

# Securing the Place of Educating for Sustainable Development within Existing Curriculum Frameworks: A Reflective Analysis

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## **Abstract**

*Educating for sustainable development (ESD) generally happens within existing disciplinary frameworks. In this paper, our intent is to compare the views and practices of environmental educators who pursue ESD from a perspective different from what is occurring in our own constituency of Manitobans. We collected data on curriculum, teaching perspectives, and practices to compare an alternative school approach to our local model. As the alternative, we chose the Colegio Ambientalista Isaiiah Retana Arias (CAIRA), a public school in the local district of Pérez Zeledón in Pedrogoso, Costa Rica. CAIRA is a unique high school that has designed and implemented a compulsory, school-wide environmental curriculum. As a result of our deliberations, we identify several issues concerning the implementation of ESD in our community. We address the discipline versus non-discipline placement of ESD, compulsory versus optional ESD courses, teacher preparation and professional development, curriculum development, and the role of place. We conclude with the recommendation for the fusion of Manitoba's current grade ten science and social studies courses using ESD as a context, guided by necessary outcomes from the disciplines, and incorporating a significant local component that puts our young people back into their communities.*

## **Résumé**

*L'éducation en vue du développement durable est généralement dispensée à l'intérieur de cadres institutionnels établis. Dans cet article, nous cherchons à comparer les points de vue et les pratiques d'éducateurs en environnement qui appliquent l'éducation en vue du développement durable selon une perspective s'écartant de celle que nous Manitobains avons adoptée. Nous avons recueilli des données sur les exigences scolaires, les perspectives de l'enseignement et les pratiques ayant cours afin de mettre en comparaison l'approche d'une école alternative et notre propre modèle. Nous avons choisi pour modèle alternatif le Colegio Ambientalista Isaiiah Retana Arias (CAIRA), une école publique située à Pedrogoso dans le canton de Pérez Zeledón, au Costa Rica. CAIRA est une école secondaire unique où l'on a conçu et mis en œuvre un programme scolaire axé sur l'environnement et obligatoire pour tous les élèves. Par suite de nos réflexions, nous relevons plusieurs questions portant sur la mise en œuvre de l'éducation en vue du développement durable dans notre collectivité. En matière d'éducation en vue du développement durable, nous comparons l'orientation institutionnelle à l'orientation non institutionnelle, les cours obligatoires aux cours facultatifs, nous abordons la préparation des enseignants, le perfectionnement professionnel,*

*le perfectionnement du programme éducatif et le rôle que joue le lieu. Nous terminons en recommandant le fusionnement des cours actuels de science et de sciences humaines de dixième année au Manitoba en faisant de l'éducation en vue du développement durable le contexte dominant, en se fondant sur les résultats nécessaires dans les institutions concernées, et en introduisant un élément local considérable dans l'intention de réintégrer nos jeunes gens dans la collectivité.*

*Keywords:* education for sustainable development, environmental education, curriculum development, place-based education, compulsory education

## Introduction

In their rebuke of the Ontario Ministry of Education's commitment to integrating environmental science into core curriculum, Puk and Behm (2003) cite "startling" results that indicate few teachers in the discipline areas spent anywhere near the recommended amount of time on environmental topics. Additionally, fully 85 % of the grade 9/10 teachers surveyed and 77 % of the grade 11/12 teachers surveyed did not teach a single environmental concept in the field or spent less than five hours of their class time out of doors. They concluded "there is no time in the extensive science guidelines for teachers to voluntarily add ecological topics to the curriculum" (p. 18). Ironically, as curriculum makes a new turn to an integration model for environmental science, the problems of implementation are not new at all. Over twenty years ago Robert Stevenson (1987/2007) wrote about the incompatibility between environmental education and the prevailing organizational culture of schooling that drives curriculum organization and, thus, the framing of learning experiences for students. He pointed out that, "While an environmental education curriculum should be interdisciplinary and focus on real practical problems, school curricula are discipline-based and emphasize abstract theoretical problems" (p 146). Recently, Edwards (2006) questioned whether environmental education should be integrated into disciplines or exist on its own and noted that environmental education has rarely been able to establish itself in the curriculum as a subject in its own right.

Although there has been a significant shift in curricula concern from environmental science to education for sustainable development (Breiting, 2009; Colucci-Gray, Camino, Barbiero & Gray, 2006; McKeown & Hopkins, 2003; Palmer, 1998; among others), the tension between the autonomy of a discipline-oriented curriculum and a broadly based realization of education for sustainable development (ESD) remains unresolved (Kyburz-Graber, Hart, Posch & Robotom, 2006; Stevenson, 1987/2007). We accept the generally held view that ESD is a complex and evolving concept that requires learning about key themes from social, cultural, environmental and economic perspectives (Government of Canada, 2002; Learning for a Sustainable Future, n.d.; UNESCO, 2005), and that

many of these themes remain contentious and open to debate and modifications (Jickling & Wals, 2008; Reid & Scott, 2006). Nonetheless, there is a long standing recognition that problems clearly reside in positioning ESD within a highly discipline-oriented curriculum (Kyburz-Graber et al., 2006; Stevenson, 1987/2007). Thus, our intention in this paper is to initiate an examination of the ways in which ESD has been implemented in a school's organized curriculum structure, not to debate whether ESD should or should not be part of a school's curriculum. Our discussion is framed by the premise that while ESD development has taken a significant position in recent national curriculum documents (e.g., CMEC, 1997), meaningful implementation has been difficult for classroom teachers. We attribute this at least partially to the nature of a discipline-oriented curriculum where ESD assumes an add-on status, if it is given any status at all. The essential issue, Edwards (2006) argues, "is whether EE/ESD should be bolted on to, or infused into, conventional curriculum structures" (p. 113).

The debate surrounding Edwards' (2006) question has two sides: (1) those who advocate that ESD should fall within existing curriculum frameworks; and (2) those who argue that existing frameworks are inadequate to accomplish the goals of ESD. Stables and Scott (2002) reject any kind of framework that would revise the primary agenda of the disciplines and argue that teachers need to approach teaching from within the confidence of a discipline. In terms of addressing the human-nature relationship, they argue for a series of reflexive critiques from within the discipline. Opponents of the views of Stables and Scott claim that the disciplinary culture fragments and compartmentalizes knowledge such that students are unable to see how the compartments become whole again (Morin, 2001; Orr, 1994). Stevenson (1987/2007), in his seminal article, maintained that fragmented facts, concepts, and simple generalizations are organized loosely within discrete fields of study. He further noted that an understanding of such practices and the contradictions they create with the goals of environmental education could be gained by examining the structural organization of schools and teachers in practice. Although we now have an extensive archive of research on environmental education, Bolstad, Cowie, and Eames (2004) suggest that implementation at the school level remains a gap. They question how environmental education can effectively become an authentic part of schooling and wonder what kinds of changes are required within schools to make this happen.

Such an examination of the structural organization of schools and teachers in practice is what we have begun to study and report upon here. The organizational components that we believe are essential to understanding the discipline versus integrated implementation of ESD curriculum include compulsory versus optional curriculum, teacher preparation and professional development, curriculum development, and the role of place.

Whether ESD is implemented by integration within the disciplines or as a stand-alone offering, the question of the compulsory versus optional nature of the implementation influences who receives the curriculum. In Manitoba,

as in many other Canadian jurisdictions, compulsory science education ends in grade ten. In grades eleven or twelve, students are free to choose to end or continue their science education. Those who continue either decide to enter the traditional discipline areas of Biology, Chemistry, and Physics or select a secondary science offering within the context of a “Topics in Science” option. As with science education, the question of who should take ESD is a key question for which we need to provide a clear answer in order to move towards meaningful implementation of ESD.

Without doubt, the training of pre-service teachers and the professional development of in-service teachers is critical to consequential implementation and delivery of ESD (Fien & Mclean, 2000). Some research has shown that teachers in the discipline areas lack subject-specific knowledge in ESD and lack the ability to make connections between their discipline and environmental topics (Lane, Wilke, Champeau, & Sivek, 1994; Samuel, 1993). Additionally, Reid and Petocz (2006) examined academics’ understandings of sustainability across various disciplines and concluded that there existed a lack of a shared understanding, problems of incommensurability, and a lack of enthusiasm for integrating ESD into their discipline. Who teaches a stand alone course in ESD or how discipline area teachers acquire the skills to integrate ESD within their disciplines are important issues concerning the implementation of ESD that require further investigation.

Curriculum, naturally, influences any form of implementation. In our study we use the three components of effective environmental education (EE) programs (*about*, *for* and *in* the environment) to frame several of our questions (Lucas, 1979). Curriculum that is conceptualized as little more than education *about* the environment implies a significantly different implementation than curriculum *for* and *in* the environment. Curriculum *for* and *in* the environment suggests some attention needs to be focused on the role of place.

Place-based education, “an approach to curriculum development and school-community relations that draws upon local cultural, environmental, economic and political concerns” (Smith, 2007, p. 189), is well positioned to help reduce the artificial boundaries that exist between students, their schools, and their community by grounding at least part of students’ school experiences in the social and natural environments of their neighbourhoods. Meichtry and Smith (2007) argue that learning is enhanced “as the learner is engaged in issues related to both human and environmental systems that directly affect them and other members of their community” (pp. 15-16). Delving deeper into “place” and taking steps toward Gruenewald’s reinhabitation (2003), thus doing more than merely being *in* the environment, are important considerations in any attempt to understand the implementation of ESD.

In this paper, we compare and contrast two approaches to implementing and teaching ESD. We do so in an effort to understand ways in which ESD is currently being implemented and to seek differing perspectives in the belief that

such awareness can enhance the understanding of our own point of view. We examine and report how these implementation methods connect to the central issue of discipline versus integrated approaches to ESD and to issues surrounding such implementation. We do so through a lens that compares and contrasts curricula, teachers' characteristics, teaching and assessment strategies, and barriers to ESD implementation.

## Background

Our intent was to compare the views and practices of environmental educators at the upper middle and secondary levels (grades 7-12) who pursue ESD from a perspective different from what is occurring in our own region, the mid-western province of Manitoba in Canada. In our assessment, in Manitoba, an "islands of excellence" model for ESD is used locally. In this model, there are well-qualified, committed environmental teachers bringing environmental issues into their classrooms on a regular basis. However, these practitioners work within a highly discipline-oriented system where they must teach other subject areas and fit environmental objectives into the broader curricular context of Biology, Chemistry, Physics or Social Studies. Our Manitoba model is not unlike what is occurring in other Canadian provinces and territories where committed teachers initiate isolated offerings and extracurricular activities to bring environmental education to their schools (Russell, Bell & Fawcett, 2000).

Manitoba teachers receive significant and positive support from the provincial Ministry of Education. Recently, a Council of Ministers of Education of Canada (CMEC) response to a UNESCO survey stated:

The province of Manitoba has been particularly active in all aspects of education for sustainable development. The Manitoba Department of Education, Citizenship and Youth (MECY) has developed a provincial *Education for Sustainability Action Plan (2004-2008)* to foster teaching and learning for sustainability in elementary and secondary classrooms. (Farthing, 2005, p. 3)

In cooperation with MECY, the province of Manitoba is serving as the pilot jurisdiction with its establishment of the Manitoba Education for Sustainable Development Working Group (MESDWG) as part of a national initiative. This group facilitates and supports regional co-ordination, development, and implementation of ESD policies, curricula, materials/resources and teacher education. Additionally, they bring together stakeholders from the formal, non-formal, and informal education sectors for policy input, debate, and exchanges, to enhance delivery of ESD activities in support of the UN's Decade of Education for Sustainable Development (MESDWG, 2005). A critical component of this support is to establish the presence of ESD throughout the curriculum, not merely the curricula for science and social studies.

Additionally, in Manitoba's "islands of excellence" model, we find third

party support through the development of specialized curricula focused on the environment (e.g., watershed management, forestry, fisheries, and biological centres at the municipal and provincial level). Although readily available, the extent to which these materials find their way into the regular classroom is questionable (Arnold, 2005). Finally, in the traditional “islands” model, real action and events found in our local schools, such as composting or the celebration of an environmental week, often take place as an extracurricular activity over short periods of time.

Perhaps the most significant problem with an “islands” model, aside from its limited reach, is that it usually ends when the committed teacher who promotes the curriculum or event moves on, or removes her/his support. Such a situation was described by Posch (1999) when he noted that individual innovations pursued by dedicated teachers often came to an end when the commitment lagged, obstacles to implementation were encountered, or support was withdrawn. Benedict (1999) also claimed that while there are many excellent, highly visible environmental education projects here and there, “there is little evidence that such a ‘lighthouse’ approach actually does lead to changes in classroom practice that are sustainable over time without additional inputs or more deep going systemic changes spreading to a large number of schools and pupils” (p. 434).

As previously stated, a goal of this paper is to compare and contrast Manitoba’s current standard practices in the environmental education field with alternative approaches. One such alternative initiative provides for the implementation of stand-alone courses of study across the entire school in a “whole school approach.” Such a whole school approach addresses environmental problems in the formal and widely implemented curriculum of the school in its day-to-day practice, thereby covering all aspects of school life. That is, schools practice what they teach through the action-oriented behaviour of teachers, pupils, and staff (Shallcross, 2005). Such an approach to ESD is designed to include most elements of school life such as school governance, pedagogy, curriculum, resource management, school administration, and grounds. Whole-school approaches also promote links and/or partnerships with the local community (Henderson & Tilbury, 2004). Consequently, important goals in this paper were to identify aspects of such a whole school approach relevant for ESD in our local context and to investigate the success of such an implementation through a comparative study of the views and practices of environmental educators in “islands” and whole school settings.

## Methodology

Our primary interest lay in collecting data on curriculum, teaching perspectives, and practices to compare an alternative school approach to our “islands of excellence” model. In our deliberations we were guided by Dillon’s (2004)

model of an intrinsic case study. An intrinsic case study is pursued when one is looking for a better understanding of a particular case. The case doesn't have to represent other cases "because, in all its particularity and ordinariness, this case itself is of interest" (p. 237). Dillon further adds that a case study is both the process of learning about the case and the product of our learning. It is through this product of learning that we wish to make comparisons to our own context with the intentions of learning more about ourselves and how we might improve the implementation of ESD in our own community.

In an effort to further delineate our queries, we framed them around teaching *about*, *for*, and *in* the environment. Any review of curriculum reveals that cognitive environmental awareness approaches are the dominant form of environmental education. That is, there are many objectives with intentions to teach *about* the environment. This, of course, is a positive and necessary co-requisite to ESD. However, Shallcross (2005) has cited much research evidence "which shows that, while young people demonstrate a high degree of environmental awareness and positive environmental values, there is generally a failure for these perceptions and values to be reflected in their actions" (p. 2). Thus, a valid question is to what extent do we teach *about* the environment as opposed to *for* or *in* the environment?

For our purposes, teaching *about* the environment addresses knowledge outcomes such as those found in curriculum documents, teaching *for* the environment concerns teaching that results in action to improve or benefit the environment, and teaching *in* the environment includes activities that take place outside of the classroom in a natural locale. These categories seem reasonable to provide some specificity to our questions about the implementation of ESD. While there may be some concerns, in particular about teaching *for* the environment (Jickling & Spork, 1998), we are not advocating one viewpoint or another but rather, are framing our questions in terms of what teachers are bringing to the classroom.

As a model case we chose the Colegio Ambientalista Isaiah Retana Arias (CAIRA) in Pedrogoso, Costa Rica. CAIRA is a public school in the local district of Pérez Zeledón. One of the us, (Metz), has been associated with the school for five years through a student teaching practicum and teacher exchange program. Without formally defining it as such, CAIRA is a practicing example of the whole school approach to ESD. CAIRA is a unique high school in Costa Rica that is implementing a broadly based environmental curriculum in grades 7 - 11. The school is located in a semi-rural setting with a 15-hectare campus, and its program includes a compulsory, school-wide, multi-grade curriculum in environmental education. The ESD teachers are environmental specialists and their classes often meet *in* the environment to work on several sustainable projects. The projects are diverse and include a tree nursery, organic gardens, gardens for medicinal plants, a peccary nursery, trails, and a butterfly garden. The school has overcome many obstacles to implementing an environmental curriculum.

One goal of the school is to further develop their use of technology and to integrate environmental attitudes and curriculum into other discipline areas. The school is well supported by the community. Teachers and students participate in community projects, and there is a robust English as a Second Language program.

We began by developing a survey in both English and Spanish to gather information from environmental education teachers in Manitoba and at CAIRA. We asked about teacher demographics, curriculum development, teaching and assessment practices, and barriers and supports to teaching ESD. We purposefully invited educators who were known or self identified as “environmentally friendly” teachers who would reflect best as opposed to common practices. In this sense, these teachers were exemplars of our “islands of excellence.” Participants in our study were seven teachers from CAIRA in Costa Rica and nine teachers from Manitoba. All teachers taught in grades seven through twelve. Additionally, the Director of CAIRA and one administrator from Manitoba were interviewed.

In an effort to understand our model school more completely, and to overcome potential cross-cultural and linguistic barriers, we also organized a focus group meeting for the Costa Rican teachers, which was translated and recorded for us in real time. This was later transcribed for analysis. We asked questions based on the teachers’ responses to the survey. Additional information was collected through web-sites, field observations, and analysis of government and teacher developed curriculum materials including teacher planning documents, program outlines, mission statements, curriculum outcomes, and project proposals.

Analysis consisted of a reflective, iterative process of collating data, reviewing the data for similarities and differences, and forming judgments based on this evidence. In re-examining the evidence, we sometimes formed new judgments and identified further comparisons and contrasting issues. We then used this new understanding to reflect upon our local situation in order to consider how we might improve the implementation of ESD in our community.

## Results

We begin with an examination of the context in which the participating teachers from Manitoba are working. We have already described our local situation as an “islands of excellence” model and the CAIRA context as more of a whole school approach. But we questioned whether this difference in context naturally led to a difference in the goals for ESD. Thus, we started our comparison by looking at overt statements of these goals in mission or vision statements. In a multi-layered administrative system of education, mission statements can be found at many different entry points. Mission statements developed at the regional/provincial level can be found in Table 1 (CAIRA, 2008; Manitoba Education and Training, 2000).

Both mission statements are similar in reflecting an element of action, reference to social, cultural and economic needs, and recognition of present and future generations. We read into the Manitoba statement a more individualist and economic focus, albeit stated as equitable, while the Costa Rican statement portrays a more communal, social, and cultural environmental ethos.

It is not unusual to find mission statements for individual schools. CAIRA has a mission statement that includes a declaration of environmental goals with an additional aim of creating an interactive site where practical experience and the use of technology are integrated. Moreover, the school motto is “Educar para Conservar” (Educate to Conserve), and the school song, performed on a regular basis, strongly reflects an environmental theme.

Manitoba	<p><i>Students will become informed and responsible decision-makers, playing active roles as citizens of Canada and the world, and will contribute to social, environmental, and economic well-being, and an equitable quality of life for all, now and in the future.</i></p>
Pérez Zeledón	<p><i>Posibilitar en Pérez Zeledón, el alcance de una cultura ambiental, por medio de acciones de conservación, protección y recuperación del ambiente natural, social y cultural, con el fin de satisfacer las necesidades de las presentes y futuras generaciones.</i></p> <p>To facilitate in Perez Zeledon, the scope of an environmental culture through actions to conserve, protect and restore the natural environment, social and cultural development in order to meet the needs of present and future generations.</p>

Table 1. Mission statements.

In our web review of the mission statements of Manitoba schools, we found no such references to the environment or environment-related themes. Schools posting mission statements tended to focus on academic excellence and good citizenship in a safe and supportive setting. Departments within some Manitoba schools made reference to environmental goals, but these were never stated in the context of a broader mission statement. One school, a UNESCO school, advocated UNESCO goals but again, these were not in the context of a mission statement. The mission statements of Manitoba schools that we found are a clear illustration of the “islands of excellence” model: In some parts of some schools one finds further articulation of provincial ESD goals, ostensibly because of an interested teacher. In contrast, at CAIRA, the ESD message was up-front and clear, overtly stated as a guiding principle, and practiced.

### *Curriculum Development*

In our survey of teachers and curricular materials we found that both jurisdictions had a form of curriculum guidance emanating from a central authority. In both cases, this was in terms of specific courses, with several of these courses being under development. An important difference was that ESD outcomes at CAIRA were part and parcel of several different stand-alone environmental courses, such as “*Introduction to Environmental Problems*”, whereas ESD outcomes in Manitoba were found within specific disciplines such as Social Studies (e.g., natural resources) and Biology. In situations where curriculum guidance from a central authority did not exist, teachers in both jurisdictions developed their own curriculum, commonly in collaboration with other interested teachers. At CAIRA, the courses became part of the school’s curriculum, while in Manitoba the Grade 11/12 “*Topics in Science*” course was generally used as a placeholder for new modules or courses in environmental studies developed by motivated teachers.

A noteworthy difference was identified in the compulsory versus optional nature of the courses. In Manitoba, science and relevant social studies courses containing some ESD outcomes within a broader scope were compulsory through Grade 10. At CAIRA, stand-alone environmental courses with a significant practical component were compulsory for all students from Grades 7 to 11. Many of the same curricular outcomes were found in both contexts. However, a major difference was the transdisciplinary nature of outcomes at CAIRA. That is, outcomes divided between science and social studies in Manitoba were components of one environmental course at CAIRA. In one particular case, formal learning objectives for ethics, respect, population, and development were alongside objectives for learning specific concepts about water, soil, air, flora, and fauna. Although there was a difference in the courses regarding certain types of outcomes, we concluded that both contexts roughly contained similar curriculum outcomes *about* and *for* the environment. There were, however, far more outcomes *in* the environment at CAIRA, many of which were connected directly to the development and maintenance of school projects.

The survey responses of participating teachers reflected these differences. Manitoba teachers reported that they taught ESD within many different discipline-oriented courses for varying amounts of time ranging from one to ten hours per week and one to many weeks per school year. The six CAIRA teachers taught ESD full-time, from thirty to forty hours per week, forty weeks per year. Although the number of hours of instruction per week in Manitoba is fewer (27.5), the differences are still considerable. Tables 2 and 3 delineate this data across the *about*, *for*, and *in* the environment strands. Clearly, there is a major difference in the amount of time teachers at CAIRA spend on environmental topics and in the amount of time they spend teaching *in* the environment. Since we found roughly the same curriculum outcomes in the CAIRA courses as we found spread across the discipline-oriented Manitoba system, we must conclude

that the CAIRA outcomes are treated more thoroughly, making stronger and more meaningful connections to the natural environment. When one realizes that every student at the school receives this focus every year for five years, the differences can be considered quite major.

	Manitoba (hours/week)	CAIRA (hours/week)
Teaching <i>about</i> the environment	4	10
Teaching <i>in</i> the environment	1	16
Teaching <i>for</i> the environment	2.5	10

Table 2. Time spent teaching about, in, and for the environment.

	Manitoba (percent of time)	CAIRA (percent of time)
Teaching in a classroom	74	24
Teaching in the natural environment on the school grounds	11	64
Teaching in the natural environment off of school grounds	15	12

Table 3. Teaching environment.

### *Teacher Characteristics*

CAIRA teachers were full-time environmental specialists who typically had up to five years of post-secondary education in areas such as agriculture, forestry, science, or natural resources as well as, in some cases, additional experience working professionally in their field. The school staff established an ideal profile for the kind of teacher that was needed, and qualified candidates applied for the position. In Manitoba, teachers reported a variety of routes to becoming an “environmental” teacher. These ranged from matching their interest with an available position, to being a self-declared environmentalist or having an appropriate science background. We also asked participating teachers how many hours per month they were personally involved in environmental work in the community or organization, outside of teaching at school. The results were identical for both groups, ranging from zero to thirty hours (average: 10 hours),

which indicated to us that the commitment of the Manitoba teachers to the broader theme of environmental awareness, action, and involvement in their community matched the commitment of the CAIRA teachers.

### *Teaching and Assessment Strategies in the Classroom*

We asked both groups of teachers to rate how often they used various strategies in the classroom. The strategies we listed were lecture, note-taking, class discussion, hands-on classroom activities, student presentations, computer-assisted instruction, guest speakers, student debates, and student research. We found few differences in the responses of the two groups. At CAIRA, there was slightly more use of hands-on activities reported and less use of guest speakers. Typically, in the CAIRA program, hands-on activities in the classroom were extensions of activities that took place in the field. For example, with a nursery attached to a classroom, it is quite easy to bring plants into the classroom environment for experimental work and practical activities. We also asked the teachers to rate how often they used these strategies in the field. Again we found few differences, with CAIRA teachers reporting more use of hands-on activities and fewer guest speakers. Since activities *in* the environment at CAIRA were project-oriented, it seemed sensible that there were more hands-on references made. We speculate that CAIRA teachers used fewer guest speakers because they were very much the “experts” in their field and had immediate access to a natural setting. As such, they had less need for supplementary information or external assistance.

Teachers in both situations used written tests, student presentations, performance tests, journals, portfolios, and questioning as assessment strategies to varying degrees. Teachers at CAIRA, however, used more performance tests in both classroom and in-field assessments. Finally, when asked to identify the subject matter (e.g., mathematics, science, social studies, language arts, health, physical education, and/or art) integrated into their courses, teachers in Manitoba more often made reference to social studies, while teachers at CAIRA included additional vocational outcomes such as the proper use of tools necessary for working on school projects.

### *Barriers to Teaching ESD*

When asked to identify the impediments they faced in teaching ESD, the teachers from Manitoba reported the following: a lack of funding for resources, especially for field trips; a lack of connection between curriculum outcomes and the physical environment; lack of time; students’ lack of interest that resulted in low enrolment and cancelled classes; and the burden of school and curricular demands.

Teachers at CAIRA cited resources, which for them meant inadequate physical buildings and limited funding to initiate and develop outdoor projects, prob-

lems associated with students who did not like the physical work in the field, and weather—noting that in the rainy season poor classroom facilities sometimes made it difficult to teach and students could be stranded in the field or outdoor classroom for a time. Also demanding for CAIRA teachers was having little or no preparation time (they had a longer school day that began at 07:00 and ended at 16:00) and teaching without the benefit of an official curriculum. They also described their planning process as challenging.

### *Supports to Teaching ESD*

The Manitoba teachers generally reported receiving positive administrative support. In some cases this support translated into implementation support such as the provision of a flexible schedule that enabled the teacher to engage students in outdoor activities. They also noted a positive support network with other dedicated teachers in the province through programs such as Envirothon and various teacher in-service and professional development opportunities.

The CAIRA teachers reported the provision of smaller class sizes (half the normal class size) and cooperative students and parents. (Many students had a rural connection or parents who were engaged in work related to the land such as farming). However, they were very clear that the biggest support that they had was their campus and projects. As one teacher commented: “We have a 17 hectare classroom. We do not just tell the students let’s imagine that we have the resources, the plants, the butterflies, we have the campus where they can apply what they learn in the classroom.”

### *Summary*

In both contexts we found committed, motivated teachers who were aware of and used a wide variety of teaching and assessment strategies. The CAIRA teachers were more specifically prepared for their subject area, but both groups of teachers modified and developed new curriculum to meet their needs and interests. Both groups also had support, but, not surprisingly, called for additional financial resources. CAIRA teachers had significantly less preparation time and significantly more teaching time. Both groups were very similar in teaching *about* the environment. However, the CAIRA outcomes were concentrated in stand-alone environmental courses that have a significant practical orientation. The amount of time spent teaching *in* the environment was different, with the CAIRA environmental courses directly connected to a practical activity and the Manitoba courses lacking any specific or local context.

## Discussion

In our reflections on the structural organization of schools and teachers in prac-

tice, we return to the organizational components that we identified as essential to understanding discipline versus integrated implementation of ESD curriculum, namely, compulsory versus optional curriculum, teacher preparation and professional development, curriculum development, and the role of place. As we reflect upon our experience, a number of issues concerning implementation of ESD come to the fore.

### *The Discipline Versus Non-Discipline Place for ESD*

Several arguments have been presented that illustrate differing viewpoints with respect to embedding ESD within a discipline or providing a stand-alone course for ESD implementation (Edwards, 2006; Morin, 2001; Orr, 1994; Stables and Scott, 2002; Stevenson, 1987/2007). The nature of these arguments often centres on the inherent interdisciplinary nature of ESD. At CAIRA we found the context to be paramount in their approach to teaching ESD within a stand-alone course. Essential disciplinary-focused science and social outcomes were used to understand the contexts whether they be organic gardening, butterfly life cycles, medicinal plants, or animal husbandry. In Manitoba's disciplinary-centred approach, there appeared to be little time for context as illustrated by the differences in time spent *in* and *for* the environment.

We argue that a subtle difference exists between suggesting that ESD topics be embedded in a discipline-based course such as Chemistry, Physics, or Biology where the primary focus is in the content area, or approaching ESD topics in a stand-alone course with the structure and rigor of the disciplines. We might, for example, intend to analyze local water quality because fish are dying. We could embed the context in a Chemistry course where outcomes such as pH, solubility, oxygen content and so on would normally be found. The problem becomes the government-mandated Chemistry outcomes, which are part of a bigger disciplinary picture that includes a wide array of topics organized and ordered to satisfy the discipline. As Kuhn (1962) suggested, the discipline is organized as an initiation into an existing paradigm. There is nothing inherently wrong with this organization except that the context with its social, cultural, and economic components is often lost or seen as time consuming and superfluous to many teachers loyal to the discipline.

### *Compulsory Versus Optional Implementation*

CAIRA reached out to all students from grades seven to eleven each school year. In the Manitoba model, the situation is much less structured as some courses are compulsory to certain levels and others are not. Hence all students receive a little ESD for a short period of time. Certainly, given the prominence of ESD in government policy, this is not what many would hope to have in terms of curriculum implementation of ESD. The compulsory implementation of environmental courses across all grades at CAIRA involved all students

all of the time, with the result that the whole school atmosphere reflected a genuine concern coupled to local action on environmental issues. As part of this program, the school developed and managed a major recycling centre for the entire community.

The gap between governmental rhetoric and implementation is not unique to Canada. In their review of New Zealand Environmental Education, Bolstad, Cowie and Eames (2004) note that the five Tbilisi objectives for environmental education, namely awareness, knowledge, attitudes, skills, and participation, provided the framework, principles, and guidelines for environmental education at local, national, and international levels. However, they state, “the immediate impact of Tbilisi on policy and practice in the formal education sectors of most countries was generally underwhelming” (p. 19).

We suggest that part of this underwhelming impact is due to the optional nature of ESD programs. Indeed many countries have adopted reward and accreditation programs for environmentally-friendly schools (Henderson & Tilbury, 2004) instead of compulsory curriculum programming. It is hard to imagine an award scheme for schools that pursues a “Chemistry friendly” or “Physics friendly” agenda. If the objectives for a sustainable future are highly valued, as indicated in government policy and literature, then why not make them compulsory for all students? When it comes to EE/ESD, there remains an “opting in” attitude. We believe that change is quite easy: make it compulsory.

### *Teacher Preparation and Professional Development*

It would be easy to say that the CAIRA teachers were better prepared to teach ESD than teachers in Manitoba, but we are not convinced that this would be an accurate generalization. Professionally educated teachers in Manitoba prepare for five years and are highly qualified when certified. Perhaps many studying at the grades 7-12 level would seek qualification in ESD if such an avenue existed for them. Many Manitoba teachers are prepared in the related discipline areas of Biology and Earth Sciences, but they lack a pre-service focus on pedagogical issues associated with ESD. Further, many current teachers exist within the system without an adequate background in EE or ESD, which means that ESD becomes an additional responsibility for them. Clearly, in any worthwhile implementation of ESD, a well thought-out professional development program is essential.

### *The Role of Place*

Place played a significant role in the implementation of the environmental courses at CAIRA. The school campus was similar to having a farm on the school grounds where one could step outside and into a different world; a world with social and natural environs that set the context and thus, fused the theoretical and practical components of environmental studies. The advantage of such

a school was the ability to ground the students' learning in the local setting, their community, where they become an integral part and are able to leave behind a tangible legacy for future students who follow them.

At CAIRA, they seized the opportunity to use a rural campus setting and associated projects as their context for learning. But what of urban environments? Smith (2002) suggests other domains exist for adopting place-based education. He advocates cultural and historical investigations, environmental monitoring and advocacy, real-world problem solving, entrepreneurialism, and involvement in public processes. Additional possibilities exist within the emerging field of urban ecology (Barnett et. al, 2006) where students conduct research at a local ecological site within a city, which as Gruenewald (2003) suggests, may lead to its reinhabitation. One environmental educator we know turned the grounds of his school located in the inner city of Winnipeg into a park-like setting with outdoor classrooms, gardens, and a nature centre that are connecting young people with their natural surroundings in ways that would probably not otherwise occur.

In this context, place is where you are and what you make of it. Perseverance, ingenuity, willpower, and perhaps some true grit will go a long way in defining the local and the opportunities that it can bring into the educational experience. The importance of place in our investigation became paramount, and we would do well following Smith's (2007) advice that "acquaintance with the local environment can enhance young people's familiarity with what is beautiful and worth preserving in the territory they call home" (p. 192).

In the world in which today's students grow up, many seem to be grounded everywhere but in the local (Louv, 2005; Pyle, 2007). I-pods, text messaging, and the Internet extend their reach to places we older folks could never dream about in our time as students. We must recognize these facts as part of the world that we live in, and we need to address in a rational manner a way to bring our students back to the local. If the objectives of ESD are to be realized, we must find a way to reposition our students in the local and help them to develop the skills and confidence to know that with time, energy, and ability, they can make a difference.

## Conclusion

In our final reflections we would like to offer some suggestions as to the direction that future curricular developments might move. We also want to be pragmatic, recognizing that calling for an overhaul of our disciplinary system in favour of CAIRA's model would simply fall on deaf ears and not be practical in our setting. Further, we do not wish to discard what is working. We are products of the disciplinary system, it has served us well and continues to maintain many academic advantages. The essential question for us, then, is "How can ESD meaningfully fit within such a system, becoming a valued member alongside the disciplines?"

At CAIRA, time and place were significant advantages that permitted the environmental teachers within the school to pursue a specialized curriculum. What can we do in our system to maximize time and place in an effort to more fairly address the recognized urgency of sustainability education?

The curriculum that we live with is very much a product of the Pan-Canadian Science Framework (CMEC, 1997), which was developed as a collaborative effort starting about ten years ago. Those of us who were in science education and science teacher education at this time, were at times consulted for this framework and remember the proposal for an integrated science course at the grade ten level. What resulted from this proposal was a set of disjointed outcomes rooted in the disciplines of Physics, Chemistry, Biology, and Earth Science. We believe the time has come to reconsider the initial intentions of the proposal's framers. Consequently, we are suggesting the redesign and merger of the grade ten courses in science and social studies, using ESD as the context, guided by the necessary outcomes from the disciplines, and incorporating a significant local component which puts our young people in the field studying and helping to solve community problems. Such a merger makes available the time needed to overcome scheduling difficulties and allows for a significant participatory component in the local community. This new course, if compulsory for all Grade 10 students, would bring about implementation of ESD as espoused by national goals, and place students in their communities for at least a portion of their schooling. Such a proposal could lay the foundation for good science learning, civic participation, and awareness of, and informed action towards, the long-term health of local communities. Greater awareness of environmental issues should give such a proposal the necessary currency and advance a long overdue innovation in Manitoba's schools.

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