Ecologically-Based Education: Establishing Linkages Between Planners and Educators

by

Veronica Hicks

A practicum submitted in partial fulfillment of the requirements for the Degree of Master of City Planning

Department of City Planning
Faculty of Architecture
University of Manitoba

THE UNIVERSITY OF MANITOBA

FACULTY OF GRADUATE STUDIES

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A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of Manitoba in partial fulfillment of the requirement of the degree

Of

MASTER OF CITY PLANNING

Abstract

It is widely acknowledged that there are a number of human-generated issues pressing on the environment including deforestation, global warming and water and air pollution, among others. Unfortunately, the approach to solving these issues is highly debated while little concrete action is being taken. This practicum contributes to the field of environmental education and explores the potential for ensuring more sustainable behavior through education. It is hypothesized that implementing an ecologically-based approach to education, which is interdisciplinary and action-based, will help instill a different set of values that respect the environment and the role of humans within the ecosystem. Establishing linkages between planners and educators to implement an alternative educational approach is proposed as the most effective way to stimulate changes in people's attitudes and actions toward the environment. The research involved individual interviews with planners and educators, and culminated in a focus group composed of members from both professions. The results of the empirical research encourage the possibility of establishing linkages between the planning and education profession. Further, the findings clarify the most effective approach to implementing change at a local level in individual schools and classrooms. A total of eleven recommendations are presented in four categories: Promotion, Activities, Resource Materials, and Institutional Change. These set out specific action items for moving toward the goal of implementing ecologically-based education. Initiating these actions can contribute to moving society on the path to implementing an education system that instills the values necessary to live in harmony with the rest of the world, not only in an environmental sense, but in a social and economic sense as well.

Frogs, I am told, will continue to sit calmly in water brought to a slow boil. Cumulative processes of environmental change, soil erosion, deforestation, species extinction, and acid rain are slowly bringing our water to a boil. Someone, somewhere, may be watching to see if we jump in time.

Orr, 1992, 82

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1.0 Introduction

The global environmental crisis, which I believe is an imminent reality, has motivated me to pursue this research and identify potential measures to address the issue. In contemplating the issues surrounding environmental degradation, I have considered a variety of responses that have been advanced as a solution to this crisis and have found that these responses have often been ineffective in moving society toward a more sustainable future. For example, the development of environmental policies has not led to significant action, and regulations have either been loosely enforced or ignored altogether. More specifically, the lack of direction by government and individuals toward concrete ways to alter environmentally damaging patterns of behavior has prompted my examination of the issue more closely. From an individual perspective, changes in environmental behavior have been slow to evolve and inconsistent at best. In order to address the inconsistency and lack of sustainable behavior, it is my assertion that implementing ecologically-based education as the foundation of the public school curriculum will serve as a catalyst to stimulate societal change, and thus usher in a more sustainable world.

1.1 The Problem

> If today is a typical day on planet earth, humans will add fifteen million tons of carbon to the atmosphere, destroy 115 square miles of tropical rainforest, create seventy-two miles of desert, eliminated between forty to one hundred species, erode seventy-one million tons of topsoil, add twenty-seven hundred tons of CFCs to the stratosphere, and increase their population by 263,000. Yesterday, today, and tomorrow (Orr, 1992, 3).

It is widely acknowledged that there are a number of human-generated issues pressing on the environment including deforestation, global warming and water and air pollution, among others. Unfortunately, there is little agreement as to the appropriate course of action in order to remedy the situation. There are people who subscribe to the 'technology will save us' school of thought; those who believe that governments should take a stronger stance on environmental issues by enacting legislation and policy, and still others who believe that the global environmental crisis has been overstated and does not require immediate attention. Reflection on this issue has led me to believe that planners have a role to play in promoting environmentally responsible behavior.

The field of planning has generally focused on securing a preferred future for society. This has traditionally been done through implementing policies and regulations regarding land use, and developing models of land use such as Traditional Neighbourhood Design (TND). However, these solutions have not been particularly effective in creating real change in people's daily lives and their attitude toward the environment. As an addition to regulations, policies, and physical design models, I suggest that planners should become involved in developing and implementing an innovative public school curriculum. It is hypothesized that this will instill a different set of values, resulting in a new worldview that is more environmentally responsible. Such a curriculum will incorporate the concepts of place, environment, and community involvement within a holistic and integrated education model that transcends the boundaries of traditional compartmentalized, subject-based learning.

1.2 Purpose

The purpose of this research is to examine the field of environmental education and evaluate the opportunities and barriers that exist to implementing an ecological approach to education. In particular, opportunities for developing linkages between planners and educators to implement ecologically-based education will be identified.

The major questions driving this research are:

- What role can planners play in developing and implementing an ecologically-based education system?
- What are the barriers to implementing ecologically-based education?
- What steps need to be taken by planners and educators to begin the process of developing an ecologically-based curriculum?

1.3 Methods

In order to address the above questions, and to determine the position of both professions, the research included members from the field of planning and members from the field of education. Individual interviews were conducted to determine personal opinions and ideas. A focus group was conducted with members of both professions in order to initiate an interdisciplinary discussion on the potential to develop and implement an alternative education system. Details of the research methods and results are found in Chapter 4.0.

1.4 Organization of the Practicum

The practicum is organized into five chapters. The first chapter provides an introduction and orientation to the subject and a description of the research methods, as follows:

- The Problem
- The Purpose
- Methods
- Organization
- Assumptions
- Limitations

Chapter Two is dedicated to a literature review that will inform the topic from several perspectives. Planning history, sustainable development models, behavior modification literature, and literature from the field of education will form the basis for the empirical research. Chapter Three presents an overview of the Manitoba curriculum and evaluates it based on the themes emerging from the literature in Chapter Two. Chapter Four describes the methods used in the empirical research and analyzes the results of the research conducted with planners, educators, and education administrators. Chapter Five is dedicated to summarizing the research findings and to making recommendations for action.

1.5 Assumptions

The most significant assumption underlying this research is that education can be used as a method of value creation or value change. Thus, education that focuses on particular values such as instilling an *ethic of caring* (Sarkissian, 1996) toward each other and toward the environment will act as a springboard for societal change.

The second assumption that is being brought to this study is that ecologically-based education should be implemented as a standard in public schools as a means of achieving a more sustainable future. This research will not engage in a debate regarding whether or not environmental education of this type should be implemented. The focus will be on the changes that should be made to the existing curriculum in order to increase *ecological literacy* (Orr, 1992).

Third, I take the position that planners have a role to play in developing changes to the curriculum and implementing this kind of education. There is support for this within the Canadian Institute of Planners (CIP). The CIP Statement of Values contains several points that refer to the planner's role in environmental protection (see Appendix A). Educating children is one route to achieving this goal and is therefore compatible with the role of the planner. Focusing on children provides an opportunity to start environmental education with a 'blank slate', with open minds, in contrast to re-educating adults who already have a particular worldview that may or may not include environmental values.

In addition, a recent publication by the Canadian Institute of Planners (CIP) provides opportunities for a union between these professions. The CIP publication *A Kids Guide to Building Great Communities: A Manual for Planners and Educators*, is a resource book for planners and educators interested in teaching children and youth about urban planning and community development. The book includes ideas and exercises to assist in teaching planning concepts and principles. It is also easily integrated into existing curriculum subject areas such as social studies, language arts, science, and math (www.cip-icu.ca). A planner involved in the CIP Working with Kids Committee notes

that many planners believe it is their responsibility to "...influence the development of a future generation of adults who are interested and involved in their communities and politically intelligent about their role in healing the earth" (Gustavson, 1996, 21).

Putting this model into action, the City of Winnipeg and the Manitoba Professional Planners Institute (MPPI) held an event in recognition of World Town Planning Day. The Kids Can Plan event was held in May 2002 as a joint initiative between MPPI and Beaumont Elementary School. A Grade 6 class had the opportunity to learn about the planning profession and undertake an exercise to redevelop a downtown site. The chosen site was Waterfront Drive and a workbook guided the students through some planning principles, a field visit and, ultimately, the development of a planning and design concept for a section of Waterfront Drive (www.mppi.mb.ca). A similar event was introduced at the 1997 CIP conference in St. John's, Newfoundland. The planner involved in this project noted that "[W]e need planners who are committed to working directly with kids, and who will help educational institutions incorporate planning principles into curriculums [sic] across Canada" (Miller, 1997, 19). This research is aimed at doing just that.

These examples show a distinct connection between educating children about community and ensuring a future citizenry that is cognizant of local environmental, social and economic issues. Since planners work with the public to develop successful communities that are strong socially, economically and environmentally, it follows that they also have a responsibility to educate children, the future generation of residents and decision makers.

The fourth assumption is the belief that education will result in more sustainable behavior in people's daily lives. This assumption is cause for significant debate within the psychology literature, which is discussed in the literature review.

Lastly, as the researcher, I conducted the interviews and focus group sessions and analyzed the results. Thus, there is potential that some bias occurred in the data analysis process.

1.6 Limitations

The theoretical and empirical research being undertaken assumes a 'western' or 'developed world' context and application. It must be noted that the application of environmental education programs such as those discussed in this thesis are suitable in this context as a catalyst for societal change. However, this method may be inappropriate in other settings, or even within certain Canadian communities, such as northern and remote areas, or Aboriginal communities. Although it is acknowledged that global action is necessary, the methods of implementing change will vary significantly from region to region and from culture to culture.

The second major limitation to this research is that only the Manitoba curriculum is analyzed in detail. Although examples from other provinces and countries are drawn upon where appropriate, the main focus lies within Manitoba.

2.0 Literature Review

This chapter brings the contemporary academic literature in the fields of planning, psychology, and education together in order to define a new and expanded role for planners in educating children. First, the literature in the field of planning and related studies is discussed in order to establish the current context for planners. This will be followed by an evaluation of literature in the field of sustainable development, including an exploration of the definition of sustainable development. The third section draws upon literature from the field of psychology, with a focus on behavior modification. This section serves to exemplify how education can alter behavior and thus lead to more environmentally responsible behavior. The fourth section discusses the concept of environmental education and the transition to what has been termed *ecologically-based education.*

2.1 The History and Role of the Planner

The following section examines the historical role of planning within the modernist paradigm. In particular, the impact of the modernist paradigm on the environmental health of the planet is discussed. This is followed by a discussion on the postmodern turn in planning and its implications for a new form of planning practice that will include innovative ways for planners to unite with the public in order to achieve a sustainable future.

2.1.1 Modern Paradigm

The field of planning has evolved through several stages, including a period that focused on design for approximately twenty years following World War II. At that time, the fields of architecture and planning were closely linked, and at times indistinguishable (Taylor, 1998, 159). This period was followed by a shift that began to view planning as a rational science rather than an art (Taylor, 1998, 160). This is the most widely understood form of planning: rational, objective, and undertaken within a modernist framework. The elements of modernism are often associated with words such as rational, scientific, quantitative, and positivist. Modernism is focused on identifying truths about the world, including truths about humans. It is seen as "...the ability of the social sciences to generate truths about humans in much the same way that the physical sciences were seen to generate truths about nature..." (Norton, 2000, 7).

The rise of the modern paradigm was influenced by the Enlightenment period, and especially by Christian religions. The Stoic, Jewish and Christian religions were

> ...influential in the birth of modern science in the sixteenth century, in the philosophical movement of the Enlightenment of the seventeenth and eighteenth centuries, and in the rise of positivism in the nineteenth century. Each of these developments further contributed in some way to the idea that humans and nature were separate (Norton, 2000, 40).

As a result, a man/nature dualism has developed over time, which has contributed to the current environmental crisis. Jepson (2001) also remarks on this historical worldview and the significant barrier it presents to challenging conventional views of nature:

> ... our Judeo-Christian religious philosophy that sharply separates man from nature and holds the former as having dominion rights of exploitation over the latter.....the empiricist tradition, which views nature as mechanistic and something that can and should be manipulated by human beings for their benefit (Jepson, 2001, 501).

The role of the planner in the modern context has been that of the 'expert', providing solutions in the interest of the public good. In terms of planning's connection to the environment, planning literature has assumed a connection between the role of planning and environmental considerations, however, the focus has been on policy development, government regulation, and a variety of new physical planning models such as Traditional Neighborhood Design (TND), Transit Oriented Development (TOD), and new urbanism. In that respect, planning has always had a concern with the environment; however, it has been from a professional vantage point, creating policies related to environmental protection, or creating master plans that ensure environmental considerations.

In order to move away from privileging the components of modernism that have contributed to the environmental crisis, a shift toward postmodernism may be pursued. Although this shift in itself will not bring an end to environmental issues, by moving toward a postmodern paradigm that is more inclusive, values traditional knowledge and is more collaborative in its approach, a sustainable future is a greater possibility. While current planning theory is moving toward a postmodern paradigm, it must be stressed that planning practice is still very much rooted in the tenets of modernism. While some evidence of postmodern practice can be seen in planning today, it is most accurate to consider planning practice, and society in general, in the process of a paradigm shift.

2.1.2 The Postmodern Turn

It is the premise of this research that the traditional practice of planning has been ineffective in securing a sustainable future. The traditional, modernist approach is

regulatory and superior, and tends to create animosity rather than collaboration in dealing with issues. Furthermore, it has contributed to the environmental crisis by perpetuating a scientific system that views humans and nature as distinct. As an alternative, a postmodern approach to planning, and to education, will begin to effect the kind of societal changes that are required to ensure the ongoing viability of the planet. Although collaborating with the public, and particularly with children, has not been the traditional position of planning, it is the assertion of this research that planners can and should be involved in promoting environmental education for children, and in making linkages between the education profession and the planning profession. This is hoped to create a future generation that holds different values and priorities regarding the environment, is more aware of their local environment and, hopefully, more respectful of it too. As planning struggles with the paradigm shift from modernism to postmodernism, an expanded role is being developed for planners that will make these kinds of interdisciplinary linkages commonplace.

So, what is postmodernism and postmodern planning? As with any 'ism', there is great debate. While this research advocates the need to embrace the tenets of postmodernism, they are often very difficult to define. Norton (2000) defines postmodernism as "[A] movement in philosophy, social science, and the arts, arguing that reality cannot be studied objectively, and stressing that multiple interpretations are both possible and legitimate" (Norton, 2000, 333). Within a planning context, this has resulted in the acknowledgment that the planner does not have 'the' answer, but rather that responses are borne through a variety of understandings of an issue and a variety of

approaches to dealing with the issue. For example, within planning literature, Sandercock (1998) focuses on the types of knowledge that are considered legitimate:

> New epistemologies – among them hermeneutics, action research, feminist, and other ways of knowing (see Chapters 3 and 5), social learning – are displacing the sole reliance on the powers of positivist social science as a basis for action. Local communities have grounded, experiential, intuitive, and contextual knowledges which are more often manifested in stories, songs, visual images and speech than in the typical planning sources (Sandercock, 1998, 205).

Sandercock (1998) advocates a postmodern paradigm that seeks to radically change the basis of current planning knowledge. She proposes that planners be educated with five literacies, know as the planner TAMED (Sandercock, 1998, 225). These include:

Technical Literacy
Analytical Literacy
Multicultural Literacy
Ecological Literacy
Design Literacy

These literacies are similar to the model Sarkissian (1996) proposes in the T.EN.C.E.L. model. This approach to planning with an ethic of caring for nature includes:

Teamwork
Direct **E**xperience of **N**ature
Grounding in **C**ommunity Processes and Experience
The Formal Study of **E**thics
Attention to the Aspects of Professional **L**iteracy

Essentially, the movement to postmodern planning broadens the scope of planning from a land use expert to a broader, more encompassing view of planning as an approach to delivering the goal of securing a preferred future. Although difficult to define, a postmodern planner can be considered to be one who does not take the expert role, but rather works with the public in defining the direction and implementation of change. In fact, one of the defining changes has been the shift from *planning for* to

planning with communities (Sandercock, 1998, 82). In that respect, involving planners in education meets the criteria of *planning with.* Although education may not be considered 'planning' per se, it does set the stage for the public to have the knowledge needed to make sound decisions for the future. Based on the preceding differentiation between modern and postmodern planning, it appears that the kind of planner who would undertake to fulfill this new role is one who has had a theoretical grounding in postmodernism, and understands the advantages of acknowledging different ways of practice and different approaches to problem-solving.

The preceding discussion provides a theoretical basis for postmodern planning that supports the inclusion of children's education within its framework. The following section evaluates literature pertaining to sustainable development and discusses some of the issues that surround the terminology and the application of sustainable development.

2.2 Sustainable Development

The driving force behind this research is a concern for the future of the global ecosystem. From the preceding discussion, planners do have an obligation to meet the challenges presented by a growing population, over-consumption, and a diminishing supply of resources. The concept that encompasses the economic, social and environmental concerns is known as sustainable development: a common, and perhaps overused buzzword.

This section examines literature from the field of sustainable development, including the varying definitions of sustainable development. As set out in the assumptions (section 1.5), this research assumes the reality of the ecological crisis and

the need for change. Thus, arguments to support the assertion that there is indeed a crisis have not been included.

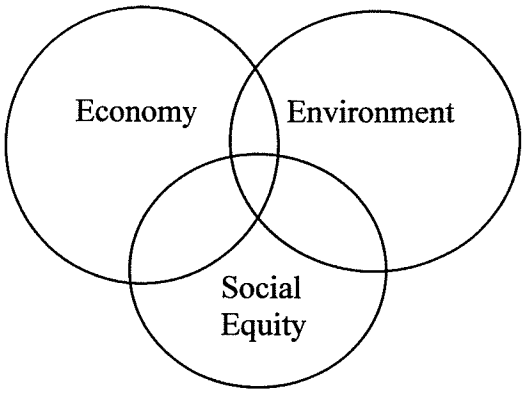
2.2.1 History of Sustainable Development

The term *sustainable development* came to the forefront of public consciousness in 1987 with the publication of *Our Common Future*, by the United Nations World Commission on Environment and Development (World Commission on Environment and Development, 1987). Although the term is relatively new, the concept of sustainable development has been around much longer and is often considered a practice of indigenous populations. The following discussion highlights some of the key events that have brought the western concept of sustainable development to the forefront, and also highlights some of the debates over the definition itself.

In 1972, The United Nations Conference on the Human Environment (UNCHE), better known as the Stockholm Conference, began a movement in government toward evaluating environmental issues and discussing the consequences of human action (McDonald, 1996, 227). Many scientists, environmentalists and ecologists were raising warning flags about the environment for at least a decade with little success. For example, the publication of Rachel Carson's *Silent Spring* (1962) was one of the key events in raising awareness, and the Stockholm Conference was the first step toward global discussion on environmental degradation. A decade after the Stockholm Conference, the General Assembly of the United Nations established the World Commission on Environment and Development (WCED) in 1983 to delve into the issues surrounding the state of the environment and human development. In 1987, the

Commission's findings were published in *Our Common Future*, also known as the Brundtland Commission report named after the chairwoman, Gro Harlem Brundtland (McDonald, 1996, 227). The definition of sustainable development proposed in the report has been a source of debate since that time, resulting in a wide variety of viewpoints on what the basis and components of sustainable development are. This dispute will be discussed more fully in the next section. Essentially, the concept of sustainable development that stems from the Brundtland Commission views the environment, economy, and society as overlapping entities that combine to create sustainable development (see Figure 1).

Figure 1: Sustainable Development



In 1991, a document was published that set the stage for the Earth Summit in Rio de Janeiro. The publication, *Caring for the Earth* set out action strategies based on the principles in the Brundtland Commission report (McDonald, 1996, 227). The Earth Summit was held in 1992 by the United Nations Commission on Environment and Development (UNCED) and resulted in Agenda 21, an action plan for the 21st century. Unfortunately, the document has not generated widespread impact in Canada in terms of action or planning strategies. This has been the downfall of government policies for

years. This is largely a result of government tendencies to be slow and conservative in its approach due to political ramifications. This has been exemplified recently with the ratification of the Kyoto Accord by Canada, which many say has taken too long, and is too general to generate any real impact (Paraskevas, 2002). Furthermore, some countries have refused to sign it since it may adversely impact them economically (Paraskevas, 2002). This lack of implementation and action from a state perspective is a major reason here for focusing on education as a catalyst to stimulate change.

2.2.2 Defining Sustainable Development

The most widely known and accepted definition of sustainable development resulted from the Brundtland Commission: it states that sustainable development "...meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, 8). Although the most common, and perhaps the most easily understood definition, many authors and academics from a variety of fields question the soundness of this definition. For example, entire academic journal issues such as the May 1995 issue of the *Journal of Planning Literature* have been devoted to defining sustainable development and its implications for planning (Beatley, ed. 1995).

Several authors (Jepson, 2001; McDonald, 1996; Rees, 1995) have explored the contradictions inherent in the term sustainable development. There are two main schools of thought regarding the core meaning of sustainable development. The two viewpoints are categorized as the "expansionist" paradigm and the "steady-state or ecological" paradigm. The expansionist paradigm essentially follows a modernist perspective and relies heavily on the man-nature dualism discussed in section 2.1.1. Definitions that use

this foundation view the economic piece of the three-circle model as the most important and focus on human inventiveness as an acceptable method of continuing growth beyond the current size both in terms of population and in terms of economic wealth. Due to the expansionist paradigm's reliance on technological fixes and human inventiveness, it is also referred to as *technological sustainability* (Orr, 1992).

The view essentially follows the reasoning that the depletion of natural resources, particularly non-renewable resources, can be remedied simply by replacing them with new technologies. This view does not value the resources as important in and of themselves; it only views them as valuable insofar as they are useful to humans for continued growth.

> As currently structured, the field of economics measures material wealth but overlooks cultural and biological wealth. It does not adequately measure the value of redwood forests, well-cooked meals, a sturdy house full of memories, clean water, heirloom vegetable seeds, elephants, crickets, and cougars, or the sound and smell of the ocean (Wann, 1996, 3).

In *Notes from a Big Country*, Bryson (1998) discusses this issue as it relates to a country's GDP. He notes that the GDP will rise in many cases where damage has been done to humans or the environment. For example, the Exxon Valdez oil spill, the O.J. Simpson murder trial, and factory pollution all contributed to an improved GDP.

> In terms of conventional economic measurement, all of this is gain, not loss. So too is overfishing of lakes and seas. So too is deforestation. In short, the more recklessly we use up natural resources, the more the GDP glows (Bryson, 1998, 68).

Furthermore, the expansionist view does not acknowledge the possibility that there may be a finite carrying capacity for the earth to support humans.

In contrast, the ecological viewpoint assumes that despite human capability to use technology as a solution to resource depletion, the earth and the environment have an

upper threshold to support humans. The ecological viewpoint focuses on natural capital, resource flows, and waste sinks as determinants of the capacity for the earth to carry the human species (Rees, 1995). This viewpoint focuses on the environment portion of the tripartite diagram as the pivotal piece, with the other two resting upon it. The concept of the *ecological footprint*, a measurement of the capacity for the earth to support humans, is revealing. It measures "....the aggregate of land required continuously to produce the resource inputs and to assimilate the waste outputs of that population or economy wherever the land may be located" (Rees, 1992, Rees and Wackernagel, 1994 as cited in Rees, 1995, 351). Rees (1995) notes that most industrial countries far exceed the amount of physical land they occupy in order to support consumer lifestyles. "While they may seem economically prosperous, industrial economies are running massive 'ecological deficits' with the rest of the planet that are not revealed in their trade balances or current accounts" (Rees, 1995, 351).

Ironically, the most recognized source for defining sustainable development, the Brundtland Commission, proposes that in order to solve environmental crises, and to establish social equity, " a five to tenfold increase in manufacturing output will be needed just to raise developing world consumption of manufactured goods to industrial world levels by the time population growth rates level off next century" (World Commission on Environment and Development, 1987, 15). This suggests that developing countries should be consuming goods at the same rate as developed countries. Rees and Roseland (1991) point out that this definition assumes that "...the solution to the global ecological crisis resides within the same socioeconomic structures that seem to have created the crisis in the first place" (Rees and Roseland, 1991, 16). Rees (1995, 347) also points out

that the Brundtland Commission follows the expansionist viewpoint. Similarly, Orr notes this issue by stating that the Brundtland Commission "...reinforces a tendency toward a global technocracy and a continuation along the present path of development..." (Orr, 1992,2).

Other proponents of sustainability advocate a more local, grassroots approach to economics as a path to environmental balance. For example, Nozick (1992) identifies linkages between the global economy and environmental degradation. Drawing heavily from Schumacher (1973), she proposes a return to community and local economic self-sufficiency as a route to environmental care. This contrasts with the WCED proposal, that not only supports continued economic development, but encourages economic growth. Rees and Roseland point out that "...sustainable *growth* in a finite environment is a logical impossibility, but there is no contradiction in sustainable *development*" (emphasis mine) (Rees and Roseland, 1991, 16).

It seems that the Brundtland Commission assumes that sustainability can be achieved without much personal sacrifice. In fact, the Brundtland Commission report appears to promise a utopia where everyone will live a higher quality of life economically and socially while enjoying the benefits of a clean environment. However, other viewpoints on sustainability suggest much more radical changes are needed of a systemic nature, which will impact people personally. Jepson discusses this concept with respect to the social equity piece of sustainable development:

> With respect to the equity dimension, there tends to be a focus on the part of many mainstream advocates on the *inter*generational side of the equity coin, with its call for natural resource conservation and environmental protection for the good of future generations. Because one's children and grandchildren, as well as nature and its creatures, are encompassed within the equation, intergenerational equity is not a difficult pill for most people to swallow (at least not conceptually).

> However, such understanding does not so easily extend to the issue of *intra*generational equity, which may require a diminution of one's personal standard of living or a transfer of one's wealth to benefit others who are here and now and are unrelated (Jepson, 2001, 503).

Based on the preceding quote, it seems clear that the ecological model does not fit within a modern framework or worldview that is the current way of living for western society. The ecological viewpoint proposes a way of living that would be radically different from that of today, while the Brundtland Commission definition assumes a future that would continue to be similar to today's lifestyle and would even extend that lifestyle to other parts of the world.

> In the most general terms, the difference is whether a society can become sustainable within the modern paradigm through better technologies and more accurate prices, or, whether sustainability requires the transition to a post-modern world that transcends....individualism, anthropocentrism, patriarchy, mechanization, economism, consumerism, nationalism and militarism... (Orr, 1992, 24).

It is the position of this research that attempting to implement solutions within the current framework will be ineffective, if not impossible. There may be a need for a conceptual shift in people's ways of knowing, understanding, and living in the world in order to bring about changes that will address the existing and impending environmental issues. The preceding section has outlined the differing approaches to sustainable development and the need to focus on ecological sustainability rather than technological or economic sustainability. The following section explores the potential to stimulate a shift in behavior in order to foster a better human-nature relationship that is grounded in an ecological approach to sustainable development.

2.3 Shaping Behavior: from knowledge to action

As an addition to top-down, regulatory approaches to achieving sustainability such as policy development, regulation, and penalties, education may be used as a method of value creation in order to create a more sustainable society. This assumes that individual change can create a new collective consciousness that will hold radically different values and priorities from those held today. This research proposes that education will foster environmental values and thus will encourage society to act in a more sustainable manner.

The most widely understood conception of behavior modification generally pertains to the classical conditioning of Pavlov's dogs (Kazdin, 1994). While behavior modification does generally focus on increasing or decreasing specific human behaviors in specific settings, "[T]he scope of behavior modification has clearly expanded from individual problems to community concerns" (Martin and Pear, 1996, 21) and it is being successfully applied in community settings to achieve broader goals. One of the early studies in this area defined *behavioral community psychology* as "...applications to socially significant problems in unstructured community settings where the behavior of individuals is not considered deviant in the traditional sense" (Briscoe, Hoffman and Bailey, 1975, 57 as cited in Martin and Pear, 1996, 21). According to this definition, the application of behavior modification techniques as a way to encourage environmental behavior is reasonable. Behavior modification basically uses social learning experiences[1]

[1] Social learning occurs within a social context. Bandura (1977) emphasizes the importance of observing and modeling the behaviors and attitudes of others such as through action-based education.

as a way of altering behavior. In general, it focuses on increasing 'good' behaviors and decreasing 'bad' or maladaptive behaviors. "The key feature of the behavioral approach is recognition of the plasticity of behavior or the amenability of behavior to change when systematic learning experiences are provided"(Kazdin, 1994, 3). Therefore, from an environmental perspective, behavior modification seeks to increase environmentally responsible behavior such as recycling and reduce 'bad' behaviors such as excessive driving. Action-based education is one way of creating social learning experiences that ensures students are learning in an interactive and participatory environment.

The area of behavior modification that links with education essentially follows this path of reasoning: People develop particular beliefs through a variety of experiences, including education. Those beliefs result in positive or negative attitudes toward particular topics. In turn, those attitudes will develop into personal intentions and ultimately, actions regarding the particular issue or topic. The assumption of environmental education is that education will develop and/or change a student's beliefs and attitudes thereby resulting in desired behaviors. This line of reasoning assumes that increased knowledge will develop positive attitudes toward the environment, not negative ones, resulting in positive actions or 'good' behaviors.

Notwithstanding the previous explanation of attitude formation and its relation to action, the field of psychology that is focused on behavior modification is intense with debate. There are some authors who doubt the linkage between a person's beliefs and attitudes and their behavior (Fishbein and Ajzen, 1975) while others believe a correlation is evident and focus on the development of certain attitudes through education in order to result in particular behaviors. In either case, there is a general agreement that behavior

development is complicated and predicting environmental behavior is difficult (Hines, 1986/87).

In the environmental education literature, several studies have been conducted that link knowledge of environmental issues and attitude toward the environment (Armstrong and Impara, 1991; Bradley, Waliczek and Zajicek, 1999; Ma and Bateson, 1999; Roth and Perez, 1989; Tikka, Kuitunen and Tynys, 1999). However, there appears to be a paucity of research regarding the correlation between knowledge, attitudes, and *action*. Since the ultimate aim of environmental education is to increase sustainable behavior, more research needs to been done to address how education shapes behavior. Planning authors such as Moore (1995) and Sutherland (1998) have noted the disconnect between knowledge and action and its impact on the effectiveness of increasing sustainable behavior.

For example, a recent survey conducted in Winnipeg by the Civic Environmental Committee (CEC) revealed 82% of respondents attached a high level of importance to the environment. Many also indicated that they would be willing to participate more in environmental activities such as using transit, xeriscaping, and recycling or composting. However, the survey did not determine under what conditions these changes would take place and there is no mechanism to evaluate whether people are acting on their intentions. Furthermore, although 77% believe that the City should spend more on the environment, increases in taxation to fund programs was clearly not supported with 69% of respondents indicating it would be their least preferred way of funding environmental programs.

In contrast to the above noted cases, which show a disconnect between knowledge and action, the following studies reveal how knowledge gained through *experiential* learning provides a more solid foundation for future action. This appears to support the social learning concept much more readily than does classroom learning.

Hungerford and Volk (1990) analyzed the disconnect between knowledge and action and note that environmental behavior does not occur through a simple linear model that links knowledge, attitude, and action. Building on Hines' (1986/87) model, Hungerford and Volk propose that behavior is related to several variables that they categorized as *entry-level, ownership, and empowerment variable*s. Their evaluation of these variables suggests that in educational settings "[S]tudents must be given the opportunity to develop a sense of ownership and empowerment so they are fully invested in an environmental sense and prompted to become responsible, active citizens" (Hungerford and Volk, 1990, 17). This focus on action-based learning is an essential component to the development of environmentally responsible citizens. Similarly, Hartig, Kaiser and Bowler (2001) indicate that experiential learning is linked to environmental behavior and that positive experiences in natural environments may be a more effective motivator for people than punishment for poor environmental behavior. In order to achieve increased awareness in a positive fashion, they note that "[E]nvironmental instruction is one way to promote greater interest in natural environments and ecological processes" (Hartig et al, 2001, 603).

The action-based learning model is exemplified well by Wals, Beringer and Stapp (1990) in their description of the Action Research and Community Problem Solving (ARCPS) model as an approach to environmental education. This model was developed

at the University of Michigan as a way of bridging "...natural and social sciences, learning and doing, and the school and the community" (Wals et al, 1990, 13). It allows learners to engage in community based problem solving, problem identification, development of solutions, development and implementation of action plans, and results evaluation (Wals et al, 1990, 14). This allows students to have the opportunity for real world learning and provides them with a sense of empowerment and accomplishment to carry forward into adult life. Hart notes the importance of building this foundation in children:

> "Ideally, children's experience with planning and design projects will mature to the point where they wish to work alongside adults. This should be the goal for any community, rather than keeping children's voices falsely segregated, as though adults and children lived in different communities" (Hart, 1997, 111).

Chawla (1998) has also conducted analyses to determine adults' sources of commitment to the environment. For example, will parental attitude and belief weigh more heavily on a person's attitudes or can education counter the effects of family history? Chawla (1998) reviewed several studies to determine influential variables on peoples' attitude toward the environment. She found that many of the studies pointed toward childhood experience in nature as a significant formative factor. This would seem to suggest that a more experiential type of learning is required as opposed to traditional classroom education. Chawla (1999) supports this notion in her study of environmentalists. She interviewed 30 environmentalists in Kentucky, USA and 26 in Norway to determine the source of their commitment to the environment. The interviewees were from a variety of professional backgrounds that can be considered part of an environmental movement. The majority of people interviewed stated the chance

situation of their birth as the initial formative factor. For example, the type of family they were born into already had an affinity for the environment or the means to explore it. After that initial life situation, a number of formative circumstances were cited. In Kentucky, the top four responses included experience of natural areas, parents, organizations, and education. In Norway, experience of natural areas, parents, organizations, and friends were the top examples. Education and books were tied for the fifth ranking. Figure 2 outlines the responses.

Figure 2: Sources of commitment to environmental protection (% mention rate)

Sources of Commitment	Kentucky	Norway	Total
Experience of Natural Areas	87	65	77
Family			
Parents	67	61	64
Others	13	12	13
Total	80	73	77
Organizations	53	58	55
Negative Experiences			
Habitat Destruction	23	23	23
Pollution, radiation	10	23	16
Total	33	46	39
Education	40	35	38
Friends	23	42	32
Vocation	30	23	27
Sense of Social Justice	23	27	25
Book or author	7	35	20
Principles or religion	10	19	15
Concern for children, grandchildren	0	8	4

Adapted from Chawla (1999)

From this study, Chawla concludes, "....important as school-based instruction may be – environmental educators also need to seek ways to foster the type of out-of-school

experiences that figure so saliently in environmentally-committed people's memories" (Chawla, 1999, 25).

A local example of such a community based, experiential model is EcoOdyssey. a Senior 3 (16-17 year-olds) program offered at Neelin High School in Brandon, Manitoba. This program focuses learning on the outdoors and the local community (www.brandonsd.mb.ca/ecood/coverpage.htm). The model provides integrated learning opportunities, as opposed to teaching in compartmentalized units. Course credits for the semester include Language Arts, Physical Education, Physical Geography, Environmental Studies, and Biology. Projects are generally developed to incorporate components of each of these subjects so students begin to understand interdisciplinary learning and the interconnectedness of traditionally separate subject areas.

Similar to Chawla's research, Gayton (1996) refers to the primal landscape that is formed in childhood. He notes that through life, landscapes similar to those of 'home' will evoke positive feelings while dissimilar landscapes may evoke discomfort, "...even active disgust" (Gayton, 1996, 72). Thus as Chawla (1998, 1999) suggests, positive experiences in natural environments are crucial for children to develop an affinity with the environment. It may also be concluded that this would be especially true for children who live in highly urbanized environments and who cannot easily see the connections between humans and nature.

There has been a great deal of discussion in recent literature about the linkages between place, childhood experiences in nature, and the development of an *ecological identity* (Thomashow, 1995). The key is to develop a sense of self that is formed around a core that includes an ecological foundation and a strong sense of place. Orr (1992)

discusses the need to focus on place as a starting point for understanding and learning. Citing Lewis Mumford, one of the most recognizable historical figures in planning, Orr examines the regional survey as an educational tool that engaged all members of society, including children. Writing in the 1940s, Mumford notes that the regional survey was

> "...not something to be added into an already crowded curriculum. It is rather (potentially) the backbone of a drastically revised method of study, in which every aspect of the sciences and the arts is ecologically related from the bottom up, in which they connect directly and constantly in the student's experience of his region and his community" (Mumford, 1946 in Orr, 1992, 128).

Building on Orr's foundations of education (1992) (Appendix B), Thomashow (1995) also proposes that the process of learning and reflection on the information is as important as the content, and that experiences in nature are vital to understanding the environment. Orr also draws a distinction between education and literacy by suggesting that knowledge is not enough, one must know what to do with it. He suggests that the goal of literacy is the ability to ask "What then" (Orr, 1992, 85) and to look to the future with a critical eye. In other words, filling students with information is not enough. One can understand ecological processes conceptually by learning in a classroom. Teaching students to think, reflect, analyze, and become citizens who can contribute to society is required. Orr (1994) uses the analogy of education as a 'drawing out' of students' experiences and reflection, rather than as a 'filling up' with information. In reflecting on the move from modernism to postmodernism, a modernist approach to education focuses on knowledge and facts, and a repetition of the truth. In contrast, a postmodern approach to education focuses on critical thinking and questioning the status quo.

Building on the action-based concept of education, Birkeland (2002) discusses the establishment of "playgardens" for children in order to develop an experiential learning environment. The author notes:

> Children's emotional security and affinity with the natural environment is perhaps more important in shaping their disposition towards nature than their intellectual understanding of the environmental crisis.....No amount of intellectual or metaphysical teaching can inculcate a caring identification with nature: it must be felt. This is why many adults understand the environmental crisis intellectually, but do nothing (Birkeland, 2002, 111).

So, there may be debate in the academic world regarding whether there is any correlation between knowledge, attitude formation, and action toward the environment or whether factors other than one's education are more influential. However, the above literature clearly sets out a solid argument that education does have a positive effect on environmental attitudes. However, it is a particular kind of action-based, experiential learning that must be the focus of environmental education and it must be linked to place-based experiences at an early age. Furthermore, Orr (1992) and Bowers (1995) acknowledge the distinction between *education* in terms of knowledge gathering, and *literacy*, in terms of nurturing the ability of students to think in a holistic fashion, not just about subject matter. Orr states: "Literacy is the ability to read. Numeracy is the ability to count. Ecological literacy is the ability to ask "What then"? Considerable attention is properly being given to our shortcomings in teaching the young to read, count, and compute, but not nearly enough to ecological literacy" (Orr, 1992, 85). This ability to think critically is key to understanding and solving the environmental crisis.

With the preceding concepts of learning and relationship to the environment in mind, the following section discusses environmental education and some of the educational frameworks that incorporate the aforementioned concepts.

2.4 Distinguishing EE from Ecologically-Based Education

At first glance, the concept of environmental education may appear relatively straightforward: teach children more about the environment so they will become better environmental citizens. However, as the preceding section has shown, traditional classroom-based education models are not enough to achieve changes in the way people understand and interact with the world. Upon closer inspection, the philosophies and underpinnings of environmental education are diverse. In fact, even the phrase *environmental education* is debated in terms of what it means and how it differs from *ecologically-based* education. This section begins to tease out the nuances between these two education models that endeavor to increase sustainable behavior.

2.4.1 Environmental Education (EE)

Environmental education is becoming a common element in public school curricula. In most cases, the curricula seek to include sustainability or environmental issues in the existing framework of subject-based courses. Environmental education, dubbed EE, "...does not become another add-on to the curriculum, another subject that needs to be fit into an already overburdened schedule. Rather, it takes only a little extra time to use environmental issues and concerns to teach skills and concepts within the normal scope and sequence of subject areas" (Simmons, 1989, 15). EE does not mean that the existing curriculum will simply include a new course on the environment within

the current compartmentalized, subject-based structure. As Simmons (1989) notes, the goal of EE is to infuse environmental values and concepts into the existing structure by including it in all subject areas in order to increase the level of interdisciplinary knowledge of students. The Manitoba curriculum follows this model by including Sustainable Development as one of the *Essential Elements* that is integrated into all curricula (Appendix C).

EE is an acronym that has emerged from the North American Association for Environmental Education (NAAEE). The NAAEE is "...a network of professionals, students, and volunteers working in the field of environmental education throughout North America and in over 55 countries around the world" (www.naaee.org/aboutnaaee/index.php). Their philosophy and mission statement include phrases that lead to the conclusion that they are working within the modern paradigm and are not seeking to change underlying cultural assumptions about humans and the environment. For example, the NAAEE states that they take a 'scientifically-balanced approach' and they still discuss the notion of 'environmental stewardship'. Phrases such as these lead to the conclusion that there is an assumption of human superiority. Orr notes that "[T]he crisis cannot be solved by the same kind of education that helped create the problems." (Orr, 1992, 83). Following Orr's statement, education reform advocates and environmental champions alike insist that EE does not go far enough nor does it challenge the philosophical underpinnings of the current education system.

> "Teaching students about recycling, the dangers of polluting the environment, the characteristics of such natural systems as wetlands and primal forests are not seen as being in conflict with also reinforcing the modern view on the primacy of the student's own subjective experience" (Bowers, 1995, 16).

While EE seeks to infuse environmental issues and concepts into all subject areas in order to 'green' the curriculum, authors such as Orr (1992), Bowers (1997) and Slattery (1995), debate the validity of this model because it is built on the foundations of modernism and the taken-for-granted worldviews that are associated with modernism. Thus, the EE program continues to be part of the paradigm that led to the environmental crisis in the first place. Community development author Nozick states, "We cannot speak about environmental destruction and the loss of diversity without also speaking about root causes – the engrained attitudes and social and economic institutions which have led to the ecological crisis" (Nozick, 1992, 70). Thus, these root causes *must* be addressed in order for profound and meaningful change to occur. Bowers' (1997) work *The Culture of Denial* expresses at length how the current educational system has created and sustained these notions. He likens this reinforcement to sexist stereotypes: "The experience that we take for granted may lead to destructive behaviors that we are not aware of, like the sexist patterns that feminists have been attempting to make explicit" (Bowers, 1997, 158). Thus, as with changing gender attitudes and institutional racism, the entire system must be dismantled in order to re-cast the subconscious messages it relays.

2.4.2 Ecologically-Based Education

In contrast to EE, ecologically-based education focuses on a style of education that is interdisciplinary and action-based. The interdisciplinary model not only includes ecological concepts into a variety of subject areas but also breaks down the compartmentalized subject-based model to provide a more integrated model for learning. This is coupled with an action-based component to ensure that projects are tangible and

applicable to students. The ecological model also focuses on instilling the understanding that humans are a part of the ecological system, whereas the environmental viewpoint continues to suggest that humans and nature are distinct. The EE approach thus reinforces the sense that humans have power and superiority rather than acknowledging that humans are living within an ecological system and that they are an integral part of that system.

In order to achieve the kind of radical change that an ecologically-based education system is built upon, several education reform advocates, including Orr (1992), Bowers (1995) and Slattery (1995), promote the need to move to a postmodern curriculum whose underpinnings include entirely different epistemologies and ontologies than the current modern, anthropocentric paradigm. This includes a move toward valuing traditional knowledge, including feminist perspectives, and providing holistic and integrated learning that transcends the traditional boundaries of the classroom.

In terms of defining a different mode of education, Birkeland (2002) sets forth *Education for Sustainability Principles*. These principles provide a framework for a postmodern education, which incorporates many of the features that are missing in the current education system. The sixteen principles include:

- 'Action learning' over environmental activities
- Participatory over top-down processes
- Multi-sector and transdisciplinary over specialist research only
- Holistic over reductionist frameworks
- Lifelong, inclusive and continuous learning over formal education structures only
- Critical thinking over knowledge production only
- Quality of life outcomes over information outputs
- Empowerment over awareness raising
- Focusing on causal relationships over symptoms
- Systems change over monitoring and mitigating impacts
- Institutionalizing ecodesign solutions over end-of-pipe regulations
- Developing partnerships over balancing competing interests

- Value explicitness over claims of value neutrality
- Multi-dimensional over linear analyses
- Stewardship over control of resources
- Respect for indigenous design knowledge

Birkeland, 2002, 12

Hart (1997) is also a notable source on the topic of involving children in learning about their communities and local ecology as a means to achieving increased sustainability. Hart advocates that children are central to the development of their communities and as such, have a role to play in ensuring a more sustainable world. His work details the role of children in planning for their community rather than studying topics such as civics and the environment from an arm's length, theoretical basis. This hands-on approach allows children to exercise their rights as citizens and increases their capacity for learning by focusing on an action-based model of learning. This follows Chawla's (1999) study that concludes that out-of-classroom experiences are necessary to the development of people's environmental behavior. Hart also emphasizes the need for children to understand small-scale, local applications of environmental issues in order to increase their capacity to understand global issues as they age. Slattery (1995) supports Hart's concept of engaging children in their community and promoting action in real situations as a learning tool:

> " The emerging postmodern holistic and ecological models of curriculum dissolve the artificial boundary between the outside community and the classroom. Postmodern teaching celebrates the interconnectedness of knowledge, learning experiences, international communities, the natural world, and life itself" (Slattery, 1995, 175).

These postmodern education authors provide a framework that planners can work within to link children to their communities, to increase their understanding of ecological processes, and to develop an understanding of their relationship and role within the

ecological system. This is expected to result in a more *ecologically literate* public (Orr, 1992). It must be noted that some authors including Chawla (2002) and Driskell (2002) focus primarily on the rights of children to participate in community planning, which results in creating a sense of caring toward the environment. In contrast, this research focuses primarily on the need to generate a more environmentally responsible citizenry, with children's education being one component of the action plan.

Going beyond the concept of ecologically-based education, Wilber's concept of integral education acknowledges the different 'quadrants' that people operate in (Wight, 2002, 3). These are presented in Figure 3:

Figure 3: Wilber's Quadrant Structure

"I" Interior-Individual Intentional	"IT" Exterior-Individual Behavioral
"WE" Interior-Collective Cultural	"ITS" Exterior-Collective Social Systems

Adapted from Wight, 2002.

Wilber notes that continuing to focus on one quadrant at the expense of others is keeping our knowledge and understanding incomplete. For example, Wilber draws on the concept of spiral dynamics in his work and suggests that postmodernism has advanced ways of understanding from orange (scientific materialism) to green (pluralism)[2]. This has allowed us to "be more inclusive and sensitive to the marginalized others of rationality" (Wight, 2002, 11). However, this in itself does not incorporate all levels of knowledge that are required to fully understand the world and is thus incomplete.

[2] Wilber draws on the concept of spiral dynamics as advanced by Beck and Cowan (1996), which equates levels of understanding with various colours used to represent each successive advancement.

Wilber's approach values the contribution of all approaches, resulting in what is referred to as *Integral Theory*. This has been applied to many areas including *Integral Psychology* and *Integral Ecology* (www.integralinstitute.org). Although much of the ecologically-based education literature does not go as far as Wilber suggests is necessary, several authors have reached the postmodern realm in terms of their approach to education. Incremental change will likely see the pendulum settle back to a position that is capable of appreciating the valuable aspects of modernism while maintaining the advances that postmodernism has made. One may consider a continuum of advancement in knowledge moving from the more scientific understanding of 'environment' to the more holistic concept of 'ecological' to a complete system known as 'integral'. This shift will ultimately acknowledge the value of all contributions, including *both* modern and postmodern approaches, as well as relevant pre-modern teachings.

Notwithstanding the preceding description of *ecologically-based* education, it must be noted that there is academic tension with respect to the use of the word ecological. While the most recent literature in planning and related fields has been using the term ecological to describe a holistic view of nature that includes a social and economic component, the scientific community would not ascribe to this definition since the root meaning of ecological describes the interaction between living and non-living things but does not consider elements such as human social and institutional systems. While this research will use the term ecological as described by authors such as Orr (1992), Bowers (1995), Thomashow (1995) and Sarkissian (1996), it is acknowledged that there is a need for more appropriate terminology that will be acceptable in an interdisciplinary context.

This chapter has provided a basis for situating the profession of planning within the realm of education, and has provided a definition of ecologically-based education, which will be used to evaluate existing education programs. Three key points will be used to analyze the Manitoba curriculum in the following section: interdisciplinary education, action-based education, and the application of the ecological sustainability concept. The following chapter views the Manitoba curriculum through the lens of an ecological approach to education. Several education programs from a variety of geographical areas will be used as examples of cutting-edge practice in education, and some of the most significant barriers to implementation will be identified.

3.0 Case Study and Evaluation

The preceding literature review has provided a foundation for developing ecologically-based education programs. In order to contextualize this theory and provide a tangible example, this chapter provides an overview of the Manitoba curriculum, its current structure, and analyzes it in terms of some of the themes that emerged through the literature review. Further, a review of the significant barriers to implementing ecologically-based education is presented.

3.1 Existing Manitoba Curriculum

The provincial government's Education, Training and Youth department prescribe the curriculum documents in Manitoba. Subject-based curriculum guides exist for each age group from Kindergarten to Senior 4 or 'S4' (Grade 12). For example, in science, Manitoba Education, Training and Youth provides a document entitled *Kindergarten to Grade 4 Science: Manitoba Curriculum Framework of Outcomes*. Similar documents exist for the spectrum of age groups including Grades 5-8, Senior 1, Senior 2 etc. There are parallel documents in various subject areas.

The Science Curriculum documents set out "Five Foundations for Scientific Literacy" which are the same at all grade levels, K-S4. The Five Foundations are:

1. Nature of Science and Technology
2. Science, Technology, Society and Environment
3. Scientific and Technological Skills and Attitudes
4. Essential Science Knowledge
5. Unifying Concepts

Within each of the above categories, General Learning Outcomes (GLOs) are set forth which outline the objective of the learning unit. There are 28 GLOs in total. The GLOs are the same from K to S4 (Appendix D).

In addition to the GLOs, each grade level has Specific Learning Outcomes (SLOs) that are organized into "clusters". Cluster 0 is Overall Skills and Attitudes, which is integrated into each of the four (4) Clusters. Clusters One (1) through Four (4) have a varying focus on Physical Science, Life Science, and Earth and Space Science. Each SLO is cross-referenced to a GLO. The SLO quite specifically sets out an objective or lesson to be reached. For example, in the Senior 2 Science Curriculum, Cluster 1 entitled "Dynamics of Ecosystems" specifies that students will "Illustrate and explain how carbon, nitrogen, and oxygen are cycled through an ecosystem" (Senior 2 Science, Manitoba Curriculum Framework of Outcomes). This is an easily measurable, specific piece of information that must be learned at this point in the student's education (Appendix E). Thus, while the GLOs remain the same, the SLOs increase the depth and breadth of knowledge through each successive grade level.

In addition to traditional subjects and specific things a student must learn as they progress through the grades, Manitoba Education, Training and Youth sets out "Elements Integrated into Curriculum". These include:

- Foundation skill areas
- Resource-based learning
- Differentiated instruction
- Curriculum integration
- Aboriginal perspectives
- Gender fairness
- Appropriate age portrayals
- Human diversity
- Anti-racist/anti-bias education
- Sustainable development

Each of these elements are being integrated into all curricula. The Sustainable Development component includes a document entitled *Education for a Sustainable Future* (Manitoba Education and Training, 2000). It outlines how sustainability concepts can be integrated into a variety of subject areas and also relates the concept of sustainable development to SLOs that already exist within the curriculum, mainly in science, but also in other subject areas.

The preceding section, although significantly simplified, provides an overview of the structure of the Manitoba curriculum. The following section evaluates both the content and structure of the curriculum in relation to the concepts that emerged in the literature review.

3.2 Evaluation

At the close of the literature review, several fundamental principles emerged that can be considered in the evaluation of the Manitoba curriculum. These principles will be discussed in relation to the Manitoba curriculum:

- Interdisciplinary education structure (thematic units)
- Action-based, experiential learning
- Ecologically-based education - Ecological sustainability (humans as part of the ecosystem)

3.2.1 Interdisciplinary Education

The first and perhaps most significant point to note is that the Manitoba curriculum follows a model of EE. Section 2.4 of the literature review notes that EE maintains subject-based learning and that even if sustainability or environmental concepts

are included in all subject areas, the compartmentalization does not allow for integrated or holistic teaching models. The above description of the Manitoba curriculum immediately reveals that it is structured around traditional compartmentalized subject areas. This leads to a separation of curriculum goals within different subjects. Although the "Elements Integrated into all Curriculum" does provide some knitting of overarching concepts between subjects, it does not provide a strong tie. The literature review identified that interdisciplinary education is a key component of an ecologically-based education system. The focus on *interdisciplinary* education must be stressed in contrast to *multi-disciplinary* education. Interdisciplinary education assumes on interdependence and collaboration between subject areas, whereas multi-disciplinary education simply suggests education in more than one subject area. Although there are opportunities for interdisciplinary projects, the Manitoba curriculum has not provided a strong interdisciplinary component.

Despite the lack of formal interdisciplinary connections between subject areas, there are opportunities for teachers to develop unique learning opportunities across subject areas. At the discretion of individual teachers, thematic units that cross subject boundaries may be developed. Since the curriculum sets out learning objectives but does not prescribe how they must be administered, there is considerable flexibility for this to happen. As long as the year's curriculum objectives are met, the delivery mechanism is generally left up to individual teachers.

The ease of implementing interdisciplinary units is relatively straightforward in the K- Grade 8 setting where students may have only one or two teachers as opposed to Senior Years where students are constrained by more rigid schedules. For example, the

Two River Project in New Jersey, USA, involves four teachers responsible for one of the following subject areas: science, reading, math, and social studies. Each teacher works with the others to "...identify skills and knowledge common to all subject areas and coordinate skill development and knowledge acquisition across the curriculum using thematic units that are primarily based on the environment" (Chen, 1999, 16). A more local example is the Rivers project conducted in the summer of 1996 at the University of Manitoba. This program examined "...the potential of the arts as a mode of learning through which middle years students could broaden their knowledge in an integrated environmental study" (Morin, Stinner and Coffman, 1997, 12). The combination of creative, artistic outlets as a way to discover local environments near the Red River, allowed students to express themselves artistically while providing an opportunity to understand the environment outside the traditional context of science, math, and language arts. Thus their expression was not limited by knowledge in those areas.

Similarly, the "nature immersion" program at Hollywood Elementary School in Hollywood, Maryland has been using the EIC (environment as an integrating context) model for more than ten years. A hands-on component for interdisciplinary learning is provided in this project where students in K- Grade 5 are able to use the wetland habitat that is located on the school property (Tracy and Glaser, 1999, 5).

Despite the difficulty of implementing interdisciplinary units in the Senior Years due to multiple teachers and teacher specialization, there are examples of high school based interdisciplinary studies. A project at Lely High School in Naples, Florida provided an opportunity to address some of the issues on the school grounds while covering a variety of subject areas. Teachers at this school noted that although it is difficult to work

across departmental barriers that exist in many high schools, the opportunity for students to work on a real project ensured ongoing interest and ownership of the project (Kerby and Egana, 2001). In a local example, the EcoOdyssey program at Neelin High School in Brandon, Manitoba is a semester long program that provides credits in Language Arts, Physical Education, Physical Geography, Environmental Studies, and Biology. One advantage of this program is that one teacher administers it, so there are no coordination issues. In addition, students participate in this program alone during the semester, so there are no conflicts with other courses. The course work and curriculum outcomes are presented in integrated, thematic units and a strong community based component is woven throughout the program (www.brandonsd.mb.ca/ecood/coverpage.htm).

In Manitoba, the Seniors Years curriculum allows for up to 8 credit hours for "student initiated projects" (SIPs) of the 28 credit hours required to graduate. This also provides interested students an opportunity to design a tailor-made program for themselves on a topic of interest. The opportunity exists through SIPs to have self-motivated students explore areas not generally covered in depth by the existing curriculum. The major disadvantage is that this approach requires the student to initiate the project, which is likely to be taken on by students already interested and knowledgeable on the environment.

The above programs all focus on interdisciplinary units as a basis for learning subject based matter. However, many of the programs also include another important component that is integral to developing an *ecological identity* (Thomashow, 1995). That is, the need to provide hands-on learning opportunities for students to identify with, rather than providing only abstract theoretical concepts within the classroom. The

following section will discuss action-based learning and provide some examples of action-based programs.

3.2.2 Action-Based Learning

A second fundamental principle of ecologically-based education is that it is action-based. Chawla (1998, 1999, 2002) and Birkeland (2002) focus on the need for childhood experiences in nature in order to create a sense of connectedness to the earth. Section 2.3 of the literature review discusses this in detail. In terms of providing the opportunity for action-based learning, the Manitoba curriculum does not promote or require such an approach. However, as with the opportunities for interdisciplinary education, individual teachers can develop these kinds of experiences, provided the curriculum outcomes for each grade level are being met.

Again, there are many examples of programs that include an action-based component as a learning tool. The CEI (Community Environmental Involvement) program was developed in Minnesota and is offered to high school students at Little Falls Community High School, Minnesota. The program has also been applied in Chelyabinsk, Russia to a river monitoring program. The program is interdisciplinary, but also includes a community involvement component in that it studies various aspects of the Mississippi River, which each student is connected to for drinking water, recreation, and aesthetics. Students work with local agencies to report river quality, apply their English component to public speaking regarding the river, and spend time completing various tasks related to the river such as marking storm drains. This approach ensures that the learning process is being directly translated into real world experiences (Pikal and Lindquist, 1999).

Similarly, the Green Mapmaking project "...brings students into closer contact with the wealth of nature and eco-friendly projects in their communities to engage them in creating neighbourhood green maps – visual representations of local environmental and cultural sites" (Zuber, 1999, 7). The Green Map system began in 1992 for attendees of the Earth Summit in New York City. It has continued since that time and provides a way for students to think about their communities, identify local ecologically significant sites, and, in turn, take an interest in protecting those sites. In Calgary, Alberta, a Green Map was developed with youth as part of the redevelopment of a former military base in order to draw attention to existing natural components that should be preserved (Zuber, 1999, 9; (www.greenmap.com/ymaps/kgrmaps.html#calg). This project was guided by Child Friendly Calgary, a program developed by University of Manitoba City Planning graduate, Michael Gray.

The STREAMS (Science Teams in Rural Environments for Aquatic Management Studies) program in Huntingdon, Pennsylvania integrates learning across the subject areas of Language Arts, Math, Science, and Social Studies. Learning in the classroom is applied to local aquatic environments. "This combination of relevant, hands-on learning and consistency across disciplines creates enthusiastically engaged learners, reduces discipline problems, reaches students with different learning styles, and significantly increases learning" (Wilson, 1999, 12). In fact, unannounced post project tests showed a high level of knowledge retention as a result of learning, applying, and understanding rather than simply memorizing facts.

The preceding examples all exemplify the action-based component that is necessary in establishing an ecologically-based education. The following section outlines the third principle necessary in an ecologically-based education: a focus on ecological sustainability.

3.2.3 Ecologically-Based Education and Ecological Sustainability

The third fundamental principle relates to the type of sustainability being taught in schools. Section 2.2.2 of the literature review outlines the contrast between ecological and technological sustainability. The integration of sustainable development into the curriculum through the *Education for a Sustainable Future* document (2000) follows a technological and scientific conceptualization of sustainable development. It does not view the North American lifestyle of over-consumption and waste as inherently flawed, but rather, suggests that changes or inventions in technology, or improvements in the efficiency of current technologies will improve the sustainability of the planet. If one views sustainable development as three platforms rather than three overlapping circles, the model proposed in the Manitoba curriculum is the standard approach to using economic growth as the basis for sustainable development. In contrast, the ecological approach suggests that ecological systems, of which humans are a part (not separate from), form the basis of sustainability. Although this concept has not been embraced by the mainstream for a variety of reasons, it is being applied in some education programs.

The ISIS (Integrated Studies in Systems) program at Lincoln High School in Stockton, California is a two-year interdisciplinary program that uses action-based learning opportunities. "What makes ISIS perhaps unique is that the program uses the

characteristics of ecosystems as a framework for inquiry and learning, and as a model for the biological, social, political, historical and cultural systems that make up the content of the grade 9 and 10 curriculum" (Martin, 1999, 20). This program provides an exciting new perspective for learning that will foster an alternative way of looking at the world based on the six principles that are taught, which include: Networks; Boundaries; Cycles; Flow-Through; Development; and Dynamic Balance (Martin, 1999).

In a similar vein, the Earth Community School is a model for secondary education being developed by Frans C. Verhagen. "The ECS model is based upon the assumption of a need to shift from an anthropocentric to a biocentric mode of instruction and learning, and from traditional subject area curricula to an integrated curriculum that has contextual sustainability as its organizing principle" (Verhagen, 1999, 29). The organizing principle of contextual sustainability includes ecological sustainability, social justice, and participatory decision-making. As such, it is the only model presented thus far that seriously considers the social component of the three-part sustainable development diagram. Verhagen notes that environmental or social goals are individually ineffective organizing principles. Verhagen draws on the work of Bowers (1997), Orr (1992) and Thomashow (1995) as foundations for developing such an educational model. Although radical, this example is by far the most comprehensive in terms of presenting a model for delivering ecologically-based education.

3.3 Barriers

Implementing the above programs was not necessarily achieved with ease. There are many barriers, both real and perceived, that impede the development and application

of ecologically-based education programs. The first significant issue relates to teacher commitment. Since the above noted programs operate within the existing curriculum structure, the onus is on interested, energetic teachers to develop a program. The tireless input of teachers is required to successfully develop and implement a unique program. This can be further complicated if there are several different teachers involved. "Without a strong commitment from each teacher to maintain and develop thematic activities and units, we would easily have slid back into traditional subject-based teaching" (Chen, 1999, 18).

Second, since high schools are often structured around a subject-based departmental system similar to universities, bureaucratic issues regarding responsibility and budgeting may present barriers. However, as Kerby and Egana (2001) note, "[W]hile school grounds projects may be challenging for high schools to undertake, the large number of related academic topics that can be covered makes them worthwhile" (Kerby and Egana, 2001, 21). The authors also note that such a program can expose students to career options they may not have considered, and greater feelings of self-worth and meaning can be developed as a result of this kind of experience.

Third, since these programs are done on an ad hoc basis, access to such programs will vary significantly across the province, resulting in unequal educational opportunities. Only students who are fortunate enough to have a teacher interested and willing to develop and implement a unique program will benefit.

The preceding evaluation has identified several areas of the Manitoba curriculum that require attention in order to develop an ecologically-based system of education.

While there are some opportunities for teachers to develop such programs themselves, a systemic change is necessary to completely rebuild the foundation of education. This is a significant undertaking since curriculum changes are often very slow and difficult to implement. However, the individual classroom work that is being done provides a starting point for stimulating change. With time, there may be opportunities to formalize that change within the curriculum. The results of the empirical research confirm the above barriers and also identify additional barriers. Sections 4.3.7 and 4.4.1 present results of the empirical research relating to barriers.

4.0 Research Approach and Analysis

The empirical component of this research was undertaken in two parts. Since this research proposes a connection between two traditionally separate professions, it was determined that interviews should be conducted with both professions, in addition to a focus group to bring the two professions together. First, individual interviews were conducted with education and planning professionals. The interview participants were selected on the criteria that they were professionals in their respective fields in either a practicing or administrative capacity. Second, a focus group was convened with some of the interviewees to address issues surrounding ecologically-based education, possible curriculum changes, and the role of the professional planner in participating in curriculum development and implementation. Individuals were recruited by letter asking if they would be interested in participating in the research. Those who agreed to participate were sent a four page brief on the concept of ecologically-based education and the potential role of planners in establishing such an educational system (Appendix F).

4.1 Semi-Standardized Interviews

Berg (2001) defines interviewing a "dramaturgy", a way of moving past words to develop a relationship between interviewer and interviewee in order to draw out information. This research used semi-standardized interviews which set out specific questions but also allow the interviewer the "...freedom to digress; that is, the interviewers are permitted (in fact expected) to probe far beyond the answers to their prepared and standardized questions" (Berg, 2001, 70). "The interview is an especially effective method of collecting information for certain types of research

questions...[P]articularly when investigators are interested in understanding the perceptions of participants...(Berg, 2001, 72). In this research, the individual interviews were effective in determining participants' level of knowledge of ecologically-based education and determined real and perceived barriers to establishing ecologically-based education. These barriers were also discussed in the focus group bringing together the two professions.

In total, twelve people agreed to participate in the interview: seven planners (four in various levels of government, and three consultants) and five educators (three administrators, and two teachers). Each interview ran approximately one hour and was conducted at a mutually agreeable time. Each participant signed an informed consent form prior to the interview. Once all interviews were conducted and transcribed, analysis was undertaken through open coding and axial coding to identify themes (Berg, 2001).

The individual interviews were focused on establishing the interviewee's level of knowledge regarding ecologically-based education, highlighting personal experiences with ecological or environmental education, and finally, identifying barriers to ecologically-based education (see Appendix G for interview instrument).

The interviews provided an opportunity to discuss the topic in depth with each individual and to understand each individual's perspective. The focus group then provided an opportunity to discuss individual ideas in a group setting where professionals from different backgrounds could provide insights into their opinions and ideas. The focus group was able to stimulate discussion and ideas that may not have been considered in the individual interviews.

Following the interviews, general themes regarding barriers were identified through an analysis of the responses. These barriers were presented to the focus group participants and a discussion regarding the barriers and potential solutions was undertaken.

4.2 Focus Groups

Krueger and Casey (2000) define a focus group as "...a carefully planned series of discussions designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment. Each group is conducted with six to eight people by a skilled interviewer. The discussions are relaxed, and often participants enjoy sharing their ideas and perceptions. Group members influence each other by responding to ideas and comments of others" (Krueger and Casey, 2000, 5). The last comment is of particular interest since the group consisted of professionals who have traditionally not worked together. The focus group was beneficial in that it provided an opportunity to generate ideas between the two professions.

There are several advantages to using focus groups as a method of data collection in academic research. Berg (2001) suggests that it may be advantageous for the researcher to be afforded the opportunity to observe the interactions among the participants and how they may have discussed the topic among themselves (Berg, 2001, 115).

Another significant advantage of conducting focus groups as a research method is the reduced time and financial costs. Since several participants are providing data at the same time, the total amount of time is far less than if individual interviews were

conducted with each participant. Berg notes however that there will be less detailed data generated from a focus group than from an individual interview, thus, depending on the research needs, this will be a trade off (Berg, 2001, 116). Conducting both interviews and a focus group alleviated this concern.

The focus group consisted of two planners and two education professionals. While Berg (2001) suggests a maximum of seven participants in a focus group, Krueger and Casey (2000) suggest a somewhat larger group of ten is manageable. Although this focus group was small, it was balanced between the two professions, providing an equal opportunity for each to contribute to the conversation. The session ran approximately two hours and was conducted during the workweek. The session was audio recorded and transcribed for data collection purposes. In order to ensure confidentiality, the tapes have been destroyed and identifying statements have not been included in the written analysis. Results were transcribed and analyzed using a similar coding technique as the interviews (Berg, 2001).

The consent form signed at the interviews also pertained to the focus group. In addition to the researcher ensuring the confidentiality of each participant, each member of the focus group was also required to ensure the confidentiality of the other members of the focus group.

4.3 Analysis of Interviews

There were seven questions asked of each participant and the following analysis is organized by providing the results of each question. Each question is listed for ease of reference. A more detailed set of questions including scheduled probes is found in

Appendix G. An overall summary of the main themes that emerged through the interview process is provided in section 4.3.8.

4.3.1 Prior to receiving the package of background information, were you aware of the concept of ecologically-based education?

The first question sought to establish the participant's prior knowledge of ecologically-based education. Most participants, including planners and educators stated that they were not aware of the terminology, however, they felt that they understood the general concept. Although most participants seemed unfamiliar with the terminology, they went on to describe their thoughts about teaching environmental issues in the classroom.

One planner noted that she had seen a change in the curriculum since she was in school and although she had not heard of the phrase *ecologically-based education*, the concept was somewhat familiar. Another planner indicated that the terminology was new but was curious about the distinction between EE and ecologically-based education. He was "puzzled that people would think in such a way as to place humans and nature separately".

A senior planner, currently working in development control, focused on the terminology and questioned whether the distinction between EE and ecologically-based education was just academic jargon:

> I can't say that I have heard the term before and I have to say that I'm having trouble thinking of it as a concept more than just semantics. I think you need to tell me more about it or I need to read more about it because you are comparing environmental education versus ecologically-based education and my first comment is, *is this just about terms?*

This respondent did go on to say that regardless of the definitions, he agreed with the direction. He also picked up on the underlying principle that an ecologically-based education would go beyond knowledge and begin to instill values:

> I'm not sure I get the distinction, although I appreciate the principle of incorporating environmental or ecological thinking in education at an early age. Its not one of those tools you learn like arithmetic or geography. It's one of those mindsets. These become part of your life and engrained in your thinking.

Respondents from the education field were similarly unfamiliar with the term ecologically-based education. Two educators suggested that they were more familiar with the term sustainable development and its relationship to activities like composting and recycling:

> What we do from an environmental sense is talk about recycling and reusing and not littering and so on. In an ecological sense, I'm not sure.
>
> I was more familiar with sustainable development and the emphasis on the environment. Maybe they are the same but you are pointing out some differences. It was mostly EE and sustainable development that I have been involved in like clean-up days. We would call these environmental activities.

Interpretive Analysis:

Although most respondents were unfamiliar with the terminology there was a sense that having environmental concepts included in education is a positive trend and is becoming a more common practice today. The Manitoba curriculum has added sustainable development as an Essential Element of the curriculum framework. The reference to sustainable development and activities like recycling indicates that this addition to the curriculum has raised the awareness of educators, and that curriculum can influence the educator's understanding of a topic.

4.3.2 Can you describe your understanding of the difference between EE and ecologically-based education?

The second question sought to determine the participants' understanding of the distinction between EE and ecologically-based education that was outlined in the pre-interview background package. Understanding this distinction is important since it identifies people's understanding of the predominant worldview that exists today, and also identifies their level of understanding of moving to an alternate worldview.

One planner described the environmental view as a more technical and practical one while the ecologically-based view was more 'big-picture':

> I think when people talk about environmental things that's about recycling and turning off the lights but ecological is way more about actions and consequences in terms of how you affect the environment. Its way more integrated.

Another planner suggested that the environmental approach seemed like a list of wrongdoings with associated solutions whereas the ecological approach was more of a vision:

> The ecological approach sounds to me like more of a vision. Think about how the world ought to be and how we ought to move around, and how we ought to farm and how the balance of ecology works. Environmental education sounds negative, like a fix-it approach, whereas the ecological approach is more positive, a 'what should the world be like' approach.

The environmental approach maintains a human-nature distinction while the ecological approach moves away from viewing humans and nature as separate. One planner saw this conceptual change as a difficult transition:

> That makes the ecological approach much more difficult because how do you change that mindset? It really is a revolution in how people view themselves fitting into the world. It sounds kind of tough.

Two planners seemed unsure of the distinction and did not seem to be confident in their understanding:

> I have been involved in schoolyard renovation work to develop outdoor classrooms and naturalized schoolyards to facilitate different kinds of curricula being taught in a new way. But I don't know if that's ecologically-based education.
>
> I would put ecologically-based education as a subset of EE. EE is big-picture but ecologically-based is a more detailed, narrower subset.

The education professionals tended to focus on how education is developed and delivered rather than discussing the distinction between the two education models. One senior administrator drew an analogy between EE and models of teaching family-life education: "I think the analogy to EE is like the old way of doing family life education and smoking education. A stand and deliver approach. Current research on teen pregnancies shows that this does not work". This respondent suggested that the stand and deliver approach is ineffective and went on further to refer to Birkeland's (2002) concepts in the background material:

> I like this part about action-learning. That seems to be what I see in most schools whether it is recycling or whatever it seems to have more impact on the kids. And when you are in a student-centered approach to education that would be the only way to make an impact....and it should be started with the very young.

Another educator likened the ecologically-based model of education to the Inquiry Model in education:

> With the inquiry approach we have students identify problems that they want to do research on what was mattering to them and then developing an approach with them rather than us telling them how and what they should be learning. The complaint of the students was that they really enjoyed their time doing that with us and it was difficult to go back to the traditional teaching approach with 40 minute classes.

Two educators immediately honed in on curriculum and the need to have concepts included in the curriculum, to ensure they are actually taught:

> Putting it into curriculum outcomes ensures it is even and guarantees that everybody is covered. That is always my philosophy: if it is in the curriculum and is listed as an outcome then people will do it. If it's an appendix or an add-on or a good idea, it won't be consistent. Right now its hit and miss all over the map. If you want it for everyone it has to be written down as an outcome.
>
> The challenge is to keep pressure on the people doing curriculum. I don't know who the people are who are championing EE. Better results come when people take a moderate approach unlike Greenpeace or organizations like that who are out there. If a moderate approach is worked into curriculum then it can be done. And support materials need to be made available because teachers will not go out and research the information.

One educator suggested that he thought the ecological part might be less socially involved whereas the environmental part might be more socially involved, for example, looking after our environment. This response was interesting as it was the opposite of viewing EE as science-based and technical while ecologically-based education is more holistic and encompasses the human element within the system.

Interpretive analysis

Some respondents seemed to have a general or conceptual understanding of how EE and ecologically-based education differ. However, few respondents provided a 'picture' of how education would look in an ecologically-based system. For example, there were no references to thematic units of teaching, although one respondent talked about the Inquiry Model, which is similar.

Only one respondent noted that the ecologically-based education system requires a change in people's worldview. Two educators did make references to curriculum change, however, it was not clear if the focus was on adding to the curriculum, or changing its structure entirely. Overall, there did not seem to be a clear understanding

that the ecologically-based approach is a complete structural change in how education is delivered.

4.3.3 Do you consider yourself an environmentally aware person? If, so, in what ways?

This question was designed to determine the respondent's perception of his or her own level of environmental behavior and to determine how that behavior manifests itself. There was also an attempt to draw out whether those who considered themselves environmentally aware had been exposed to childhood experiences in nature. This line of questioning was geared toward identifying a link between the literature that suggests that childhood experiences in nature are one of the key formative factors in developing a sense of caring for the environment.

One planner indicated that he felt he was aware and translated that into action where possible. However, it was not a driving force in his lifestyle:

> I will do things because it is convenient to me and will choose alternative forms. I will choose alternative forms of transportation knowing that it's more environmental but it's more a lifestyle choice. I enjoy the walk to work.

Similarly, another planner stated that he was "more aware than most but didn't act on it as much as he could".

One planner noted that the degree to which one chooses to behave in an environmental way "boils down to thinking about day to day choices". Several planners indicated that they were aware of environmental issues and tried to make choices that reflected their understanding of the issues. For example, another planner thought he was environmentally aware and had made a conscious choice to reflect this value:

> I rarely drive my car. I almost always use the bus or ride my bike or walk. I live in a part of the City that allows me to do that and the area I live in was chosen to allow me to do this. We are a one-car family. I follow the GM (genetically-modified foods) debates and the changes in our agricultural industry. It does upset me to see a lot of agricultural practices, the dependence on the global economy and the incredible amount of energy that goes into moving food products around so that we can have oranges all year round, apples all year round - anything you want year round instead of eating seasonally and locally. I dislike the idea of factory livestock production. I am environmentally aware and it bothers me that individuals in society get so out of tune with the environment and so dependent on technology to manage and control the environment.

Another planner talked about very similar ideas and the choices that their family makes with respect to fostering an environmental lifestyle:

> It boils down to thinking about what your choices are. What choices do you have? We are renovating the house so when we look at purchasing materials, where do they come from? What was the production cost? Not the cost in dollars, but environmentally. Using a real mower instead of a power mower. Walking or biking to work everyday. We do it to a point where it works for us. We get food that's organically grown because that is important to us to not have all the chemicals. When we make purchases we think about how much packaging there is. The main thing for me is recycling but there's two R's that come before it that are never thought of but are huge. How we arrange our yard to use less water. Planting to get shade in the summer so we don't have to use air conditioning all the time. There is also a gap between what we want to do and what we can afford.

In contrast to the above, one planner indicated that the more she learned, the less she felt she knew:

> I don't know, but sometimes the introduction to a subject points out what you don't know. A couple of years ago I would have said yes, absolutely I am environmentally aware. But now that I know more, I think not. I know what I don't know now – I have so much to learn. I am at least aware where I am lacking.

This planner went on to suggest that school education was important in creating awareness because children will pass on their knowledge:

> You can educate adults through children. Children are sponges and the information will filter up. They can have a serious impact on the adults around them. Adults are also hard to train but children have an amazing ability to train adults. The kids will teach their parents and show them that they can do things differently.

One educator also thought that he was aware and described the beginning of his teaching career over 25 years prior, where he was involved in outdoor activities relating to the environment. A similar response came from another educator who had been involved in outdoor education:

> When I was younger I was probably more environmentally conscious. I taught courses in recreation. I lived outside in quinzees and the Volkswagen van. We were always looking for alternative power sources – we lived off the grid and our stereo was powered by riding a bicycle. I rode my bike everywhere and now I have two vehicles which I swore I would never do, but with three kids....

Another educator related his awareness to more recent experiences at his school, which is involved in the Toyota Evergreen Project and provided an example of the outdoor classroom project:

> Outdoor classroom space is part of the long-term objective where we will have habitat where bugs will want to live and maybe the odd rabbit. Plants, bees, different gardens with different odors so you can have a sensory experience...we have kids involved in a gym activity planning out the playground. They were involved in looking at a diagram of the school ground and deciding where you would want to put trees and how to organize things.

Interpretive analysis

The majority of respondents indicated that they thought they were at least somewhat aware and went on to qualify their answer with examples of how they fit environmental responsibility into their daily lives. It was interesting to note that some suggested that their choices were more related to lifestyle than to a conscious protection of the environment. Further, it also appears that some people's lack of ability to act in an environmental manner was related to their current lifestyle with family and children.

It also became evident that for most respondents, their awareness and action was something relatively new in their lives as opposed to a mindset that was formed through

childhood. Although this may seem to conflict with some of the literature, it may be generational. Had these people been educated differently, perhaps they would be even more environmentally aware. Furthermore, many of the respondents' parents would have grown up in an era that preceded the popular environmental movement.

The education professionals initially answered the question but then went on to describe the kinds of activities that are taking place in their schools rather than in their personal lives. Conversely, the respondents from the planning profession described their personal lives and how they translated their knowledge into action.

Lastly, one planner noted the advantage of educating children as a way to introduce adults to new concepts like environmental behavior. This is an important idea and is suggested at a later point by another respondent.

4.3.4 What is your perception of the planning profession?

This question was posed to educators in order to determine the level of knowledge educators had about the planning profession. Since this research is focused on developing a connection between the two professions, it is important to establish a sense of where planners need to start if they are going to approach educators in the future.

Many of the participants indicated that they did not have a solid sense of what planners do. In addition, most seemed to focus on traditional land-use planning:

> I don't know. I've never really thought much about city planners to be honest. I don't know...I assume on a very basic level that they plan cities (laughs).

> No idea. I wondered. I had no idea what they did. I was familiar with planners in the sense that if something wasn't planned properly the kids talked about it - 'that's a silly place to put that' - and I thought, there must be somebody who does that.

One educator also indicated that his experience of planning had not been positive and did not understand why decisions were made the way they are. After a discussion regarding the political nature of planning, he seemed to understand the profession more clearly.

> I don't know. My perception of planners is not that positive. There is building going on all over the place and there must be pressure from builders to open up the land. It makes it hard for us in the school division to know where to close down a school and where to build one. It baffles me. What *does* a planner do?

Despite the lack of understanding, two educators who had more recent experience with the planning profession seemed positive:

> My experience isn't that long but what we were trying to do last year to varying levels of success (through a City-funded community planning process) was to involve the community in the process about how this might work and then pulling it together with some representative groups to take the next steps. A lot seems people –related and doesn't seem all that different from my job some days.
>
> The Kids Can Plan was really neat for me in that way and for the kids too. Some thought it would be neat to do that (planning). They had an idea about planning after that.

Interpretive analysis

Given the limited and sometimes almost non-existent understanding of the planning profession, the results of the question identified a huge gap that must be addressed before planners and educators can work together. Given the educators minimal knowledge of the planning profession, it is not likely that many educators would see a linkage between these two professions without prompting. However, despite that lack of understanding, most educators seemed curious and interested in exploring the connection further.

4.3.5 In what ways do you see planners and educators collaborating?

The participants were asked to describe how a linkage between planners and educators would manifest itself, and how they thought this connection would work. This question was posed under the assumption that planners should be pursuing this connection between the professions. However, through the interview process a second theme emerged that questioned whether this was part of the responsibility or mandate of the professional planner. This digression is reflected in some of the planners' answers.

Two planners immediately questioned whether professional planners even accepted this idea. One indicated this would be the place i.e to seek consensus from within the profession before approaching other professions. Another planner also indicated that it would be a "huge transition for planners to see themselves in that way":

> It is quite a big challenge actually. Not that the end wouldn't justify the means it would take to get there. It's just that planners, even the ones who consider themselves non-traditional, still think in such a traditional way because they work in systems that keep them stuck in such a mode.

Despite these concerns and challenges, most planners felt that it was appropriate for them to be involved in education, even if it would be a big change for them:

> When I went through the list of Birkeland's in the background material, there were some things in here that really struck me as having a real strong connection between planning and ecological education. I think that it would take more research and imagination on my part to see the connection. Not that its not there but mainly because my background has all been very traditional land use planning and people with my experience tend to think of control and police power as a way to solve problems. This says 'no, change the system, change the mindset of culture' rather than controlling culture with laws. That is a big leap for me, but philosophically I really like it.
>
> With me it would take a lot more work to get into the right mindset. I see this thinking more in younger planners who have been through school more recently. I could see them talking to kids in school about what we want to achieve for our cities and how they fit into that goal. I can see them doing that but I feel a bit behind on it personally.

Another planner agreed with the statement in the background material that suggests planners have a responsibility to educate: "I like that you say that planners have a responsibility to educate because I think that's very true. I think we do have a responsibility to pass along knowledge that we have". This planner also noted that the benefits are apparent for both professions:

> The only experience I have is with Kids Can Plan but Calgary is doing this with Michael Gray as is Elisabeth Miller in Saskatoon. That is a wonderful opportunity for planners and students. For the students the obvious link is that they get access to a profession that they might not otherwise because we (planners) are not that visible. Even adults have no awareness of the profession. There is benefit to planners too in stepping out from the day-to-day. The value in stepping back and asking where do I fit into society, what am I doing, what is the applicability to anything important? This is important. Its good to pull back sometimes and see the big picture.

Another planner who is a contemporary of the previous one indicated that planners think a lot about connections and actions and consequences, so having someone like that to work on curriculum would be good. The notion that adults learn from kids was also raised, which was suggested previously by another respondent. This provided an opportunity for planners to affect change since many are unable to do so in their jobs:

> Then there is the whole thing too about planners and how we want things to be, and planners who work in the real world and know where they'd like to be but don't have a hope of getting there in the short term so you have to make do with the day-to-day decisions. I think the main thing that would be of benefit to planners is that it would be a way to change a lot of people's thinking because kids take it home.

One planner stated that the question was not whether planners should be involved, but why not other professions too? Similarly, a teacher suggested that "any time you can get someone who is knowledgeable in one field to work with educators who aren't knowledgeable in that field it helps guide them in curriculum planning. It would be helpful regardless of the field".

The education professionals seemed very open to the idea of exploring connections with planners and saw the benefits of involving planners in their activities:

> On page 3 (of the background material) it talks about quality of life and causal relationships. We don't have these discussions with kids. We spend too much time on knowledge and not enough on cause and effect and that sort of thing. In terms of quality of life, having planners come in and talk to the kids may make them realize its not all bricks and bridges but there is more – what is the causal stuff? The planning group would be good to come into the school and talk about this.

This answer reflects one of the planners' responses that planning has a handle on the actions and consequences of daily decisions and although the educators did not have a good understanding of the scope of the planning profession, this response suggests that they do see planners as having skills that view cities and communities in a holistic and interconnected way. Another educator had a similar response:

> Planners themselves, my perception is that they have a great deal to offer. We just haven't found a way to bring the two together. The vast majority of students, if you asked them about desirable occupations or what they want to do, city planning doesn't come up because they are unfamiliar with it. When you talk to them about things like why there are retention ponds they don't know. They have no idea. But as educators, we really don't either. We don't talk about it enough.

One planner had also noted the importance of a school's place in the community in terms of fostering a sense of community among people. It was suggested that this is a necessary precursor to fostering a sense of caring toward the environment. "This includes not having school shut down at 3:30 and then its not part of the community after that. It has to be integrated in with all aspects of the community, 24 hours a day." An administrator echoed this point:

> I think it would be fabulous if we could plan the school (not the academic piece) but to plan the school's place in the community. As a physical facility, as a leadership piece and as a gathering place. I can see the planning piece of that being huge in terms of tying school with community together in much more meaningful ways.

Interpretive Analysis

As mentioned in the introduction to this section (4.3.5), some planners questioned whether planners, or the planning profession itself was supportive of this idea. In addition, other planners suggested that it would be a significant shift for planners to see education as part of their focus. Despite these concerns, there was support from the more recent planning graduates who may have been exposed to a broader view of planning in the course of their education.

In contrast to the concerns raised by the planners, the education professionals were supportive of having planners involved and could see the benefit of having a planner bring a broader focus to education by moving away from disseminating knowledge and focusing on relationships and community. On two occasions, respondents mentioned that having planners and educators work together is a good way to introduce planning to children who may not be aware of the profession. Although this is not the goal of shifting to ecologically-based education, it may be a peripheral benefit for the planning profession.

4.3.6 What do you see as the first steps that need to be taken to begin developing and implementing ecologically-based education?

While this question sought to identify first steps that need to be taken to begin moving toward developing and implementing an ecologically-based curriculum, there was a tendency to bring in a variety of ideas and issues. There was also a tendency for respondents to lose focus of the ecologically-based concept and respond with very conventional suggestions that reflect the current subject-based system.

For example, one planner noted that additions to the curriculum may not be something that educators want:

> Are they (educators) looking for an addition to their curriculum? Do they have room; do they want this sort of thing? If they are totally overloaded and they are dropping art and music can they take this on? I don't know. It's a consideration.

Another planner suggested that the first steps could be approached in two ways - small scale or big scale:

> If you go small scale, you find a friend who's a teacher who is looking for a speaker, a presentation or career fair display. It might be a one-time thing or an annual thing. That would be small-scale. The big-scale is for MPPI to contact MTS[3] and say 'we want to do a piece in your curriculum. We want to change/add to your subject area, to the matters that you cover'. But then who charts the course?

Again, the language in the above responses indicates a traditional way of thinking by suggesting that planners may want to add on to the existing curriculum. Another planner suggested a couple of initiatives at different scales including presenting at a CIP conference to engage planners, and developing exhibits for children similar to the Forks installation that focused on educating kids about what happens underground with infrastructure. These suggestions were followed up by pointing out that "formal curriculum change is difficult" and therefore, smaller interventions such as this may be a good start.

One planner noted that in terms of developing curriculum, "The planning field is good at bringing varying interests and getting them to work together but we are not the only people and we are not even qualified on the ecological front".

[3] MTS is the Manitoba Teachers Society, a group that represents the interests of teachers in the classroom.

A similar concern was raised by another planner who noted that "We have to work *with* education, not say, here's a new curriculum". Similarly, another planner noted the need to work with other disciplines:

> We need to carve out what we mean as a profession. What are our objectives? How do we think cities should work ecologically? Its not just planners, it's a variety of people. How do we collectively carve out what we need to do? We are not ecological experts so it has to be totally multidisciplinary.

One planner suggested that there may even be distrust of planners, which would have to be addressed first before becoming involved in curriculum change:

> Credibility could be a bit of an issue because of decisions planners have made in the past. Credibility needs to be built with the education profession. First steps could include developing a relationship with the education profession. I don't think there is one way of going about it. Maybe with schools though events like Kids Can Plan?

Another planner suggested that by having educators and planners together at the focus group to plant the seed with a few people from each profession is the first step, so it has already been taken.

Similar to the planners, many of the educators talked about special or annual events where planners would spend a short period of time with students:

> I think we would need to have a school and a group of planners who were prepared to do a pilot project. You are looking at a three to five year time span for meaningful change. Once habits like that are developed they are hard to break because people learn by association, so if we can build it into the parent council and the children it becomes instilled.

> Education is one of the slowest to react. Going at this with the assumption that people aren't environmentally aware and appreciative of what they have – you have to tackle it from different fronts over the long term. With Science Olympics not everyone is keen but it develops over time. You could have Ecology competitions.

Despite some tendency to focus on one-time events, educators also discussed curriculum planning and the opportunity to introduce the concept to educators at various events.

Three educators mentioned presentations at in-service days or at the yearly SAG (Special Areas Group[4]) conference. This was suggested as a way to provide an opportunity to introduce these concepts to teachers and to introduce the planning profession.

In terms of curriculum change and development, three senior administrators offered the following separate comments:

> From a curriculum perspective that would be the place to get involved for sure and that way you are talking involvement at the provincial level and curriculum that involves all of Manitoba. Planners would have to take the initiative and contact the curriculum department. Once the curriculum is set, help would be needed by school divisions in delivering new concepts.
>
> In terms of curriculum, what you need to do is to get into the curriculum planning process and get onto the provincial committees that meet. You need the government to ask planners to be involved for the two-year time commitment (about ten days a year) to help create a new provincial curriculum. That is where your efforts should go.
>
> The things that do work are the ones that in the planning process, they have gotten the ear of the curriculum planners early and carry it through with them. For success from the start it requires people to be lobbying with the influential people early and having someone on the inside who is committed to the importance of it. If we can steal math time to teach something that is actually going to affect people's lives, I'm all for it.

Interpretive analysis

The focus of the question was to identify first steps toward developing an ecologically-based curriculum that is built on different principles than the current subject-based system. Despite indicating some understanding of the distinction between the way EE is taught and how ecologically-based education would differ, participants tended to have difficulty answering this question, and their theoretical understanding seemed dissipate when respondents started focusing on the application of a new kind of education.

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[4] TheSAG conference is a Manitoba-wide conference for educators to partake in various sessions of interest to a teachers in a variety of subjects.

This difficulty translating conceptual understanding into practice reveals the engrained mindset about education and how it happens. For example, some noted the need to seek an ecologically-based education but then went on to talk about fitting issues like recycling into certain subjects. Also, in terms of curriculum re-development, the focus still seemed to stay with a subject-based approach. Most respondents focused on one-off events like Kids Can Plan, conferences, exhibits, or *adding* to curriculum.

This difficulty may have been due in part to a lack of serious contemplation on the background material or a lack of clarity in the background materials. It may also be due to the fact that since most people continue to operate within a modernist worldview that does see humans and nature as separate and distinct, that the introduction to an ecological worldview was too extreme to be fully understood in the short period of time that the participants had to contemplate it.

Despite these difficulties, the educators recognized the need to focus on curriculum change (even if it is still subject-based) since it ensures continuity of delivery across the province. It was also mentioned that curriculum change tends to be slow; and therefore, having small-scale individual events while simultaneously addressing changes to the curriculum would be advantageous.

As with the previous question, some respondents slipped into thinking that this was a way to introduce kids to the planning profession, which is not the case. However, while this may not have been the intention, it is certainly a spin-off that could have positive impact on the future of the profession.

4.3.7 What do you see as the main barriers or challenges to developing and implementing ecologically-based education?

Identifying the first steps that should be taken in order to begin developing an ecologically-based curriculum necessarily generates concerns regarding how it will be done. This question began to draw out some of the barriers and challenges that respondents felt would arise through this process. Not surprisingly, all respondents identified *lack of time* as a major hurdle. From within the planning profession, freeing up professional time would have to be seen as a priority. This applies to both private and public sector planners. Another planner echoed this sentiment and noted that "it is a lens change for the profession to see this as part of what they do". However, this challenge did not seem to be insurmountable:

> If they could be convinced it is important they may be able to free up time. It's not that it can't be done. If everyone decided it's a priority maybe they create a budget line for it. If the public sector finds it important maybe they create time for someone to do this.

One planner felt that changing the mindset of planners would be the first challenge:

> I think that it has taken this long for *Kids Can Plan* to have happened so clearly people weren't thinking that way enough to make them take the next step. I think the challenge is within the planners themselves. If they don't buy into this and see it as necessary they won't be willing to do it. But institutional change is long and hard, so changing the school system will be tough.

The tendency to 'stovepipe' or compartmentalize subjects in education was mentioned by one planner who indicated that ecologically-based education needs to be interdisciplinary. Another planner also mentioned this issue: "Turf-oriented professions may not be willing to accept that others have something to offer." In a similar sense, one educator thought that people have lost focus on the purpose of education:

> The crucial part is that we (educators) have forgotten what we are doing. I think we need to revisit, as a professional organization, what

> our true and sole purpose is. I think we pay lots of attention to subjects and the price we pay is that we have forgotten to pay attention to people. I think that's a revolution that's next on the horizon for education – a return to treating people as humans rather than people requiring subject matter to fill them up.

The extreme frustration of trying to change ingrained attitudes was expressed passionately by one person:

> The parent councils are huge barriers because they have such a fucked-up view of things. It's not even funny. Two schools I have been working with I have tried to tell them about alternative play environments but schools spend a lot of money for expensive catalogue equipment and won't consider alternative things that stimulate a child's imagination and incorporate ecological issues like having a marsh. The problem is the parent councils are fixated on raising enough money to get the biggest play structure for the kids. If you try to tell them otherwise it's an uphill battle. Its part of the boomer mentality – the material culture we live in. Also, its evidence of them doing something because they have something to show for it and compare it to what the other schools have.

Several other respondents noted that changing people's view of education will be difficult and that changing teachers' education will be necessary too. They offered the following separate comments:

> I think that people are afraid of change and that the teachers are also resistant. It needs to be in the teachers' training too. People are very simple and narrow-minded. There are a lot of perceptions that will have to be changed. Your best bet is to educate children because adults learn through children.

> It would be beneficial to introduce the idea in the education of teachers at university. That would be a good place to start because then it is in their training and they can see how to integrate. This is the only way – for this to be integrated and incorporated it has to be integrated into teaching style and delivery rather than a topic. Some teachers are comfortable with hands-on learning like this but some aren't so in their training this would be a good spot to work at it.

> If you brought it into the Faculty of Education when students are being educated to become teachers it becomes part of their mindset – this is something I teach and how I do it. This is better than trying to teach someone who has been teaching for twenty years.

As with planners, all educators mentioned the time factor of bringing in new ideas, and provided the following separate comments:

> Time. There aren't enough hours in the day.
>
> Time and commitment. A group has to be committed to championing this and they have to be very clear on what they are doing. It is grunt work. You have to be willing to work like slaves for the community.
>
> The key thing from a teacher's perspective is that time is of the essence. It's so hard to find time to teach the curriculum you are already familiar with. On the other hand you would have some teachers who are like "Wow' this is really great and its interesting and my kids will like it. It really depends on your teachers. Getting anything new off the ground is a challenge.
>
> Another hurdle is the time factor, which is always mentioned. The time in the day to cover everything isn't there. Integrating subjects is fine but it takes planning and it doesn't just happen. The teacher has to be on the ball enough to do that and plan it.

Some respondents also mentioned the need for financial resources and access to materials to assist teachers in delivering new content in a new way. Interestingly, CIP published a manual recently entitled *"A Kids Guide to Building Great Communities: A Resource Manual for Planners and Educators"*, however, it is unclear how this resource has been promoted to the education profession. I undertook a minor follow-up of this publication and its subsequent marketing. It was found that the manual was distributed to provincial CIP affiliates, with the distribution and implementation being left to their discretion. Unfortunately, in Manitoba, there has not been a comprehensive implementation of the manual to schools and school divisions. If materials such as these are available, they must be actively marketed to educators through their professional organizations.

Interpretive Analysis

Having the time available to develop and implement ecologically-based education was raised frequently. However, it is unclear whether the additional time would be part of

the initial learning curve begin to take steps to implement this change, or whether ecologically-based education is necessarily more time-consuming.

Although the time factor was mentioned frequently, it began to appear as though planners themselves may be one of the greatest challenges to establishing this linkage. While working with children has become more popular with planners (e.g. the Kids Can Plan event, Child-Friendly Calgary, CIP publication) it still appears as though education, particularly of children, is not really seen as part of a planner's job. There were also some concerns raised that planners do not have the technical expertise to be making suggestions for education on ecological issues. However, because planners tend to take a broader perspective on issues, and the interconnections between various stakeholders, they may be very well suited to developing a curriculum that is less compartmentalized, and they may be able to offer skills that can bring a number of stakeholders to the table.

The resistance to change was mentioned several times by both educators and planners. This applies to a variety of groups including planners themselves, educators, and the general public. The need to begin introducing the concept of ecologically-based education to students of education at university was suggested as a way to open up the minds of the teachers. In the planning profession, a similar approach could be taken. Unfortunately, educating the general public, particularly those with children in school, is left as a significant challenge to overcome.

4.3.8 Overall Summary and Analysis

During the course of the interviews, a number of themes arose, often in response to more than one question. One of the most significant findings that emerged was the

general lack of understanding by both professions regarding how ecologically-based education would differ from traditional education. There did not seem to be a clear grasp of the fundamental difference between EE, a compartmentalized approach and ecologically-based education, an integrated approach to education (Section 2.4.1 and 2.4.2). This became especially clear when respondents spoke about implementation and reverted to stating examples that suggested more traditional modes of education delivery. For example, the language used by respondents suggested that they saw ecologically-based education as an addition to the existing curriculum rather than a restructuring of the delivery format of education and knowledge. There was also a focus by approximately half the respondents on events such as guest speakers and field trips, or having planners come to talk with classes. This was coupled with a misunderstanding that the focus or intent of ecologically-based education was to introduce children to the planning profession.

The difficulty of respondents grasping the fundamental change that an ecologically-based approach would entail may be due to the fact that people's worldviews are so deeply engrained that proposing structural changes to long-standing institutions is difficult to comprehend. As discussed in section 2.4.1, it is similar to the difficulty that has been experienced in understanding systemic sexism or racism. While people agree that equality is a right, it is often difficult to put into practice. This may suggest that while the concept of ecologically-based education appeared to be palatable to the respondents, the actual implementation may be much more difficult as people begin to comprehend the complexity of the change. It may also become much more difficult to sell when it becomes clear that this change calls not only for a structural change in the

institution of education, but in an individual's understanding of their place in the world and how they conduct themselves within that world.

A second significant theme that became apparent is the lack of profile that the profession of planning has with people outside its boundaries. Very few of the educators had a clear sense of the scope of planning, and those who had been exposed to the profession had been involved relatively recently. Despite the lack of awareness of planning, respondents from the field of education appeared open to the possibility of collaborating with planners, and indicated that the planning profession may have something valuable to offer.

In contrast, it appeared that there may be more concern with the willingness of planners to become involved in this endeavor. While some planners agreed with the holistic approach to planning and viewed this as congruent with the mandate of the profession, others thought that a real shift in the current identity of planning would be required first. This difference of opinions may be indicative of Witty's crisis in planning (Witty, 2002). The planning profession seems to have a wide range of views on its role and identity, which can create internal conflict when a portion of the profession begins to look toward new and perhaps radical ways of approaching planning. Since planning has gone through significant changes in the past hundred years, it is often difficult to define its role. Alonso (1965) describes the difficulty planning has had with its identity in the past:

> "The city planning profession, like most adolescents, is self-conscious. It worries about appearances, it strikes poses, it adopts and discards heroes, it revolts against its parents while depending on them. In short, it tries to establish its own identity. It is a profession in rapid change, full of contradictions and given to excesses" (Alonso, 1965, 170).

Similarly, Rodwin (2000, 15) compares the changes in the planning profession to humans' development of an identity, particularly through childhood and adolescence. Based on the responses, some respondents might suggest that the practitioners of planning must agree on its role among themselves before venturing toward collaboration with other professions.

A further complication arose when some educators suggested that there is a tendency to compartmentalize education into subjects and areas, and that turf-oriented professionals may be threatened by an outside profession being involved. However, the educators who participated thought that planning has something to offer and seemed open to the possibility. A couple of respondents from both fields suggested that curriculum change is a very long process and therefore would require a significant commitment.

From a more personal perspective, rather than from a professional perspective, three respondents indicated that for themselves, they felt that they were somewhat aware of environmental issues, and integrated environmental behavior into their daily lives when possible. However, there was a sense that a concern for the environment was not something that drove their choices and were sometimes based more on lifestyle choices, rather than environmental choices, for example, walking to work because it is enjoyable, not to reduce fossil fuel consumption. This may suggest that, before educators and planners become conduits for transferring ecological values to children, their worldview and behavior will first have to change.

The last point of note was that some respondents suggested that educating children was an effective way to reach adults and to change their behavior. This notion is particularly exciting since many of the traditional planning tactics to encourage

sustainable behavior have not been effective. This may be due in part to the fact that once people have reached adulthood, their attitudes have become well established. This line of thinking became a significant theme in the focus group session, the results of which appear in the following section.

4.4 Analysis of the Focus Group

The focus group was held after all of the interviews had been conducted and analyzed. The session included two planners and two educators. Two recorders were also present. I began by reviewing the premise of the research since it had been approximately two months since the initial interviews were conducted. A review of the distinction of EE and ecologically-based education was undertaken and a review of the barriers that were identified through the interviews was provided. (see section 4.3.7).

The following questions guided the group discussion:

1. Are there any new barriers or challenges to add to those presented, or anything to add to the existing ones?
2. How can each of these barriers be addressed within each profession?
3. What are the first steps to developing an ecologically-based curriculum?
4. What are the first steps to implementing an ecologically-based curriculum?
5. How can the initial linkage be established between planners and educators?

The results of the discussion surrounding each question are presented in the following sections. Note that during the focus group process, questions three and four became combined as a result of the direction of the discussion. This is reflected in the

organization of the following sections. Section 4.4.5 provides an overall summary of the focus group session.

4.4.1 Barriers

The first topic in the focus group was intended to ensure that the most significant barriers had been identified. Following a review of the barriers that were prominent in the interviews, an opportunity was provided to discuss each barrier more fully and also to add any that may have been missed through the interview process. Through the interviews, the barriers that were mentioned repeatedly were: time and the lack of time available to develop and implement changes, lack of awareness of planners or the related profession, and professional resistance. It should be noted that profession resistance was considered more systemic and institutional than individual. While individually there was support for the implementation of new educational strategies, the implementation within the existing system appeared to be a concern. All participants agreed with the existing barriers that were presented and added some others. It was noted by one planner that curriculum seems like a 'big ship to steer'. The educators wholeheartedly agreed to this comment. However, one of the educators also noted that, although curriculum is very immense and cumbersome to change, it is also flexible, which allows a variety of concepts and topics to be presented within the confines of curriculum without much difficulty.

One educator noted that the ecologically-based approach to education seemed to be more of a philosophy or a mindset rather than specific activities or courses. As a result, it was felt that the lack of this kind of education for teachers while they are at

university is a significant barrier. This participant noted that in order to develop this mindset in children, the teachers would first have to understand it themselves so that they could incorporate it into their teaching. This point became part of a significant theme later in the focus group and ultimately shifted the direction of this research from curriculum changes to teacher education and adapting programs to work within the existing curriculum.

4.4.2 Addressing the barriers

The second topic provided an opportunity to discuss ways to address each of the barriers or challenges that were presented in the previous question. With respect to time, it was noted that keeping the idea small and focused is a way to manage the time it would take to implement. For example, focusing in on one or two specific grades was suggested as a way to introduce the concept of ecologically-based education since each child would pass through that grade at some point. However, this approach seems to defeat the goal of developing a mindset and a value system since it would result in a stand-alone component of education at a specific point in time. Further, it may actually be more confusing to have one educational approach during a particular year and then return to a traditional approach for each year thereafter.

Introducing the concept of ecologically-based education to teachers at a Special Area Group (SAG) Conference was suggested as a way to reach a large number of teachers at one time. This suggestion was also raised during the interviews and seems to be an approach that most educators feel would be an appropriate way to introduce planners, and the concept of ecologically-based education, to the education profession.

One planner raised a concern regarding the ratio of planners to educators in Manitoba: there are approximately 15,000 teachers and significantly fewer planners (in the low hundreds). Therefore, having the opportunity to reach such a large number of educators at one time is a necessity. In terms of having planners reach out to individual schools, this imbalanced ratio would present a problem.

One planner noted that education should not be considered isolated in the context of school; rather learning should be occurring throughout the day, through games and activities, and day-to-day experiences. This ties into a comment that was made in the interviews that suggested that children should be exposed to alternative play environments in order to foster creativity and learning, rather than allowing the continual 'mind-numbing' play that children are exposed to today.

The lack of awareness among educators of planners and the scope of planning was noted as detrimental for the planning profession. For example, the style of outreach and community consultation that planners employ was described as 'boring' for adults, never mind being engaging for children. It was also noted that planners have not consulted enough with children as users of the city environment. One educator noted that there is also a lack of connection between the planning of the community and the planning of the school's place in the community. This was also noted in the interviews as an integral component of developing aware and active citizens. In response to the above, the planners agreed that their profession does need to do a better job at promoting the profession and educating people on the wide variety of activities planners undertake on a day-to-day basis.

The third challenge that was discussed focused on professional resistance to implementing a new style of education, and resistance to working with other professions. Again, the need for a change in teachers' education arose. One educator noted that if the teacher did not have a level of comfort with the material it would not be incorporated into classroom activities. Therefore, presenting this concept to future teachers at the university level would minimize resistance and ensure application as they prepare classroom activities.

The planners noted that as sustainable development has become more common, resistance has reduced. This is particularly true as planning progresses as a profession, and both planners noted that younger planners would be quite open to having a role in education as part of their professional responsibility. This change in the scope of planning was also noted in the interviews when a senior planner suggested that the idea of having planners involved in education seemed like something that planners coming out of school today would embrace and accept as part of their role and responsibility.

4.4.3 What are the first steps to developing an ecologically-based curriculum? What are the first steps to implementing an ecologically-based curriculum?

The original focus of these two questions was designed firstly to draw out how to begin developing a new curriculum that would be based on ecological values and secondly, how the implementation would occur. However, as a result of clarifying the difference between EE and ecologically-based education, a very different approach arose which is reported here. The subtlety between these two questions was pointed out prior to addressing the first question, which led to a need for further clarification on the

difference between the two forms of education. The results of this clarification proved extremely important since throughout the interviews and the focus group, there still seemed to be a tendency for participants to focus on fitting this concept into curriculum and into subject areas. While it had been the approach of this research to restructure the curriculum, it has become apparent through this process that more progress can be made by working within the existing curriculum structure and finding ways to link subject areas together. Figures 4 and 5 graphically display the different approaches to education:

Figure 4: Environmental Education (EE)

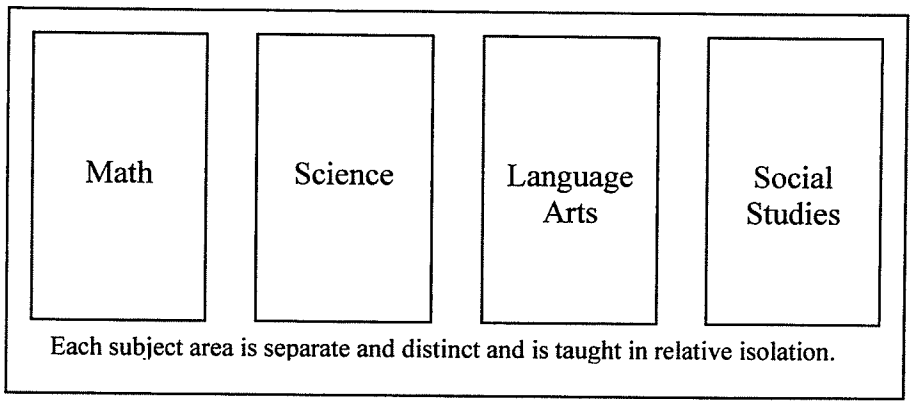
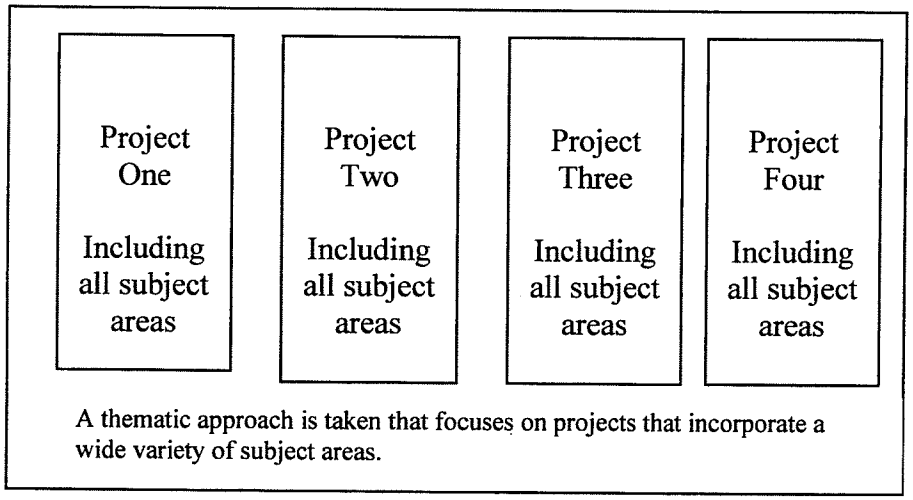


Figure 5: Ecologically-Based Education



This graphic representation led to a significant realization for the participants, particularly the educators. The educators pointed out that the ecologically-based approach reflected the K-Grade 3 approach to education, which focuses on thematic units. This is part of the structure that Early Years teachers take and is facilitated by the fact that one teacher is responsible for delivering the entire curriculum for that year. In contrast, the educators noted that the EE model with its subject-based rigidity is akin to the high school model where students attend subject-based classes with teachers who specialize in that particular area.

The educators considered the ecologically-based approach to be an easy sell at the Early Years level because that is already the approach. Although the Early Years curriculum guides are still presented in subject-based modules, the units are linked across a theme. For example, if dinosaurs are the theme, this will be covered through a variety of subjects with a differing focus depending on the subject.

The educators suggested that the ecologically-based approach would be a much harder sell at the high school level from the perspective of the teachers and the parents. From the teachers' point of view, it was suggested that high school teachers focus very specifically on their area of expertise and tend not to stray from that area. Further, it was suggested that there is a mindset that the high school teacher's job is to teach a specific subject, not to educate young adults. Further complicating the matter, parents often want to know what percentage their child is getting in a certain subject, not in how they are developing as an engaged citizen who is capable of thinking. Since the ecologically-based model focuses on several less tangible goals such as respect for diversity, and becoming an engaged citizen (in addition to developing respect for one's place within the

ecosystem), it was noted that some parents may not see the value in such an approach since it cannot be quantified or graded in the same way that fact-based material can.

One suggestion that arose in terms of how to circumvent the subject-based issue in high school is to develop an ecologically-based class. Such a class would have an interdisciplinary structure and focus on a thematic approach to projects. The educators queried the level of interdisciplinarity in planning school, and it was noted by the planners that it is a very interdisciplinary field, and this is reflected in the educational approach in planning school. The educators noted that this feature of planning education provides an opportunity for planners to contribute to developing courses such as this since they are familiar with the approach.

It was also noted that in the work world, most careers are interdisciplinary, so having an interdisciplinary course introduced at the high school level is imperative to develop that kind of big-picture thinking. This suggestion seems crucial to developing well-rounded young adults and begs the question regarding why this approach would not be taken throughout high school. It seems counter-productive to move students to a compartmentalized, subject-based approach as they mature, when in reality, the need for understanding issues from an interdisciplinary perspective is becoming more applicable and crucial to their lives.

In terms of first steps to developing an ecological approach to education, one educator suggested that it must be presented at the political level, to the Assistant Deputy Minister (ADM) of Education, and the key players at that level must be convinced that this needs to happen, not as an add-on, but as a philosophical approach to managing our world. This educator went on to suggest that this may be a difficult task since there is

such a huge portion of the population that wants to know how well our kids spell and do math. It has become part of the system to have comprehensive exams to measure, in a quantitative fashion where a child is in relation to others, "and if it can't be measured, nobody wants it." This may be one of the most significant challenges with the ecologically-based approach – it is holistic and integrated and does not lend itself well to people who understand a compartmentalized and black-and-white world.

The second educator picked up on this point and suggested that this is why a philosophy, not a curriculum, needs to be developed. It was suggested that developing an ecologically-based mindset in teachers and in education is needed because curriculum comes with too much baggage and is too structured. Thus, it was suggested that the first step would be to develop an ecological mindset in education through the teachers. Thus the teachers would be able to understand the concept and apply it to the existing curriculum. One planner posed the following example: in math, students could be asked to look at the world population and the amount of resources that North Americans use and calculate the impact that has on the world. This becomes a math problem, a social problem, and an ecological problem that requires a solution. This mindset requires a change in the teachers' approach to education so the first step must be to change the education process of teachers so they can teach with this in mind and work with the existing curriculum to consider the overriding ecological issues that can be incorporated. "If the teachers do not understand this, they will not apply it in their teaching."

4.4.4 How can an initial linkage be established between planners and educators?

In terms of taking the first steps toward establishing a linkage between the two professions, there was a strong sense that MPPI, as the local representative of the planning profession, should be involved in raising awareness first within planning itself, and secondly, with educators. Again, the focus remained on increasing awareness and understanding within education through presentations at SAGs in order to plant the initial seeds. It was suggested that initially, the presentations would simply be awareness-raising, with more specific direction on implementation coming later.

Following the previous point, it was noted that from an implementation perspective, resource materials must be made available to teachers and they must be simple and easy to use. A strong cautionary note from the educators was made since materials are often developed that are so comprehensive that they become unwieldy to manage. This concern was also mentioned by a senior administrator in the interviews and provides very clear direction on how materials should be delivered. For example, the CIP publication *A Kids Guide to Building Great Communities* was not known by any of the educators in the interviews and thus becomes an ineffective resource since it has not been promoted and has not been discussed with educators in terms of its application. This discussion led to the final key suggestion of the group. It was noted that there are already several programs happening at various schools and in the community. For example, places such as Fort Whyte Centre have become actively involved in education and delivering environmental programs to school age children, as well as individual schools developing their own programs. All focus group participants agreed that identifying the

existing programs and building on them is an effective way to develop this idea further. One educator noted, "we must start with what we have and not re-invent the wheel. There are examples of this happening so that's where to start". Since curriculum is so immense, the educators recommended that the most direct approach would be to focus on promoting the philosophy or mind-set of ecologically-based education, and to have educators introduce it through the existing curriculum.

4.4.5 Summary

The focus group was informative and clarifying both to myself and to those involved since it finally clarified the difference between ecologically-based education and EE. This break-though in understanding was important since it appeared in the interviews that the alternative structure of ecologically-based education was not well understood by either profession. The focus group discussion also served to re-focus the direction of this research from changing the structure of the curriculum to taking a more local approach. For example, this could be done on a class by class basis or in specific schools rather than at the provincial level. Although the institutions that maintain a compartmentalized approach, not only in education but also in government and business, should begin to shift to a different system, it is evident that local approaches may prove more manageable and more effective in the short-term.

The need to change the system but also implement solutions now led to the conclusion that a two-pronged approach may be the most effective way to begin changing the systems that people live within. First, a local approach as suggested in the focus group, is needed. This would provide for opportunities to implement ecologically-based

educational activities within the existing curriculum structure. Such a grassroots approach often requires a great deal of commitment by interested individuals to volunteer their time to launch programs, however, there is generally less bureaucratic red-tape in such an approach. Simultaneously, discussions should be happening at a larger-scale and at a more political level to address the need to approach curriculum structure in a different way. This is a time-consuming process, however, it would be done at an administrative level rather than relying on teachers and volunteers. This approach would provide a cohesive framework for all teachers to follow, ensuring a relatively even application to all students, rather than relying on individual teachers and interested professionals to provide discrete opportunities at some schools.

Finally, the educational approach of students of education in university clearly must be addressed. This approach had not been considered in the initial stages of this research; however, it is quite obviously an integral part of implementing an overall plan to move toward an ecologically-based education system.

5.0 Summary and Recommendations

At the outset of this research, I declared several assumptions regarding *environmental education.* These assumptions included the acknowledgment that planners have a role to play in promoting and implementing environmental understanding, and that education is an effective method for establishing values and attitudes that are respectful of the environment. The literature review supported and informed these assumptions with research from the fields of planning, psychology, and education.

The objectives driving the empirical research were to determine the role planners may play in implementing an ecologically-based systems of education, to identify the barriers to implementing an ecologically-based system of educations, and third, to identify the steps that would be required to begin the process of planners and educators developing an ecologically-based curriculum (section 1.2).

Through the interviews and subsequent focus group analysis, I determined that there was support for planners to play a role in education, and that the field of planning does have valuable knowledge and skills, which would complement the skills of teachers and other professionals in developing an ecologically-based education system. In particular, the education professionals were open to the possibility of having a group of professionals from another field involved in the education system.

The second objective of identifying barriers to implementing ecologically-based education did not become a focus of the research. Although most participants did acknowledge some barriers or challenges, fortunately, most were quick to disregard these challenges or to suggest ways to address them.

The discussion around the third objective moved the focus of the research away from the academic concept of ecologically-based education toward concrete and tangible action: developing a curriculum that would reflect the values and objectives of ecologically-based education. This component of the empirical research became the most significant and also shifted the direction of the development of 'first steps' toward ecologically-based education. Initially, the research objective was to identify ways to restructure the current subject-based curriculum to reflect an interdisciplinary, action-based model of education. However, as reported in the research findings in section 4.4.3, this approach was suggested to be extremely difficult.

It was also suggested that the goals and approach of ecologically-based education would be achievable within the current curriculum structure. The drawback to this approach is that it continues to maintain a reliance on individual teachers and school divisions to assume responsibility for learning a new method of education, and undertaking it within the classroom. This may result in a discontinuity between grades and schools. Despite these drawbacks, the educators felt that a more grassroots approach would be effective in the initial stages and that curriculum change would follow. Based on the results of these research findings, eleven suggestions for action are recommended and have been categorized into four main areas: Promotion, Activities, Resource Materials, and Institutional Change:

5.1 Promotion

The first step that is required is a general promotion of the planning profession, not only to educators but also to the general public. The scope of planning has changed

drastically in the past twenty years; however, many citizens still maintain a traditional understanding of the master planner or land-use planner. Further to this, the role of the planner and the political influence on decision-making is necessary to ensure an accurate representation of the planner within the system. Within the Manitoba context, this responsibility belongs to the Manitoba Professional Planners Institute (MPPI). MPPI has taken steps recently to promote World Town Planning Day, which has raised some awareness; however, the profile of this event must be increased. It is also recommended that events throughout the year be held for the general public. MPPI has also recently begun this effort with evening lecture events that are open to the public and are of potential general interest to citizens. In addition to MPPI, the University of Manitoba Department of City Planning can act as a partner in such promotions, both within the City of Winnipeg and in non-urban and northern communities.

Second, in addition to promoting planning to the general public, I strongly recommend exposing educators to the planning profession and the profession's range of offerings at SAG conferences. This will serve to build credibility and interest in the planning profession and will establish a relationship between planners and educators. This approach also provides an opportunity to access the majority of educators in Manitoba at one event.

Third, once a relationship has been established between the two professions, collaborative efforts to present the concept of ecologically-based education at SAG conferences will provide a way to introduce educators to an alternative approach to education. Undertaking an interactive workshop with educators to present the

ecologically-based education concept, and to work though some exercises from the CIP manual would be an engaging and effective way to stimulate interest in this idea.

5.2 Activities

Focusing on existing program models will assist in the implementation of new programs without having to re-invent the wheel. There are currently several examples of teachers and school divisions pursuing models of ecologically-based education, or some variation of it. Many of these programs have been developed solely by interested teachers who have taken the time to develop a course or an entire program that reflects interdisciplinary, action-based education. While there are many examples of such programs in existence, other educators may not be aware of them.

Developing and tracking such programs as a resource for other teachers to use as a model is necessary. Since the majority of these programs are developed on an ad-hoc basis by personally motivated educators, providing such a resource would eliminate the problem of re-inventing the wheel. It would also allow for a continual learning process by presenting information on what approaches and activities have worked and which have not.

Second, although small, one-off events were not the original intent of this research, it has become clear that they serve a purpose in exposing children and youth to alternative ways of doing. While single-day events do not provide the consistent reinforcement that an entire course or program would, it still provides an opportunity to pique student and teacher interest in new approaches. Taking opportunities to visit

schools or individual classrooms through existing relationships with educators can facilitate this ongoing effort.

Third, linking planners to schools for education says is an effective way to tap into the limited number of planners in Manitoba and make the best use of the human resources. There are far fewer planners in Manitoba than there are teachers and schools. However, developing linkages between interested planners through MPPI, and individual schools, is recommended. Most people, including planners, have at least one connection to a local school through friends or family. This connection can be built upon by having MPPI, on behalf of planners, approach individual schools and school divisions to offer the skills and opportunities that planners can provide. This option also allows planners in areas outside Winnipeg to become involved.

5.3 Resource Materials

The first recommendation that I am making regarding resource materials is to ensure that they are accessible and easy-to-use. Once an idea is promoted at an event such as the SAG conference, some teachers may be interested in implementing the concept but not have time to develop activities and ensure that they fit into the curriculum. Developing a resource manual that links existing curricula to ecologically-based activities is recommended. This should be done with educators, planners, and various other professions to ensure a holistic, inter-disciplinary approach is maintained. This should be undertaken with a workbook that can be used for teachers to tailor activities to their classroom. Further, providing an opportunity to familiarize teachers with the resource tools and work through some of the exercises is imperative, to ensure that the resource

materials become incorporated into teaching activities and not get disregarded because there is no understanding of how to use them.

Second, promotion of the CIP manual *A Kids Guide to Building Great Communities* must be undertaken. The manual provides a wide variety of activities for students at a variety of grade levels. It also indicates how each activity can be incorporated into existing curriculum requirements, thus assisting the teacher with the background research. The CIP manual is an existing resource that has had a great deal of promotion to the planning profession at conferences, in Plan Canada, and on the CIP website. However, its promotion to education professionals is lacking. I recommend that this resource be marketed and distributed to school divisions, individual schools, and teachers associations. This must be done in conjunction with an offer to collaborate with teachers to implement some of the activities in the book. This effort should be coordinated through MPPI or other provincial affiliates.

5.4 Institutional Change

In order to start implementing this change in peoples' worldview with teachers, I strongly recommended that the concept and application of ecologically-based education be presented in university to students studying to become teachers. Exposing future teachers to an ecologically-based approach to education may develop a view or approach to education in the formative stages of a teacher's career. While there are numerous practicing educators that must be exposed to the concept, having the opportunity to develop this mindset during the initial stage of a teacher's career is imperative. At the University of Manitoba, a linkage can readily be made between the Department of City

Planning and the Faculty of Education. This approach has the additional benefit of reaching future teachers who are not from Manitoba.

Second, convincing the Education Minister of the importance of ecologically-based education is necessary to begin making steps toward future curriculum change. This approach requires a much higher level of political savvy than the others and would have to be handled carefully. Taking advantage of the connections and relationships that exist between provincial planners and provincial politicians to move this agenda forward is necessary. However, this is also a sensitive area, which would have to be handled professionally.

Third, having a planner sit on a curriculum development committee will begin to add a new dimension to the existing curriculum structure. Curriculum development committees for various subjects meet to discuss the direction and focus when developing new curricula. Having a planner become one of the members of such a committee would bring a different dimension and focus to the discussion. There are currently outside professionals who sit on these committees, therefore, using existing relationships and connections to establish a presence in curriculum must be pursued.

Figure Six: Summary of Action Items

Promotion • Promote the planning profession • Promote planning to educators • Promote ecologically-based education to educators	**Activities** • Create a database of existing ecologically-based programs • Continue one-time events • Link planners to specific schools
Resource Materials • Develop easy-to-use resource materials and provide support to educators in implementation • Assist in marketing and implementing the CIP manual	**Institutional Change** • Introduce ecologically-based education to students of education • Lobby the Minister of Education • Have a planner sit on a curriculum development committee

The following section offers some final thoughts on this research.

5.5 Closing Remarks

The preceding section has introduced several highly achievable recommendations that can begin to move society on the path to implementing an education system that instills the values necessary to live in harmony with the rest of the world, not only in an environmental sense, but in a social and economic sense as well. These goals go hand-in-hand. While the initial direction for research was more ambitious in looking toward restructuring the Manitoba curriculum, the research has led to considering a grassroots approach at the individual and local school level. At the outset of the research, it seemed necessary to fix the system in order to address a systemic problem. However, after talking to several planners, teachers, and others about this research, it has become apparent that encouraging systemic change by nurturing changes at the grassroots level will be more effective, not to mention much more manageable to implement.

Therefore, unlike many research documents that are produced, I will not be identifying further research that needs to be undertaken. What is needed now is action. This is not to suggest that research and reflection are not necessary, but action is necessary to begin moving forward. It is hoped that this research will stimulate action in the area of ecologically-based education, which will allow for an iterative process of action and reflection that is necessary to move forward from the current way of living. The action items identified can be initiated at any time by planners and educators willing to contribute their time to change a system that has incubated a way of living that is destructive. As planners strive toward collective social change, and educators strive for individual change in students, the connection between these two professions can intersect in a new way to both raise and broaden the consciousness of society. This will be a

collaborative effort, but someone must take the initiative to open the door to a new relationship. Therefore, in conclusion, I would also like to suggest an answer to the often asked question: Why planners? My approach throughout this research has been: Why not? As a profession that tends to strive toward improving quality of life, it is a natural fit that planners should be agents for systemic change that will improve the quality of life for all, and will ensure a global future that is more respectful and sustainable. If not planners, then who?

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APPENDIX A

CIP Statement of Values

CIP Statement of Values

1. To respect and integrate the needs of future generations. CIP members recognize that their work has cumulative and long-term implications. When addressing short-term needs, CIP members acknowledge the future needs of people, other species and their environments, and avoid committing resources that are irretrievable or irreplaceable.

2. To overcome or compensate for jurisdictional limitations. CIP members understand that their work can affect many jurisdictions and interests. Therefore they practice in a holistic manner, recognizing the need to overcome the limitations of administrative boundaries.

3. To value the natural and cultural environment. CIP members believe that both natural and cultural environments must be valued. They assume roles as stewards of these environments, balancing preservation with sustainable development.

4. To recognize and react positively to uncertainty. CIP members believe that the long-term future is unpredictable and develop adaptable and flexible responses to deal positively with this uncertainty.

5. To respect diversity. CIP members respect and protect diversity in values, cultures, economies, ecosystems, built environments and distinct places.

6. To balance the needs of communities and individuals. CIP members seek to balance the interests of communities with the interests of individuals, and recognize that communities include both geographic communities and communities of interest.

7. To foster public participation. CIP members believe in meaningful public participation by all individuals and groups and seek to articulate the needs of those whose interests have not been represented.

8. To articulate and communicate values. CIP members believe in applying these values explicitly in their work and communicating their importance to clients, employers, colleagues and the public.

Reference: www.cip-icu.ca

APPENDIX B

Orr's Foundations of Education

Orr's Foundations of Education

1. All education is environmental education.

2. Environmental issues are complex and cannot be understood through a single discipline or department.

3. For inhabitants, education occurs in part as a dialogue with a place and has the characteristics of a good conversation.

4. The way education occurs is as important as its content.

5. Experience in the natural world is both an essential part of understanding the environment, and conducive to good thinking.

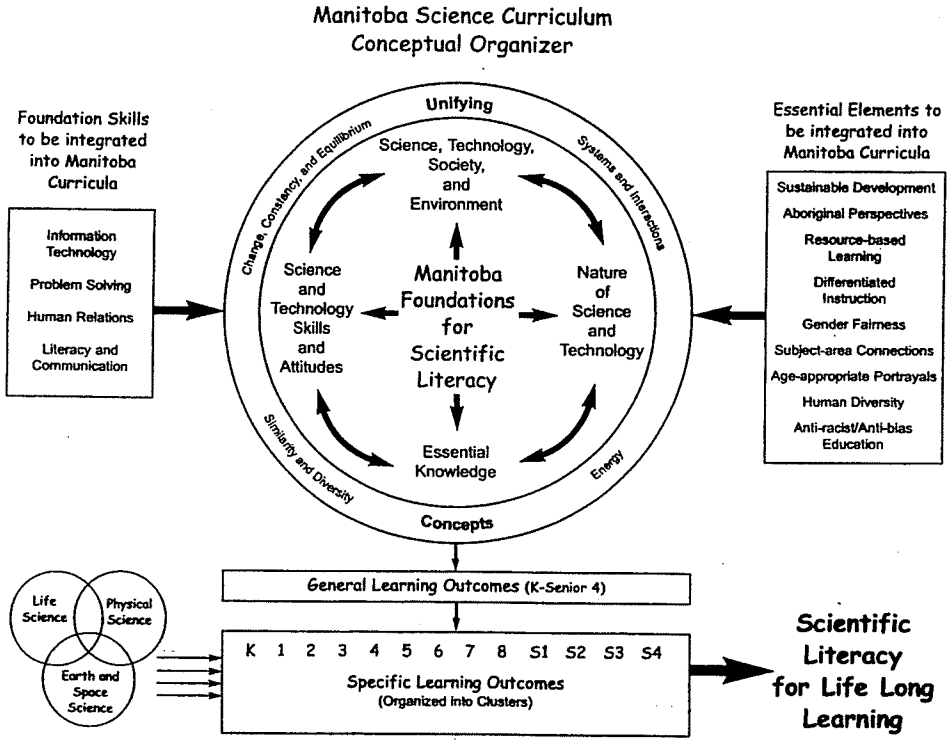
6. Education relevant to the challenge of building a sustainable society will enhance the learner's competence with natural systems.

Reference: Orr, 1994.

APPENDIX C

Manitoba Science Curriculum Conceptual Organizer

Manitoba Science Curriculum Conceptual Organizer



APPENDIX D

General Learning Outcomes
K-S4 Science Curriculum

General Learning Outcomes – K to S4 Science Curriculum

Nature of Science and Technology
A1. recognize both the power and limitations of science as a way of answering questions about the world and explaining natural phenomenon
A2. recognize that scientific knowledge is based on evidence, models and explanations, and evolves as new evidence appears and new conceptualizations develop
A3. distinguish critically between science and technology in terms of their respective contexts, goals, methods, products, and values
A4. identify and appreciate contributions made by women and men from many societies and cultural backgrounds towards increasing our understanding of the world and in bringing about technological innovations
A5. recognize that science and technology interact with and advance one another

Science, Technology, Society, and the Environment
B1. describe scientific and technological developments, past and present, and appreciate their impact on individuals, societies, and the environment, both globally and locally
B2. recognize that scientific and technological endeavors have been and continue to be influenced by human needs and the societal context of the time
B3. identify the factors that affect health and explain the relationships among personal habits, lifestyle choices, and human health, both individual and social
B4. demonstrate a knowledge of, and personal consideration for, a range of possible science-and-technology-related interests, hobbies, and careers
B5. identify and demonstrate actions that promote a sustainable environment, society, and economy, both locally and globally

Scientific and Technological Skills and Attitudes
C1. recognize safety symbols and practices related to scientific and technological activities and to their daily lives, and apply this knowledge in appropriate situations
C2. demonstrate appropriate scientific inquiry skills when seeking answers to questions
C3. demonstrate appropriate problem solving skills while seeking solutions to technological challenges
C4. demonstrate appropriate critical thinking and decision-making skills when choosing a course of action based on scientific and technological information
C5. demonstrate curiosity, skepticism, creativity, open-mindedness, accuracy, precision, honesty, and persistence, and appreciate their importance as scientific and technological habits of mind
C6. employ effective communications skills and utilize information technology to gather and share scientific and technological ideas and data
C7. work cooperatively and value the ideas and contributions of others while carrying out scientific and technological activities
C8. evaluate, from a scientific perspective, information and ideas encountered during investigations and in daily life

Essential Science Knowledge
D1. understand essential life structures and processes pertaining to a wide variety of organisms, including humans

D2. understand various biotic and abiotic components of ecosystems, as well as their interaction and interdependence within ecosystems and within the biosphere as a whole
D3. understand the properties and structures of matter as well as various common manifestations and applications of the actions and interactions of matter
D4. understand how stability, motion, forces, and energy transfers and transformations play a role in a wide range of natural and constructed contexts
D5. understand the composition of the earth's atmosphere, hydrosphere, and lithosphere, as well as the processes involved within and among them
D6. understand the composition of the universe, the interactions within it, and the impacts of humankind's continued attempts to understand and explore it

Unifying Concepts
E1. describe and appreciate the similarity and diversity of forms, functions, and patterns within the natural and constructed world
E2. describe and appreciate how the natural and constructed world is made up of systems and how interactions take place within and among these systems
E3. recognize that characteristics of materials and systems can remain constant or change over time, and describe the conditions and processes involved
E4. recognize that energy, whether transmitted or transformed, is the driving force of both movement and change, and is inherent within materials and in interactions among them

APPENDIX E

Specific Learning Outcomes
K- Grade 4 Science Curriculum

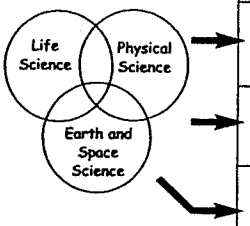
Specific Learning Outcomes – K to Grade 4 Science Curriculum

Organization into Clusters

This *Science Framework* presents specific learning outcomes (SLOs) for Kindergarten to Grade 4 science. Within each grade, SLOs are arranged into groupings, referred to as clusters. Clusters 1 to 4 are thematic and generally relate to the three science disciplines discussed earlier in the *Science Framework*. Cluster O includes Overall Skills and Attitudes. (See Figure 5: Cluster Titles.)

Whereas the SLOs themselves are mandatory, the order in which they are addressed is not. Teachers are encouraged to plan their instruction based on student needs, individual contexts, learning resources, and other pertinent considerations. This may involve organizing the SLOs from a particular grade into new groupings and a new order. *Kindergarten to Grade 4 Science: A Foundation for Implementation* provides planning tools, as well as suggestions for instruction and assessment.

The Overall Skills and Attitudes SLOs for each grade are also presented as part of a Kindergarten to Grade 4 chart (separate attachment). The purpose of this chart is to provide support related to the tracking of the development of skills and attitudes across several grades



Grades / Clusters	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Cluster 0	Overall Skills and Attitudes (to be integrated into Clusters 1 to 4)				
Cluster 1	Trees	Characteristics and Needs of Living Things	Growth and Changes in Animals	Growth and Changes in Plants	Habitats and Communities
Cluster 2	Colours	The Senses	Properties of Solids, Liquids, and Gases	Materials and Structures	Light
Cluster 3	Paper	Characteristics of Objects and Materials	Position and Motion	Forces that Attract or Repel	Sound
Cluster 4		Daily and Seasonal Changes	Air and Water in the Environment	Soils in the Environment	Rocks, Minerals, and Erosion

APPENDIX F

Background Information for Research Participants

Background Information

The following pages have been taken from my research proposal. They provide an overview of my interest in this topic, the distinctions I have uncovered with respect to the scope of environmental education, and a suggestion on the role that planners have in education. The following is intended as information only and is not provided in order to suggest a particular position on this topic. As discussed, I would ask that you please review the following material prior to our scheduled interview.

Why Education for Sustainability?

My motivation to pursue this topic as the basis for thesis research has resulted from my personal belief that there are pressing environmental issues that must be addressed in order to ensure a future for all species. Unfortunately, there is little agreement as to the appropriate course of action in order to remedy the environmental situation. There are people who subscribe to the 'technology will save us' school of thought; those who believe that governments should take a stronger stance on environmental issues by enacting legislation and policy, and still others who believe that the global environmental crisis has been overstated and does not require immediate attention. As a student of city planning, reflection on this issue has led me to believe that planners have a role to play in promoting environmentally responsible behavior.

Through my research, I have considered a variety of responses that have been put forward as a solution to this crisis and have found that these responses have often been ineffective in moving society toward a more sustainable future. For example, the

development of environmental policies has not led to action, and regulations have either been loosely enforced or ignored altogether. More specifically, the lack of direction by government and individuals toward concrete ways to alter environmentally damaging patterns has prompted my examination of the issue more closely. From an individual perspective, changes in environmental behavior have been slow to evolve and inconsistent at best. In order to address the inconsistency and lack of sustainable behavior, it is my assertion that ecologically-based education as the foundation of the public school curriculum will serve as a catalyst to stimulate societal change, and thus a more sustainable world.

While the field of planning has traditionally focused on securing a preferred future for society, it has generally been done through implementing policies and regulations regarding land use, and developing physical models of land use such as Traditional Neighbourhood Design (TND). However, these solutions have not been particularly effective in creating real change in people's daily lives and their attitude toward the environment. As an alternative to regulations, policies, and physical design models, I suggest that planners should become involved in developing and implementing an innovative public school curriculum in collaboration with education professionals. Such a curriculum will incorporate the concepts of place, environment, and community involvement within a holistic and integrated education model that transcends the boundaries of traditional compartmentalized, subject-based learning.

The purpose of this research is to research the field of environmental education and evaluate the opportunities and barriers that exist to implementing an ecological approach to education. In particular, identifying opportunities for developing linkages between planners and educators to implement ecologically-based education will be identified.

Environmental Education or Ecologically-Based Education: a significant distinction

At first glance, the concept of environmental education may appear relatively straightforward: teach children more about the environment so they will become better environmental citizens. However, upon closer inspection, these two terms have very different foundations.

Environmental Education

In the most general sense, environmental education, dubbed EE, "...does not become another add-on to the curriculum, another subject that needs to be fit into an already overburdened schedule. Rather, it takes only a little extra time to use environmental issues and concerns to teach skills and concepts within the normal scope and sequence of subject areas" (Simmons, 1989, 15). EE does not mean that the existing curriculum will simply include a new course on the environment within the current compartmentalized, subject-based structure. The goal of EE is to infuse environmental values and concepts into the existing structure by including it in all subject areas in order to increase the level of interdisciplinary knowledge of students. The Manitoba curriculum follows this model

by including Sustainable Development as one of the *Essential Elements* that is integrated into all curricula.

However, education reform advocates and environmental champions alike insist that EE does not go far enough nor does it challenge the philosophical underpinnings of the current education system. Furthermore, psychology literature does not support the theory that knowledge and education alone can change behavior. Authors from that field cite many examples such as education campaigns regarding smoking, drug use, and vehicle safety among others. Ultimately, *knowing* there is a problem does not lead to action to solve it, even if the solution is known. Therefore, education must go further in order to ensure that knowledge transfers to action.

Ecologically-Based Education

In contrast to EE, ecologically-based education focuses on a style of education that is interdisciplinary and action-based. The interdisciplinary model not only includes ecological concepts into a variety of subjects but would also break down the compartmentalized subject-based model to provide a more integrated model for learning. This is coupled with the action-based component to ensure that projects are tangible and applicable to students. The ecologically-based model also focuses on instilling a sense that humans are a part of an ecological system whereas the environmental viewpoint suggests that humans and nature are separate and distinct. Birkeland (2002, 12) sets forth "Education for Sustainability Principles" which provides a framework for ecologically-based education. These include:

- 'action learning' over environmental activities;
- participatory over top-down processes;
- multi-sector and transdisciplinary over specialist research only;
- holistic over reductionist frameworks;
- lifelong, inclusive and continuous learning over formal education structures only;
- critical thinking over knowledge production only;
- value explicitness over claims of value neutrality;
- multi-dimensional over linear analyses;
- quality of life outcomes over information outputs;
- empowerment over awareness raising;
- focusing on causal relationships over symptoms;
- systems change over monitoring and mitigating impacts;
- institutionalizing ecodesign solutions over end-of-pipe regulations;
- developing partnerships over balancing competing interests;
- stewardship over control of resources; and
- respect for indigenous design knowledge.

Hart (1997) is also a notable source on the topic of involving children in learning about their communities and local ecology as a means to achieving increased sustainability. Hart advocates that children are central to the development of their communities and as such, have a role to play in ensuring a more sustainable world. His work details the role of children in planning for their community rather than studying topics such as civics and the environment from an arm's length, theoretical basis. This hands-on approach allows children to exercise their rights as citizens and increases their capacity for learning by focusing on an action-based model of learning. This follows Chawla's (1999) study that concludes that out-of-classroom experiences are necessary to the development of people's environmental behaviour. Hart also emphasizes the need for children to understand small-scale, local applications of environmental issues in order to increase their capacity to understand global issues as they age.

These postmodern education authors provide a framework that planners can work within to link children to their communities, and to raise their awareness of environmental issues. This is expected to result in a more *ecologically literate* public (Orr, 1992).

The Role of the Planner: Tying it all Together

There is a close relationship between educating children about their local community and ensuring future sustainability. In the education system, planners can certainly develop linkages with teaching professionals to develop meaningful exercises to teach children about community, ecology, and participation. These positive childhood learning experiences will ensure a more educated and responsible community in the future. Since planners work with the public to develop successful communities that are strong socially, economically and environmentally, it follows that they also have a responsibility to educate children, the future generation of residents and decision makers.

APPENDIX G

Individual Interview Instrument

Individual Interview Instrument

Please describe your current employment position.

How long have you been in this profession?

Prior to receiving the package of information I sent you, were you aware of the concept of ecologically-based education?

Scheduled Probe: How did you hear about it?

After reading about it, how do you see environmental education differing from ecologically-based education?

Would you consider yourself an environmentally conscious person? In what ways?

Scheduled Probe: What have been some of the formative factors in your interest and sense of responsibility toward the environment?

(Educators Only) What is you perception of the planning profession (what do planners do)?

In what ways do you see planners and educators collaborating to establish ecologically-based education?

What do you see as the first steps toward implementing ecologically-based education?

What do you see as the main barriers to implementing ecologically-based education as a standard?