Cambridge, England: Cambridge University Press.

Pike, G. (1996). Perceptions of global education in Canada: A passion for internationalism. *Orbit, 27*(2), 7-11.

Pike, G. (2000a). Global education and national identity: In pursuit of meaning. *Theory into Practice 39*(2), 64-73.

Pike, G. (2000b). A tapestry in the making: The strands of global education. In T. Goldstein, & D. Selby (Eds.), *Weaving connections: Education for peace, social and environmental justice* (pp. 218-241). Toronto, ON: Sumach Press.

Pike, G., & Selby, D. (1988). *Global teacher, global learner*. London, England: Hodder and Stoughton.

Pike, G., & Selby, D. (1995). *Reconnecting: From national to global curriculum.* Surrey, England: WWF UK (World Wildlife Fund for Nature).

Pike, G., & Selby, D. (1999). *In the global classroom 1.* Toronto, ON: Pippin.

Pinar, W.F., Reynolds, W.M., Slattery, P, & Taubman, P.M. (2004). Understanding curriculum: An introduction to the study of historical and contemporary curriculum discourses. New York, NY: Peter Lang.

Proulx, J. (2008). Some differences between Maturana and Varela 's theory of cognition and constructivism. *Complicity: An International Journal of Complexity and Education, 5*(1), 11-26.

Raia, F., & Deng, M.C. (2011). Playful and mindful interactions in the recursive adaptations of the zone of proximal development: A critical complexity science approach. *Cultural Studies of Science Education, 6*(4), 903-914.

Reed, C.A. (Ed.). (1996) On becoming a global citizen. *Orbit, 27*(2), 1.

Reimer, K., & McLean, L.R. (2009). Conceptual clarity and connections: Global education and teacher candidates. *Canadian Journal of Education, 32*(4), 903-926.

Richardson, R. (1976). *Learning for change in world society: Reflections, activities and resources.* London, England: World Studies Project.

Richardson, R. (1990). *Daring to be a teacher: Essays, stories and memoranda.* Stoke-on-Trent, England: Trentham.

Richmond, B. (1993). Systems thinking: Critical thinking skills for the 1990s and beyond. *Systems Dynamics Review 9*(2), 113-133.

Richmond, B. (2000). *The "thinking" in systems thinking: Seven essential skills.* Waltham, MA: Pegasus Communications.

Roche, D. (1989). A passion for the planet. *The ATA Magazine, 69*(4), 16-18.

Romm, N. (1995). Some anomolies in Ulrich's critical inquiry and problem solving approach. In K. Ellis, A. Gregory, B.R. Mears-Young, and G. Ragsdell (Eds.) *Critical issues in systems theory and practice* (pp. 503-510). New York, NY: Plenum Press.

Rubin, H.J., & Rubin, I.S. (2005). *Qualitative interviewing: The art of hearing data*. Thousand Oaks, CA: Sage Publications.

Ruitenberg, C.W. (2007). Here be dragons: Exploring cartography in educational theory and research. *Complicity: An International Journal of Complexity and Education, 4*(1), 7-24.

Schultz, L. (2007) Educating for global citizenship. *The Alberta Journal of Educational Research, 53*(3), 248-258.

Schweisfurth, M. (2006). Education for global citizenship: Teacher agency and curricular structure in Ontario schools. *Educational Review, 58*(1), 41-50.

Selby, D. (1996). Towards the darker green school: Making education for sustainability sustainable. *Orbit (27)*2, 41-45

Selby, D. (1999). Global education: Towards a quantum model of environmental education. *Canadian Journal of Environmental Education, 4*, 125-141.

Selby, D. (2004). The signature of the whole: Radical interconnectedness and its implications for global and environmental education. *ZEP : Zeitschrift für internationale Bildungsforschung und Entwicklungspädagogik 27* (4, S). 23-31.

Semetsky, I. (2008). Not by breadth alone: Imagining a self-organized classroom. *Complicity: An International Journal of Complexity and Education, 2*(1), 19-36.

Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization*. New York, NY: Doubleday.

Simon Fraser University, Faculty of Education. (2008). Teaching and Learning for global perspectives. Brochure retrieved from https://tl4gp.wikispaces.com/file/view/globalbro.pdf/32570409/globalbro.pdf

Sinclair, M. (2004). Complexity theory in the mathematics lab-classroom. *Complicity: An International Journal of Complexity and Education, 1*(1), 57-71.

Skyttner, L. (2005). *General systems theory: Problems, perspectives, practice.* Singapore: World Scientific Publishing Co.

Smitherman, S. (2005). Chaos and complexity theories: Wholes and holes in curriculum. In W. E. Doll Jr., M.J. Fleener, D. Truitt & J. St. Julien (Eds.) *Chaos complexity, curriculum and culture* (pp.153-180). New York, NY: Peter Lang.

Sober, E. (1999). The multiple realizability argument against reductionism. *Philosophy of Science 66*(4), 542-564.

St. Julien, J. (2005). Complexity: Developing a more useful analytic for education. In W. E. Doll Jr., M.J. Fleener, D. Truitt & J. St. Julien (Eds.) *Chaos complexity, curriculum and culture* (pp.101-116). New York, NY: Peter Lang.

Stake, R.E. (2005). Qualitative case studies. In N.K. Denzin and Y.S. Lincoln (Eds.) *The Sage handbook of qualitative research* (3rd ed.) (pp.443-466). Thousand Oaks, CA: Sage Publications.

Stewart, M. (2012). Joined up thinking? Evaluating the use of concept‐mapping to develop complex system learning. *Assessment & Evaluation in Higher Education, 37*(3), 349-368.

Toh, SH. (1993). Bringing the world into the classroom: Global literacy and a question of paradigms. *Global Education, Global Literacy, 1*(1), 9-17.

Tye, K. A. (Ed.) (1990). *Global education: From thought to action.* Alexandria: Association for Supervision and Curriculum Development.

Tye, K. A. (2009). A history of the global education movement in the United States. In T. F. Kirkwood-Tucker (Ed.), *Visions in global education: The globalization of curriculum and pedagogy in teacher education and schools* (pp. 3-24). New York: Peter Lang.

Ulrich, W. (1988a). C. West Churchman – 75 years. *Systems Practice, 1*(4), 341-350.

Ulrich, W. (1988b). Churchman's "Process of unfolding" – Its significance for policy analysis and evaluation. *Systems Practice 1*(4), 415-428.

Ulrich, W. (1991). Critical heuristics of social systems design. In R.L. Flood and M.C. Jackson (Eds.) *Critical systems thinking: Directed readings* (pp. 103-115). Chichester, England: John Wiley & Sons Ltd.

Werner, W., & Case, R. (1997). Themes of global education. In I. Wright, & A. Sears (Eds.), *Trends and Issues in Canadian Social Studies* (pp. 176-194). Vancouver: Pacific Educational Press.

Willinsky, J. (1998). *Learning to divide the world: Education at empire's end*. Minneapolis, MN: University of Minnesota Press

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Young, J.M. (2003). Global education and good citizenship: An examination of student outcomes. unpublished Master's thesis, Simon Fraser University.

Young, J.M. (2010). Problems with global education: Conceptual contradictions. *Alberta Journal of Educational Research, 56*(2), 143-156.

Young, M., & Cassidy, W. (2004). The impact of a global education course on students' citizenship attitudes and behaviour. *Canadian and International Education, 33*(2), 57-87.

Appendices

Appendix A.

Ethics Consent Letters

1. Letter of consent for participating teachers

SIMON FRASER UNIVERSITY

Faculty of Education

Teachers' Conceptions and Experiences with Systems Thinking

within Global Education Practice

Letter of Consent For Teachers

A Message from the Office of Research Ethics, Simon Fraser University

The University and those conducting this research study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This research is being conducted under permission of the Simon Fraser Research Ethics Board. The chief concern of the Board is for the health, safety and psychological well-being of research participants.

Should you wish to obtain information about your rights as a participant in research, or about the responsibilities of researchers, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact the Director, Office of Research Ethics by email at xxxxxxx or phone at xxxxxxx.

Your signature on this form will signify that you understand the procedures, whether there are possible risks, and benefits of this research study, that you have received an adequate opportunity to consider the information in the documents describing the study, and that you voluntarily agree to participate in the study.

Title: Teachers' experiences with systems thinking within global education practice

Primary Investigator Name: J. Melanie Young

Co Supervisor: Kumari Beck

Co Supervisor: Suzanne DeCastell

Department: Faculty of Education, Simon Fraser University

Information From the Researchers

Study Overview

In this study, my goal is to explore teachers' understandings and practices of global education. I am interested in identifying what teachers think about global education and what it looks like in the classroom. I want to compare our ideas and practices, and also explore what, if anything, makes global education different from other teaching approaches.

About Global Education

Global education is essentially a holistic education which is concerned with interconnection, interdependence and awareness of multiple perspectives. Many teachers and scholars believe that a more holistic approach to curriculum and instruction will serve to better prepare students for a world where local lifestyles and decisions are increasingly interconnected within global contexts. Such an education, it is believed, will help students make more informed choices and give them a greater number of options in their lives, as well as prepare them for their roles as active participants in Canadian and global society. Global education is an approach used by teachers across Canada, from elementary school to post-secondary.

Procedures of this Study

A researcher will work with teachers individually to explore what they think of as global education, what it looks like, if and how it differs from other educational approaches. Procedures are as follows:

1)There will be one initial interview with each participating teacher. The interview will be taped and parts of it transcribed.

2)Each teacher will be asked to provide in advance an outline of a unit or lesson series that will serve as the subject of the observation.

3)The researcher will visit the classroom, to observe the practical implementation of the unit or lesson series. The focus will be on what the teacher does in the classroom. The number of visits will be negotiated between the researcher and the teacher. There should be no less than 3 and no more than 8 classroom visits. Classroom visits will be videotaped.

4)The researcher and the teacher will collaboratively examine the results of this data collection. The process of this collaboration will be: an initial interpretation of the teaching observation will be provided to the teacher. The teacher will then have the opportunity to respond either in writing or in person. If in person, the conversation will be taped and parts of it transcribed. The researcher can again respond and this collaborative interpretation process will continue until the researcher and the teacher are satisfied. This interpretive process should be complete within two months of the observation.

5)The researcher will provide an interpretation of a compilation of the individual teachers' understandings and experiences based on initial interviews, observations and collaborative interpretation processes.

6)All study participants (teachers and researchers) will gather together to respond to the researcher's interpretations. This meeting will take place in the summer of 2010.

7)Study participants may also provide individual responses to the researcher's interpretations of the groups experiences if they choose to do so.

Benefits

This study will contribute to a field bereft of empirical studies on how global education is understood and practised at the classroom level. It may help teachers to decide whether or not they want to adopt this approach and how they might do so. It may also help teacher education programs in their program development.

Anonymity and Confidentiality

Confidentiality and anonymity will be assured for all participants. Identifying information for the teachers and the students in their classes will only appear on the ethics documentation.

Risks and Handing of Personal Information: We foresee no risks to participants and will ensure each participant's privacy and confidentiality during all stages of research - collection, coding, analyzing and using of data.

All data resulting from this empirical study will be stored on a disk and a memory stick. These will be kept in a locked environment (a strong box) in the researcher's private residence. After completion of the study, the data will be stored for up to 7 years and will be available to former participants upon request, through contact with the principal investigator.

Participants can withdraw at anytime without prejudice or in the case of participants who are students, without adverse effect of their grades or evaluation in the classroom or coursework.

Permissions

Permission will obtained from the school district, school principal, students and parents/guardians of students before observations begin.

Ethical Concerns

This research project has sought ethical approval from SFU's Office of Research Ethics. Should any participant wish to discuss concerns about this study with the department of research ethics at SFU they may contact:

Dr. Hal Weinberg, Director

Office of Research Ethics

Simon Fraser University

Xxxxxxx

Obtaining Study Results : Should any participant like to obtain copies of the results of this study, please do so upon its completion by contacting J. Melanie Young at < xxxxxxx > after December 2010.

I have received this document, which describes the procedures, possible risks, and benefits of this research study, I have received an adequate opportunity to consider the information in the document, and I voluntarily agree to participate in the study. I understand that the data collected in this study may be used in other studies of global education and teacher practice. I understand

that my agreement to participate in this study does not constitute an agreement to participate in any future study. I understand that I may withdraw my participation at any time. I also understand that I may register any complaint with the Director of the Office of Research Ethics.

Dr. Hal Weinberg

Director, Office of Research Ethics

Office of Research Ethics

Simon Fraser University

8888 University Drive, Multi-Tenant Facility

Burnaby, B.C. V5A 1S6

Xxxxxxx

I may obtain copies of the results of this study, upon its completion by contacting: J. Melanie Young (xxxxxxx), Dr. Kumari Beck (xxxxxxx), or Dr. Suzanne DeCastell (xxxxxxx) after December 2010. I understand the risks and contributions of my participation in this study and agree to participate: Please fill in this area. Please print legibly

Participant's Full Name

Participant's Signature:

Date

2. Addendum to letter of consent for participating teachers

SIMON FRASER UNIVERSITY

Faculty of Education

Teachers' Conceptions and Experiences with Systems Thinking

within Global Education Practice

Interview Prior to District Approval:

Addendum to Letter of Consent For Teachers

I have received the document, Letter of Consent for Teachers, which describes the procedures, possible risks, and benefits of this research study, I have received an adequate opportunity to consider the information in the document, and I voluntarily agree to participate in the study. My signature on that document constitutes my agreement to participate in the study.

This addendum document shows my agreement to begin the first part of this study, the interview, before receiving district approval for this study. I understand that the classroom observation portion of this study will not be carried out until approval from the district, principal, parents or guardians, and students has been obtained.

Participant's Full Name

Participant's Signature:

Date (use format MM/DD/YYYY)

School Principal's Name

School Principal's Signature (If the interview is carried out on school property)

Date (use format MM/DD/YYYY)

3. Letter of consent for parents

SIMON FRASER UNIVERSITY

Faculty of Education

Teachers' Conceptions and Experiences with Systems Thinking

within Global Education Practice

Letter of Consent

For Parents or Guardians of Minors

Primary Investigator Name: J. Melanie Young

Co Supervisor: Kumari Beck

Co Supervisor: Suzanne DeCastell

Department: Faculty of Education, Simon Fraser University

Information From the Researcher

Study Overview

In this study, our goal is to explore teachers' understandings and practices of global education. We are interested in identifying what teachers think about global education and what it looks like in the classroom. We want to compare our ideas and practices, and also explore what, if anything, makes global education different from other teaching approaches.

About Global Education

Global education is essentially a holistic education which is concerned with interconnection, interdependence and awareness of multiple perspectives. Many teachers and scholars believe that a more holistic approach to curriculum and instruction will serve to better prepare students for a world where local lifestyles and decisions are increasingly interconnected within global contexts. Such an education, it is believed, will help students make more informed choices and give them a greater number of options in their lives, as well as prepare them for their roles as active participants in Canadian and global society. Global education is an approach used by teachers across Canada, from elementary school to post-secondary.

Your child's participation

The focus of this research is the teacher's thinking and action in their regular classes. A researcher will come into the class to observe and video the teacher working. Your child will only be a subject of observation when she/he is interacting with the teacher, and the focus will always be on the teacher's actions and reactions.

Your child's participation in this study is limited to allowing the researcher to come in to and videotape regular classes class. The focus of the researcher will be upon the teacher and her/his practice, not on the students and their work. Your child will NOT be asked to do anything special for this study.

Benefits

This study will contribute to a field bereft of empirical studies on how global education is understood and practised at the classroom level. It may help teachers to decide whether or not they want to adopt this approach and how they might do so. It may also help teacher education programs in their program development.

Anonymity and Confidentiality

Confidentiality and anonymity will be assured for all participants to the full extent permitted by law. Identifying information for the teachers and their classes will only appear on the ethics documentation.

Because the study involves observation of teachers in their classrooms documented on video, students will appear in the pictures. The videos are for the reference of the teacher and the researcher. If at any time in the future the videos are shown to an educational audience, the faces of the students will be blurred. If any student (or their parent/guardian) does not wish to appear in the video at all, then any section of the video where that student appears will be obscured.

Risks and Handing of Personal Information: We foresee no risks to your child and will ensure each child's privacy and confidentiality during all stages of research - collection, coding, analyzing and using of data. The class will not be informed as to who has agreed to participate and who has not. If students do not want to participate in this study, their grades or classroom relationships will not be affected.

All data resulting from this empirical study will be stored on a disk and a memory stick. These will be kept in a locked environment (a strong box) in the researcher's private residence. After completion of the study, the data will be stored for 8 to 10 years.

Students can withdraw at any time without prejudice and without adverse effect of their grades or evaluation in the classroom or coursework.

Permissions

The teacher has signed a consent letter to participate in this study. Permission has been obtained from the school district and school principal.

Obtaining Study Results : Should any participant like to obtain copies of the results of this study, please do so upon its completion by contacting J. Melanie Young at < xxxxxxx > after December 2010.

A Message from the Office of Research Ethics, Simon Fraser University

Ethical Concerns

This research project has received ethical approval from SFU's Office of Research Ethics. Should you wish to obtain information about your child's rights as a participant in research, or about the responsibilities of researchers, or if you have any questions, concerns or complaints about the manner in which you were treated in this study, please contact the Director, Office of Research Ethics.

Dr. Hal Weinberg, Director
Office of Research Ethics
Simon Fraser University
xxxxxxx
xxxxxxx.

The University and those conducting this research study subscribe to the ethical conduct of research and to the protection at all times of the interests, comfort, and safety of participants. This research is being conducted under permission of the Simon Fraser Research Ethics Board. The chief concern of the Board is for the health, safety and psychological well-being of research participants.

Your signature on this form will signify that you understand the procedures, whether there are possible risks and benefits of this research study, that you have received an adequate opportunity to consider the information in the documents describing the study, and that you voluntarily agree to allow your child to participate in the study.

I have received this document, which describes the procedures, possible risks, and benefits of this research study, I have received an adequate opportunity to consider the information in the document, and I voluntarily agree to allow my child to participate in the study. I understand that the data collected in this study may be used in other studies of global education and teacher practice. I understand that my agreement to allow my child to participate in this study does not constitute an agreement to participate in any future study. I understand that I may withdraw my child's participation at any time. I also understand that I may register any complaint with the Director of the Office of Research Ethics.

Dr. Hal Weinberg

Director, Office of Research Ethics

Office of Research Ethics

Simon Fraser University

8888 University Drive, Multi-Tenant Facility

Burnaby, B.C. V5A 1S6

xxxxxxx

I may obtain copies of the results of this study, upon its completion by contacting: J. Melanie Young (xxxxxxx), Dr. Kumari Beck (xxxxxxx), or Dr. Suzanne DeCastell (xxxxxxx) after December 2010. I understand the risks and contributions of my child's participation in this study and agree to allow their participation.

Please fill in this area. Please print legibly

Child's Full Name

Parent or Guardian's Full Name

Parent or Guardian's Signature:

Date (use format MM/DD/YYYY)

4. Letter of consent for elementary school students

<div align="center">

SIMON FRASER UNIVERSITY

Faculty of Education

Teachers' Conceptions and Experiences with Systems Thinking

within Global Education Practice

Letter of Consent For Elementary Students

</div>

Hi! My name is Melanie and I am a researcher. I am very interested in the work your teacher is doing in class. I was wondering if I could come to your class and watch your teacher teaching. I would like to bring in a camera to video my visits to your class. The video is for the teacher and I to look at. If anyone else watches the video (like another teacher) then your face will be blurred so no one will know who you are.

1) Is it OK if I video you while you are working in the classroom?

____ YES

____ NO   (if you do not want to be in the video please know that this will not affect your

                    marks or grades in the class)

2) Is it OK if I video you talking to your teacher?

____ YES

____ NO   (if you do not want to be in the video please know that this will not affect your

                    marks or grades in the class)

3)Is it OK if I video you talking to other students about your work?

____ YES

____ NO   (if you do not want to be in the video please know that this will not affect your

                    marks or grades in the class)

If you have any questions about the work I am doing, I would love to hear them!

Please SIGN your name here if you read and understand what this project is about

_____

Thanks again,

Melanie Young

5. Letter of consent for secondary school students

SIMON FRASER UNIVERSITY

Faculty of Education

Teachers' Conceptions and Experiences with Systems Thinking

within Global Education Practice

Letter of Consent For Secondary Students

Hello

My name is Melanie Young and I am a researcher at Simon Fraser University. I am studying what your teacher thinks about teaching and how your teacher teaches in order to find out what global education looks like in the classroom. I would like to come to your classroom and observe your teacher at work. I would like to bring in a camera to video my visits to your class. The video is for the teacher and I to look at. If anyone else watches the video (like another teacher) then your face will be blurred so no one will know who you are. I am writing this letter to ask if this is okay with you?

If it is not okay, then I will do my utmost to ensure that you do not appear on the video. If you do, I will ensure that the scene is obscured. If you do not want to appear in the video, this will not in any way affect your grades and no one will know that you have chosen not to take part.

1) Is it OK if I video you while you are working in the classroom?

____ YES

____ NO   (if you do not want to be in the video please know that this will not affect your

                marks or grades in the class)

2) Is it OK if I video you talking to your teacher?

____ YES

____ NO   (if you do not want to be in the video please know that this will not affect your

                marks or grades in the class)

3) Is it OK if I video you talking to other students about your work?

____ YES

____ NO   (if you do not want to be in the video please know that this will not affect your

                marks or grades in the class)

If you have any questions about the work I am doing, I would love to hear them!

Please SIGN your name here if you read and understand what this project is about _____

Thanks again,

Melanie Young

Appendix B.

Initial Interview Script

On the research question: it began, as they know, with my being interested in the barriers teachers face when they try to practice global education. However, after consultation with my supervisors, it was decided to expand the question because looking specifically at barriers carried with it a number of assumptions that needed to be tested (even that there were barriers). So the question changed to the more general, focus on interconnection and interdependence within global education, how teachers understand and practice these concepts, whether practices change once they adopt the approach, and how this understanding and practice differ from other educational approaches.

Procedure: Teachers agree to an initial interview followed by a period of classroom observation, the number of observations to be negotiated (primarily the teacher's decision).

Explain why I think observation is important (the difference between planned and lived curriculum).

Following this is a collaborative interpretation of the data and they can contribute as much or as little as they would like.

Then I will compare data between participants, and during a summer meeting (with dinner) we will all together talk about some questions or ideas that came up (perhaps commonalties or differences). Again they can contribute their own interpretations. Make it clear that their voices will be heard in the final work, whether they agreed with me or not.

Point out that I cannot look at students' work or interview students BUT they can come and talk to me and the participants can include students' work in their discussions of what happened in the class.

Ethics: Explain the ethics requirement that teachers and other students not know who has agreed to participate and who has not.

To teacher: Please collect but not look at the students' consent forms, and to just collect the parents' ones. Explain that any consents which did not get handed in will be considered a non-participant. Talk about my ideas for ensuring that non-participating students do not appear on camera (lanyards, wristbands).

Intentions: Talk about my own intentions: getting a PhD, getting publications, contributing to the field, finding out about myself as researcher.

Power and risks: Talk about how power worked in this process: first, in our original relationship as teacher-student, second in our roles as researcher and researched, and third in our roles as university "expert" and practice "expert". Talk about how awareness and openness about this will both help the research outcomes but also the research process because this is also an

exploration of what is hopefully a systems methodology. Talk about the risk in this process: risks for them (feeling like they're being evaluated, finding out that their ideas of what they do and what they actually do may not be the same); and risks for myself (that I don't become the evaluator - always a risk for someone as critical as I- and that my research process lives up to my research intention not to exploit the participants or betray their trust, and to approach this in a "global ed" way, whatever that is!)

I've tried to, within the structure of this process, make sure that participants' voices are heard. Also, it is important that our intentions and potential concerns about power and risks be out on the table and open for discussion.

Appendix C.

Initial Interview Questions

<u>Methodology Questions</u>

What has been your relationship in the past to educational research – drawing upon it, engaging in it?

What are your intentions / reasons for participating in this study?

What concerns or worries do you have with regard to this process (e.g. being critiqued / evaluated; discovering that intention and practice do not coincide; differences in interpretation; taking too much time)?

<u>Global Education Questions</u>

What drew you to global education initially? Having studied and perhaps practiced the approach for some time, how have your initial reasons changed or developed if at all?

What readings, if any, have had an impact on your understanding of global education and/or on your practice of the approach?

What experiences have had an impact on your understanding of global education and/or on your practice of the approach?

What is global education in your estimation? Can you give an outline of its content, values and purposes?

Have you, in recent years, made a conscious effort to approach your teaching practice as a global educator?

When taking a global approach to teaching, did you perceive a shift from your previous approach to teaching?

If not, what differentiates global education from other approaches to education?

If you did perceive a shift, then how much of a shift? What internal shifts, changes to your thinking, did you experience? What external shifts, changes to your practice, did you experience? Can you give examples of each?

Can you describe situations or experiences where you have felt that you successfully practiced a global approach in your classroom. What made this global? Was this successful for the students as well? Why or why not?

Do you sometimes experience difficulty in enacting global education in your practice? Can you give examples? What do you think causes these difficulties? Can you see possible ways to address them?

Do you think other teachers take a similar approach to their practice? Why might they do so? Why might they not?

Appendix D.

Observations Times

Jay: Grade 6	Deekay: Grade 12	Ella: Grade 10	Kasey: Grade 1-2
April 14 3 hours 55 minutes	May 17 1 hour 15 minutes	April 19 1 hour 20 minutes	April 29 5 hours
April 15 3 hours 15 minutes	May 18 1 hour 15 minutes	April 21 1 hour 20 minutes	April 30 5 hours
April 16 1 hour	May 19 1 hour 15 minutes	April 26 1 hour 20 minutes	
	May 20 1 hour 15 minutes	April 28 1 hour 20 minutes	
	+ 1 hour 30 minutes of time before and after classes	+ 1 hour 30 minutes of time before and after classes	
8 hours, 10 minutes	**6 hours, 30 minutes**	**6 hours, 50 minutes**	**10 hours**

Appendix E.

Simulation in Ella's Grade 10 class

Case	A 16-year-old by from ** High School is at a party in ** on a Saturday night in June. We will call him David. There are 40 people there, but no adults and no parents. There is alcohol and marijuana. Just before midnight, a large group of people are outside by a bonfire and witness David having an argument with his girlfriend. She separates herself from him, and when he tries to follow her, she screams at him to leave her alone. David becomes agitated, swearing and pacing, then finishes his beer and leaves the party in his father's truck. He is alone. Speeding westbound on ** Road, from **Street, he pulls into the on-coming traffic lane in order to pass another vehicle. An eastbound car comes over the crest of the hill, and the boy collides with it head-on. The driver, 25-year-old Rita, is killed instantly and her 14-year-old sister Kelly, a passenger in the car, is thrown from the vehicle and suffers minor injuries. David suffers a concussion and his right leg is badly broken.
Instructions	You will be asked to join a team to represent the following groups. What questions and/or concerns does your group want to put forth? What might your group propose in terms of charges or an appropriate punishment for David?
Roles	Police officers called to the accident, as well as an emergency medical team, and representatives from Insurance Corporation of British Columbia (ICBC).
	A group of senior students from ** High School. You are friends of David. Some of you were at the party.
	A group of student government leaders from a different high school in another town. You do not know any of the people involved.
	A group of people from Mothers Against Drunk Driving (MADD).
	A group of parents whose children have been involved in serious car accidents while drinking.