

**OVERCOMING CULTURALLY DISLOCATED CURRICULA
IN A TRANSITIONAL SOCIETY:
AN AUTOETHNOGRAPHIC JOURNEY TOWARDS PRAGMATIC WISDOM**

Bal Chandra Luitel
Kathmandu University, Nepal
bcluitel@yahoo.com

Peter Charles Taylor
Curtin University of Technology, Australia
p.taylor@curtin.edu.au

Paper presented at the annual meeting of the American Educational Research Association
(AERA), SIG: Self-Study of Teacher Education Practices
Montreal, 11-15 April 2005

**OVERCOMING CULTURALLY DISLOCATED CURRICULA
IN A TRANSITIONAL SOCIETY:
AN AUTOETHNOGRAPHIC JOURNEY TOWARDS PRAGMATIC WISDOM**

Bal Chandra Luitel & Peter Charles Taylor

Abstract

In this paper we present part of an autoethnographic inquiry into the prospective role of cultural values and beliefs in rendering Nepali school mathematics more culturally inclusive. The research was conducted by the first author, a Nepali mathematics teacher educator, during postgraduate research in an Australian university. The research enabled him to develop practical curriculum wisdom as a culture worker pursuing development of a culturally contextualized mathematics curriculum for Nepal. The second author, a transformative teacher educator, served as research mentor and co-writer. The sub-theme of the paper is the value of autoethnographic research as a means of transformative professional development for non-Western educators conducting postgraduate culture studies research without having direct access to their home country.

Introduction

As recent political events have demonstrated, Nepal is at a relatively early stage of transition in moving from a monarchical society towards a social democracy that participates in the global economy. So how should the Nepali education system respond? How should it serve the apparently conflicting interests of preparing Nepali children as skilful and competent one-world citizens who are also proud and willing to continue growing their own local cultural systems? In a recent study we explored how the mathematics education system of Nepal can make use of democratic principles to promote cultural integrity and diversity (Luitel, 2003). Bal Chandra Luitel conducted a critical autoethnographic inquiry (Ellis, 1997; Ellis & Bochner, 2000) into his cultural situatedness as a school student, teacher and teacher educator in the field of mathematics education. Autoethnography is a powerful emergent form of professional development that enables science and mathematics educators to examine the cultural situatedness of their professional practice and to re-vision their role as culture workers who create culture-sensitive curricula and pedagogy (Afonso & Taylor, 2003; Pereira, Settelmaier & Taylor, in press; Song & Taylor, 2005; Taylor & Settelmaier, 2003).

Bal's inquiry was shaped strongly by the narrative and performance turn of postmodern qualitative research (Denzin, 2003; Tierney & Lincoln, 1997). He created textual representations of his lived experience in the form of "self narratives that critique the situatedness of self with others in social contexts" (Spry, 2001, p. 710). The process of writing which constituted this act of inquiry (Richardson, 2000) enabled Bal to explore critically and creatively the cultural transitionality he had experienced throughout his educational journey from childhood to adulthood. Bal wrote also with the purpose of engaging his readers in pedagogical thoughtfulness (van Manen, 1990) about the role of education in transforming his society. The performative discourse of Bal's stories and reflective autobiographies is intended to show how people with power in the Nepali education system (curriculum experts, school teachers, subject advisors, school board members) enact cultural meanings in their daily lives and "how these meanings and performances can shape experiences of injustice, prejudice and stereotyping" (Denzin, 2003, p.xi).

Throughout the inquiry Bal used the perspective of metaphor as a powerful imaginary to explore hidden and complex meanings of curriculum (Lakoff & Johnson, 1980; Willison & Taylor, in press). He depicted dominant images of mathematics curricula that perpetuate a monocultural worldview in Nepali classrooms—curriculum as subject matter, discrete tasks and concepts (Schubert, 1988), and he envisaged alternative images—curriculum as local enactment, power sharing, cultural reconstruction, to promote culture-sensitive perspectives. Bal argues that if we are to understand deeply the ways in which classroom teaching and learning practices can be aligned with the emerging democratic goals of Nepal (and perhaps other

transitional societies) then we need to expand and enrich our curriculum images and ensure that they serve the interests of all stakeholders. We need to construct and adapt curriculum images that help reconceptualise an egalitarian, learner-centred, needs-based and inclusive mathematics education.

In the paper we illustrate how postmodern arts-based research (Barone, 2001; Eisner, 1997) can be used as a means of transformative professional development in mathematics teacher education (Brookfield, 1995; O'Sullivan et al, 2002; Taylor, 2004) to disrupt an otherwise epistemologically and politically conservative field in which research is framed (invisibly) by absolutist views of the nature of mathematics (Ernest, 1991) and transcultural views of mathematics curricula; perspectives perpetuated by an historically entrenched international curriculum and textbook export industry. This self-study signifies how educators from transitional societies undertaking postgraduate studies in Western universities can conduct a form of practitioner research that develops creatively their cultural capital and generates multidimensional curricula knowledge grounded in their cultural values, beliefs and practices.

The paper speaks also to the nexus between practitioner research and curriculum inquiry as a creative space for professional development. Since the completion of Bal's original study we have encountered the powerful perspective of Henderson and Kesson (2004) which advocates growth of practical wisdom via seven modes of curriculum inquiry – *techne*, *poesis*, *phronesis*, *praxis*, *dialogos*, *theoria*, *polis*. These modes of inquiry are familiar to practitioners of postmodern, critical and aesthetic forms of qualitative research for transforming the self as the first step towards transforming the world (Palmer, 1998; Pereira, Taylor, Pereira, 2005; Pereira, Settelmaier, Taylor, in press). Bal's self-study involved him in five modes of inquiry, apart from *polis*, in which he engaged subsequently on return to his professional community, and *techne* which is concerned with developing the craft of teaching and learning.

The paper is in four sections. First, Bal provides a narrative account of why Nepali society can be termed transitional. He explores his life history as a student, teacher and teacher educator, and writes critically about the politics of globalization impacting on Nepali society. This writing constitutes a form of critical reflective inquiry aimed at identifying a major source of social inequity restraining the flourishing of democratic ideals and practices in Nepal. Henderson and Kesson (2004) describe this form of social activist writing as 'praxis'.

In the second section, Bal inquires into the nature of transitionality in direct relation to school mathematics in Nepal by representing his experience of mathematics education, a field in which he has studied and taught extensively. The inquiry involved writing, and subsequently interpreting, 20 mixed genre stories, some of which are included in this paper. Storying enabled Bal to develop further his reflexive and creative self. This process has been described as 'poetic phronesis' (a combination of *poesis* and *phronesis*), or a process of development of the practically wise self deeply involved in the moralactivity of seeking a new way of living among others (Wall, 2003).

In the third section, Bal discusses the nature of reforms that, he believes, are essential for developing a culturally sustainable mathematics education for Nepali schools. His argument has an enhanced moral force, drawing on theories of cultural activism (Freire, 1993; Giroux, 1993), the cultural nature of mathematics (D'Ambrosio, 2000; Pinxten, 1994), and critical mathematics pedagogy (Skovsmose, 1994). This form of theorizing has been described as 'theoria', a visionary intelligence that allows one to speculate, to imagine and to envision possibilities of a peaceful, just, pluralistic and sustainable world (Henderson & Kesson, 2004).

Bal's inquiry ends by seeking a rapprochement between the otherwise diametrically opposed interests of universalism and contextualize, signaling development of 'dialogos', his newfound disposition to honouring a diversity of worldviews (Henderson & Kesson, 2004). We hope that this paper provides sufficient evidence of Bal's journey towards pragmatic wisdom, a sophisticated form of intelligence well suited to complex decision making about what constitutes culturally inclusive and pluralistic curricula for the children of Nepal.

The paper is written in diachronic form, a narrative structure that reveals aspects of how the inquiry actually unfolded over time (Polkinghorne, 1997; Stapleton & Taylor, 2003). Thus the reader can glimpse how Bal's theoretical perspectives emerged during the inquiry and enabled him to consider the cultural significance of issues embedded in his stories and how these perspectives were folded back reflexively into the inquiry and shaped subsequent stories of educational practice.

Transition of Nepali Society: My Narrative of Experiences

Growing up as a student, a mathematics teacher and a teacher educator, I have seen Nepal facing major political, economic and cultural upheavals. Nepali society has struggled for a long time to acquire a democratic political system that ensures direct participation of its population in governance. I witnessed pluralistic and transformative perspectives starting to gain momentum even within the framework of a long-established autocratic system. Such perspectives helped establish the multiparty political system in 1990.

Did the past remain as *the past*? This question is at the centre of discourse while uncovering the nature of ideological transitionality. Perhaps, Said's (1994) perspective that 'the past cannot always be the past' is mirrored in the Nepali socio-political context in which monocultural and non-liberal standpoints have reemerged since the recent democratisation of Nepal. In the transition from the old cultural posture to a liberal and democratic one, our state seems to be unclear in its conceptualisation of policies for improving the lives of the Nepali people. To me, the transition to a liberal and market-oriented economy has added to the confusion. Privatisation has resulted in a push to sell all government-owned companies to businesspersons, and conflicting interests amongst civil society, political elites and donor agencies have resulted in transitory policies and plans. Given the condition of escalating violence and frightening absence of social justice, the old regime has reemerged with the ideology of peace-through-arms.

In the process of democratisation of Nepal, I have observed the transition from monocultural to multicultural landscapes and an accompanying official perspective that minorities should be listened to as the state endeavours to make more inclusive policies (Bohora, 2002). However, the past has not remained the past; to me, the basic character of the state has remained the same as the state governance has been centralised as in the monarchical rule. As the state continues to embrace a repressive cultural posture, the growing insurgency — which embraces a similarly repressive posture — has depleted basic developmental infrastructure in various parts of the country. More than 10,000 people have been killed in the last eight years of organized insurgency, and a number of people have been tortured by both the state and the insurgents (INSEC, 2004).

In my view, the transitional character of Nepali society cannot be explored without looking at the unjustifiable landscape of globalization. With the upsurge of information technology the impact of Western cultural traditions seems to be distorting the originality of local Nepali cultures rather than to be promoting dialog between cultures. From the perspective of cultural activism, the notion of globalization has become a new form of hegemony in the cultural sphere of transitional non-Western societies (Huntington, 1997). Indeed, my experience of globalization within Nepal is that it is a process in which dissolution of local and minority cultures appears inevitable. For many Nepalis, embracing the so-called 'global worldview' involves adopting a new cultural perspective that suppresses local worldviews.

As Nepali society is in the process of constructing and embracing new values in politics, the economy and culture, pro-autocratic perspectives are clearly evident in mainstream Nepali society; and growing conflicts between pro-autocratic and reform-oriented ideas are contributing to the transitional character of Nepali society. As a reform-oriented educator, I believe that there is an intertwined relationship between society and education: education is a subculture of contemporary society.

Next, I inquire into the nature of transitionality in direct relation to school mathematics in Nepal by representing my experience of mathematics education, a field in which I have both studied and taught extensively. My inquiry involved writing, and subsequently interpreting reflectively, 20 mixed genre stories, three of which are included in this paper. Storying enabled me to develop further my self-reflexive and creative self which has been described as 'poetic phronesis' (a combination of poesis and phronesis), or a process of development of the practically wise self deeply involved in the moral activity of seeking a new way of living among others (Wall, 2003).

My Images of Mathematics Education

My formal educational journey started in 1979 in a rural primary school in Nepal. As a result of wondering why there were no stories in my primary school mathematics textbook, I constructed

an image of mathematics as a *foreign subject* that does not include my cultural capital. During my secondary education, this image was strengthened as the school management crossed the southern border to find *Indian teachers* to teach Nepali mathematics. Witnessing the lack of mathematics teachers in the rural secondary schools, I planned to pursue a mathematics education course in my tertiary education. While studying the intermediate mathematics courses, my images of mathematics turned out to be *mathematics as inexplicable in Nepali* and *mathematics as a teacher's subject*. Amidst teacher generated understanding, *meaningless mathematics* was the main image of mathematics during my subsequent bachelor's degree studies. Whilst teaching from an Anglo-Indian mathematics textbook to Nepali students, I witnessed how cultural, conceptual and lingual contradictions were major hindrances to student learning. *Mathematics-teaching-as-reproduction-of-theorems* and *mathematics-as-collections-of-unchangeable-definitions* were some of the images I constructed during my Masters course in mathematics. In the meantime, I had developed an unclear but exciting image of ethnomathematics as *mathematics of the people*.

After a brief career in a government teacher education college, I joined Kathmandu University¹. I saw many problems in the teaching and learning of mathematics in the schools of Dhulikhel Municipality² where I worked as a mathematics educator for an in-service teacher-training programme. This field-based experience helped me connect between and understand the landscape of university teaching, pre-service and in-service teacher training, and school mathematics teaching.

Changing my workplace from the crowded university classroom to resource-poor semi-rural schools set me on a new journey of teaching and learning mathematics. I constructed a range of images of mathematics, from *mathematics-is-what-teachers-say* to *mathematics-as-storytelling*. How to embed local cultural contexts within teaching and learning mathematics is one of the outstanding problems for teachers who are mostly unaware of developing culturally contextualised learning activities. I too had only limited experience and awareness of how to embed local cultural contexts in mathematics teaching. However, supervising mathematics teaching provided me with rich references for reflecting upon the context, the subject matter and this potential teaching approach. Over time, I learnt that each observed lesson was unique in terms of approach, temporality, person, context and content.

In the meantime, the Nepali school mathematics curriculum changed in response to the government-generated rationale that secondary school graduates were *weak* in basic mathematical knowledge and skills. Consequently, new content was included in the new school mathematics curriculum. However, the transition to this new curriculum created a chaos-like situation among secondary school teachers because most of the new content was unfamiliar to them. Nevertheless, according to the teachers, the inclusion of new content did not make any significant difference to their practice. The curriculum materials – textbook, teacher's guide, and assessment-related documents – were also the subject of teachers' criticism because of their decontextualised nature. On the contrary, the curriculum designers, textbook authors and university professors were of the opinion that the school curriculum needed to introduce other important mathematical concepts. Talking to the experts revived my initial image of *mathematics-as-a-foreign subject*. However, visiting schools, reading the faces of the students and encountering their original mathematical thinking did little to enable me to accept this alienating image.

As a teacher educator, I have continued to extend my images of mathematics and mathematics curriculum. To me, constructing images does not only depict them as signifiers but also helps uncover a number of issues associated with pedagogical perspectives which, in turn, helps me reflect on and improve my own teaching-learning practices. Transient in their nature, the images change from time-to-time in accordance with changing curricula, pedagogical prescriptions and situatedness. With this, a question emerges out of my images of mathematics: What are the prevailing scenarios of the landscape of Nepali mathematics education, especially in terms of curriculum, classroom and school culture and societal expectations?

¹ Established in 1991, Kathmandu University provides undergraduate and (post)graduate programs within Arts, Education, Engineering, Science, Medical Sciences and Management Schools: Link: www.ku.edu.np .

² Dhulikhel Municipality is situated to the northeast of the capital city, Kathmandu. It is a small and famous place for 14th/15th century old Nepali cultural traditions and artefacts.

Exploitive view of curriculum

What is the major hindrance in carrying out educational reforms? To me, our own frame of thinking that makes us unaware of taken-for-granted ideas, practices and perspectives is a primary obstacle to bringing about change. Beside this intrinsic obstacle, the culture that is manifested in the process of developing and implementing mathematics curriculum may have an adverse effect in changing the conventional pedagogical models. In the Nepali context, a bureaucratic, hierarchical and repressive culture has shaped and facilitated the thinking and actions of Nepali experts who work in the field of curriculum. Perhaps, the tendency of under-representing teachers (and other stakeholders) in the curriculum development process has contributed to an unsustainable and elitist mathematics education that rarely provides opportunity to enrich existing mathematics curriculum by including local contexts and content. The following story, constructed according to my experience as a teacher educator of a school-based teacher education program, portrays how a curriculum expert regards the relationship between the mathematics curriculum and teachers.

They Don't Have Any Ideas About Curriculum

It could be any day in March 2000. Gunaraj and myself are about to reach his office. "Do you think the secondary mathematics teachers need more curriculum orientation training?", he asks. Gunaraj, a fellow teacher educator, coordinates the project activities that aim at improving the teaching-learning situation in the government schools of Dhulikhel municipality. "Yes, they have plenty of questions about the curriculum, especially about the content area and textbooks," I reply.

By then we reach his office. He opens the main door and invites me to take a seat. "Let's propose a date for the orientation session," Gunaraj says as he places a calendar on the table. "What about the first Monday of April?" "That's fine," I agree with the date. "I will discuss it with the teachers," I propose.

"So, what are their main complaints about curriculum?", he asks me. "Subject matter, sequence, timing, the textbooks' insufficiency in fulfilling curriculum goals, curriculum decision process, etc," I read these points from my diary. "What do you think about these problems?", he asks. "Perhaps, there are some problems in curriculum," I continue, "specifically, teachers are not yet ready to cope with the changes."

Gunaraj then orders two cups of tea. "Which school are you going to visit, sir?", he asks. "Deurali Secondary School," I reply. "Teachers are also full of negative attitudes," he opines. "Yes, that's true, but we need to take account of their ideas", I continue. "They are the 'first hand implementers' of the curriculum." "For me, the definition of curriculum itself is a problematic issue," Gunaraj maintains. "Each curriculum specialist has his/her own definition. For some, everything turns out to be a curriculum: even activities performed outside the school seem to be a part of school curriculum." I indicate my agreement with his ideas: Perhaps, it is a way of sharing commonalities with a degree of diplomacy. "Despite these broad ideas of curriculum, the teachers have been regarding the textbooks as the main curriculum," I add. "This view is a good example of the problematic relationship between theory and practice." We do not speak for a while. Gunaraj checks his email.

A few moments later Gunaraj affirms, "Yes that's true. Recently, I read an article about English language curriculum. It has exemplified several types of curriculum. Curriculum as syllabus, textbook, lesson plan, activities, objectives and so forth." "Is this similar to the concept of mathematics curriculum?" "Yes, but mathematics has been depicted traditionally as more content based than activity oriented. Teachers' main concern is the sudden change in content areas as though they are more important than the teaching-learning activities," I clarify.

“Oh, we are yet to confirm the expert for the curriculum orientation training session. Who do you think is appropriate?”, Gunaraj asks. Perhaps, we need to invite Mr. Clout? Gunaraj checks his phone number. He indicates for me to call him.

“Hello”

“Hello. May I speak to Mr. Clout?”

“Sorry. He is on leave. Perhaps he may be at his home. Do you have his home number?”

“I don’t have it. Could you give it to me?”

“01 xx xx xx”

“Thank you”

I dial the number given by the personnel officer of the Curriculum Development Centre.

“Hello”

May I speak to Mr. Clout?”

“I am here. By the way to whom am I talking?”

“I am Bal Chandra, working as a teacher educator in Kathmandu University. We have organised a mathematics curriculum orientation session as per the demand of the secondary school teachers. We would like to invite you as the expert for that session. Are you available for the first Monday of next month?”

“Thankyou for your invitation. But I am sorry to say that I have stopped discussing the issue of curriculum and textbooks with teachers. They don’t understand anything about curriculum. It is just a waste of time. It would be better to organise a session about how they have to teach particular content in their classroom.”

“Oh, I see. Thankyou very much for your time.” I hang up the phone.

“What does he say?”, asks Gunaraj. I recount what Mr. Clout said about my invitation to him as a curriculum expert. Perhaps we need to think about other people? “Oh, I have to be in school in fifteen minutes,” I add. “Let’s discuss this tomorrow”. Gunaraj agrees. On the way to school, I am still in a state of confusion about the sacred nature of expert-defined mathematics curriculum.

This story may help you understand the perspective of the curriculum expert who regards curriculum as a detached substance and the process of developing a curriculum as an activity separate from teaching. It seems to me that that Mr. Clout dispenses a fragmented view of curriculum development in which the completion of experts’ tasks indicates the beginning of teachers’ jobs and the concluding of teachers’ jobs is the beginning of students’ learning journeys. Mr. Clout defined his curriculum as the subject of academic discussions and bureaucratic decisions that involve only a handful people who exercise power. Perhaps, this perspective holds the idea of separating curriculum from the day-to-day pedagogic lives of teachers. What might be Mr. Clout’s curriculum metaphor? How does that metaphor affect the day-to-day lives of Nepali schools? Do not these metaphors compel practitioners (i.e. teachers) to understand curriculum as a means of forming a hierarchy among the actors—experts, teachers and students? For me, the expert image of curriculum can be represented by the metaphors of the *hidden treasure* and the *market*. Taken together, these metaphors imply that the curriculum treasure is kept (secretly) within the community of experts and that the curriculum decision process is akin to bringing the hidden treasure into the unchallenged market. Implicitly, the consumer of the monopolized market cannot get more than one choice, as the seller defines the destiny of the customers. Opening this divine formula of curriculum devolvement to the teachers would be unethical for Mr. Clout.

In my experience, the expert generated idea, *curriculum as expert's business*, has restrained us from developing a sustainable mathematics curriculum that can be a tool for emancipating teachers and learners from hierarchical pedagogical frames. Perhaps, emancipation has been hindered by the frame of metonymical representation of curriculum through only limited metaphorical images such as, curriculum as *document*, *expert-assembled knowledge*, *monocultural text* and so forth. As long as the expert thinks that discussing the issue of curriculum with teachers is a waste of time, the inherited aim of the curriculum remains unexplored. Unethical in its nature, the semantic and professional depiction of the term ‘teacher’ by the expert appears to be guided by a repressive, non-egalitarian and undemocratic culture. Consequently, the expert-generated notion of teacher and curriculum delimits the frame of

pedagogy as *teaching for tests*. Using only sit-for-test exams as a means of assessment affords extreme authority to a select group/person. Such an assessment system empowers the powerful and overpowers the powerless. Using the same tools of assessment for rich and poor, urban and rural, resource-rich and resource-restrained schools promotes success for the privileged and failure for the deprived. In essence, the pedagogical implication of the expert-oriented image of curriculum is likely to be a Pavlovian model of mindless teaching.

The cultural landscape of Nepali classrooms

My exploration of culture is guided by the idea that culture includes normative and voluntary manifestations of language, behaviour, interaction, ontological beliefs and so forth. Besides, I believe that the notion of culture can also be uncovered through topical, historical, behavioural, functional, mental, structural and symbolic perspectives. Given these perspectives, in my experience the classroom culture in Nepal has remained the same despite various ups-and-downs in the socio-political context. What might be possible reasons behind this? Could it not be the case that we have uprooted our own educational values and thus are not fully able to adapt other values? In the case of mathematics teaching and learning, the classroom culture emanates from the implicit notion that the purpose of teaching mathematical content is to transmit ideas to *passive subjects* as though the subjects are prepared to be injected with senseless ideas. My experience of being a mathematics student tells me that I was not given the opportunity to raise questions nor did I realize that I had a shared ownership of the subject I was learning. Although I was one of the privileged students, I witnessed how the classroom culture suppressed student ideas in the name of definitions, theorems and formulas. The following story, entitled *Definition of Triangle*, depicts the context of a primary school classroom in remote Nepal.

Definition of Triangle

“Why didn’t you complete your homework? You pathetic little...I know how to treat you. Oh...I forgot my stick...!” I was stunned and tried to check whether I had completed my homework. The flat-long-moustache-faced person with an unironed suit and typical faded Nepali cap had just entered our fourth-grade classroom. I could not make eye contact with Mr. Giant who was our opponent-and-umpire for the whole year’s game. What a pity! We were a group of helpless opponents! He went directly to the small boy who was not able to complete ‘math homework’. The boy’s face was already full of fear. He was silently saying that he could not understand the problem. However, Mr. Giant was too big to listen to the small boy’s plea. A few days ago, the same boy was on the Mr. Giant’s blacklist, and was threatened several times. Mr. Giant had told the boy, “If you follow me, you will pass the test and become a good person otherwise you will remain a cowboy.” At that moment I looked at the boy and could see his head shaking back and forth indicating his fearful confusion. Mr. Giant’s standard Nepali was too difficult to understand for that small village boy for whom Nepali was a second language.

In the Giantdom, there was no place for our voices. Our quiet voices disappeared in the kingdom of his mathematics. The definitions were his powerful weapons for containing our positions. The bookish problems were sacred texts and the process ritual was central. I had narrowly escaped from Mr. Giant’s would-be punishments. Perhaps there were very few students who were still at large from his summons.

“If you tell me the definition of a triangle, I won’t punish you,” Mr. Giant offered.

“A triangle is a figure with three sides and three angles”, was the boy’s answer.

“Your definition is not complete. I will give you one chance.” Mr. Giant’s moustache seemed to be shaking. However, the boy could not make it. He was so nervous.

“Now you have to go the front door, and from there you need to touch the left corner. Finally, you have to return here. Remember you have to walk on your knees. It will help you remember that a triangle is a ‘closed’ figure enclosed by three sides.”

The small boy completed his task with wounds to his knees. However, I wasn't confident that he could insert the missing word 'closed' in his definition.

Reading the story may help you uncover a number of issues that are essential to discuss for making Nepali mathematics education more culturally ethical, contextualised and justifiable. From my standpoint cultural practices need to be appraised and critiqued from egalitarian, moral and democratic perspectives. The cultural posture embedded in the story draws upon the notion of teaching as *depositing* the teacher's ideas into students' heads as though students are to be his bank accounts. Besides, the culture of 'blaming juniors' rather than appreciating them for their efforts seems pervasive in our pedagogical practices. To me, the story may also indicate the underlying monocultural perspective emanating from the singular ontological standpoint of official/bookish mathematics.

I believe that the culture of the classroom reflects the culture of contemporary society. For me, a sociological perspective, perhaps an interactionist one, helps uncover the culture of mathematics embedded within the subject matter and pedagogy. Deconstructing the contemporary cultural standpoint leads me to uncover the meaning of the term *guru* which has a strong cultural attachment with the term *teacher* in Nepali society. Indeed the etymological meaning of *guru* is a person who helps lessen the ignorance of another person. However, intermingled with the old Westernised educational norms and values, the meaning of *guru* has been symbolised as a repressor rather than the knowledge dispenser. Though the notion of teacher in our cultural landscape is a facilitating, caring and nurturing person, its depiction in the storyline gives a totally adverse meaning.

What types of curriculum images does the story represent? The question leads me to explore various conventional images such as curriculum as *subject matter*, *teacher's voice*, *subjugation*, *imposition* and *author's text*. These images represent conventional contemporaneity which holds that changes in the mathematics curriculum are not necessary because mathematical content is universally true. Besides, the view that change in the mathematics curriculum is synonymous with importing mathematical content from the so-called 'developed world' (rather than exploring from our own knowledge traditions) makes curriculum a matter of impositional adoption. For me, both of these perspectives deal with the idea that mathematics is transcendental from contemporary society. I do not agree with this idea because I believe that it advocates an unjust mathematics education for school students.

Anglicisation, quality and equity

In my perspective, an equitable and quality education enables learners to both interpret their worlds and contribute to the well being of human civilisation. Perhaps this perspective opens up an alternative view that quality is not only a matter of content possession but also the way we make meaning of the world. Similarly, the notion of equity is concerned with fairness in selecting various knowledges for the curriculum, applying learner-centred pedagogical approaches and adapting alternative assessment practices. Given these perspectives, a couple of questions appear here. How is the notion of quality regarded in my educational context? Does not the sole emphasis on Anglicisation make inequitable our mathematics education? Although I was educated in Nepali language schools—most government schools use Nepali language as the medium of teaching—my teaching career started in a private English language school. The bilingual medium of my tertiary education (in Nepal) helped me understand very basic landscapes of English that could be used in the mathematics class for which I was assigned.

My intention in bringing this issue into my writing is to uncover the growing Nepali parental belief that educating children in English language schools helps them to get quality education. Admittedly, the democratization of Nepal in 1990 weakened schools that conducted their day-to-day teaching and learning activities in the Nepali language and strengthened privately managed English language schools. In my experience, however, focusing on English as the sole medium for teaching mathematics has promoted a culturally decontextualised mathematics education that may not enable learners to make meaning of their worlds. Furthermore, the idea of equity is at stake because of blind imitation of Western knowledge, unjust teaching strategies and inappropriate assessment approaches. Given this situation, the following story, *Mr. Trade, Dr. Prescription and My Students*, represents an experience of mine whilst working as a mathematics teacher in a private school in Kathmandu.

Mr. Trade, Dr. Prescription and My Students

It could be any morning of the last week of July 1994. I have told the school principal that the textbooks are not relevant to our context. I pointed out examples of how the textbooks had made mathematics a more difficult subject than it is. She neither supported nor opposed my standpoint about the mathematics embedded in the textbook series. She suggested that I discuss this issue with Mr. Trade (a School Board member), and she confirmed that Mr. Trade would be available in the school next day.

I meet Mr. Trade in our staff room at 10:30am. After returning his normal but non-egalitarian greeting, I start to present my problem. “I have been facing some language-related problems associated with these textbooks,” I point to the pile of books and continue, “The names of persons, places and even examples are not familiar to our students, therefore, it is very difficult for them to understand mathematical concepts, and to develop problem solving skills.”

“Sorry, I don’t understand your point,” he says.

“For me, the textbooks are not relevant to our context. So, we need to find another set of textbooks for the next academic year,” I clarify, “I am planning to revise some chapters for the remaining classes of this academic session.”

“What are you saying? How can you challenge this ‘Universal Publication’? It is the best publication in our region,” he replies disagreeably.

“Maybe in other subject areas. How can I say these textbooks are good while our students cannot make any sense of many problems and examples?”. I open one of the textbooks.

“These books have been recommended by Dr. Prescription. Do you know him? For me, the names of persons and places do not make any difference in mathematics. Instead, the major issue is conceptual understanding. Mathematics is universal. It is everywhere the same. You know this!” He tries to depict Dr. Prescription as the messiah of Mr. Trade’s mathematics.

The discussion ends with the Board member’s one-sided decision that the textbooks will not be changed unless Dr. Prescription recommends it and that I may not make any changes because that would degrade the standard of mathematics in his school.

I become so sad for not being able to make any changes. For a moment, I feel that everything is against me – the school building, the garden and the electricity poles. I need to be quiet for awhile in order to cool off. So, I go to the eastern corner of the semi-grassland and mull over the issue I had raised with Mr. Trade. “Are there no mathematics textbooks written for the Nepali context?”, I murmur to myself, “Does mathematics necessarily mean teaching foreign terms and places?”

“What happened in the meeting?”, asks my colleague. I have to say that I was not able to change the situation. I make it clear to him that our school’s education is being made a private commodity in the name of ‘quality education’. I admit that we are not preparing our students to become creative thinkers. Instead, we are turning them into a mass of hopeless knowledge receivers. I mention explicitly that we cannot act as teachers but as clerks of the School Board. How painful is this situation! A common phenomenon in a Nepali private boarding school!

Rather than advocate discarding the use of English in mathematics teaching and learning, my focal point is to make English a means instead of the end of learning. To me, the story suffices to demonstrate the hegemonic notion of Anglicisation which means to discard the idea of culture-laden mathematics curriculum and pedagogy. Furthermore, the story represents the conventional notion that because mathematical knowledge is universal there is no viable alternative image to *curriculum as subject matter*, even though the subject matter was prepared for a different cultural context.

As I mentioned earlier, the notion of quality education has been conceptualised as developing in most students only a communicative ability in English. Rather than ensuring

equitable learning activities for all learners, the pedagogic symbolism of the story puts much emphasis on teacher-centred pedagogy. Revealing the unjust landscape of knowledge selection for teaching, the story shows Mr. Trade's unawareness of a transformative intent in mathematics teaching. To me, Mr. Trade's insistence on regarding mathematics teaching as having the mission of implanting so-called 'standard mathematics' into students' heads seems to be serving only a *technical interest* (Grundy, 1987).

The story may be unclear until we understand the issue of globalisation. Globalisation supports the argument that Nepali educators need to prepare Nepali students not only for the nation but also for the world at large. However, this consideration is not as straightforward as we might think. We have plenty of political, cultural and social issues to discuss while considering the issue of globalization. These questions remain unresolved: Whose worldview are we imparting? Whose knowledge counts in such a curriculum? Whose interests are being served by such decontextualised textbooks?

Developing a Sustainable Mathematics Education Program

Exploring Nepali mathematics education through sociological and anthropological lenses has unfolded a range of anomalies prevailing in the field. My list of anomalies includes culturally decontextualised curricula and pedagogy, asymmetrical power relationships between the agents involved in the curriculum process (i.e., curriculum experts, teachers and students), hierarchical communicative classroom contexts, and teacher-centered classrooms. In saying so, I have not embraced a reductionist view that these are the only anomalies responsible for culturally dislocated mathematics education. Instead I believe, according to my experience as a student, a mathematics teacher and an educator, that these are the major anomalies which restrained my own learning in a way that can be envisaged as mathematics serving the goal of imparting only technical knowledge rather than emancipating with life-affirming goals.

Given this perspective, this section includes the nature of reforms that, I believe, are essential for developing a culturally sustainable mathematics education for Nepali schools. My argument here has an enhanced moral force, drawing on theories of cultural activism (Freire, 1993; Giroux, 1993), the cultural nature of mathematics (D'Ambrosio, 2000; Pinxten, 1994), and critical mathematics pedagogy (Skovsmose, 1994). This form of theorizing has been described as 'theoria', a visionary intelligence that allows one to speculate, to imagine and to envision possibilities of a peaceful, just, pluralistic and sustainable world (Henderson & Kesson, 2004). At the same time, I will contest the idea that mathematical knowledge is transcendental, arguing that pedagogical selection of learning experiences is guided by politics, values and interests. Epistemologically, I am situated in a position that embraces a view of learning as a process of meaning making.

Constructing and Enacting Contextualised Mathematics Curricula

Perhaps, the popular Nepali adage, *don't forget your landscape*, which is used often to remind others about their background, is appropriate to link up with the notion of contextualisation. As the adage is used to advise persons with an improved lifestyle resulting from formal education not to deviate from their cultural capital by which they are linked with their land, it also gives the sense that everything about our histories and traditions are rooted in the soil on which we live. Does the metaphor of linking-with-their-soil not indicate that sustainability of education is possible through cultural contextualisation of curriculum and pedagogy? Given this perspective, I continue to explore the notion of contextualising mathematics education through my experiential and theoretical landscapes.

The primary notion of contextualisation of mathematics curriculum is to ensure the inclusion of local knowledge traditions as the curriculum content. Besides, suspending the monocultural regime of Westocentric mathematics and its acclimatization in the local cultural context in accordance with the local language(s), historiography, corpora of knowledge, myths, images, quantitative and qualitative thinking, customs and so forth (D'Ambrosio, 2001; Restivo, 1991) gives an outlet for starting off the notion of contextualisation. Furthermore, the idea of contextualisation is to allow the existence of multiple mathematics as many civilizations have their own mathematics to represent their interpretations of quantitative and qualitative

phenomena. The idea of multiple mathematics uncovers multiple systems of thought, sources of knowledge, conceptions of the nature of knowledge and perceptions of reality, which are labeled by the (so-called) mainstream historiography as inferior knowledge systems. Do we not need to embrace an ethic of diversity (D' Ambrosio, 1999)? Do we not need to develop a justifiable ethic of acknowledging different sources of knowledge so that our generations to come understand each other, become dialogic, and promote multicentrism? However, the ethic of diversity is far removed from my context in which mathematics is regarded as not dealing with cultural contextual issues. Monological in its nature, *the* mathematics has professed its own landscapes of definitions, theorems, rules, algorithms and corollaries, rather than having the aim of emancipating students beyond the boundary of cold reason (Taylor, 1996).

To me, the genesis of overcoming culturally dislocated mathematics curricula is to employ the notion of cultural contextualisation which has a strong relationship with alternative paradigms of thinking in education such as constructivism, cultural activism and critical curriculum perspectives. Specifically, my notion of the constructivist paradigm is to emphasize taking learners' contexts into account in curriculum planning, a notion that has a significant role in promoting the contextualisation of education. The constructivist notion of 'viability' (von Glasersfeld, 1995)—which represents an alternative perspective of truth—allows us to explore a theoretical construct that deals with the extent of the adaptability of certain corpora of knowledge in different contexts. However, I have envisaged the possibility of (mis)interpretation of the concept of viability as being supportive of the certification of Westocentrism as the only viable knowledge tradition. Discarding the notion of an absolutist idea of viability, my focus here is on employing it as a relative approach to taking local knowledge and sources of knowledge into account whilst planning, designing and enacting school mathematics curricula. As the essence of 'border crossing' (Giroux, 1993) is to deal with the issue of 'othering' through the lens of cultural activism, the issue of contextualisation is intertwined with it as the ownership of curriculum is central. I have considered Paulo Freire's (1993) ideas of 'sensitization' and 'conscientization' that dispel the myth of a know-about-the-world pedagogy and energize a know-from-the-worlds pedagogy to help liberate the oppressed people as a referent to construct contextual pedagogy. To dispel the myth of culture-free mathematics I have employed the ideas of culture-laden mathematics and mathematics as subculture (Clements, Grimison, & Ellerton, 1989), which have opened a new window for viewing the landscapes of mathematics education for the Nepali context. With the idea that we need to empower local actors to take up new initiatives to carry out reform in education, the notion of 'ecology in education' (Schubert, 1988) also places a strong emphasis on locally suitable, reconceptualized and inclusive and culturally appropriate education programs.

Reflecting upon my own experience gives rise to a practical wisdom that planning for cultural contextualisation of mathematics curricula needs clarity in identifying goals and the process of contextualisation. Some authors have portrayed the notion of contextualising mathematics as an act of disguising the enculturation of learners ultimately in Westocentric mathematics, that is, to prepare students according to the culture of Western Mathematics as though they have to wipe out their *own* cultural capital. Disagreeing with the idea of enculturation, as it is incompatible with the notion of *multiple mathematics* (D'Ambrosio, 2000), I agree with Pinxten (1994) that mathematics cannot be free from the culture from which it is generated. Is the notion of 'culture-free mathematics' not simply a ploy to impose Eurocentric mathematics? How then is cultural contextualisation possible? To me, these questions do not demand a one-sentence answer; rather they require deep exploration.

There is no dearth of literature (Abreu, 2002; Pinxten, 1994; Skovsmose, 1994) that helps us to generate different levels of contextualisation of mathematics curriculum. In my perspective, they can be categorized as teacher, school, content, pedagogy and curriculum development levels. The case of *teacher level contextualisation* is a matter of teachers' enthusiasm for enacting the existing curriculum by incorporating local content, pedagogical models and examples. In a similar way, schools too can implement or be selected to implement mini-projects on the cultural contextualisation of mathematics education. Such projects can be useful for extending the idea of contextualising mathematics education to other schools. Certain content areas can be taken from local corpora of knowledge—such as the Limbu counting system, the Sherpa number system, geometric patterns in wicker baskets, and so forth—to promote the contextualisation of mathematics at content level. Contextualisation at the pedagogy level requires us to understand mathematics as a subculture that comes from a

discourse community and contemporary society. Pedagogical contextualisation involves employing local pedagogical model such as *sitting-with-grandma*, indirect follow up, telepathic approaches, and collective socialization and learning models. Besides, developing contextualised pedagogy also requires contextualised language, media, communicative codes and so forth.

Pedagogy of Meaning Making

Perhaps, reading my stories has helped you understand how in my Nepali educational landscapes hierarchical, teacher-centered and learner-neglected pedagogy is widespread. To me, such a pedagogical standpoint puts much emphasis on transmission strategies of knowledge believed to be scientific, standard and non-anthropomorphic. Furthermore, this pedagogical perspective assumes a portrait of learners as *inferior receivers* rather than *co-learners* or *co-constructors*. Hierarchy, therefore, seems inevitable while embracing the traditional pedagogical perspective as it draws a clear borderline between the teacher (sender) and students (receivers). In essence, the teacher- and subject-centered pedagogy hardly promotes a sustainable mathematics education; rather, it distracts learners away from *the* mathematics as it rarely incorporates life-affirming goals in mathematics teaching.

It is worthwhile mentioning that individual-as-meaning-maker pedagogy (Taylor, 1996, 1998) has a strong relationship with 'transformative pedagogy' (Freire, 1993). To me, transformative pedagogy helps to improve the agency and awareness of learners, changing them from their current passive, receptive and disempowered state into a state of liberated thinking. Besides, transformative pedagogy emphasises the learner's empowerment in examining the falsifiability of their own taken for granted ideas. In embracing this pedagogy, the appropriateness of subject matter in accordance with life-affirming goals is always under the scrutiny of the learners and other stakeholders. What does the phrase *scrutiny of the learners and other stakeholders* indicate? Does *it* not suggest a pedagogical anarchy? In my perspective, the phrase has a two-fold injunction: (1) learners are required to be involved in the *curriculum process* and, (2) the curriculum needs to be developed in an inclusive and participatory way. The second question —Does *it* not suggest a pedagogical anarchy?—seems to be a reflection of conventionalism that regards the function of pedagogy as maintaining law and order for imparting other-generated mathematics.

In the process of implementing transformative pedagogy, we need to explore the existing micropolitics (Giroux, 1993) of Nepali classrooms with a view to energizing and reconceptualising egalitarian approaches to instruction. In so doing, the traditionally aligned educationalist may refuse to change their practice, saying that the pedagogy of mathematics should focus on the subject matter rather than the 'thinking frame' of the learners. Focusing largely on expert-generated mathematics structure, the old-paradigm treats learners as 'inferior others' rather than significant actors of the learning process. Such thinking may also produce a culture of mathematics learning whose goal is to justify the unjust politics of the selection and dissemination of knowledge for the educational process. Furthermore, focusing on the politics of the classroom involves us in making visible the power relationship between teacher, students and other agencies that (pre)shape our classroom social dynamics. In my experience, the politics of the Nepali mathematics classroom belongs traditionally to a type of asymmetrical, misrepresented and hierarchical classroom. Such a typology seems to stem from both the *subject culture* and the culture of our immediate society.

Because of the emergence and expansion of constructivist theory (Ernest, 1991; von Glasersfeld, 1995), which promotes learning environments for empowering learners to construct meaning rather than storing ideas, hierarchy-oriented classroom politics is at stake. By focusing on learner-generated understanding constructivism emphasizes learning activities that help make sense out of a variety of information, problems, contexts and ideas. A constructivist-oriented pedagogy respects learners as young mathematicians who explore their worlds of experience and establish connections between the various meanings they construct, particularly in relation to their usefulness for transforming their lives. For me, the meaning making approach to pedagogy, along with critical reflection on questions such as *Whose knowledge counts?*, *Whose interests are being served by the corpus of knowledge*, and *Are students liberated from their taken-for-granted ideas?*, can help mathematics teachers develop critical pedagogies of mathematics (Skovsmose, 1994).

Transformative pedagogy is not that easy to adopt within the frame of teaching-as-enculturation pedagogy. Perhaps, we need to develop and adapt a new frame that ensures an open environment to appraisal, critique and exploration. Specifically, connecting between global trends and local needs requires us to sketch a comprehensive picture of how we intend to make mathematics education sustainable. As I give voice to my resentment of the monocultural pedagogic perspective of Westocentric mathematics, some may be suspicious of my aim to dispel the cultural myths of hard control and cold reason (Taylor, 1996) and to set up new avenues of learner empowering pedagogy. To me, multilogic pedagogies that promote dialogue between learners, teachers and mathematicians can be fully understood after we accept the existence of *multiple mathematics*. Furthermore, preparing students for the diverse world requires us to embrace the notion of teaching as *acculturation*, a notion that can help students better understand the different cultural landscapes in which they need to act out their lives (Taylor & Cobern, 1998).

Conclusion

Considering the two adversarial metaphors of *contextualism* and *universalism* as referents, I envisage that Nepali mathematics curricula can be made contextualised by employing ethnomathematical and critical perspectives that connect between Westocentric and local mathematics. In the process of overcoming culturally dislocated mathematics curricula explorations of local mathematical landscapes are urgently needed to enable critical mathematics educators to unfold the existing corpora of mathematical practices for incorporation into school mathematics curricula. In so doing, the only image of mathematics, *mathematics as a body of knowledge*, can be suspended by taking into account the progressive images, *mathematics as activity* and *mathematics as cultural representation*. The notion of contextualism is aligned with transformative pedagogy together with contextualised subject matter, putting more emphasis on learner-centred approaches to instruction. In my experience, embracing learning as *meaning making* entails a readiness to implement this pedagogy as a way of overcoming culturally dislocated curricula. A question may still be raised: What would be the image of Nepali mathematics classrooms if we enact culturally contextualised curriculum practices? Perhaps, we would see: (1) Nepali students carrying out meaning making activities such as conversation, project work, problem solving; (2) the teacher incorporating local sources of knowledge and practice; (3) students having opportunities to link local knowledge with global knowledge; and (4) students being respected as learners and being helped to improve their agency as owners of their mathematical learning.

List of References

- Abreu, G. (2002). Mathematics learning in out-of-school-context: A cultural psychology perspective. In L. D. English (Ed.), *Handbook of international research in mathematics education* (pp. 323-353). London: Lawrence Erlbaum Associates.
- Afonso, E.Z. de F. & Taylor, P.C. (2003, Jul). *Auto-ethnographic inquiry for professional development: Re-conceptualising science education in Mozambique*. Paper presented at the annual conference of the Australasian Science Education Research Association (ASERA), Melbourne, Vic.
- Barone, T. (2001). *Touching eternity: The enduring outcomes of teaching*. New York, London: Teacher College Press.
- Bohora, A. (2002). An end to the means. *Nepali Times*, Available Online <http://www.nepalnews.com.np/ntimes/issue107/opinion.htm>.
- Brookfield, S. D. (1995). *Becoming critically reflexive teacher* (1st ed.). San Francisco, CA: Jossey-Bass.
- Clements, M. A., Grimison, L. A., & Ellerton, N. F. (1989). Colonialism and school mathematics in Australia 1788-1988. In M. A. Clements & N. F. Ellerton (Eds.), *School mathematics: The challenge to change*. Geelong, Victoria: Deakin University.

- Cohen, L., Manion, L., & Morrison, K. (2001). *Research Methods in Education* (5th ed.). London: RoutledgeFalmer.
- D' Ambrosio, U. (1999). Methodological questions in studying the history of mathematics in colonial Latin America. *Acta historiae rerum naturalium necnon technicarum*, 3, 139-151.
- D' Ambrosio, U. (2001). What is ethnomathematics, and how can it help children in the schools? *Teaching Children Mathematics*, 7(6), 308-310.
- D' Ambrosio, U. (2000). A historiographical proposal for non-western mathematics across cultures. In H. Selin (Ed.), *The History of Non-Western Mathematics* (pp. 79-92). Dordrecht: KluwerAcademic Publishers.
- Denzin, N. K. (2003). *Performance ethnography: Critical pedagogy and the politics of culture*. Thousand Oaks, CA: Sage Publications.
- Eisner, E. W. (1997). The promise and perils of alternative forms of data representation. *Educational Researcher*, 26(6), 4-10.
- Ellis, C. (1997). Evocative autoethnography: Writing emotionally about our lives. In W. G. Tierney & Y. S. Lincoln (Eds.), *Representation and the text: Reframing the narrative voice* (New York: State University of New York Press). pp. 117-119
- Ellis, C., & Bochner, A. P. (2000). Autoethnography, personal narrative, reflexivity-Researcher as subject. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed.) (New York: Routledge Falmer). pp. 733-761
- Ernest, P. (1991). *The philosophy of mathematics education*. Hampshire, UK: The Falmer Press.
- Ernest, P. (1991). The dialogical nature of mathematics. In P. Ernest (Ed.), *Mathematics education and philosophy: an international perspective* (pp. 33-48). London: The Falmer Press.
- Freire, P. (1993). *Pedagogy of the oppressed* (20 ed.). NY: Continuum.
- Giroux, G. A. (1993). *Border crossings: cultural workers and the politics of education*. NY and London: Routledge, Chapman and Hall.
- Glaserfeld, E. von (1995). A constructivist approach of teaching. In J. Gale (Ed.), *Constructivism and education* (pp. 3-16). Broadway, Hillsdale: Lawrence Erlbaum.
- Grundy, S. (1987). *Curriculum: product or praxis*. London: The Falmer Press.
- Henderson, J. G. & Kesson, K. R. (2004). *Curriculum wisdom: Educational decisions in democratic societies*. CO, Ohio: Pearson.
- Huntington, S. P. (1997). *The clash of civilization and remaking of world order*. NY: Touchstone.
- INSEC. (2004). *Human Right Yearbook 2004*. Kathmandu: Informal Service Sector, INSEC.
- Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. Chicago, IL: University of Chicago Press.
- Luitel, B. C. (2003). *Narrative explorations of Nepali mathematics curriculum landscapes: An epic journey*. Unpublished Dissertation for Master of Science (Mathematics Education), Curtin University of Technology, Perth, Australia. [Online] Available: <http://pctaylor.com/> under 'Mentoring'.
- O'Sullivan, E. V., Morrell, A., & O'Connor, M. A. (Eds.) (2002). *Expanding the boundaries of transformative learning: Essays on theory and praxis*. New York, NY: Palgrave.
- Palmer, P. J. (1998). *The courage to teach: Exploring the inner landscape of a teacher's life*. San Fransisco, CA: Jossey-Bass.
- Pereira, L. J., Taylor, P. C., & Pereira, C. E. (2005, Apr.). *Rewriting history: A poetic approach to the moral transformation of leadership practice*. Paper presented at the annual meeting of the American Educational Research Association (AERA), Montreal.

- Pereira, L., Settelmaier, E., & Taylor, P.C. (in press). Critical auto/biographical research as/for professional development. In Roth, W. M. (Ed.), *Auto/Biography: Praxis of research method*. New York, NY: Peter Lang.
- Pinxten, R. (1994). Anthropology in the mathematics classroom. In S. Lerman (Ed.), *Cultural perspectives in the mathematics classroom* (pp. 85-97). Dordrecht: Kluwer Academic Publishers.
- Polkinghorne, D. E. (1997). Reporting qualitative research as practice. In W. G. Tierney & Y. S. Lincoln (Eds.), *Representation and the text: Reframing the narrative voice* (pp.3-21). Albany, NY: State University of New York Press.
- Restivo, S. (1991). *The Sociological worldview*. Cambridge: Basil Blackwell.
- Richardson, L. (2000). Writing: A method of inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 923-947). London: Sage Publications.
- Said, E. W. (1994). *Culture and imperialism*. London: Vintage.
- Schubert, W. H. (1988). *Curriculum: Perspective, paradigm and possibility*. New York and London: Macmillan Publishing Company.
- Skovsmose, O. (1994). *Towards a philosophy of critical mathematics*. Dordrecht: Kluwer Academic Publishers.
- Song, J. & Taylor, P. C. (2005). Pure blue sky: A soulful autoethnography of chemistry teaching in China. *Reflective Practice*, 5(3), 141-163.
- Spry, T. (2001). Performing autoethnography: An embedded methodological praxis. *Qualitative Enquiry*, 7(6), 706-732.
- Stapleton, A. J., & Taylor, P. C. (2003). *Representing research (&) development*. Paper presented at the annual conference of the Australasian Science Education Research Association, Melbourne, Victoria
- Taylor, P.C. (2004, July). *Transformative pedagogy for intercultural research*. Paper presented at the meeting of the Culture Studies in Science Education International Research Network, Kobe University, Japan.
- Taylor, P. C. (1998). Constructivism: Value added. In B. J. Fraser & K. Tobin (Eds.), *International handbook of science education* (pp. 1111-1123). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Taylor, P. C. (1996). Mythmaking and mythbreaking in the mathematics classroom. *Educational Studies in Mathematics*, 31(1,2), 151-173.
- Taylor, P.C. & Cobern, W.W. (1998). Towards a critical science education. In W.W. Cobern (Ed.), *Socio-cultural perspectives on science education: An international dialogue*. (pp. 203-207). Dordrecht, The Netherlands: Kluwer Academic Publishers.
- Taylor, P. C. & Settelmaier, E. (2003). Critical autobiographical research for science educators. *Science Education Journal Japan*, 27(4), 233-244
- Tierney, W. G. & Lincoln, Y. S. (Eds.) (1997). *Representation and the text: Reframing the narrative voice*. Albany, NY: State University of New York Press.
- Manen, M., van. (1990). *Researching lived experience*. New York, NY: State University of New York Press.
- Wall, J. (2003). Phronesis, poetics, and moral creativity. *Ethical Theory and Moral Practice*, 6, 317-341.
- Willison, J. & Taylor, P. C. (in press). Complementary epistemologies of science teaching: Towards an integral perspective. In P. Aubuson, S. Richie, & A. Harrison (Eds.), *Analogy and metaphor in science education*. Dordrecht, The Netherlands: Kluwer Academic Publishers.

ⁱ An earlier version of this paper was accepted for publication in J. Earnest & D. Treagust (Eds.) (in press), *Educational change and reconstruction in societies in transition: International perspectives*. Perth, WA: Black Swan