POLICY AND PRACTICE IN EDUCATION

The editorial board welcomes contributions on most aspects of the education of those who teach. Whether this teaching occurs in elementary, secondary, or postsecondary institutions, which is our primary focus, or in other institutions, such as business and industry, government, or the military, the board is interested in exploring how people become teachers, how their practice matures, what issues and challenges they face, and how the public policy context shapes their practice. The board especially wishes to encourage two kinds of manuscripts: (a) those in which are illuminated the complexities of teaching through established and emerging theories and programs of research, and (b) those in which matters preoccupying contemporary debates about teaching and the public policy context of teaching are critically examined. Manuscripts should be written in an accessible and rigorous style, which communicates to specialist and nonspecialists. *Policy and Practice in Education* is published by the Faculty of Education, at the University of Regina, Regina, SK, Canada.

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Many splits exist in the teaching and learning of mathematics: splits between theory and practice, between instruction and assessment, and between what preservice teachers say about what it means to know mathematics and what it means to teach mathematics. The authors present a case for the need for teacher educators to acknowledge and address the splits between teaching and doing as experienced by preservice teachers in their teacher education programs. In acknowledging the multidimensionality of mathematics knowing and doing, in particular, they examine the potential role of portfolio assessment in healing the split between instruction and assessment in mathematics.

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Professional Development for Global Education: Possibilities and Limitations

The first picture of Earth from space had a reorienting effect on the human psyche. The recognition of the singular frailty of the planet caused teachers and scholars to explore ways of developing curriculum to prepare future generations to live justly, consciously, and peacefully in the world, efforts that generally came to be defined as global education. More than three decades following these early initiatives, the preparation of teachers for global education remains a challenge. In this article, William Gaudelli examines the possibilities and limitations of a professional development workshop on global education. The workshop consisted of a week-long inservice and seven months of support and follow-up activities.

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This study examines a school-university collaboration among four educators who work together to improve their respective educational practices. A teacher educator/researcher, a vice-principal/teacher, an experienced teacher, and a novice teacher combine their teaching expertise to plan and co-teach an integrated science and music unit in two grade 4/5 classes. Data analysis reports about the nature of teaming and about the influence of these elements on teaching and learning. Optimistic reflections emerge on how to cultivate and nurture educational partnerships.

EDITORIAL

Ann Kipling Brown

Reflective Practice and Professional Dialogue

Professional development plays a key role in our work as educators. In this edition of *Policy and Practice in Education*, the authors suggest ways that educators can work together to provide significant learning experiences for students. All promote the importance of reflective practice and professional dialogue among preservice, novice, experienced, and university educators in well-designed programs and over extended periods of time.

Kathleen Nolan and Sonya Corbin Dwyer, in "The Role of Portfolios in Healing the Splits between Instruction and Assessment in Mathematics", examine the use of portfolios as teaching and evaluative tools in two university undergraduate courses: a mathematics course and a psychology course in assessment. Students were asked in both courses to reflect on the use of the portfolio and to identify how the portfolio may have changed their views on assessment. The article draws upon both courses for data to confirm the possible role of the portfolio in the classroom. Most importantly, the specific example of the use of the portfolio in the teaching of mathematics is described. Two prominent gaps in the teaching of mathematics are discussed. First, the divide between the learning of mathematics and the teaching of mathematics is clarified. Second, the resultant gap between instruction and assessment in mathematics is outlined. The authors encourage a re-evaluation of the traditional notion that mathematics is about getting the right answer, and promote the recognition that there are diverse ways of knowing and doing in mathematics. The portfolio is regarded as a means of closing those gaps and assisting in changing the way mathematics is taught. The portfolio is defined as a record and reflection of the student's learning that reveals both the student's knowledge and understanding of the subject. The authors emphasize the role of the portfolio in the classroom as providing both the teacher and the student a voice in determining what will be learned and how learning will be demonstrated. They project that the portfolio

process will make students more active learners. However, from the reflections of the undergraduate students involved in the mathematics portfolio, the authors feel strongly that the preservice teachers will face many challenges as they attempt to change the traditional and comfortable approaches to teaching and learning mathematics.

William Gaudelli, in his article "Professional Development for Global Education: Possibilities and Limitations", emphasizes the need for teaching for diversity and provides a definition of global education as "curriculum that seeks to prepare students to live in a progressively interconnected world." An explanation of the development of global education and the comments for and against its inclusion in school programs provide insight into the development and implementation of his project. He shuns present practice that focuses on national interests and events and encourages a practice that provides students with opportunities to deal with diverse points of view and alternatives. He challenges teachers to understand the need for global education and to act on their thinking about diversity in their teaching practice. As such, he created the World Teaching Institute (WTI), a university-based professional development workshop for preservice and inservice teachers that provides significant and relevant experiences in global education. Clearly, he is aware that teachers are often reluctant to become involved in new initiatives in curriculum development and implementation, seeing these projects as adding to the work they already do. The often short and episodic workshops, together with the lack of quality resources and knowledge, do not help to alleviate these concerns. As a consequence, the design of the WTI involves experiential activities that are varied and extensive with opportunities for educators to dialogue face-to-face as well as on-line. Gaudelli provides a detailed description of the intensive week-long activities as well as the interaction during the following months of the workshop. In order to assess the benefits of the institute, he examined the responses of six of the fifteen participants in the professional development workshop. He explains that even though the learning of the participants was significantly different there were some common perspectives. He draws upon the data to suggest that dialogue among professionals is of paramount importance and that planning for dialogue should be part of any professional development workshop. Additionally, there should be a diversity of offerings from lecture, experiential activities, face-to-face encounters, on-line chat rooms, well-developed resources, and support from

administration and peers. There seems to be some potential for using this research to inform the design and implementation of any professional development program, and to challenge some of the formal structures that typically provide educators with access to curriculum development and implementation.

Andréa Mueller's investigation presents further solutions to the many curriculum expectations faced by the educator and the continuing environment that promotes the learning of facts, figures, and formulas. In "Learning How to Improvise: The Changing Rhythms of a Team Teaching Quartet", she describes an integrated unit involving music, technology, and science, which was presented to two groups of elementary students by a vice principal/teacher, a novice teacher, an experienced teacher, and a research assistant/teacher and university professor. This team approach provided opportunity for professional discourse and allowed for each individual to draw upon the strengths of others. The success of this project depended on everyone's ability to participate fully and to have time and opportunity to plan and debrief together. As is the case in many school environments, teachers, particularly those with administrative duties, are often called away for periods of time to deal with immediate crises. Despite the fact that it was not possible to co-teach at all times, the participants learned much from each other. Three key themes were identified: demonstrations by the expert provided content learning as well as pedagogical content knowledge for the other teachers; hands-on-learning is important not only for the teachers' own learning but for that of their students; and group work was critical as the children learned from each other. Mueller highlights the importance of professional dialogue, and recommends that educational partnerships between schools and faculties of education would improve their respective educational practices.

For these authors, learning is an active process and much of the learning about teaching is through the practical experience of teaching; whatever the setting, it seems that there are opportunities for educators to work together. There is definitely a need to create opportunities for researchers and professional educators to work together to improve educational practices. It is important to foster situations where university faculty and teachers plan together and co-teach, or where novice and experienced teachers share their individual expertise in a team-teaching situation, or where preservice teachers have an opportunity to

examine both their content and pedagogical knowledge with reference to their experiences as student and teacher.

The Role of Portfolios in Healing the Splits between Instruction and Assessment in Mathematics

Kathleen Nolan and Sonya Corbin Dwyer
University of Regina, Regina, SK Canada

Many splits exist in the teaching and learning of mathematics: splits between theory and practice, between what preservice teachers say about what it means to know mathematics and what it means to teach mathematics, between learning goals and performance goals, and between the language of learning goals and performance goals (Nolan and Corbin Dwyer, 2002). Another split that appears closely connected to the others is between instruction and assessment in mathematics. What can teacher educators do about healing these splits, in particular, those between instruction and assessment?

This paper emerges out of two recent studies with elementary preservice teachers at a Canadian university. In the first study, conducted in an introductory educational psychology course on assessment, students were asked to reflect on the use of portfolios as a teaching and evaluative tool within the course. From this first study, we worked to understand the difficulties student teachers have in generalizing what they learn in their teacher education courses and the transfer to their practice as teachers. In the second study, conducted in a mathematics curriculum and instruction course, students were asked to reflect on their past experiences of assessment in mathematics as well as their views on portfolio assessment. The results of these studies suggest the need for teacher educators to acknowledge and address the splits between teaching and doing, between theory and practice in teacher education programs. In particular, from the second study, our objective was to examine critically these splits in the context of how portfolio assessment has the potential to heal the split between instruction and assessment in mathematics.

The Splits in Mathematics

In order for prospective teachers to develop the reasoning and sense-making abilities of their future students, the teachers themselves must make sense of and reason about the mathematics they will teach. However, many prospective teachers have only experienced mathematics as the rote following of procedures, and are not aware that reasoning can be used to solve problems in non-standard ways, or that reasoning underlies the standard procedures in mathematics. (Beckmann, 2002)

In examining the many splits between teaching and learning mathematics, a common problem for preservice teachers is that they "know very little about how the mathematics they have learned can be applied" to what is taught at the elementary and secondary levels (Bloch, 2002, p. 3). "It is therefore difficult for them to get a critical and reflexive point of view on mathematics" (Bloch, p. 3). Most teacher education programs focus on the development of teaching skills, which may include "encourag[ing] student teachers to get involved in the process of inquiry as learners [and] also as teachers" (Spiliotopoulou and Potari, 2002, p. 2). The divide, however, between the learning of mathematics and the teaching of mathematics inadvertently conveys mixed messages as preservice teachers occupy the two (seemingly exclusive) roles of learner and teacher. We believe that these mixed messages can result in a split between instruction and assessment in mathematics.

The instruction/assessment split is likely fostered through a view of mathematics as being close-ended and very procedurally oriented. In a recent study (Nolan, 2001), an elementary preservice teacher was quoted as saying:

> *Math is yes or no … I* know *I'm going to get the right answer. Math to me seems like sort of a closed box. This is math. Here it is. These are the boundaries and it stops right here.* (p. 102)

This preservice teacher is expressing a predominant view of what it means to know in mathematics, that is, to get to one right answer. This view has been shaped from traditional experiences of instruction and assessment in mathematics. In a (typical) traditional mathematics classroom, the teacher attempts to cover content objectives by delivering factual information via a few illustrative examples. The students' knowledge of mathematics is then assessed through a written test that (typically) requires them to repeat the same procedures demonstrated by the teacher. From this perspective, it follows that no matter how determined teacher educators are to introduce varied and interesting strategies for

mathematics instruction, preservice teachers' views on assessment remain focused on being able to "do" or perform mathematics to get the right answers. It is no wonder then that if assessment remains primarily within the realm of traditional tests and quizzes, major shifts in instruction are unlikely to be realized.

The National Council of Teachers of Mathematics, in an examination of why and how assessment practices should be changed, discovered that many students "saw assessment as somehow different from instruction, as a sequence of separate events that were not connected very well with what they did each day in class" (NCTM, 1998, p. 5). In order to make mathematics more meaningful, contextual, and real-life, curriculum, instruction, and assessment must be closely linked.

> Almost anyone who has anything to say about assessment of student learning is apt to agree that curriculum (what students are to learn), instruction (how it will be learned), and assessment (how learning will be monitored) should be closely related. (Kuhs, 1997, p. 83)

In a model mathematics classroom, instruction and assessment will be interwoven such that the ways in which mathematics is taught and learned are also the ways in which mathematics is done and knowledge assessed. Acknowledging diverse ways of knowing mathematics means altering assessment strategies, which in turn necessarily implies altering instruction strategies and curriculum interpretations.

Kuhs (1997) promotes diverse ways of knowing and assessing mathematics. She writes about a "portfolio culture" as one in which the roles of students and teachers are reshaped. Students are actively involved in goal setting for their own learning, as well as in the monitoring of the progress toward these goals; instruction is not seen as "received" by the student but, instead, both teacher and student have a voice in determining what will be learned and how the learning will be demonstrated (p. 31). In such a mathematics classroom, where process becomes more important than product, portfolio assessment becomes one very important means for linking curriculum, instruction, and assessment.

Healing the Splits:
Portfolio Assessment in the First Study – Educational Psychology

My questions reveal huge gaps — crevasses even — between

> what I think my students should be able to say and what they actually do say. (Danielewicz, 1998, p. 33)

Before proceeding with our discussion of portfolio assessment in a course on educational psychology, it is important to provide a working definition of portfolio. There are, in fact, different types or levels of portfolios (Duffy, Jones, and Thomas, 1999). The distinguishing characteristic is often whether they are used as process or product. As Meyer and Tusin (1999) point out, "[a]t one end are educators viewing portfolios as evolving works and at the other those viewing them as showcases. In the middle are educators seeing value in both the process of creating a portfolio and the final product" (p. 131).

While there is no common definition of portfolios or methods for using them, for the purpose of this article, a portfolio is defined as being a record of learning that focuses on the student's work and on the student's reflections or metacognition regarding that work. Material is generally collected collaboratively by the teacher and the student. It is an attempt to provide a holistic picture of the student's learning within contexts of significance. It also allows assessment to be blended with instruction rather than making measurement a task outside of, and in addition to, learning (Pawluk, 2000; Kuhs, 1997). This definition is not meant to be exhaustive but to provide the reader an idea of what is being referred to in this article by the term portfolio.

Our intention is not to go into detail about how mathematics portfolios might look. Instead, we explore the role of portfolios in mathematics education; preservice teachers' attitudes and beliefs toward using portfolios; and what we, as teacher educators, can do to promote their use in healing the splits between instruction and assessment. In doing so, a crucial question to ask is whether preservice teachers are willing to examine their beliefs and attitudes about what it means to know mathematics, even if such a process might call for shifts in thinking that directly contradict their experience of learning mathematics.

> "Theory" in the academy usually designates some account of depersonalized structures … Instead, I want students to attach the word "theory" to the act of deliberation, to their attempts to articulate beliefs which are often unconscious and contain significant contradictions. Theorizing means being self-conscious about one's beliefs, one's identity, and intentionally considering how those beliefs might translate into future action. (Danielewicz, 1998, p. 35)

Today's school climate asks teachers to engage their students in

higher-order thinking skills, to be reflective about their own learning, to integrate evidence of their students' learning, and to continually re-examine their practice and the curriculum (Lyons, 1999). Portfolios as assessment tools can help teachers meet these goals. Fenwick and Parsons (1999) list the benefits of portfolios: portfolios help students set and monitor goals as they reflect upon their learning, evaluate items, make selections, and rationalize choices; the creation of a portfolio requires new skills, critical reflection, and self-analysis; portfolios show student growth over time by providing continuity, integration, and a record of overall progress; they show the process of learning, not just the outcomes as collected work reflects the students' learning stages; and portfolios may reveal instructional gaps allowing teachers to reshape instruction. Specifically in mathematics education, many students (particularly women) do not view themselves as participants in the construction of mathematics knowledge but instead see the teacher as an agent who delivers factual information, rules, and formulas, which must be memorized (Seaman, Nolan, and Corbin Dwyer, 2001). Portfolios address these issues when students become active participants in their learning.

Increasingly, in teacher education programs, portfolios are used as tools for assessing the progress of preservice teachers. "Often, preservice teachers have a grasp of the necessity of such techniques, are able to explain their application in the tests that they write and, less frequently, are asked to demonstrate that understanding" (Corbin Dwyer and patterson, 2001, p. 18). In our university's teacher education program, portfolios are used as a teaching and evaluative tool in an undergraduate educational psychology course on assessment. Their use is integrated with other assessment techniques. The portfolios are designed to provide opportunities for preservice teachers to develop and assess their own learning, and to identify strengths and areas requiring improvement in instruction and assessment. One component of the portfolio asks student teachers to provide written reflections on the process of creating their portfolios, which they then share with their peers. These reflections, which coincided with the end of the term, indicated that the portfolios engaged the student teachers in different ways:

- *This discussion … made me think I am trying to find appropriate ways for using different types of assessment and that I am thinking about how to use this in a functional manner.*
- *As a teacher, you would have to make the students feel comfortable with a new way of learning that would take away from paper and pencil tests. We cannot stop there, as parents and guardians also need to feel comfortable with and understand the effectiveness of authentic assessment.*
- *In terms of learning contexts, I mentioned how important it is for students to have choice in what they learn and how they want to represent it*

The first statement suggests a split between instruction and assessment, as assessment does not appear to be connected or contained within instruction. The last two comments including reference to "learning" and "learning contexts," demonstrate the preservice teachers' increasing awareness of different ways of "knowing" on the part of their students. However, it appears from these comments that preservice teachers did not make a link between assessment and instruction and how one informs the other.

According to Liebars (1999), if preservice teachers are expected to use alternative forms of assessments, then they must first experience them. However, it appears that they find it difficult to generalize from their experience in teacher education courses to use in their own practice. It is essential that teacher educators build bridges between what preservice teachers learn in their teacher education courses and the classrooms in which they will teach.

Healing the Splits: Portfolio Assessment in the Second Study – Education

In this section, we explore the use of portfolios in mathematics, including how preservice teachers reveal what teaching/learning/assessing mathematics means to them. Before doing this, a discussion on what it means to know (in) mathematics is required.

Dimensions of Mathematical Literacy

The National Council of Teachers of Mathematics has recently advocated important changes in mathematics assessment practices (NCTM, 1999, p. 5). For example, NCTM calls for a shift away from assessing only students' knowledge of specific facts and isolated skills and toward assessing students' full mathematical power, and

from limiting students to single, universal ways of demonstrating their mathematical knowledge. Instead, students should be provided with multiple opportunities to demonstrate their mathematical knowledge. Both of these recommended reforms in assessment practices direct attention to a need for understanding the many dimensions of knowing and doing mathematics and to becoming mathematically literate.

Cathcart, Pothier, and Vance (2000) describe seven areas of assessment in mathematics: knowledge, connections, problem solving, reasoning, communication, technology, and attitude (pp. 31-33). To better align curriculum, instruction, and assessment in mathematics, it is important that these areas of assessment also be viewed as areas of instruction and curriculum. In this context, referring to them as dimensions of mathematical literacy (Nolan, 2002) better conveys the importance of these seven areas. To take the dimensions seriously means that teachers must consciously provide experiences and opportunities for students to develop each of these dimensions. To become mathematically literate is clearly distinguishable from becoming a "number cruncher," an expression a preservice teacher recently used to describe what it means to know mathematics (Nolan, 2002).

For a portfolio to assist teachers in both instruction and assessment, teachers must provide activities that address each of the dimensions of mathematical literacy. There must be a deliberate effort to link the things students are asked to do in mathematics class (instruction) with what students learn in mathematics class (assessment). As mentioned previously, creating this kind of portfolio culture (and, for that matter, mathematics culture) "requires considerable effort and commitment to the idea that educators must find ways to assess all dimensions of learning instead of accepting traditional explanations of what can be measured and how assessment should be done" (Kuhs, 1997, p. 99).

Dimensions of Mathematics Portfolios

In the second study, a group of preservice teachers (different from the group in the first study) in a middle years mathematics curriculum and instruction course were given a survey to gather data on their ideas about the use of portfolios in teaching and learning mathematics. At the same time, they were required to complete a portfolio assignment as part of this course. The portfolio

assignment was designed to demonstrate students' growth in their awareness of the multi-dimensionality of mathematics teaching and leaning, addressing primarily mathematics pedagogical content objectives through the various entries. Some examples of the portfolio entries were problems of the week, professional development activity reflection, journal responses to in-class math questions, a mathematical portrait, a poem, and a personal choice entry.

The contents of the portfolio assignment used in the mathematics curriculum class have been described here because of thier significance to the ideas of healing the splits between the theory of instruction and assessment and the practice of instruction and assessment. The assignment was given so that preservice teachers could experience for themselves a method of mathematics assessment (what students learn) that was closely tied to mathematics instruction (how the material is presented) within the course. The portfolio focused on different dimensions of mathematical literacy, providing students with diverse ways of learning mathematics and of expressing this mathematical knowledge. Overall, however, the preservice teachers were quite dissatisfied with the assignment and did not make the intended connections between instruction and assessment; neither did they embrace the explorations of the dimensions of mathematics. While many students spoke of the portfolio assignment as being different from any other mathematics they experienced as elementary and secondary students, they were also very quick to dismiss the assignment as not teaching them the "real" mathematics that they needed to know to be teachers themselves.

In the survey, preservice teachers were asked: As a (future) teacher, do you plan to use portfolio assessment in mathematics? Why or why not? On the positive side, a few responses seemed to indicate a changing view of the nature of knowing and doing mathematics, with an underlying acknowledgement of the many dimensions of mathematics knowing. For example:

- *Yes, because students then take ownership for their work as well as their own assessment.*
- *Yes. I believe they are less intimidating to those who may be uncomfortable with math.*
- *Yes. I believe it is a way to get a broader understanding of where a student is at not only procedurally but conceptually.*

- *Yes, because it will help me assess how well students have understood concepts and will allow students who don't like tests to find other ways of being "good" at math.*

Other comments from the surveys, however, indicated primarily one of two possible intentions for portfolios in mathematics. On the one hand, preservice teachers could imagine using portfolios in their mathematics classrooms as a collection of tests and quizzes. For instance, one response to this survey question indicated that the preservice teacher would *"probably not use [portfolios] for learning purposes [but] I would use them as a showcase tool."* On the other hand, some students embraced the idea of portfolios composed of interesting activities (like problems of the week, journal entries, portraits, etc.) but they would not make the portfolio worth very much in their overall evaluation scheme. One preservice teacher stated that the contents of the portfolio should be similar to what she experienced in the mathematics curriculum class, but *"… not weighted too heavily but checked for completion."* Another preservice teacher responded, *"Yes, because it is the wave of the future and makes students responsible for work not being marked."*

In addition to the surveys, several follow-up interviews were conducted with preservice teachers. In one interview, a preservice teacher expressed her view on the use of portfolios:

> *I would like a portfolio to reflect what the students think is their best work or what they find is most important, and that might not necessarily be things that have been graded. I would have the students choose something that they thought was really fun, that they really enjoyed about math, and put that in there as well. I think I would use it more for showing progression than marks.*

These comments illustrate how difficult it is to heal the split between instruction and assessment in mathematics, when the real issue is a changed view of what it means to know and to do mathematics. While they believe that students might enjoy experiencing different dimensions of mathematics learning, these preservice teachers appear to view such experiences more as a means for keeping students interested than as actual aspects of what it means to know and do mathematics. In other words, the preservice teachers demonstrated a belief that what mathematicians actually do is "number crunching" but teachers

might be able to fool students into believing mathematics is more interesting by disguising it in projects, journal entries, and other non-traditional mathematics activities. One preservice teacher concluded that portfolios *"… will help the students who try hard but are not mathematicians."*

Instead of a bridge between instruction and assessment, there is a major gap, or split, between them. Instead of one informing the other, the two are regarded as mutually exclusive. If students are instructed primarily in the performance of calculations and the mastering of procedures, then it is reasonable for assessment to focus on how well they have learned these limited dimensions of mathematical knowing. If, however, students and teachers are expected to expand their epistemological views on the dimensions of mathematics, then assessment of these dimensions must necessarily follow. In other words, the dimensions cannot be viewed merely as fun mathematical asides to the instructing and assessing of the real, more traditional, mathematics. Ernest (1998) calls for more than merely a change in the culture of mathematics classrooms. He states that "epistemologically empowering learners to have a say over the content of their learning (the task), their means of working (investigative and cooperative), and the assessment of their outcome is not just a matter of changing the culture of the mathematics classroom…" (p. 258); instead, it calls for a more embodied (mind and body) approach that challenges the rhetoric of what it means to know (in) mathematics.

Healing the Splits: More than We Know

> The limitations of existing structures for teaching my own students … frustrates me … Am I really helping them to become teachers or just passing on glib cleverness? It means everything to me, that difference between their knowing something abstractly … and their real actions that indicate significant internalized knowledge. (Danielewicz, 1998, p. 32)

If mathematics portfolios are to become more substantial than a collection of tests and quizzes, then the views of what it means to know in mathematics must be transformed. Teacher educators must acknowledge the multidimensionality of mathematics knowing and doing. For many preservice teachers, this is a major shift in thinking requiring both a personal and professional transformation of beliefs about what it means to know mathematics. Can teacher educators help create the conditions for such transformations in preservice teachers? This question draws

attention to three very important issues in teacher education and the changing nature of mathematics instruction and assessment.

First, how can the views of what it means to know mathematics be transformed, incorporating in particular the National Council of Teachers of Mathematics recommendations (NCTM, 1999) and the dimensions of mathematical literacy, if teachers still see the curriculum as crowded with concepts to be covered and then measured through skill-based performance testing? One preservice teacher spoke of the frustration she was having with her own son in trying to help him realize the importance of understanding and communicating in mathematics:

> *The thing that I find working with my own kids is that because they're already indoctrinated into this sort of performance-based math, when I do try and get them to take time to think about why they're doing things, it's very irritating to them because … they just think "all I need is the right answer and so you're really irritating me by asking me to explain this to you" … For him already, he's so ingrained by the age of eleven that the only thing you have to do is get the right answer. And when I challenge him about it, he always tells me, "Well, I always get 90s in math."*

It is difficult to imagine changing this traditional answer-based approach to the instructing and assessing of mathematics when it continues to be the predominant classroom experience. This same preservice teacher said that she would begin her teaching career committed to the use of portfolios in mathematics because she felt the benefits of emphasizing communication and other dimensions were worth it, but added:

> *I think I anticipate as a teacher, I would get a lot of pressure from administration and parents and students that they want a quantified mark to show their success. And so I think … in the end I'd probably have to bend and give them their quantified marks to satisfy politics, but I would really want to help them understand.*

Second, are we, as teacher educators, doing enough to heal the split between theory and practice, when the type of practice we would like to see in mathematics education is so very different from the preservice teachers' experiences? For instance, the portfolio that was assigned in the mathematics curriculum and instruction class focused more on mathematics pedagogy than on mathematics

content. Therefore, at best, the preservice teachers may have been able to think differently about mathematics pedagogical knowledge, but were they able to bridge the gap to the mathematics content knowledge of a junior high mathematics class? One preservice teacher explained a typical dilemma with regard to the gap between theory and practice in her recent pre-internship experience of teaching mathematics in a grade eight classroom. She thought she would try using journaling in her class, to give students an opportunity to communicate in writing what they learned about graphing that day. She recalls her experience:

> *I'd teach the graph, say stem and leaf, and then I'd have the students write down what they thought a stem and leaf graph was. And so the students would say, "I don't know what to write." They'd say, "Well, what kinds of things do I write?" And I'm trying to tell them what to write, but I'm not even sure what I would write if they asked that question, and I didn't think about that before … I thought they'd be able to do this because it's just making up their own definition for what this graph is, but I didn't think of what I would write. And when they asked me, I didn't have a clue.*

While it seems that many preservice teachers want to embrace alternative instruction and assessment in mathematics, the gap between theorizing about it and actually putting ideas into practice may be too large to traverse. Their ideas and idealizations fall between the theory/practice cracks.

And third, if what we try to model as teacher educators for instruction and assessment in mathematics (hence trying to heal the split) is seen as a teacher educator's experiment but not as happening in any mathematics classrooms, then how can teacher educators shake the image of ivory tower ignorance of what is really going on out there in the schools? For example, on the surveys conducted in the mathematics course, preservice teachers were asked to discuss their portfolio experiences as students in elementary and secondary schools. Approximately one-half of the thirty survey responses indicated that portfolios were used for assessment in their language arts, visual arts, and even social studies classes. Not one respondent reported having seen or experienced portfolios in mathematics classes. Not only is the practice uncommon, but it is virtually a nonexistent aspect of their mathematics learning experiences. In addition, these same preservice teachers reported the absence of any discussion or implementation of mathematics portfolios in their pre-internship classrooms. One preservice teacher wrote: *"Using [portfolios] in*

math is still a bit of a new/strange idea for me." How can our efforts as teacher educators be understood and valued by preservice teachers when their present experience reveals that little or no changes are occurring with instruction and assessment in elementary and high school mathematics classrooms?

Danielwitz's (1998) opinion of the purposes of teacher education programs does not appear to coincide with these preservice teachers' views:

> [A teacher education program] is not specific methods that need to be learned, but rather ways of thinking, and ways of living a life as a teacher. In other words, a teacher education program should help students develop a reflective self, someone who is capable of thinking through and about one's students and subject matter. (Danielewicz, 1998, p. 45)

There is some hope, however. One preservice teacher expressed both the non-traditional and metacognitive aspects of portfolios in mathematics:

> *… when I have to do a portfolio, it really makes me think about what I have learned. And so I could see it working for Math, just because … it made me think "What am I learning?" and "Why am I learning this?" And it's just so different from doing just workbooks and things like that. And so our experience in school so far has been math is just the subject that's most traditional with just chapter questions, everyday. So when I experience that now, I think, "Wow! There are so many other ways that we could be doing this … math is really just so much bigger" … I think it's hard for people to give up that it's neat and tidy.*

To understand that mathematics is "just so much bigger" than typified by the more traditional experiences of mathematics teaching and learning may be the greatest hurdle of all. It is difficult to initiate change when the traditional approaches feel so much more comfortable. Even if preservice teachers vow to teach differently than they were taught and make every effort to extend their thinking from mathematics knowing that is "neat and tidy" to mathematics knowing that is multi-dimensional, the reality is that they will likely be breaking ground as they attempt to heal the splits. The following preservice teacher's quote acknowledges the challenges, yet also the strengths, of such a groundbreaking journey:

> *… that's the other thing about a portfolio that may be beneficial to the whole thing about changing the way people think [about*

mathematics], if you have a portfolio and you bring parents in, then they don't see it as sort of abstraction. They hear their kids saying, "Well, I'm doing this in math and this," and then the parents say, "Well, that has nothing to do with math." Then they come in and they can see the project and they can see the portfolios and the students can say, "This is what I'm learning." You can fill in the gaps. And they have something concrete.

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Kathleen Nolan <kathleen.nolan@uregina.ca> is an Associate Professor in mathematics and science education at the Faculty of Education at the University of Regina, where she teaches undergraduate courses in elementary and secondary teacher education programs, as well as graduate courses in curriculum and instruction.

Sonya Corbin Dwyer <scorbin@swgc.mun.ca> is an Associate Professor in the Department of Psychology at Sir Wilfred Grenfell College, Memorial University of Newfoundland. She was teaching educational psychology in the Faculty of Education at the University of Regina when the studies for this paper were conducted.

Professional Development for Global Education: Possibilities and Limitations

William Gaudelli

University of Central Florida, Orlando, FL USA

The picture of Earth from space profoundly affected the collective human psyche and represents a turning point at which humans began to comprehend the singularity and complexity, oneness and frailty of our planet. Global education emerged nearly simultaneously with these images of Earth where groups of teachers, scholars, and curriculum specialists became increasingly concerned that schools were myopically focused on national interests. Students who did not encounter diverse points of view, who did not see their own perspective as situated, who thought that the world was a cultural monolith, who were not aware of systems, and who were not engaged in considering alternatives futures, it was argued, would be unable to live justly, consciously, and peacefully as global citizens.

Looking back on the early days of global education, it is not difficult to see why there was such energy and enthusiasm for rethinking school curricula. The 1960s and 1970s were a time of intellectual revolution that saw the active reconsideration of modernist thinking, particularly positivism in educational research. Global education was formulated not only as an alternative,

postmodern curriculum, but also as a new way of thinking lodged in relativity, complexity, and uncertainty. In this climate of reconsideration and optimism, global education flourished. There was research grant money, cooperative institutions between educational agencies at all levels were established, and teaching resources proliferated (Gaudelli, 2003). In the 1980s and 1990s, however, global education met significant challenges. Those who were critical of such alternative curricula began to critique and condemn this endeavour. In the United States, global education was said to be anti-American, morally relativistic, utopian, and anti-capitalistic (Cunningham in Schukar, 1993).

Over the past three decades, while the fortunes of global education have ebbed and flowed, a commitment to teaching for diversity has emerged and become widely institutionalized. The standards of the National Council for Accreditation of Teacher Education (NCATE), which accredits in excess of 575 institutions in the United States that prepare approximately two-thirds of all beginning teachers, include diversity in teacher preparation, which is a central idea within global education. NCATE standards contain 42 references to teaching culturally diverse learners, and diversity represents one of the six standards used to measure the quality of teacher preparation institutions: "One of the goals of this standard is the development of educators who can help all students learn and who can teach from multicultural and global perspectives that draw on the histories, experiences, and representations of students from diverse cultural backgrounds" (National Council, 2002, p. 32).

The current inquiry presented herein begins with a question: How do teachers experience professional development about global education? To develop answers, I studied six teachers at various career stages who were engaged in an intensive professional development workshop on global education. In this article, I begin by providing background on global education and professional development, then move to illustrate the learning activities for teachers. I proceed to examine the experiences of these six teachers. I conclude by examining the possibilities and limitations of professional development of teachers generally, specifically with respect to those engaged in global pedagogy.

Background

What is global education? Global education is often described as an amalgamation of, or a new field emerging from, various sources: international relations, cultural studies, environmental study, economics, history. Hanvey (1976) offers five elements of a global perspective, including: (1) perspective consciousness, (2) knowledge of world conditions, (3) cross-cultural awareness, (4) knowledge of global dynamics/systems, and (5) knowledge of human choices. Merryfield (1997) adopted these five, adding three additional elements: global history; indigenous knowledge; and analytical, evaluative, participatory skills. Pike and Selby (2000) argue that global education unites two traditions, world-mindedness and child-centeredness, across four dimensions of analysis: temporal, spatial, issues, and inner. The Association for Curriculum and Supervision Development's declarative statements summarize much of what has been done in the name of global education: You are a human being, your home is planet Earth, you are a citizen of a multicultural society, you live in an interrelated world, and you make choices (Anderson, Nicklas, and Crawford, 1994).

Some lament global education's ambiguity. Popkewitz (1980) refers to it as a slogan system mired in linguistic confusion, and Lamy (1987) proposes that it is an undefined amalgamation in search of scope and method. Werner and Case (1997) suggest that global education need not exist as a separate curricular entity, but potentially could reside in all curriculum that examines interconnections, perspectivity, alternatives, and caring. For the purpose of this study, I define global education as curriculum that seeks to prepare students to live in a progressively interconnected world where the study of human values, institutions, and behaviours are contextually examined through pedagogy that promotes critical engagement of diverse information towards socially meaningful action. Rather than developing a succinct definition of the field, my efforts are aimed at interpreting how participants understand and act on their thinking about global education in teaching practice.

While global education has taken shape in the published works of teacher educators, it remains at the margins of K-12 education in the United States and elsewhere. Becker (2002) claims that since its inception in the 1960s a variety of "social, fiscal, and educational conditions … dampened or heightened interest in global education" including the dedication and withdrawal of federal grant money. "Ten years and millions of dollars later … optimism largely vanished … the extent to which [global education was] integrated into the existing curriculum was disappointing" (p. 52). Evans

(2004) echoes this appraisal of the field: "Despite a great deal of rhetoric and attempts at implementation … global education has made few inroads into a curriculum that is largely dominated by history and the social science disciplines" (p. 82). In a comparative study of 53 nations, Tye (1999) found that global issues did not generally hold a prominent place in curriculum, with notable exceptions in South Korea and Australia.

Why is global education marginalized? For Pike and Selby (2000), the additive approach of including more curriculum, be it global or otherwise, is untenable. Tye (1999) contends that most societies continue to teach about the world in strictly national terms since this focus serves national interests. Merryfield (1998) argues that we still know very little about what happens when teachers attempt to teach globally, proposing a need for field-based exemplars. My own research suggests that teachers faced with high-stakes testing, particularly in economically disadvantaged, urban communities, jettison global education for skill-based teaching (Gaudelli, 2003). For Kirkwood (2001), longstanding definitional ambiguity continues to thwart implementation efforts.

Nonetheless, professional development efforts in global education have been substantial (Adler, 1991; Boston, 1997). Unlike the one-shot, episodic workshops so common in education (Goldenberg and Gallimore, 1991), global education professional development has been characterized by more intensive and extended activity. Boston (1997) argues that global education was especially challenging for teachers, requiring professional development of alternative varieties. Given the novelty of its knowledge domains and pedagogical processes, "Teachers require time to learn new content and strategies, experiment in their classrooms, reflect on the results, and adapt the content and processes to their students' needs" (p. 176). She argues that universities, working in collaboration with each other and local school districts, can provide the material and human resources needed for long-term professional development in global education.

The Center for Human Interdependence (CHI) has worked with teachers interested in globalizing curricula over extended periods of time. Tye and Tye (1992) report CHI established partnerships with 11 schools in Southern California to promote globalizing curricula. Teachers, who generally did not teach from a global perspective, were offered materials, workshops, and sustained support in their efforts to globalize their existing curriculum, rather than to create

entirely new courses. The project directors did not stipulate a definition of global education, but encouraged participants to consider issues of perspectivity, interconnections, and alternatives in their teaching. Tye and Tye note that the lack of access to high quality resources and a dearth of collegial dialogue about global pedagogy were major impediments to the implementation of global education. While some of the teachers transformed their pedagogy significantly as a result of CHI initiatives, others refused to participate, avoided the program, or participated selectively. Tye and Tye found that the leadership of the principal was the most significant factor in how global curriculum would be implemented. Schools that globalized the curriculum the most were led by principals who advocated and supported global education.

Community partnerships have also been a dimension of global education professional development efforts. For example, Tucker (1982) created the Global Awareness Program in Miami-Dade, Florida. This long-term partnership, providing curriculum support, resources, and materials around themes of global education, involved use of community resources, such as international scholars from a nearby university. The Columbus in the World Project, and the 50 or so like efforts in cities throughout the United States, brought together teachers, university faculty, students, and community members with global connections in common (Merryfield, 1997).

In the early 1990s, the Canadian International Development Agency funded several global education projects in Canada, including university centers for global education (Case and Werner, 1997). Holden (2000), after surveying the shifting policy trends in the United Kingdom, found that teachers often hesitated to engage complex global issues because they lacked knowledge and resources. His recommended solution was the reinvigoration of global oriented inservice. Hasan (2000) examined the implementation of a professional development program in Jordan called the Global Education Project (GEP). GEP involved a "strong relatedness to the (existing) school curriculum" while promoting global concepts in teaching (p. 99). Hasan (2000) concluded that teachers involved in the professional development efforts did make some changes in their teaching to incorporate global perspectives.

Given the diversity of approaches to global education, one is left to wonder: What bounds the field? More precisely, what is the difference between global education and multicultural education, or what is different in a social studies course that is taught from a global perspective? Werner and Case (1997) conceded that it is

difficult to distinguish between teaching about the world and global education. Multicultural education is also a closely related field, has a similar historical development, and shares some of the definitional ambiguities of global education (see Grant and Sleeter, 1998; Bennett, 2001). Merryfield (1996) studied some self-described multicultural and global teachers and teacher-educators, and found that while there were somewhat distinct pedagogical emphases, all focused on preparing students to inherit an interconnected world that is complex and diverse.

So then, if students are engaged in the study of interconnections, perspectivity, empathy/caring, and alternatives, be it in a social studies, language arts, mathematics, physical education, or some other course or school activity, it can be argued that they are being globally educated. The answer lies not in the scope and sequence for the course necessarily, but in the extent to which students examine how the world is interconnected, how people around the world have different perspectives, how problems can be addressed, and how having an empathetic/caring outlook towards others builds relationships. If these conditions are present then the curriculum can be considered global.

If students study multiculturalism without seeing how identity and cultures are dialogically shared across national boundaries; if students study others with the assumption that the student's worldview is right and should be universally shared; if students fail to consider alternative ways of addressing problems; if students are engaged in their studies in a detached, pious, or judgmental manner, then such studies are, by definition, not global.

The World Teaching Institute

In this article, I examine the case of six teachers participating in a global education professional development workshop, the World Teaching Institute (WTI). WTI was a university-based professional development opportunity offered to preservice and inservice teachers in the spring and fall of 2001. The WTI was created because of an expressed interest by educators for professional development activities having a strong secondary focus but not relying too heavily on generic pedagogical prescriptions. Activities of the WTI were varied and extended in duration, occurring in a concentrated manner for one week, and followed by monthly face-to-face meetings and continued opportunities for on-line,

asynchronous dialogue. WTI consisted of approximately 50 hours of professional development in global education. In total, 15 beginning and preservice teachers participated. Noted on the schedule are those core elements of global education (interconnections, perspectivity, alternatives, and empathy/caring) that shaped the conceptual emphasis of the workshop. While it is challenging to summarize 50 hours of professional development, three aspects of the program were given particular emphasis and represent the essence of the workshop: conceptualizations, content integration, and dialogue.

Table 1 World Teaching Institute (WTI) Schedule of Events

Pre-institute	Interview with coordinator, focusing upon life experiences educational background current teaching situation needs for the professional development activity Completion of Global Awareness Profile (knowledge and attitude pre-test)
Day One	Conceptualizations Teacher introductions Life experiences Focus on perspectivity and how the experiences of a teacher informs one's outlook about pedagogy Contexts of classrooms Keynote presentation on global education Focus on competing ideas that constitute a global perspective and how dialogue with students about interconnections, perspective, alternatives, and empathy/caring constitute core values in the field Teacher talk Time allotted for discussion of ideas raised thus far and interaction with speakers and peers Presentation on modern China Focus on how the political landscape of 20th Century China illustrates a culturally-specific perspective about synthesis and historical rootedness Teacher talk Nacirema simulation activity Focus on how perspective informs what is considered strange and exotic. Further, how the activity demonstrates the exotic strangeness of what is normal for those living in the U.S. Teacher talk
Day Two	Law of the Sea simulation Debriefing Presentation on Meso-American spirituality

	Focus on temporal and spatial interconnections and parallels of ancient spirituality systems. Teacher talk Presentation on teaching resources for global education Teacher talk Presentation on teacher opportunities for global travel Focus on placing oneself in state of culture shock to move towards a deeper understanding of perspective and share insights with students. Teacher Presentation – IB Schools and global education
Day Three	Teacher talk Global conversations simulation Focus on how communication is a manifestation of perspective and how this can lead to intercultural conflict. Debriefing Presentation on the symbolism of the Virgin of Guadeloupe Focus on how icons migrated and were transformed within various cultural settings. Teacher talk Teacher presentation – Building a sense of community in our classroom Focus on how to model a classroom that embodies empathy/caring about others and has a sense of shared commitment to common goals. Presentation on secondary education in Kenya Focus on a description of problems associated with secondary schooling and some alternative possibilities for education in those and other contexts. Presentation on wine Focus on wine as a historical means of cultural exchange.
Day Four	Teacher talk Presentation – Florida in the Caribbean Basin Focus on the interdependence of the local within the regional setting. Debriefing Presentation – Energy consumption Focus on the implicit choices and global consequences embedded in energy consumption routines. Activity – Student uses of solar power Teacher talk Presentation – Local ramifications of a global economy Focus on how consumption choices locally have broad global implications with attention paid to alternatives of the cheap labour cheap goods cycle. Debrief Closing discussion and evaluation, future plans
On-line Dialogue	

(asynchronous)	Posting and dialogue of conceptual understandings of global education and how this is implemented Discussion of practical problems (textbook selections, resource needs, certification issues) Feedback and questions about the professional development activities Resource sharing and requests
April Meeting	Stories of classroom implementation Teaching with primary source documents Focus on empathy building through seeing events from divergent perspectives
May Meeting	Stories of classroom implementation Teaching through dialogue and discussion Focus on how to build empathy/caring in classroom through classroom conversations about problems
Summer Conversations	Individual meetings with teachers to reflect on practice Development of action plans for teaching from a global perspective
September Meeting	Stories of classroom implementation Reflection on 9-11 tragedy Focus on empathy/caring for victims and friends/families and discussion of perspective as illustrated by reaction to events in other parts of the world
October Meeting	Stories of classroom implementation Teaching about terrorism workshop Focus on interconnections evident in international events and the false dichotomization of issues as foreign/domestic in popular discourse
Site Visitations	Invitations to observe innovative lessons
November Meeting	Stories of classroom implementation Discussion of future directions for the program of professional development

Conceptualizations

The definition of global education that guided the development of WTI was a curriculum to prepare students to live in a progressively interconnected world where the study of human values, institutions, and behaviours are contextually examined through a pedagogical style that promotes critical engagement of complex, diverse information towards socially meaningful action. Foundational concepts were extracted from this definition, such as interconnections, perspectivity, empathy/caring, and alternatives. A keynote talk was given about the nature of global learning

focusing on how the field emerged over time and the conceptual ambiguity that still exists. After reading various definitions of the field and discussing these conceptions in light of their own educational experiences, participants wrote journal entries about what global education means in their experience and teaching situation, and explored this conversation in on-line dialogues. Participants were also encouraged to develop action plans about how they would implement ideas from WTI.

Content Integration

A concerted effort was made to offer diverse topics with respect to geographic regions (Latin America, Africa, Southeast Asia, the Caribbean), issues (i.e., environmentalism, international law, human rights, disease, energy consumption), and levels of analysis (local, regional, global) so that participants would see the pervasive nature of global considerations and the local connections embedded within. They were directed to a number of content resources, such as websites, document collections, and area studies primers, so that they could integrate new content into their existing teaching assignments. Classroom support was provided to individual teachers if so requested. I watched one participant implement a pre-colonial African trade simulation, and another who taught a cooperative lesson on the beliefs and practices of Islam. Our focus in the workshop was to provide participants with a way to reframe their existing knowledge around core global values, such as interconnections, perspective, alternatives, and empathy/caring.

Dialogue

Teacher dialogue was a key component of WTI. Each day began, ended, and was interspersed with opportunities for conversation, which centered on how to make content meaningful to students, what additional resources were available to teach a particular topic, and illustrations of teacher practice. In the time following WTI, teachers were provided with a variety of means to extend the conversations. An on-line asynchronous dialogue was made available to participants, which teachers actively used for approximately three months following the workshop. They discussed a wide range of topics, including: textbooks, materials for Advanced Placement (AP) courses, the Kyoto Protocol, suggestions for discussing controversial issues, teacher salaries, labour unions,

being a new teacher, teaching English to second language students, and managing time in the classroom. Participants were also invited, but not required, to engage in monthly follow-up meetings. Attendance was substantial for all of these meetings, with an average of three quarters of the original group participating. The participants were encouraged to share with the group what they had used from the professional development activity. They learned, for example, how colleagues were grappling in their classrooms with the events of September 11, 2001, about an attempt by one teacher to create a Model United Nations forum with her students, and about the interdisciplinary experiment of mixing concrete to make Roman architectural models.

Methodology

I used a qualitative approach to gather data from interviews, group meetings, observations, and teacher written reflections (Creswell, 1998). Six participants were the focus of the study, although all 15 participants in the WTI allowed their work samples and on-line dialogues to be used as part of the data set. The primary six participants were mainly beginning teachers: three were first year teachers, two were preservice teachers preparing for internship, and one was a teacher educator in elementary social studies (see Appendix for detailed descriptions of each participant). The data were open coded after each transcription by a graduate research assistant and me. We compared data categories and developed a consensus about our open coding, and then speculated about possible relationships among the data categories, developing *in situ* hypotheses through a constant comparative method of analysis (Creswell, 1998). These hypotheses became the source of questions for later interviews. During the summer months, independently the graduate student and I created case studies of each individual that collapsed the data collected up to that point in the study. This internal analysis strategy allowed us to formulate composite portraits of each participant in order to clarify what we knew about the perspective of the person and to reveal the gaps in our understanding.

Informed consent was provided to all participants under the auspices of the internal review board of the sponsoring university. IRB approval was sought prior to the workshop, and when participants enrolled in the workshop, they were asked to consider participating in the study. Those who agreed gave written informed consent and were assured of anonymity throughout the research and publication process. As such, all names and locations

used in this study are pseudonyms. All participants were provided with copies of the research report and asked to provide feedback about the extent to which the summary accurately and comprehensively represented their experience in the professional development opportunity. Corrections were made based on their input.

Participants engaged in bracketing interviews prior to participating in the workshop. Bracketing interviews were designed to ascertain the current practice and perceptions of teachers about professional development and global pedagogy. I asked participants to engage in a thorough recounting of their lives, with particular emphasis on their own learning. I wanted them to think carefully about themselves, prior to the WTI experience, so they could share relevant life experiences related to global pedagogy. I also wanted to signal in advance that personal narratives, traditionally viewed as unrelated to professional development, would indeed be an important part of our conversations. I assumed that if teachers began to tell their stories in the WTI, they would begin to examine their own experiences in coming to understand and teach about the world. Immediately following the workshop, participants were again interviewed about how they intended to implement their learning, their evaluation of the professional development opportunity, and changes they would suggest for future activities. A graduate assistant and I conducted all interviews and discussed the semi-structured nature of questions to be posed. Participants were interviewed over the summer and at the beginning of the following school year. They were also observed teaching a lesson that they derived from WTI and interviewed again a month thereafter.

A few observations regarding methodology deserve attention prior to the data presentation and analysis. First, while I initially hoped to include all fifteen WTI participants in the data collection process, which would have provided a more diverse group of teachers, particularly with regard to experience levels, only six consented to be involved. My sense from participants was that since the professional development activity already required about 50 hours of face-to-face participation, not to mention the hours spent at home, most preferred not to spend the additional time required to participate in the study. This an inherent limitation about what conclusions should reasonably be drawn from this data set.

A related observation is about the nature of beginning teachers who lack the ability to teach in general, let alone the specialized type of pedagogy that is global education. While this claim has some merit, in that more experience is typically better than less, I fundamentally reject the notion that global education is advanced pedagogy reserved for veterans only. Rather, when global education is thought of as a way of framing study around issues of interconnection, perspective, alternatives, and caring, then any teacher, regardless of experience, is able to teach globally. While I recognize that teaching is developmental, I do not agree that certain pedagogical capacities (e.g., discussion, leadership, building trusting relationships, or engaging students in social inquiry) precede the development of more advanced ones. I contend that pedagogy emerges as a complex and interdependent skill set. Therefore, I do not accept that there are *a priori* skills that must predate all others, beyond the obvious ones, such as reading and speaking.

A final observation is related to data categories. After initially coding teacher responses, I employed four knowledge realms commonly cited in teacher education literature: content knowledge, pedagogical knowledge, pedagogical content-knowledge, and self-knowledge (Richardson, 1996; Kagan, 1992; Shulman, 1987). After receiving external reviews that suggested such categorization suggests an *a priori* notion incongruent with qualitative research, I decided to revert to data categories that originally emerged from the study. While the use of Shulman's (1987) framework was intended as a convenience for the reader rather than a misuse of qualitative data analysis, I recognized that such a conclusion could be inadvertently drawn from such a presentation. Thus, I removed the labels that may provide greater clarity to readers of this article and returned to the original data categories generated from the analysis, including: feeling overwhelmed, planning and implementing pedagogical changes, teaching controversial issues, and engaging English as second language students.

Data Categories

Feeling Overwhelmed

A feeling of being overwhelmed by what participants did not know about the world emerged as a pattern in the pre-WTI interviews. One participant, Aron, talked openly about how he felt under prepared to talk thoughtfully about the world because he had little formal schooling and experience to draw upon. *"Does going to Tijuana (Mexico) count for travelling outside the U.S.?"* he quipped.

Joanne, while talking through her personal learning about the world, began to realize how limited her prior knowledge was. She said it was frightening how much she did not know, and yet, she had been assigned to teach about the world since *"no one else wanted to do it."* Jerry's reaction to the self-reflective focus of the initial interview was characterized by surprise. He wondered aloud how his experiences were relevant to global education, professional development, and teaching.

Each participant was given a copy of Peter Stearns' (1998), *World History in Documents* as an example of what could be used to provide secondary students with diverse views about historical people and events. The text, typically used at the postsecondary level, was paradoxically inviting and daunting for participants. Remarking on the wide range of otherwise hard-to-find primary source documents, they saw great potential in the book. They were weighed down, however, by the number of documents and the need to excerpt the documents so they would be usable by secondary students. As Jerry said in a follow-up meeting, *"These (resources) are great, but I feel overwhelmed by them. I can't imagine giving them, as is, to my high school students. They need to be shortened."* His remark was greeted with general agreement by the group, prompting Joanne to ask if there were edited versions of similar documents. Larry expressed his exasperation: *"So many ideas popped into my head as to things I could use inside the classroom, but I have no idea about teaching global issues in education. There wasn't enough time to just sit down and talk about how we can deal with this content in the classroom."*

Participants were also overwhelmed by the amount of time required to develop resources for classroom use. Larry lamented that he did not have the time and energy each evening to prepare the reading materials provided by presenters about global pedagogy. Jorge agreed, suggesting it was *"way too much information to address in a year, let alone a week."* One strategy used in WTI to make resources accessible was to provide participants with a webpage that housed a wide variety of global education links for teachers and a discussion area to share ideas with colleagues. Joanne explained that while she was interested in the ideas being raised in on-line dialogues, she had little time to participate: *"I thought the web page was a great idea; however, I found that I had little time to join in many of the discussions."* Her experience was not unique.

Planning and Implementing Pedagogical Changes

Though WTI participants felt overwhelmed by the infusion of new ideas, their curiosity was genuinely piqued by the experience. Many planned to implement new teaching activities and conceptual ideas. Larry termed this dimension of the professional development experience *"catching a spark … WTI was good because it gave us ideas and a place to begin. Sometimes you start running with it but you quickly lose momentum. But every now and then you keep going back to it and looking at it again, to spark it again."* Larry explained that he used the Nacirema reading (Miner, 1956) from the WTI in his diversity reading circle at a local community college as an example of how the "spark" that he caught informed his teaching practice. Despite initially feeling overwhelmed by the scope of new information, Larry's strategy was to assimilate a small part and make it practicable in his context. Jorge also developed a strategy for keeping abreast of content in WTI, developing a notebook of articles related to larger themes and bookmarking a variety of links on his web browser from the WTI website. As a first-year teacher, six months after WTI, Jorge was the first teacher in his department to create a student/parent webpage that housed many of the WTI links and others he collected on his own. Jorge was implementing in a direct way curriculum changes through the use of on-line webquests for students facilitated by WTI links. Jorge's move towards implementation is notable given that in the month following WTI he was uncertain about how he would implement these teaching ideas: *"Since I'm not sitting in a classroom yet and haven't asked myself, 'Ok, what do I need to teach today?' I'm not sure how I'll use the information. I think a lot of that stuff just comes out when you start teaching."*

Some participants latched onto particular conceptual ideas, such as media bias, as a means of implementing new teaching processes. In the months after WTI, Joanne spoke often about the insights she gained from WTI about the national orientation of news programs: *"Our news is biased toward the Western world, and I have not had time to explore beyond the scope of my world history book, some novels I have read, and watching the news. I have been glued to my TV more lately because of the September 11 terrorist attacks."* To accommodate her own inability to absorb the world news each night, she developed a teaching idea to engage students in reading and analyzing the media. Joanne talked a great deal about perspective with her students and required the students in her world history course to give daily reports of news they had seen.

Students were asked to compare international and national media outlets in the way they depicted (or failed to depict) events using a teacher-created rubric. Joanne seemed genuinely pleased with how this was working and how students were coming to understand how their own social orientations were influenced by media portrayals.

WTI participants talked about their desire to teach in a manner that would allow students to socially construct personal meanings about global issues. They left the institute feeling energized and challenged to implement some new ideas within the larger contextual constraints of their schools. Jerry talked animatedly in the months that followed the inservice about how his pedagogical style *"completely changed"* as a result of this experience. Jerry described his teaching as traditional prior to the WTI, characterized by lectures, recitations, and fact-focused evaluations. *"As a result of the Institute, I have included many more activities and a lot, lot less lecture. I've almost completely changed my teaching style with a lot more discussion to get the students involved. Today I did an activity about freedom to understand the French Revolution."* He also used the Law of the Sea Treaty simulation from the WTI to examine issues of national rivalry and interdependence. Jerry invited me to his class for an interdisciplinary lesson that he created with a vocational teacher about the types and uses of concrete and block during the Roman Empire. Students were engaged in a study of the masonry work along with mixing concrete and mortar.

Other participants experienced a less dramatic change as a result of WTI. Aron came into WTI with a constructivist orientation that he frequently described as emerging organically from his experiences as an elementary teacher. He did not report changes in his pedagogical outlook as a result of the WTI, but rather an energized redirection of his efforts towards promoting student inquiry about the world. He created an action plan to address aspects of citizenship education in global education: *"I am hoping to have empowered the students with the knowledge and skills to be motivated to want to do their own reflective inquiry on topics related to global education."* The WTI for Aron, in contrast to Jerry, offered an enhancement of an existing pedagogical orientation rather than a substantial revision. Felicia explained how the concept of stereotyping presented in WTI influenced her teaching: *"We did an activity about how Africans stereotype Westerners, and vice versa; the point was to be careful about using*

stereotypes or generalizations. I used that in one of my classes studying the Middle East showing them to be very careful about generalizations. I'm starting to be more conscious of it in my own teaching."

WTI participants felt prepared to implement global pedagogy as a result of the workshop. For Larry, *"The Institute was extremely effective in this regard. Not only did you get some information you need to start teaching globally, but you got ideas about how to implement this content area in the classroom. And the teaching ideas were offered in such a way that you could take what you want rather than being made to do one particular thing."* Joanne shared her perspective that ideas were not offered *"ready made*" in the WTI, but open to adaptation and contextually-specific integration: *"It was very effective … there are a lot of good ideas in there; it's just a matter of figuring out where you are going to implement them and include in your curriculum."* Jerry remarked on the variety of ideas he gained: *"Joanne was talking about how she uses art to teach about Islam and I'm trying to do that now in teaching about the U.S."*

Teaching Controversial Issues

WTI caused participants to identify problem areas related to global pedagogy, specifically, controversial issues. Participants shared examples of what their students found most controversial in global education, topics such as religion, family styles, and rites of passage. Janice explained, *"I think it is important to make what takes place in the classroom relevant to students. Students are interested and have very definite opinions about controversial subjects. The controversies bring students into the topic, answering the question of why we are studying this topic. It matters to the students."* This prompted a great deal of interaction among participants, as they agreed about the appropriateness of teaching controversial issues in global education. Joanne expressed some reservations about her ability to engage global issues with students when they lack prerequisite knowledge: *"Because my students have no world knowledge, they look at me like they have no clue when I ask them to think. I have had to resort to using methods on thinking skills because controversy requires higher order thinking and it's just not there."* Larry put it this way: *"I believe it is human nature to compare oneself and your experiences when dealing with controversial global issues. I have difficulty trying to be analytical and non-biased. Imagine how it must be for our students. Controversial issues really open the door to infinite*

opportunities in education." Joanne and Larry examined the central nature of controversial issues in global education in a manner that makes explicit the needs, interests, and learning dispositions of students. Rather than engaging a formula of how to teach controversy, however, as Schukar (1993) explains, they were problematizing their own diverse experiences and predispositions about teaching controversy as they implicitly grappled with their own limits in understanding a complex issue in another context.

Felicia attempted to hold an international day at her school after her participation in WTI: *"I tried to hold an international day and I was told that I could not do this because it might offend some members of our community. I was told 'to have a day that celebrates cultural diversity is seen as a division and separation of people'… creating a greater division in the community."* She cautioned her WTI colleagues to be careful when engaging issues of controversy, especially as a beginning teacher. *"When it comes to topics such as religion, or wars, or even sexuality (e.g., homosexuality), just make sure you are able to back up whatever you are teaching with a correlation to the state standards."* While Felicia did not seem deterred by her thwarted efforts to have an international day (similar to one presented by a WTI colleague during the workshop), she recognized that a measure of strategizing was necessary when engaging global controversies, particularly in socially conservative communities.

Engaging English as Second Language Students

Following WTI, participants began to apply their understandings of global pedagogy through the lens of perhaps their most vulnerable students, those who speak English as a second language (ESL). Given the context of living in a state with a high population of Latin American and Caribbean immigrants, this is a logical connection that participants made between WTI and their practice. Joanne asked for help with a Peruvian student who spoke little English in the WTI on-line dialogue, and Jerry suggested that she contact the school's ESL coordinator to find translated materials. He also suggested that she have the student write in Spanish initially and then attempt to translate the text into English in a tutoring environment. Felicia also talked about her use of family tree research and how she visually depicts this information on a globe to show the many places from which families

Comment: Should this be ESL?

derive. Jerry extended this theme of seeing the diversity represented by ESL students as an asset to global learning, rather than a hindrance to class progress. "*One of my classes is 50% ESL of varying degree and I have been trying to integrate them as a resource for other students. When we talk about a country, I ask them for their views … allowing other students to learn from their experience in other parts of the world."*

Jorge used a similar technique, though his was tempered with a bit more caution as he spoke with students individually prior to a lesson and asked if they would feel comfortable talking about their country of origin. He said that some did so eagerly while others declined. Another indirect process Jorge used was to partner a non-immigrant student with an immigrant one to create multimedia presentations, suggesting that this type of cooperative activity would create a space for their dialogue about language and cultural differences. Jorge experienced a culture of disregard for ESL students in his first teaching position. He was shocked to learn that the unwritten rule about ESL students was to *"seat them in the back and pass them with a D."* Given his own experiences as an ethnic minority from a bilingual family and his work with relief experience in Zimbabwe, he did not take this approach, and quickly found that his class became a desirable place for ESL students. Felicia, a bilingual Spanish speaker, had a similar experience in that a student who spoke Portuguese was placed in her class due to the similarity of the languages. *"It's been tough, but he has progressed wonderfully. As far as grading, I would have him write in Portuguese and then I would translate with a Portuguese/English dictionary to try and figure out what he was saying."*

Data Summary

How did the outlook of participants change as a result of the WTI experience? The data suggest that the experiences of participants in the WTI were highly individualized. *Table 2 Participant Perspectives* briefly summarizes the individual perspectives of each participant before and after WTI. Despite the individualized nature of WTI participant learning, their experiences centered on common themes resonated in the data analysis: specifically, feeling overwhelmed, planning and implementing pedagogical change, encountering controversial issues, and engaging ESL students. Drawing from these diverse experiences, what can be learned from this particular professional

development effort related to global education? This question frames the remainder of this article.

WTI can be examined as an illustration of professional development with elements that are promising and other dimensions that deserve reformulation. The qualities of WTI that suggest the greatest possibility for future professional development include: (1) dialogical encounters; (2) diversity of offerings; and (3) interdisciplinary effort. The limitations are related to the (1) need for experiential global learning; (2) need to recognize institutional milieu of implementation, and (3) need for administrative support.

Table 2 Participant Perspectives

	Perspective before WTI	**Perspective after WTI**
Aron, teacher educator	• Teach through caring relations • Lack of global education background • PD as accountability measure • Peer coaching as valuable PD	• Incorporate local/global activism in civic education • Promote student inquiry related to global education
Felicia, first-year middle school special skills	• Teaching as activity-oriented • Lack of formal global learning but frequent global travel and lived in diverse communities • PD as useful to get ideas	• Piqued interest in global learning • Moved to incorporate global knowledge into skills-oriented preparation class
Jerry, first-year high school social studies	• Didactic instruction • PD as "teacher detention" • Lack of global education background; took minimum courses for certification	• Pedagogical change towards student-centered learning • Integration of more activities, manipulatives, and discussions in pedagogy
Joanne, first-year high school social studies	• Want to share enthusiasm for history with students • PD as waste of time with History Alive! exception • Lack of global background • (i.e., "I'm Eurocentered")	• Recognize the need for multiplicity of views in teaching • Gained some specific ideas for classroom implementation • Created a Model UN project
Joshua, preservice	• Lack of pedagogical knowledge and experience • Anthropology and African background made him feel	• Heightened awareness of pedagogical challenges and complexities • Helped to refocus his interests

	more connected to presentations • Extended international relief experience • Greater sense of global connection and responsibility	on global understanding • Developed strategy of notebook and bookmarking to keep current global information
Larry, preservice	• Lack of pedagogical knowledge • Lack of global education background • Feeling anxiety about world teaching and institute	• "Catching a spark" for global inquiry • Reduced anxiety/greater confidence to engage global education as a teacher • Implemented a small-scale project using WTI ideas

Note. PD= Professional Development/Inservice

Possibilities

Dialogue among professionals can be a powerfully educative force. A pattern that emerged from the bracketing interviews was the prevalence of didactic teacher inservice. For Fenstermacher (1994), "Staff development … is seldom viewed as the acquisition of abilities or capacities that enable a teacher to teach himself," and is focused instead on a didactic presentation of what teachers "need to know" (p.36). Beginning teachers in WTI quickly acclimated to the "talking head" syndrome of episodic inservice offered by their school districts and came to expect something similar in WTI. Participants were very positive about the varied dialogues associated with WTI, however, including teacher talk, informal conversations, follow-up meetings, and asynchronous on-line discussions. Participants also enjoyed the latitude of being able to raise ideas and issues for consideration as it provided them with a sense of agency about what they were learning. Conversations about global education, or even teaching in general, were rare in the experiences prior to WTI. Professional development can create spaces for teachers to engage in dialogue, frequently absent from school settings yet important to the development of capable professionals.

Participants had significantly different experiences within and following WTI. Academic background, previous experiences, and the context for implementation were factors that contributed to the differences experienced by participants (see *Table 2*). This finding is consistent with much of the literature on the topic of how teachers receive professional development opportunities (Cross and Ormiston-Smith, 1996; Kagan, 1992; McChutchen and Berninger, 1999; Richardson, 1996). WTI was generally effective for this group of teachers as it offered a diverse menu of activities and resources

to assist their teaching and presented a specific curriculum focus. Due to the variety of offerings (conceptualizing global education, multiple teaching methodologies modeled, and varied resources), participants were more likely to find something of use. Professional development can be designed so that participants actively identify areas of need and focus their efforts on these areas, though typically it is not organized in this way.

Collaboration between teacher educators and content area faculty can be a significant aspect of university-based professional development programs. WTI participants responded positively to the content-focus, noting that many district workshops are content-free, generic offerings that are generally viewed negatively by secondary teachers who are socialized by content area identification. Universities are particularly well situated to collaborate in such professional development, given the wide range of specializations housed within them, as long as there is mutual interest in supporting education in the K-12 arena. Interdisciplinary collaboration presents a series of problems, however, both within the provider institution and in working with schools. In the development of WTI, meetings were held to address problem areas, including funding, faculty time, and focus/format of presentations. Collaboration between universities and schools presents other issues to be negotiated, not the least of which is the cultural divide that exists between secondary and postsecondary institutions that has led to a "history of mistrust" (Grundy, Robison, and Tomazos, 2001, p. 207). Assuming that these problems can be adequately addressed, interdisciplinary professional development can be a great asset to teachers.

Limitations

An important idea in the global education literature is the need for experiential learning by teachers. Experiences such as extended study-travel programs and living within another culture are critical to developing a deepened sense of perspective. Wilson (1993) documents the teaching lives of those with extensive living outside the US along with people who spent years of service in the Peace Corps. She found that students of these global educators reacted favourably to their teachers' efforts. Wilson (1993) reports one student who put it this way: "You learn more because it's the real thing" (p. 96). Global educators are generally more effective when

they have had the opportunity to experience the culture shock of living as an outsider among others. Germain (1998) generalizes from her study of worldly teachers, or those with extended experiences living in other societies, that "international study affected teachers in their personal and professional lives after they returned home … they all changed their classroom pedagogy, curriculum, and emphasis to some extent" (p. 214).

WTI had some elements of experiential learning, with simulations, presenters from diverse backgrounds, and participants with significant global travel/living experiences. While this was of some utility for participants, vicarious learning about the world can only take one so far. Understanding the disorienting feeling of culture shock, for example, can only be accomplished experientially. Organizing field experiences to promote global learning in other parts of the world (suggested by three participants in this study), though costly and time consuming, can be an important aspect of professional development in global education. In other curriculum fields, professional development, which engages teachers in applied settings may be a useful avenue to explore. There would be some advantage for chemistry teachers, for example, to have an inservice in a laboratory setting, language arts teachers in a media outlet, or world language teachers in international exchange programs.

Also missing from the WTI experience was sustained attention to institutional contexts and change. Sleeter (1992) studied her implementation of multicultural education workshops over the course of two years. Though she worked with teachers for an extended period of time (14 all-day sessions) and provided on-site support and follow-up, "the changes brought about by staff development structured around an individual development model are modest and uneven" (p. 205). She goes on to argue that since multicultural education is premised in institutional change, a focus on the agency of individual teachers to change the system is ineffectual. Tye and Tye's (1992) findings from their professional development efforts related to global education were similar.

The WTI experience encouraged teachers to talk about how they could make changes in their particular contexts within their classrooms. The institute also allowed teachers to receive on-site and on-line support towards that end, but the focus of the institute was clearly on the individual teacher. Institutional changes related to the manner in which school communities engage global pedagogy were not addressed in WTI. School change is a difficult undertaking, one that far exceeds the capacity of a single professional development workshop. Perhaps what is required is a

renegotiation of the relationships in schools, particularly among teachers and administrators, to provide teachers more agency in interpreting, analyzing, and engaging policy/curriculum changes (Proudford, 1998). As Sleeter (1992) found, professional developers need to recognize the limitations of their inservice efforts and pursue institutional change through avenues other than the workshop, even if it is intensive and ongoing.

In a similar vein, the efficacy of workshops like WTI is limited due to a lack of administrative support in the K-12 environment. Just as the participants' experiences in WTI were individualized, they were like lone wolves when they returned to their school contexts. School-wide curriculum change, such as developing a global perspective that involves the study of interconnections, perspectivity, empathy/caring, and alternatives, is unlikely to happen by the practice of a single teacher. Rather than focusing on individual teachers working alone, implicit in WTI by its organization, professional development efforts must be engaged collaboratively by many teachers from a school. Global education, similarly, should not be viewed as the responsibility of social studies teachers working collaboratively, but deserves the attention of all teachers if it is to be practicable and meaningful throughout the curriculum.

Conclusion

Despite the rhetoric about inheriting an interconnected world that is both smaller and increasingly complex and diverse, schools generally remain fixated on nationally oriented curricula. American students' ignorance about the world is problematic for teacher educators. As teacher candidates in the United States are generally recent graduates of the K-12 system, teacher educators inherit students who generally have little knowledge of and experience in studying the world. Those who monitor teacher education in the United States, such as the National Council for Accreditation of Teacher Education (NCATE), are concerned about the gap in prospective teacher candidates with respect to global education: "The [teacher education] curriculum lacks adequate content and experiences in global and/or multicultural perspectives" (Gollnick in Diaz, Massialas, and Xanthopolus, 1999, p.8). Zeichner (1999) cautions that despite efforts to promote diverse perspectives in teacher education, calls for policy change

presume very little about the knowledge, skill, and attitudes beginning teachers have about these initiatives.

Professional development in global education, particularly that which is designed for beginning teachers, is required to fill the gap between how societies have been transformed by globalization and how schools have generally failed to address these changes. The professional development workshop examined here gives professional developers and teacher educators some insights about teacher learning that may have application to other fields. Through this study, we see the possibilities and limitations of professional development for those at the critical beginning stages of their careers. Educational institutions, such as universities, non-governmental agencies, and public schools, can assist in this crucial process as teachers prepare future generations to inherit this singular, complex planet.

Appendix

Participants Profiles Note – all names used are pseudonyms.

Jerry - When I first met with Jerry for a bracketing interview, I asked him to share his perceptions of teacher inservice, to which he replied sarcastically, *"Oh, you mean teacher detention?!"* Jerry was a bright and witty, early 30s white male, whose students clearly enjoyed and admired him. As a part-time teacher and coach, he had an easy and pleasant rapport with his students, one that suggested knowledge of their academic and social selves. When we met, he had been teaching for less than one year, which made his comfort and ease in the school even more remarkable. During our inservice, he quickly emerged as an unofficial leader, redirecting his colleagues' attention and shepherding them to the next activity.

Jerry, like most of the other teachers in the study, did not have a favourable view of inservice. Jerry felt that the weekly meetings called "inservice" by his district were coercive and of little utility. *"Some of them are really good, and some of them are boring."* Jerry said that the *"really good"* inservices were those related to specific skills that could be used with students or *"how for us to be better teachers, how to prepare for the Comprehensive Assessment Test (CAT) in each class."* Inservice, as understood by Jerry, was supposed to be an opportunity to learn how to teach and use those strategies directly with students. Jerry's background with respect to learning from a global perspective was limited. He had a few undergraduate world history and geography courses that lacked a global orientation.

Aron – Aron, a white male teacher educator in his mid 30s with six years of experience in elementary schools, was well liked by his colleagues and students, largely due to his easy-going manner and unassuming character. He seemed genuinely to enjoy the unique position of being involved with inservice again, as it resonated with his earlier role as a classroom teacher, providing him a measure of comfort and familiarity, which the university environment infrequently offered. Along with being a full-time teacher educator, Aron was also pursuing his doctorate and wanted to add this global learning experience to his course of study. He recognized his own limited preparation in global studies, since elementary teachers are often assigned local, state, and national topics in social studies. He sought out the WTI to round out his background in global education so he might knowledgeably encourage teacher candidates to do the same.

Aron saw district mandated inservice as another example of bureaucracy. *"The district was basically interested in accountability, 'We're going to come in and teach you how to pass this test or deal with this disruptive student' and they would come back and check on your numbers later. A lot of the inservices that I went to through the district were a one shot deal, or 'district inservice day' but you wouldn't get familiar enough to implement the ideas."* Aron contrasted these less beneficial experiences with a professional development peer-coaching activity with which he was involved as a classroom teacher. He noted how the visiting team emphasized peer coaching and teaching life skills, and how the friendly demeanour of the leaders enhanced the process.

Joanne – Joanne was a white female, in her late 20s, and a beginning high school social studies teacher in her final semester of a masters degree. She was a bubbly and personable young woman, a former swimming star in high school and currently coaching the sport. Like many of her peers, she bounced around a number of odd jobs and geographic locations before settling into a more steady diet of being a student and a teacher. While she was amiable outside the confines of school, she was a bit more formal and restricted in her classroom. At times, she seemed uneasy in her school, due to her lack of teaching experience, her status as a new teacher, and the enormity of the high school environment. Joanne's classes were so large that she used a personal microphone while teaching, a tool

that seemed to give her more confidence and added to her presence in the room.

Joanne also lamented district inservices, or "teacher detention." *"I can honestly say I do not like the Wednesday inservice meetings because they seem silly. I don't feel like I get much out of it as it is not related to my teaching."* Joanne had attended a History Alive! workshop over the summer and found this activity, in contrast, to be very helpful, providing her with teaching materials and lesson ideas to implement in teaching world history. Professional development for Joanne, similar to Jerry and Aron, was best when it was practical and applicable to her teaching situation. As Joanne exhorted, *"Give me something I can do so that students understand!"* In terms of global studies, Joanne was extremely anxious, often feeling overwhelmed that she did not *"know anything"* about the world. Her formal preparation in fields related to global studies was minimal, having taken only one world history course as an undergraduate student.

Felicia – Felicia, an early 20s Latina, was a somewhat quiet and reserved beginning middle school teacher. She frequently came late to WTI sessions, generally did not participate in face-to-face follow-up activities, and kept informal interactions with her peers to a minimum. She was amiable throughout, apparently interested in the issues raised, especially those that connected to her Latina heritage. Her teaching assignment was in a middle school renowned for its family-like atmosphere and commitment to professional development. She was an accelerated student, having skipped a grade in her pre-collegiate career and receiving a scholarship to attend college. Felicia's interest and positive outlook also shaped her views of "teacher detention." She excitedly described learning teaching strategies that she gained from these meetings. She understood that her enjoyment of the weekly district inservice set her apart from her peers, and reflected on the uniqueness of this viewpoint: *"I try to look at everything from a positive perspective, to pull something positive out of it."* Felicia's global learning involved firsthand experiences with her family. She had travelled frequently to Chile as a youth and lived in diverse communities with large Latino populations in the north-eastern US. What she lacked in formal learning about the world she compensated with her experiential base.

Jorge – Jorge was a late 20s Latino with a warm and amiable nature that instantly endeared him to his peers. His conversational abilities were remarkable. Throughout his early

life, Jorge faced a great deal of personal struggle, from family poverty, unemployment, and being homeless as a young adult. He achieved a terminal degree in the school of hard knocks, but never seemed to lose his rosy outlook. His maturity belied his young age, which he coupled with a genuine openness to engage new ideas. Of all the participants, Jorge was the most globally oriented in his prior learning. His second undergraduate major was in anthropology; he worked on a relief project in Zimbabwe for seven months, and frequently hunted the web for global news outlets that he enjoyed sharing with others. Professional development was a new term in his vocabulary, which he roughly equated to a training opportunity he engaged in while working for a video rental store. *"Training work … we took over stores in bad condition and tried to fix them for the new manager."*

Larry – Larry, an early 20s white male, was shy and thoughtful. He got along well in the small group, but was more likely to be listening to the conversation than leading. Larry was the most uncomfortable in WTI, feeling like an outsider with respect to his status as an undergraduate student and his relative lack of global experience. Larry talked about *"striving to be the best teacher"* he could be in his undergraduate preparation, but he did not seem settled on how to proceed towards this goal. Throughout WTI, he became increasingly more comfortable working with the group and raising questions during teacher talk. He also eagerly participated in the on-line discussion, seeing an opportunity to learn from his more experienced peers in a non-threatening, private manner.

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William Gaudelli <wgaudelli@mail.ucf.edu> is an Associate Professor of social studies education in the Department of Teaching

and Learning Principles at the University of Central Florida, Orlando, Florida, USA 32816.

Learning How To Improvise: The Changing Rhythms of a Team Teaching Quartet

Andréa Mueller

In 1999, the National Research Council and the National Academy of Education issued reports in which they recommend research efforts be embedded in dilemmas of practice, and called for more collaborative forms of research in which researchers and professional educators work together to improve educational practices (Brookhart and Loadman, 1992; Shepard, 2000). Moreover, reviewers of the contemporary literature identify a need to examine the nature and scope of school-university collaborations to better understand what teacher educators and teachers learn, and how to sustain these partnerships (Cole and Knowles, 1996; Lieberman, 1992).

While initiating, developing and sustaining educational partnerships provide several challenges for researchers and for educators, they also have a wide range of potential benefits for their students. In this article, I describe one study of a school-university partnership. Specifically, I focus on how four educators (two classroom teachers, a vice principal/teacher, and a teacher educator/researcher) collaborate across six weeks to plan and team teach an integrated unit to grade 4/5 children. The integrated unit is designed to address a wide range of expectations in two topics of study in the Ontario K-8 science and technology curriculum document (materials that transmit, reflect, or absorb sound and

sound energy), as well as a range of expectations from the music document (knowledge of elements, creative work, and critical thinking).

One dilemma of practice identified by classroom teachers in this study was how to satisfy a plethora of curriculum expectations, particularly when they are unfamiliar with the content knowledge. A possible solution was to integrate subject areas in meaningful ways and to communicate subject knowledge expertise amongst educators. This dilemma and its possible solution became the subject of a collaborative research project.

Researcher and Practitioner Collaboration

There are various definitions of collaborative research in the literature. Tikunoff and Ward (1983) distinguish between a pure form of collaborative research where the teachers are involved in formulating research questions, formulating data collection procedures, collecting data, analyzing, interpreting and reporting findings, and implementing findings, and a partial collaboration where teachers participate in only one or more of these areas. Ulichny and Schoener (1996) emphasize the need to create a mutuality and interdependence between teacher and researcher throughout all phases of the research project. For Dyson (1997), initiating collaboration with teachers is an important process requiring faculty to accommodate to teachers' workloads. Moreover, she advises, researchers should build collaborative programs on teachers' experience and expertise.

These general principles are ideal in theory. However, in actual practice it is extremely difficult to negotiate and facilitate a research project in schools. How a project unfolds depends on the educators involved and on the school context and all its unpredictable events.

Establishing a working relationship is an important component of researcher and practitioner collaboration. Beck and Black (1991) argue "a productive research study would depend greatly on the mindful relationship" formed by the researcher and the teacher (p.137). For Ulichny and Schoener (1996), equal status based on mutual respect and concern is central. That is, a researcher should assure teachers that they are working as colleagues, not as supervisor and subordinate. Nevertheless, even when educators decide to work together, as we did in this study, individuals have

varied experiences and time obligations, and inevitably, participants take on various roles at different times. Still, it takes time and care to initiate, develop, and sustain such trusting, mindful collaborations between teachers and researchers.

Communication between researchers and practitioners is critical. Beck and Black (1991) point out that a researcher and a teacher may enter a partnership with visions and mental plans, but during the process other realities, other experiences, and other discourses transform these ideas and construct new ones. Huberman (1990) adds, "one of the more stable findings in the research utilization literature is that, for a study to exert a strong conceptual influence on practitioners, interactions between researchers and practitioners must occur not only on completion of the study, but also during and ideally, before the conduct of the study" (p.365). Dyson (1997) identifies ongoing release time for teachers to be able to collaborate with a researcher as critical. Although communication is a key element of an educational partnership, time to communicate is highly dependent on the structure of the school day and on the teachers' other professional commitments. In our project, teachers and administrators were often called away with no advance notice, interrupting classroom activities. Researchers must develop an understanding of the culture of individual classrooms and schools, and must learn how to improvise in the moment.

Co-teaching and Team Teaching

An understanding of the distinctions between co-teaching (Roth and Tobin, 2002) and team teaching (Davis, 1995; Eisen, 2000; Melnick and Witner, 1999) is useful when considering elements of collaborations between educators. Roth and Tobin (2002) describe co-teaching as an active process in which one learns to teach by teaching: this is "distinct from observing, studying, or reflecting on teaching" (p.xi). Davis (1995) defines team teaching broadly: "all arrangements that include two or more faculty in some level of collaboration in the planning and delivery of a course" (p.9). Melnick and Witner (1999) describe team-based professional development as "small teams of teachers with common interests help one another learn more about their own learning, study and reflect upon their own teaching, develop ongoing, sustained professional relationships with each other ... " (p. 2). Team-based teachers tend to be more professionally involved with their colleagues. Teaching collaborations vary; it is essential that the professional discourse communities are supportive. The manner in

which co-teaching evolves in each collaboration is highly dependent on participants. All educators in this study participated in different ways throughout the project, and this was a strength.

Dieker and Barnett (1996) developed an outline of the environment necessary to make co-teaching successful: a) designate co-teaching a priority, b) clarify roles (equal partners), c) provide regular planning time, d) include a collaborative problem-solving process, e) evaluate the process regularly, and f) share successful experiences to open the door for new co-teaching experiences. Additionally, Melnick and Witner (1999) report that

> without exception, successful teams saw the advantage to working together and sharing not only instructional strategies but also working together to take advantage of each other's strengths. Teachers had a belief that team-teaching not only enriched the content, but also enhanced its delivery. Teachers reported increased student interaction and saw gains in achievement. Teachers who team-taught seemed to be more self-confident (p. 9).

It is important to examine teaming partnerships in order to understand and appreciate the commitment, energy, and resolve it takes to learn how to team teach. There is no recipe for this educational adventure or guarantee for what learning will emerge. Ultimately, rewards for teaching together can only be known to those who do, but reports of their experiences may spur others to team.

Research Design

Context

A newly appointed vice principal/teacher and I (teacher educator/ researcher) collaborated to initiate a team teaching project with two classroom teachers in the same school. The project focused on planning an integrated science/music/technology unit. When approached by the vice principal early in the school year, these teachers, one novice and one experienced, expressed a keen interest to explore the possibilities of working and learning together. This group of educators learned to work together, to strive for harmony, and to appreciate individual contributions within many unpredictable school variables (e.g., students, timetable, physical layout of school).

The collaborative teaching site was a K-8 public school in a middle class neighbourhood school. Students from this school performed exceptionally well on province-wide tests when compared to other schools in the district. Approximately 350 students attended the school to which two administrators were assigned (full-time principal; 1/4 time vice principal). In early October 2001, a meeting was set up at the school for the vice principal, two participating teachers, and me, in order to explore the details of a potential collaboration and to respond to questions about the project. We agreed to work and learn together. Several additional meetings were scheduled for the team to meet and plan how we might team teach an integrated science/music/technology unit. Concurrently, details about the research project and ethical review process were communicated to all participants.

Participants

Participants in the collaborative study included a vice principal/teacher, a novice teacher, an experienced teacher, a research assistant/teacher, and me. All were Caucasian females from middle class backgrounds. I was the principal investigator and the vice principal was the co-investigator in the project. We acted as the team-teaching leaders. (We had teamed to teach intermediate students and teacher candidates in a previous year when the vice principal was a full-time classroom teacher.) I had 10 years of teaching experience and taught in a teacher education and graduate program at a local university. I also supervised teacher candidates in schools. The vice principal was in her first year as an administrator at a new school and had 7 years of teaching experience, including one year of teaching in a teacher education program. The novice teacher was in her first year of teaching and taught the grade 4/5 class in the study. The experienced teacher had taught for 15 years and taught the grade 4 class in the study. The project was implemented in two classes: The grade 4 class was comprised of 27 students (14 girls and 13 boys) and the grade 4/5 class was comprised of 26 students (10 girls and 16 boys). The majority of students in the project, and in the school, were from Caucasian middle class families.

An Integrated Science, Music, and Technology Curriculum Unit

The team developed a plan for integrating science, music, and technology in a way that seemed meaningful for students and implemented it in the two classes. The team leaders (researcher

and vice principal) team taught the integrated unit to a grade 4 and grade 4/5 class across six weeks (six consecutive Fridays for full days) with assistance from the classroom teachers. Generally, I led the teaching when the focus was on science and technology, and the vice principal lead when the focus was on music (with some exceptions). Together, we, as team leaders, introduced the project and guided children when working in groups. The two classroom teachers were active participants. Their participation included: observing team leaders, helping prepare resources, structuring student groups, guiding students during group work, leading some teaching sessions, and leading the final day's events. The two classroom teachers maintained full responsibility for their students and for student assessment across the project.

The six days that comprised the unit included a focus on the following: 1) exploring how sound is produced and how it travels by experimenting with materials; 2) planning, conducting, and presenting science experiments (investigations) in small groups; 3) designing, making, and playing instruments; 4) learning with high school musicians to understand sound production, variation, and composition; 5) composing rhythmic written verses to describe integration of learning through science and music; and 6) performance of group learning for an audience. Details about how the unit was taught and what students were required to do are reported in a joint paper (Mueller, A., Le Clair, J., Kechaidis, M., Swain, W., and MacDonald, J., 2004).

Data Sources and Analysis

Data Sources

Data were collected in a variety of forms and during three phases of the study. Phase I occurred prior to team teaching the integrated curriculum unit. A written questionnaire for the two participating teachers inquired about previous teaching experiences, areas of teaching expertise, and confidence in teaching subject areas. The researcher kept a regular journal record of all planning meetings prior to the actual teaching of the unit.

Phase II of data collection occurred across the six days during which the unit was taught. The research assistant kept daily field notes focusing specifically on the nature of team teaching, including notes on team debriefing meetings at the end of each day, as well as a daily photographic record. Teachers completed daily reflection

journals to provide insights about their learning at the end of each day, and participated in team debriefing meetings. Team leaders participated in audio taped conversations at the end of each day to reflect on their learning, the successes and challenges of team teaching, and how they perceived the collaboration among educators. Transcripts from the six audio taped conversations totalled 72 pages. Team leaders also recorded individual logs throughout the unit. Additionally, records of students' work across the project included evidence about their learning (e.g., daily journal responses, sound investigation reports, audio taped mural compositions, music listening logs).

Phase III occurred after completion of the unit. Teacher post-unit questionnaires examined responses on pedagogical and subject knowledge learning, team teaching, and student learning. Teacher semi-structured audio-taped interviews immediately after the project (March 2002) provided elaborations about responses in written questionnaires. A second individual interview with each classroom teacher at the end of the school year (June 2002) investigated the degree of perceived pedagogical influence from the project over the remainder of the school year and for future years. Team leader written questionnaires probed for details about team teaching learning experiences, as well as pedagogical and subject knowledge learning.

Data Analysis

An analysis of team leader data (researcher and vice principal) and teacher participant data (novice and experienced teacher) focused on the elements and nature of team teaching in this educational partnership and the influence of these elements on teaching and learning. Of particular interest was the professional knowledge developed by each educator about pedagogy and subject matter.

In this qualitative study, triangulation of data contributed to accurate and fair interpretations (Bogdan and Biklen, 1998; McMillan and Schumacher, 1997). Three insider perspectives on initial data analysis are provided by the researcher, vice principal, and the research assistant. Additionally, an outsider perspective is provided at the initial level of analysis to provide a member check. Specifically, key themes are identified individually in team leader and teacher participant data (e.g., questionnaires, journals, interviews). Subsequently, thematic and concept analysis (Miles and Huberman, 1994; Silverman, 1993) provided the means to develop coding categories. Field notes depicted the specific context

of each teaching day and the character of team participation from day to day. Additionally, detailed outlines of each day's activities were used to code classroom sessions into teacher-directed and teacher-guided sessions. Overall, as researcher, I maintained the responsibility for conducting a deeper level of analysis by checking for connections across data samples and by examining data holistically. Data analysis subsequent to the study drew upon a range of student data in order to investigate any links between teacher learning and student learning.

Research Findings

Elements of Collaboration: The Team Working Together

I - Researcher and Vice Principal Teaming

An analysis of teamwork among educators during the teaching of the unit (six full days) revealed that the researcher was present 100% of the time and the vice principal was present approximately 50% of the time. In total, 285 minutes each day were allotted for this integrated unit (total time = 28 hours and 30 minutes). Of the time when both the researcher and vice principal were present, they taught together most of Day 1 and for one session on Day 3. All other teacher-directed sessions were taught individually by either the researcher or the vice principal. For five of the seven teacher-directed sessions led by the researcher, the vice principal was not present. Although the researcher was able to benefit from the vice principal's pedagogical and content expertise in music by watching her teach and by co-teaching with her, the vice principal was unable to reap the same benefits of learning from the researcher's pedagogical and content expertise in science and technology. This unexpected change in the nature of their collaboration contributed to a shift in the ways in which the researcher was able to interact with classroom teachers and with the research assistant. The vice principal's role simply did not allow her to participate fully in ways she had anticipated when the grant proposal was originally conceived. Fortunately, both the researcher and vice principal were able to adapt, although it made the project more challenging for both of them. Two excerpts from the researcher's field notes illustrate how the researcher perceived changes in team collaboration.

January 3, 2002 (before the unit began and before the school term began)

> *Together we are quickly able to come up with innovative ideas and create plans to follow. It truly is amazing how we bounce ideas around and how we share expertise … it will be wonderful to team teach and share our ideas with the two other teachers.*

> February 21, 2002 (on the fifth day of the project)
> *Today was a little difficult … working with the students taught me again that some need more help than others and that how we guide as teachers can be very critical. I think that PF's [vice principal] guidance would have been very beneficial directly after recess and for the p.m. component, but alas she was unable to be there. I felt like I was alone for big chunks of the day and that we have had very little communication. I missed that communication.*

Comments from the vice principal in after-school audio taped conversations reveal some of her perspectives.

> January 25, 2002 (after the first day of the project)
> *It's been that way for us since the first time we worked together … like we just jump in and do it and we think alike and there's no ego interfering. It's just that we can finish each other's thoughts without us blinking or worrying about oh I'm going to offend the other person.*

> February 21, 2002 (on the fifth day of the project)
> *… you know I am torn. I run around here like an idiot. I haven't sat once today. Lunch was busy. Recesses are busy, and people come to talk to me and ask me questions … things just keep coming and I'm not in control of it all and I just have to roll with the punches and smile at the end of the day and know that I connected with every group today at some point.*

II – Researcher, Vice Principal, Experienced Teacher, and Novice Teacher Teaming

An analysis of teamwork among educators during the teaching of the unit indicated that the two classroom teachers in the study played multiple roles across the project. Initially, when observing teacher-directed sessions (with both classes) led by the researcher or vice principal they were passive learners who felt compelled to take notes for future reference. The teachers said they were happy to observe because this was a learning opportunity for them. Nevertheless, they were invited to become active participant learners when called upon to help guide their students' learning in small groups. This opportunity emerged on a daily basis and it was

at these times that the researcher and vice principal also guided student groups. Eventually, the two classroom teachers guided some sessions on their own with their regular classes as opposed to both classes during the second half of the project. The teachers stated that this provided a real sense of accomplishment for them. Overall, the teachers moved back and forth in their roles with the degree of their participation increasing over the development of the unit. For example, the researcher remarked in her journal notes:

> *It was really important at lunch to guide the teachers in the p.m. activities and briefly talk about what our roles should be. It was also a good time to touch base and get a sense for how comfortable everyone was and if we needed to discuss some issues … I'm wondering how the teachers felt about the day – if they thought it was too unguided – if they felt supported enough – if they felt their kids were getting some important learning from the day. I wonder what they think.* (Jan. 25, 2002)

The novice teacher reflected on teaming in the final interview:

> *It definitely reinforced the idea that I already had about the benefits of team teaching and being able to draw on other people's strengths … but to be able to get an actual body to come in and work together with you and the kids is very valuable …* (June 18, 2002)

III – Researcher and Research Assistant Teaming

The researcher and research assistant worked together closely before and especially during the project. The vice principal was often too occupied to direct her attention to the smaller details of the project (e.g., selecting, obtaining, and organizing resources; discussing how to organize student groups; general timing issues); therefore, these issues were usually planned by the researcher and the research assistant. They discussed key dilemmas around content and pedagogy in the unit in order to devise useful pedagogical strategies that would be transparent for teachers and for students. In retrospect, audio taped records of these pedagogically rich sessions would have proved most informative. It is essential to acknowledge that large blocks of uninterrupted time were required for these sessions. The vice principal and teachers did not have time to engage in similar dialogue. In fact, the original intent was for the researcher and vice principal to engage in deeper conversations about content and pedagogy as they had

been able to do so in a previous collaborative teaching project. The research assistant, in addition to discussing how the project was evolving, kept field note records, photographic records, and helped set up and clean up each day. The researcher recorded the following in her journal notes after meeting with her research assistant:

> *Wow what a lot of work and again I marvel at how well we work together. Today we came up with something absolutely critical that we both think will help students and teachers … It is amazing to have a teaching partner with whom to discuss pedagogical issues. With her background and experience in both science and music and elementary teaching, we are truly able to plan together and critique the work being done.* (Jan. 30, 2002)

The research assistant recorded the following reflection at the end of her field notes:

> *The concept of changing length/diameter of tube did not seem to become evident during the exploration at the Pipe It Center. Perhaps we should have provided pipe of different length/diameter but not scissors and asked how they can generate sound and what is different about the sounds.* (Jan. 25, 2002)

Degrees of Learning: Educators Describing their Learning

I – Teachers' Learning: Teachers Acquire Fresh Professional Knowledge

From the outset, the teachers expressed excitement about the opportunity to participate in this team teaching endeavour. The novice teacher hoped that her participation in the project would enable her *"to be able to use activities and teaching strategies for classes in the future."* She added: *"I also hope to take with me practical strategies for covering curriculum in more than one subject at a time. I'm very excited about having my class participate as well as being a learner myself."* The experienced teacher stated that she hoped to learn *"how to marry two subjects, a lot of music teaching, and a great deal of technology."* The teachers had not participated in team teaching before, nor did they identify their areas of expertise to be science, music, or technology. Their comments from the pre-unit questionnaire indicated that they were both keen to participate as learners in this project and excited about the learning opportunities for their students.

Across the project, the teachers completed a daily journal response at the end of each day. They were asked to describe what they learned about science and/or music content, what they learned about teaching science and/or music content, and what they saw children learning. They began their written responses at the same time the children responded in their journals at the end of the day, but usually did not complete them until after dismissing the children. Data analysis of these responses reveals three key themes the teachers regarded as critical across the project.

First, team leader demonstrations provided instrumental learning for teaching strategies and for how to teach children. For example, at the end of Day 1, the experienced teacher reported: *"It was interesting to learn how sound can be transferred even by string."* When thinking about teaching science, she added, *"I learned that you need to ask questions well."* At the end of the same day, the novice teacher reported: *"What a fabulous way to demonstrate traveling sound and sound waves."* Moreover, she noted that when teaching science it is important to have *"students think about how their experiment fits into the process of source, path, and change of vibration."* Both teachers reiterated how valuable team leader demonstrations were for their learning (content and pedagogical content knowledge) in post-unit questionnaires and in post-unit interviews.

Second, hands-on learning is identified by teachers to be important for their learning and for students' learning. On Day 2, the experienced teacher noted she learned the following about teaching science: *"Concrete examples make sense to children rather than verbal descriptions,"* and *"handling artifacts leads to questions."* Additionally, she saw children *"learning from each other what different shapes and sizes and materials produce what kind of sounds."* On Day 3, the novice teacher described her own learning to include *"all the components of the guided listening exercise and hearing specific examples of what each term meant."* Further to this, she described her students learning that *"instruments can be played more than one way"* and *"kids were thinking hard about ways to make their instrument produce different sounds."* Both teachers pointed out that as their participation in the project increased so did their understanding about the subject matter and about pedagogy.

Third, learning in groups was critical. At the end of Day 1, the novice teacher stated that she was confronted with *"the value of*

'setting kids loose' to learn on their own." However, at the same time she pointed out that the day was *"exhausting"* and that it was difficult to *"try and get to see each student group."* The novice teacher asked, *"Is there a way [to guide] without guiding them too much?"* In like manner, the experienced teacher remarked: *"children learned from each other what different shapes and sizes and materials produced what kind of sound."* At the same time she noted *"some children had difficulty because others did not cooperate."* The opportunity to observe their children learning in a hands-on fashion seemed important, but both teachers seemed to lack experience teaching in this investigative style for science and for music. They regularly asked for and appreciated guidance from team leaders about how to guide children when learning in groups.

Assessment emerged as challenging for both teachers because they had difficulties articulating how they transformed students' work into the grades required for the report cards, an issue that should be examined further. Being actively involved in the learning process was important for the teachers, for their own learning and for that of their students. Nevertheless, they thought it was important to write down what they observed the team leader doing. This element was unaccounted for by team leaders, who assumed increasing levels of participation on the part of teachers throughout the project.

II – Vice Principal's Learning

The vice principal pointed out several times during audio taped conversations that her administrative duties did not allow her to participate as fully as she had expected. She described it this way: *"I had no frame of reference about this job when we decided to do this [research] last year … I had no idea what this school meant or anything and I know it was disappointing that I would only be there for half a day sometimes …"* (Day 6, p.6). Additionally, the vice principal remarked that she did not know how her music teaching strategies would work with grade 4/5 students as her experience level was with older students. This project was a new learning experience for her. Although she did not explicitly state that she was learning about teaming with other educators, many of her comments revolved around observations of how the classroom teachers participated in the project.

An analysis of the vice principal's journal notes (six entries) indicates that she was very positive about the success of the project. However, she made no comments about the nature of teaming with the researcher or with classroom teachers, and few comments about

her own learning across the project. Instead, she focused primarily on the all-consuming role of being an administrator and the importance of good public relations at her school.

However, when asked specifically about her learning in a post-unit written questionnaire, the vice principal described her learning in the following ways:

> *It's the guiding of children that is critical, I think – the gentle balance between giving them just enough to stimulate them to explore on their own without giving them all the answers … and I don't think a lot of hands-on work is happening in classes – it's more rote learning of facts, formulas, and such. The kids are not used to discovery learning styles because there is so much to cover and so little time to cover it all.* (May 5, 2002)

Additionally, the researcher recorded the following in her journal notes after a planning session with the vice principal:

> *She [the vice principal] also mentioned how our work together has helped her better understand science, math, and technology, and helped her secure a grant to buy materials [for the school]. Earlier she would not have known enough to write such a grant. She also told me about the other science initiatives she has started in her school like the Tuesday After-School Science and Technology Program and the upcoming science fair. She has invited two female graduate student scientists to come into the grade 7/8 classes to do "A Day in the Life of a Scientist" to get kids motivated.* (Jan. 24, 2002)

III– Researcher's Learning

From an analysis of the researcher's journal notes (sixteen entries) and reflections, the following were identified as critical insights:

1) The actual experience of interpreting the new Ontario science and technology curriculum and in thinking about how to teach nine and ten year olds the expectations of this curriculum in a meaningful, hands-on approach provided important learning.
2) Sharing content and pedagogical knowledge with other educators in a truly collaborative fashion is a challenge.
3) Facilitating a research project that involves teaching 53 students and at the same time modeling for other teachers is a challenge.

4) The experience of teaching children in teacher-directed sessions and in guided, small groups sessions served as a reminder that how one structures a learning environment is really important.
5) It was important to have ample time for regular conversations about teaching, student learning, and teacher learning, as part of this project and on a regular basis.
6) The school environment is complex. The additional duties and responsibilities teachers and administrators have make it unlikely for them to participate in educational research without release time from their regular duties.
7) Learning more about music content and pedagogy by interacting with a range of individuals who have expertise in music content (vice principal, high school music teacher, high school musicians) and music pedagogy (vice principal, high school music teacher) helped me improve my teaching as a teacher educator.

The researcher observed the following in audio taped conversations with the vice principal:

> *I tried to talk to her [experienced teacher] a lot more and just go over things … I'm not sure how she should lead her discussions [with children], but she made it clear at the debrief at the end that she wasn't quite sure how to lead that discussion … we may need to have more limits, have them travel with us, even for the first two visits to two groups, and watch how we interact with them.* (Jan. 31, 2002)

In her journal notes the researcher reflected:

> *I wonder if that counts as a composition? Does the rainstorm and playing a book also count as composition? I'm learning a little more each time PF [vice principal] and I work together and I love it … the mural compositions were very intriguing to me. The idea of representing sound with symbols after choosing a theme and then deciding whether to play piano or forte and fast or slow was very new and full of adventure learning for me. I tried as best as I could to guide and assist the high school musicians who led groups, but I really had no frame of reference for how this would turn out.* (Feb. 15, 2002)

Discussion

This article is about a team teaching venture between four professional educators who made a commitment to work together to improve their respective educational practices, and about what they learned from this educational partnership. It is important to

acknowledge that several degrees of participation existed and that participation changed across the course of this school-university project. Each educator described her learning in individual ways. For example, at the end of the project, both classroom teachers revealed that they now had some understanding about the nature of educational research, and would want to participate more fully in any future projects. In contrast, although the vice principal recognized the intrinsic value of the project, she could not conceive participating at this level again because of her time-consuming role as administrator. Quite possibly, differential participation is simply a natural outcome of any team work.

As the project's researcher, I now have a much different understanding of what it means to co-teach. It was rare that the vice principal and I were actually co-teaching as described by Roth and Tobin (2002). When we were co-teaching, the vice principal could finish my sentences and we shared a unique energy. I remember the research assistant remarking that we were incredibly "in sync" and it was quite something to watch us and to watch the children respond to our energy. However, I would describe most of our remaining teaching as turn-taking, where we each taught and the other observed. It was not possible throughout the project to maintain the high level of time and energy required by co-teaching. In addition, when the classroom teachers guided students in small groups, I now recognize that they were team teaching with us, but that the vice principal or I took a lead role at this time.

I also have a better understanding of what contributes to a successful school-university partnership. Time for pedagogical conversations and time to work together on issues of pedagogy emerged as a key factor. In terms of these two issues, the character of co-teaching and the effect of time, I have three observations:

1. When reflecting on how to establish a professional learning community (DuFour and Eaker, 1998; Roth and Tobin, 2002), it is important for researchers to consider release time for team members to meet and discuss the project in action. For example, in our study, Friday afternoons at the end of the day simply did not provide enough time to discuss issues that emerged during the day and to discuss ongoing pedagogical decisions across the project. In retrospect, I realize how difficult it was for me to switch into a research mode after the day-long focus of teaching

53 children, and so I imagine that it was even more challenging for other team members. If our team-teaching day had been scheduled for Wednesday, then we could have scheduled a half day release time the next day to focus on our learning and student learning within the project.

2. From the outset, the two participating classroom teachers identified the problem of how to teach in two areas (science and music) in which they had limited knowledge. The actual practice of taking current curriculum materials and creating an integrated unit that addressed specific science, technology, and music expectations was extremely challenging, and was a task performed by the teacher educator and vice principal who had expertise in these content areas. More time to make pedagogical decisions and strategies explicit to the team would have presented a vital learning opportunity for all team members and likely refined the character of the curriculum delivery and assessment. Similarly, time for all team members to learn the science and music content together would have enhanced the project and individual professional knowledge. The expectation of co-participation by all team members should have been emphasized continuously, especially when the team leaders were regarded by the teachers as experts. It was not so important that all members participate equally in terms of the amount of time spent, but rather that team members participate in the various elements of the project so that they could share their learning and teaching experiences.

3. It is difficult to sustain such educational partnerships. Although it is not realistic to continue the same high level of focus on team teaching and teacher reflection, continuous support for pedagogical conversations is required. For example, the vice principal was in a position of leadership and could have invited other colleagues to join in on regular pedagogical conversations around teaching and learning at her school. The two participating classroom teachers in the project might have shared what they learned through their participation in the research project. Similarly, I as researcher could have offered to participate in some of these discussions or perhaps hosted occasional meetings at the university faculty with other faculty members. In short, although team participants communicated their learning in a joint paper at an educational conference, it is vital that conversations about teaching and learning continue in their school and at the faculty of education. The ways in which

administrators might support team teaching and sustained pedagogical conversations in schools requires further exploration. It was absolutely critical that the in-school administrator strongly supported this or any other school-university partnership.

It seems almost too simple to state that one learns to teach by teaching. Nevertheless, by teaching 53 children across six weeks, I, in my capacity as the teacher educator/researcher and the vice principal/teacher learned to teach grade 4/5 children science, music and technology in new ways. This was important because often teachers and/or teacher candidates assume that faculty members and administrators do not understand the realities of classroom teaching. Undoubtedly, this team-teaching experience helped me improve as a teacher educator. The novice and experienced teacher learned how to structure a learning environment that motivated children to be active and to make connections between science and music. Overall, this educational partnership directly influenced teaching and learning for all participants in various ways as they learned to teach by teaching together. The extent of this influence may not be fully realized at this early stage.

What was missing in our co-teaching research project was a continuous reflective dialogue about teaching and learning in an environment that allowed all of time to participate. As the principal investigator and the lead co-teacher, I lacked the experience and foresight to request as part of my proposal release time for all participants. Although we allotted time to meet directly after each co-teaching day, it was not enough. These debriefing sessions were more of a sharing session about how the day's events unfolded. We did not delve further into some of the issues or make active plans to change future co-teaching. As Roth and Tobin (2002) put it, "it is one thing to bring different stakeholders to a table and quite another to hear the voices of each" (p.296), and "during cogenerative dialogues it is imperative for each of the participants to speak and be heard" in order to "push the envelope of what is known and practiced" (p.297). Nevertheless, setting up an environment for all participants to engage in such a pedagogical dialogue is not easy. In retrospect, I recognize that guidelines for these dialogue sessions are critical so that all participants understand how they might participate and take responsibility for contributing to the co-teaching community. Each opportunity to co-

teach and to discuss co-teaching experiences brings with it the possibility for improving teaching and learning.

Reflections on How to Cultivate and Nurture Educational Partnerships

Researchers and educators recommend establishing professional discourse communities (Roth and Tobin, 2002) and professional learning communities (DuFour and Eaker, 1998). At the same time, it is widely recognized that reflective practices are fundamental for professional practitioners (Louden, 1991; Schön, 1987). Lieberman and Miller (1990) call for "school site-based in-service training where teachers can learn by engaging in their daily practice of teaching together, and providing for a community characterized by an ethos of continuing professional learning and development" (cited by Roth, 1998; p.371). Welch and Mueller (2002) show how collaboration between two school boards and a faculty of education can enhance professional development opportunities. As more teachers discuss their teaching, the quality of teaching and learning will improve in ways as yet unknown. Similarly, if teacher educators venture to co-teach with professional educators, they will model new forms of learning to teach together.

It is important to recognize that conducting educational research in schools that reflects what I call authentic collaboration between researchers and educators is not simple. Sustaining regular pedagogical conversations with practitioners in schools enriches not only teaching and learning for all participants, but the character of future educational research. Similarly, co-teaching is not an automatic process that just happens because two educators or more decide to teach together. It is a complex process that requires a wealth of planning time, flexibility, support, patience, an ability to respond in the moment, and the desire to reflect critically about co-teaching. Admittedly, it is less complicated to take turns teaching or to observe teaching. Roth and Tobin (2002) point out that when co-teaching both teachers are responsible for teaching, though one teacher may take the lead and some work may involve guiding students in small groups. What is important is that teachers aim to work together and that they play active supportive roles. The familiar model where a supervising teacher or university advisor observes from the back and offers advice would not be considered co-teaching. Taken as a whole, I believe that I have only just begun to learn how to co-teach and I will endeavour to do more co-teaching at all levels (with teacher candidates, novice teachers, experienced teachers, and other teacher educators). I am inspired to continue

forging educational partnerships as part of my regular practice as teacher educator, not only for research purposes. I am indebted to the three dedicated educators who generously invited me into their educational spaces. Together we learned to improvise in our educational quartet so that our respective expertise contributed to the whole educational score.

This was an incredible educational adventure. The underlying beat was steady. Educators were in this together. The rhythm changed from week to week across 6 weeks. The beginning coat hanger sound explorations intrigued everyone (children and educators) to wonder about sound and about how it traveled and changed. From week to week, our trust in one another grew as we rejoiced in learning, the learning of the children, and of our own.

A special thank you to Jan, Wendy, Maria, and Jane for their participation and commitment to this project. Our joint manuscript (Mueller et. al, 2004) provides specific details that may be informative to other teachers.

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Andréa Mueller <andreamueller_643@hotmail.com> uses her experiences as a science teacher educator to provide innovative professional development for teachers nationally and internationally. Her current interests include international teacher education and an integrated approach to science and technology education.

Leading for Change: A Renewed Focus on Teaching and Learning

A.J. Aitken and E.N. Aitken

REVIEWED BY *donna patterson*
University of Regina, Regina, SK Canada

Caught in the headlights of change within my faculty and in the schools around me, I considered that reading *Leading for Change: A Renewed Focus on Teaching and Learning* (2003) might offer practical advice (and perhaps assistance) on challenges and issues in creating a responsive and reflective approach to change. Specifically, the book details the story of a new superintendent and how he goes about dealing with everyday issues and realities of implementing change within a small school district in the mid 1990s. In its workbook format, the book speaks more to the professional than to the academic in each reader, although included is a fair and current reference list, as well as a complementary list of relevant readings.

The book may appeal most to those teaching about administrative system change or theory in educational settings in the midst of such change. Each of the seven chapters begins with a question designed to focus the reader on the central themes of the chapter and to frame the associated challenges and issues. Each chapter also ends with a series of questions intended to engage readers in self-assessment and to provide schools or districts with tools for reflective practice. The foci of the chapters range from establishing community around common understandings and shared learning goals, to systemically promoting purposeful, professional growth, to accountability and planning. Of particular interest to many readers will be Chapter 3, which highlights the complex issues surrounding using "technology as a supporting tool for learning" (p. 11).

I must say that perhaps a reviewer from educational administration would have better examined this book. My background in educational psychology engenders a focus on people in the midst of change and this focus colours my evaluation of this

book. While the narrative provided is appealing, both in its sequencing of events and it outlining of the superintendent's decision making, it leaves relatively unexplored the complexity of perspectives and actions that shape any change process. More specifically, it is surprising and disturbing that context of change is not examined until the sixth chapter. While it is true that leadership is a learning process and it is quite possible many school district leaders launch into change because of their own enthusiasm for the change being undertaken and often in response to a need to show immediate results, there is little discussion or rationale provided around the role of context and community in change. The reader is reminded that the narrative is being used as a helpful device to promote learning about change, but this narrative is not a real story of one superintendent's experience, but a composite created by the authors. The authors might have intervened with some commentary on the centrality of context in change, but their voices are sadly absent on this point.

Even more disturbing in the book is how opposition and resistance are treated as an aside. I am left wondering when change became a kind of game, with this administrator determined to go his own way no matter what. For example, the superintendent presents to the principals a draft of policies focused on the planning process. Here is how the principals' response is described:

> The principals felt more than a little overwhelmed by the scope of this policy. Given their record with respect to reporting on their supervision practice, it was no surprise that again, their major hang-up was the reporting phase. The issue of trust was trotted out: "Can't you just trust that we'll do it?" The issue of workload emerged in the discussion, "Isn't planning another make-work and paper-work imposition?" And the issue of flexibility was raised: "My plans change from day to day so that I can respond to the needs of my students." These and other manifestations of resistance convinced Greg [the superintendent] … that he was touching a nerve. The problem was clear: Holding people accountable for results causes stress and anxiety. (p. 54)

There is no suggestion that the principals brought to the table real concerns worthy of discussion. Rather, they and their concerns were trivialized. The understanding that resistance might be an effort to retain values of importance to the principals and to schools

is not even considered. Another example of what appears as a lack of respect can be found in the interpretation provided around the "culture" report on the history of the community. Four descriptions attributed to the community are all negative: dependency, immunity, suspicion, and distrust. Why is it that the only positive agents in this narrative are the administrative team, and the only possible future is the one envisioned by the superintendent? Certainly, it is not a future shaped through consensus building or discussion. Leadership is presented as control; change, as progress. The promised focus on teaching and learning is never realized or discussed in any depth. Without some conceptual unpacking of leadership and change, this book leads the reader into a world where the departure of this superintendent will leave a whole new agenda for change, and so change becomes a flavour of the month, a fashion statement, and not something constructed by those who live it.

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donna patterson <donna.patterson@uregina.ca> is an Associate Professor in educational psychology and arts education in the Faculty of Education at the University of Regina, Saskatchewan, Canada S4S 0A2.

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Mapping Social Relations: A Primer in Doing Institutional Ethnography

Marie Campbell and Frances Gregor

REVIEWED BY *Wanda Hurren*
University of Regina, Regina, SK Canada

Marie Campbell and Frances Gregor have developed a research methods primer for people who want to "do" institutional ethnography. Understanding the ways in which everyday life is organized and manipulated through institutional practices, and then working to change those institutional practices is the goal of institutional ethnography.

Teaching in the Faculty of Human and Social Development, Marie Campbell is a professor at the University of Victoria, British Columbia. Frances Gregor is an associate professor in the School of Nursing at Dalhousie University in Halifax, Nova Scotia. Both authors have a background in nursing, and developed their textbook in relation to their research and teaching experiences in the health sciences field. While the authors use this text in their graduate courses with nursing students, they indicate that graduate students and instructors within the social sciences and human services, and community activists are their intended readers. Drawing on Dorothy Smith's ideas regarding "focusing research attention on puzzles emerging in everyday life, as actual people experience them" (p. 7), *Mapping Social Relations* outlines how institutional practices in any human services area are implicated in the everyday lives of individuals who (might hope to) receive those services.

Throughout *Mapping Social Relations*, the authors provide examples of research that focus on institutional practices and "ruling relations" that affect individual lives. The examples illustrate the fact that it is most often the commonplace, normally unquestioned occurrences within institutional practices, that establish ruling relations. One example illustrates how, in the

simple act of filling out an assessment form for long term health care needs, a case manager activates a "text-mediated" social relationship. The authors point out that

> … far from being a "servant of the client" – how the nursing case manager understood her relation to her clients – Campbell et al. suggest that this relationship was conducted "in the service of the organization" … No matter how much the case manager hopes to act as the servant of the client, serving the client is not everything that is happening in this interaction. The text [of the assessment form] organizes the social relation as administrative, making administrative decisions the primary order of business. (p. 36-37)

The Primer begins with a useful discussion of epistemology and the authors expound on the value of situated knowledges and the importance of subjectivity within institutional ethnography. One of the principles of institutional ethnography is the fact that the researcher's own experiences matter, to the research and the research process. Encouraging students to look at their own experiences as socially organized is a starting point for teaching about institutional ethnography, and the authors give examples of how they have developed this understanding in their classrooms. Relative to institutional ethnography, Campbell and Gregor state that researchers must learn to recognize the "historical conditioning and continuing institutional enforcement of their knowing that stems from living in their own bodies in specific places and under specific conditions in the world" (p. 23).

Mapping Social Relations includes chapters on the usual research methods topics: identifying the problem, conceptual frameworks, reviewing the literature, constructing a proposal, choosing data collection approaches, and analyzing and interpreting the data. While these are standard topics for textbooks dealing with research methods, the authors take time to explain how each topic is somewhat different or problematic within institutional ethnography. For example, within institutional ethnography, the literature review is not just a review of the facts. Researchers must also analyze the social organization of the literature itself.

The final chapter in this textbook ties theory and practice together with the inclusion of six examples of research projects that employed institutional ethnography: a study of mental health care in South Africa; an insider's study of palliative care; the workings of a university disability policy; a job placement program for

immigrant women; health care issues for people with disabilities; and a study of AIDS activism.

Acknowledging that one textbook cannot do it all, Campbell and Gregor hope that researchers interested in institutional ethnography will find this text useful as a starting point. Not surprisingly, they encourage readers to follow up their reading of *Mapping Social Relations* by including further suggested readings, especially work by sociology scholar Dorothy Smith.

As I was reading *Mapping Social Relations*, I was often struck by the contradictions in the term "institutional" ethnography. While this research approach inquires into ruling relations as they are activated through institutional practices, researchers are required to base their inquiry on subjectivity, beginning with the personal lived experiences of individuals. "Institutional" suggests large-scale objectivity; however, any institutional ethnographic study must incorporate up-close and reflectively examined personal subjectivity on the part of researchers and participants. The authors do not openly acknowledge this contradiction until the final chapter, a discussion of which, early in the textbook, would have been useful for readers, especially those readers who are new to the field of institutional ethnography.

As a primer on institutional ethnography, one of the strengths of *Mapping Social Relations* is the inclusion, throughout the text, of examples of research undertaken within this approach. The final chapter, "Putting Institutional Ethnography Into Practice", is especially useful because the six studies included here illustrate how institutional ethnography, although very theoretically based, gives researchers the opportunity to look under the surface of things to see how texts and discourses work to rule relations, and then, importantly, to plan for practical actions. As an instructor of qualitative research methods courses, I would recommend *Mapping Social Relations* as a required reading for graduate students. This primer provides a solid starting point for researchers who desire to expose ruling relations within institutional settings and to acknowledge the experiences of everyday life and situated, embodied knowing. Just one final caution to readers of *Mapping Social Relations*: You might not ever fill out a form again without thinking of ruling relations.

Wanda Hurren <Wanda.Hurren@uregina.ca> is an Associate

Professor in curriculum and instruction in the Faculty of Education at the University of Regina, Saskatchewan, Canada S4S 0A2.

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Aboriginal Education in Canada: A Plea for Integration

John W. Friesen and Virginia Lyon Friesen

REVIEWED BY *David Newhouse (Onondaga)*
Trent University, Peterborough, ON Canada

The Friesens have written a text with a difference. Based upon a 1977 statement by Stoney Chief John Snow: "Today in schooling we need the best available ... plus we [must] integrate the wisdom of our culture with the knowledge of the technology of the other culture", they argue for an integrated education system for Canadians. Aboriginal people, they argue, have made a decision to maintain a cultural distinctiveness and to bring into aboriginal worldview that which is deemed to be useful and relevant from others. An aboriginal education system designed to support this decision would consist of elements from both traditional aboriginal and mainstream cultures. This in itself is not new. What is new and different is that the Friesens don't just speak to Aboriginal educators but to educators in general. The Friesens believe that this fusion has something to offer – traditional aboriginal knowledge can learn from the mainstream education system.

The Friesens' small text of 8 chapters starts with a multi-faceted argument for the return of traditional aboriginal knowledge to education and continues with 4 chapters dealing with the key elements of aboriginal philosophy and educational pedagogy. They include a chapter on residential schools and a chapter on Métis education, particularly in the three prairie provinces (Saskatchewan, Manitoba, and Alberta). The final chapter deals with what they call frontiers, those issues that are likely to pose challenges for educators, and issues a challenge for educators to learn from traditional elders and aboriginal knowledge in order to create healthier communities. They define the challenges as those resulting from the development of self-government and land claims, the effects of residential schools, the movement to cities of a largely rural population, and revisions to the Indian Act.

This text will be of interest to educators who want a quick and easy introduction to aboriginal philosophy, world view, and pedagogy. It is not a detailed introduction but it has sufficient depth to permit a new education student with an interest in this area to learn the basics. It does, in addition, provide a good bibliography for advanced readers who want to delve more deeply into the issues. It will provide a

sufficient background for someone to become knowledgeable about the broad contours of aboriginal educational history, aboriginal pedagogy, and the challenges facing the education system. In this sense, it would be useful as a text for courses in aboriginal education and those that provide a survey of contemporary education issues.

John Friesen is a University of Calgary professor of education with a long-time interest in teaching in multicultural environments and in aboriginal education. He is the author of a dozen books on various aspects of aboriginal cultures and spirituality, all of which emphasize themes of survival and adaptability. This work is well respected, in part because he is one of the few non-aboriginal authors to emphasize these themes as essential to contemporary aboriginal society and identities. It is not surprising, then, that this text continues these themes in the area of education. Virginia Lyons Friesen teaches in the Faculty of Communication and Culture at the University of Calgary and has an interest in teaching non-aboriginal peoples about aboriginal peoples. In previous published work, they outlined the challenges facing public education in North America and argued that it required more support rather than the wholesale development of alternatives. The current text, *Aboriginal Education in Canada: A Plea for Integration,* is consistent with this argument and provides some details about what could be changed to make public education more effective, that is, incorporating aboriginal knowledge and wisdom.

I must admit that I was a bit sceptical when I started to read the text. I originally thought it was going to be a contribution to the vast literature detailing the problems in aboriginal education: a continuation of the rhetoric of "the Indian Problem". I was pleasantly surprised by the positive tone of the text and its challenge to aboriginal leadership to build indigenous knowledge into the aboriginal education system. I was equally taken with its argument that the mainstream educational system do the same. The fundamental challenge, of course, for the mainstream educators is to see aboriginal pedagogies and knowledge as applicable beyond aboriginal peoples. Aboriginal ideas have not always been met with enthusiasm. The whole text, in fact, is a challenge to mainstream educators to begin to place value in the knowledge of aboriginal peoples. Through this argument, the Friesens add an important dimension to the debate about multiculturalism: that of knowledge and ideas.

The text would, however, have benefited from the inclusion of a few detailed, concrete examples of their ideas in action, particularly of the challenges facing mainstream educators as they try to base their actions on aboriginal knowledge. They offer scattered examples in which they discuss aboriginal approaches within aboriginal communities but none that describe mainstream schools using these ideas for their mainstream populations.

I would recommend the text for those who are interested in

understanding the challenges facing aboriginal communities and Canada in the movement towards aboriginal self-government. The Friesens makes it clear that the challenge is not just one of institution building but one of building an institution that is informed by aboriginal traditional ideas and values, and that supports this central desire of modern aboriginal society to ensure that their ideas inform the structures and processes of everyday life in modern aboriginal societies. The text would also be of interest to educators working with aboriginal communities who want to understand the ideas behind the policy actions of aboriginal education leaders.

David Newhouse (Onondaga) <dnewhouse@trentu.ca> is Chair and Associate Professor of the Department of Indigenous Studies, and an Associate Professor in Business Administration at Trent University, Peterborough, Ontario, Canada K9J 7B8.

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