Curricular Critique of an Environmental Education Policy: Implications for Practice

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Abstract

This paper provides a curricular critique of an environmental education policy framework called ***Acting Today, Shaping Tomorrow*** (Ontario Ministry of Education, 2009). *Answers to the following two curricular questions: "What should be taught?" and "How it should be taught?" frame the critique. Scrutiny of the latter of the two questions through an examination of the conventional argument for integrated curriculum models and their relevance to K-12 environmental education comprises the first part of the critique. The second part of the critique examines utilization of a typology of integrated curriculum models to analyze an environmental education policy framework within the jurisdiction of Ontario, Canada. In conclusion, Ontario's environmental education policy framework tends toward an integrated curriculum model referred to as 'selective infusion' illustrating a disconnect between curriculum theorists and designers. The implications for integrated curricular practice are identified, limitations of the critique are highlighted, and recommendations for improving the policy framework from a pragmatic curricular perspective are summarized.*

Key Words: environmental education, integrated curriculum, pragmatic curriculum critique, education policy.

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Introduction

In the province of Ontario, the protection of its environment and the conservation of its natural resources strengthened during the post-war era between 1945 and 1995. This changed dramatically during the spring of 1995 when Mike Harris, leader of the progressive conservative party formed a majority government in Ontario. The four years following 1995 "witnessed a dismantling of environmental laws and institutions without precedent in the province's history" (Winfield & Jenish, 1999, p. 212). Statutes, budgets, and resources having to do with environmental protection or natural resources management were slashed. The extensive restructuring of roles and responsibilities between the province, municipalities, and the private sector, ensured environmental marginalization. Education was not exempt from these radical changes to government policy. One of the most significant yet least noticed environmental initiatives of the government were changes to the province's elementary and secondary school curricula. With the release of a new elementary curriculum in 1998 the Ontario Society for Environmental Education (May, 1998) determined that its environmental content averaged less than five percent of learning outcomes for all grades except Grade 7. Shortly afterward, a new secondary curriculum was adopted in the spring of 1999. A long-standing and popular environmental science course was eliminated. According to Winfield & Jenish (1999) at the time:

> These changes to the elementary and secondary school curricula may represent one of the most important changes in environmental policy undertaken by the province, as in the long term it will result in a population that is less aware of the environmental challenges facing Ontario society (p. 20).

The following decade bore witness to this prophetic conclusion as Environmental Education (EE) virtually disappeared from the elementary and secondary education landscapes. Fortunately, this changed in 2009 with the Ontario Ministry of Education's release of its environmental education policy framework, *Acting Today, Shaping Tomorrow* (ATST) (Ontario Ministry of Education, 2009). For the first time in 15 years, EE re-appeared in Ontario's publically funded school system.

The purpose of this paper is to examine ATST from an integrated curricular perspective. The policy document is welcome to those who have patiently endured a void in K-12 EE policy for a decade and a half (Puk & Belm, 2003; Sharpe & Breunig, 2009). As a critique, the paper addresses the orienting question: *What are the implications of an integrated curriculum model for environmental education?*

Within the province of Ontario, the Ministry of Education (OMoE) "sets curriculum policy and defines what teachers are required to teach and students are expected to learn in each grade and subject" (OMoE, 2015). While a consistent and province-wide curriculum is ensured, teachers retain significant autonomy and discretion interpreting the teaching of the curriculum expectations in ways that maximize student learning. Our critique is centered upon ATST, and the curriculum policy it advocates, not the creative and autonomous pedagogical decisions teachers make daily educating their students *about, for,* and *in* the environment. We recognize that policy documents such as ATST are the legislative tools to ensure implementation of the

mandated curricula. This provides a conversation catalyst for stakeholders in the education community, where policy can be interpreted and implemented to suit various contexts.

Our critique is organized into three parts: Part one explains curriculum within schooling contexts and orients the reader to the nature of our critique. We adopt a pragmatic orientation to curriculum considering two politically related questions: "What should be taught?" and "How should it be taught?" (Petrina, 2004, p. 81). Part two introduces the reader to the general form of "integrated curricula" by describing a family of integrated curriculum models (ICMs) and examines its relevance to K-12 EE. Employing an integrated curricula typology (Lenoir, Larose, & Geoffroy, 2000) we classify five recognized ICMs according to Law & McConnell's (2000) framework and analyze the ICM advocated in the ATST environmental education policy document. Lastly, we summarize our critique, explore its implications and limitations, and provide several recommendations for advancing EE in light of policy initiatives.

Part I
Situating the Critique: What is Curriculum?

Recognizing curriculum studies as a well-established tradition within the field of education that draws upon a diversity of philosophical, political, and ideological perspectives (e.g., Schwabb, 1969; Doll, 1993; Pinar, 2012), our curriculum critique is guided by two political questions posed by Petrina (2004): "What should be learned? And, "How should it be organized for teaching?" These questions exemplify the conceptual distances between curriculum design, curriculum theory, and instructional design, residual divisions of labour established during the 1960s (Petrina, 2004; Tyler, 1949). Whereas curriculum theorists have thrown up their hands in despair abandoning curriculum design, and those charged with curricular design have largely ignored curriculum theory, these two orienting questions provide a framework to guide our curricular critique of ATST. We find that these questions provide a pragmatic framework to guide our critique, in an attempt to reconcile curriculum theorists with practitioners. In Petrina's (2004) words, "curriculum theorists will have to dirty their hands with the realpolitik of form and instructional designers will have to clutter their heads with theory" (p. 82).

With regard to the first question: "What should be learned?" the OMoE (2012) stipulates what teachers are to teach and students ought to learn:

> Curriculum documents define what students are taught in Ontario publicly funded schools. They detail the knowledge and skills that students are expected to develop in each subject at each grade level. By developing and publishing curriculum documents for use by all Ontario teachers, the Ministry of Education sets standards for the entire province. (Frequently Asked Questions section, para. 2)

More specifically, according to the ATST policy document, EE consists of the knowledge, skills, and attitudes *for, about,* and *in* the environment. (OMoE, 2009). A careful review of ATST (see Apprendix A) provides further details about what "knowledge, skills, and attitudes" *for, about* and *in* the environment might consist of. This addresses the first question: "What should be taught?" of EE curriculum. Turning to the second question, "How should it be organized for teaching?" we find ATST provides guidance on this as well. Within the following description, an *integrated* curriculum model is advocated:

> Because environmental education is an *integrative* [emphasis added] undertaking that allows for teaching across disciplines, educators also need the skills to link approaches and content from various disciplines to help students understand complex environmental issues and guide them towards environmental literacy. (OMoE, 2009, p. 12)

Synthesizing these responses to the two questions, EE is to consist of the knowledge, skills, and attitudes to educate *for, about,* and *in* the environment in an *integrative* fashion.

To understand the significance of this curricular decision, a caveat about the history of EE is necessary. Palmer (1998) articulates a philosophy of *holism*[8] underpinning EE, "Environmental education is regarded as the embodiment of a philosophy which should be pervasive, [throughout school subjects] rather than a 'subject' which might be identified separately" (p. 11). An integrated curriculum attempts to preserve structurally, the pervasive or holistic nature of EE. When one examines the breadth and depth of knowledge, skills, and attitudes of "what" EE is to consist of we begin to appreciate to what degree it is pervasive in nature and to intimate the logic of "how" integration may accomplish this. How well integration (the curricular form) represents what EE is to consist of is the motivation behind this critique. While we recognize the value of integration in and of itself in capturing what EE is to consist of, we question its uncritical application within school settings. In sum, there is a significant gap between EE curricular theory and practice within schools. We argue this can be partly explained by the complexity of "what" EE is to consist of and "how" difficult it is to represent it in curriculum forms in school contexts.

Focusing on Curriculum

Our inquiry is oriented by a curriculum critique of ATST for the following reason. 'Curriculum' is the Ministry's principal tool for policy implementation at the school level and when teachers heed it, it offers a tangible enactment of the EE policy framework. A curricular critique of ATST (the "What?" and "How?") allows one to anticipate to what degree EE is being practiced in schools.

The Nature of the Critique and What it Offers?

Specifically, our curricular critique of ATST examines the implications of ICMs in the context of K-12 EE. Our analysis is contemporary and focuses specifically upon ICMs' relevancy to EE. No other curricular critique of ATST has been conducted to date. Building upon earlier critiques of EE-related Ministry policy and practice conducted by Puk and Behm (2003) and Puk and Makin (2006) our critique moves the discussion forward recognizing ATST is the product of an externally imposed political process.[9] In general, there has been universal acceptance of ICMs

[8] Holism is the philosophical doctrine espousing the idea that all properties of a system cannot be explained or determined by the component parts alone, but rather the system as a whole determines in important ways how the parts behave.

[9] ATST was the result of the Ontario Ministry of Education being subjected to the provisions of the Environmental Bill of Rights (EBR) by the Ontario Ministry of Environment through a public petition to the Ontario Ministry of Education in 2006. (See Eco Issues; Environmental Commissioner of Ontario (ECO)

http://www.ecoissues.ca/index.php/Prescribing_Education:_Crucial_to_Future_Sustainability

and their application to K-12 EE by academics, educators and policy makers (Hungerford & Peyton, 1994).

Part II
Examining Integrated Curriculum Models

In this section, we clarify ICM nomenclature and summarize the arguments used to justify ICMs for EE. We also analyze ATST using a typology of ICMs adapted from Lenoir, Larose, and Geoffroy (2000) and Law and McConnell (2000).

Definitions

The terminology applied to integrated curricula is confusing because studies have shown that the term has several meanings (Drake, 2007). For example, the term "integrated" has often been used interchangeably with the terms "interdisciplinary" and "integrative" (Erb, 1996; Lenoir, Larose, & Geoffroy 2000).

The key term used to identify and enact the holistic nature of EE from a curricular standpoint has historically been *integration*. "During the 1980s and 1990s, use of this term proliferated indiscriminately as a generic term for a variety of innovative approaches that draw on more than one subject or discipline" (Klein, 2009, p. 13). Given this history, we use the generic use of the term "integrated" to refer to a variety of curriculum design and implementation methods that *connect* various disciplines, in varying degrees through various time commitments, and to learning experiences (Drake, 2007). This appears consistent with the body of researchers doing work in this area (Erb, 1996; Klein, 2009; Law & McConnell, 2000).

Arguments for Integrated Curriculum Models

Historically, there are three arguments for considering curricular integration (Beane, 1996). First, there is an appeal to the intrinsic virtue of a certain epistemology, i.e., pervasiveness or holism (Hirst, 1974; Hirst & Peters, 1970); second, the inherent value an integrated approach has for student learning (Rennie, Venville, & Wallace, 2012; Venville, Wallace, Rennie, & Malone, 2001); and third, the pedagogical benefits for the teacher (Drake, 2007). We briefly summarize the first argument in detail only, as it is important in establishing epistemic relevancy to the broader field of EE as a whole.

The first argument for curricular integration advocates some degree of intrinsic virtue in the way that knowledge is organized. An integrated curriculum is preferable because it attempts to represent a view of knowledge that is unified, and to a degree, chaotic in nature. Hirst (1974) extended this logic to apply to learning. In the traditional classroom where subject disciplines prevailed in contrast to the seamless experience of life, student learning was somewhat disjointed and artificial. Real-world learning, they argue, is founded upon knowledge that is connected, embodied, ecological, and harmonized, reflecting a pervasive or holistic character. In this sense, pervasive and holistic refers to consistency across the curriculum; that is, its separate aspects are mutually reinforcing, rendering their effects multiplicative and not simply additive. In an integrated curriculum, the whole of its effects on student learning is greater than the sum of its parts, and as such is emergent. The consistency and pervasiveness of an integrated curriculum has great currency and validity. Subsequently, ICMs reflecting this preference for a

pervasive/holistic epistemology have become a curricular antidote to disconnected student learning in environmental education (Hungerford & Peyton, 1994).[10]

Relevancy of the Intrinsic Virtue Argument: A Common Epistemic Lineage

The argument for intrinsic virtue posits that ICMs support a view of knowledge that is holistic in character. To determine whether this argument is relevant to EE, we turn our attention to how EE has been defined, paying particular attention to epistemological references.

During EE's formative years in the 1970s, its holistic nature was recognized in the UNESCO-UNEP--International Environmental Education Programme, entitled: *Procedures for Developing an Environmental Education Curriculum*:

> EE has traditionally been considered "interdisciplinary" due to the complexity of its nature and its reliance on practically all other disciplines, e.g., science, math, geography. In fact, there has been some reluctance to refer to EE as a "discipline" lest its *holistic nature* [emphasis ours] be lost. (UNESCO, 1992, p. 19)

Conventional EE philosophy substantiated EE's "pervasive" nature, advocating integrated curricula as the model for EE in schools. Because of EE's interdisciplinary and holistic nature and application, its approach to education is as a whole rather than a subject (Palmer, 1998).

Thus, ICM and EE share a common epistemic standpoint. As the argument to support ICM draws upon a view of knowledge that is holistic, and definitions of EE draw upon a similar viewpoint, the intrinsic virtue argument is helpful in illustrating how EE's holistic epistemology can be represented in the curricula of schools. As a curriculum implementation model, it provides the structure to preserve the holistic epistemological character of EE as a whole.

Typology of Integrated Curriculum Models

In this section, we examine the ICM typologies adapted from the works of Lenoir, Larose, and Geoffroy (2000), and Law and McConnell (2000) (see Figure 1). Law and McConnell's (2000) typology consists of five different ICMs differing in terms of their degree of integration (Appendix B), and has been "mapped" onto the Lenoir, Larose, and Geoffroy's (2000) typology (Figure 1).

[10] The second and third arguments for integrated curricula (they [ICMs] support student learning and simplify teacher planning) logically follow from establishing the first argument (intrinsic virtue of a holistic epistemology) and its relevancy to EE's epistemological history.

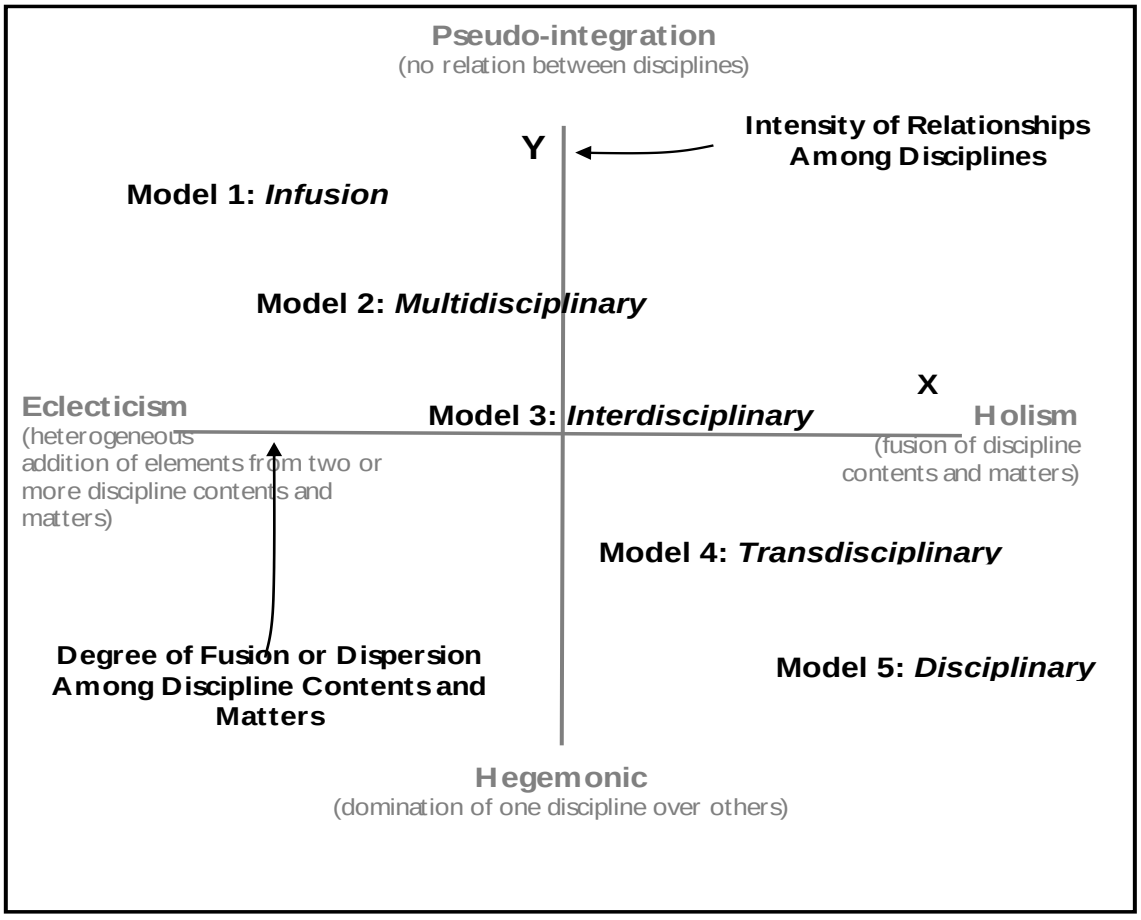

Figure 1: The poles of integrated practice. (Adapted from Lenoir, Larose, & Geoffroy (2000), *Poles of Interdisciplinary Practice*).

The two separate typologies were considered independently and then 'hybridized' for the following reasons. First, two separate typologies bring perspective to our analysis and reduce bias that might result from only considering one typology. Second, by mapping one onto the other, we wanted to demonstrate some degree of harmony or agreement between respective conceptual schemes. Third, Law and McConnell's (2000) work is specifically oriented to EE and integrated curricular practices within schools. In lieu of criticisms lobbied against Law and McConnell's (2000) typology (see Hargreaves, Earl & Ryan, 1996) and the danger of oversimplification we thought consideration of more than one typology essential. While there are

other ways of categorizing different forms of integration (Case, 1991; Drake, 1991; Fogarty, 1991; Marsh, 1993), the hybridized typology (Lenoir, Larose & Geoffroy's 2000; Law & McConnell's 2000) (Figure 1) is the most up-to-date synthesis of the available empirical evidence on the matter.

We analyze the ICM promoted within ATST using this hybridized typology. Before considering this hybridized typology, some clarification of the terms "discipline" and "subject" is necessary. In a traditional post-secondary context, the word "discipline" refers to a body of concepts, theories, and methods used by a family of scholars and reported in a distinct body of literature. In contrast, "subjects" are simplified derivatives of disciplines as they play out in K-12 Education settings. In the context of this discussion, we are equating the word "discipline" with "subject" and at times we use the terms interchangeably.

To avoid confusion over the term "interdisciplinary practice," as interdisciplinary is the label applied to a specific type of ICM, we have chosen to re-name the typology as *Poles of Integrated Practice,* where "integrated" is the general term for various types of integration, e.g., infusion, multidisciplinary, interdisciplinary, and transdisciplinary.

A caveat is required prior to examining the hybridized typology. One of the drawbacks in presenting such a typology is the impression it may create. While acknowledging the advantages of any typology for categorizing different forms of integration, Hargreaves, Earl and Ryan (1996) are concerned that a continuum embodies implicit values. For example, movement along the continuum may be perceived as "growth or progress—a preferred state" (p. 103). Drake (1991) counters by adding, "one position [along a continuum] is not superior to another; rather, different approaches are more appropriate than others according to the context in which they are used" (p. 19). Recognizing this potential drawback, the hybridized typology does provide a coherent framework for analyzing various ICMs based upon the justification of their epistemological positions, founded upon 10 years of empirical work (Lenoir, Larose & Geoffroy, 2000).

The *y-axis* represents the intensity of relations, from dominance to absence, among discipline areas. The top of the axis represents *pseudo-integration*, a model resulting in little to no discipline integration. At the other extreme, and toward the bottom of the y-axis is *hegemony*; where the insights of one discipline completely dominate the rest—the maximum intensity of discipline relations. The *x-axis*, on the other hand, represents the degree of fusion or dispersion among discipline matters and content. At the far left of the continuum is *eclecticism*, where two or more disciplines contribute various elements to the model. Toward the extreme right—*holism*--where all disciplines contribute equal discipline matters and contents to the curriculum model resulting in a "fusion" of the disciplinary contents.

Mapping Integrated Curriculum Models onto the Typology

We have "mapped" onto the typology five ICMs: *infusion, multidisciplinary, interdisciplinary, transdisciplinary*, and *disciplinary.* We concur that the fifth category—*disciplinary*—the extreme and reductionary antithesis to "integrative" captures what logically happens when one follows the identification of integration to its extreme, i.e., the *hegemonic* pole within the typology. This appears to correspond with the development of new disciplinary fields (Goodson, 1995). Model 1 (*infusion*) is located in the upper left quadrant of the typology as it minimally relates disciplines and minimally fuses discipline matters and content. The *infusion model* simply

fuses something to an existing curriculum. Using EE as an example, the teacher selects material of an environmental nature and teaches that material within their discipline. If their discipline is science, [11] for example, they might tackle the issue of Climate Change within their science class. EE is seamless across the curriculum; however, no disciplinary integration is achieved (Law & McConnell, 2000). The forms constituting "infusion" seem endless and the degree of overall disciplinary integration is minimal.

Model 2 (*multidisciplinary*) is located slightly below and to the right of Model 1. The disciplines are slightly related, and the discipline matter and content are slightly more fused. "The disciplines remain distinct, but deliberate connections are made between or among them," according to Drake (2007, p. 32). UNESCO-UNEP (1992) adds that the multidisciplinary model, "involves the incorporation of EE components in other established, interrelated disciplines" (p. 8). Teachers identify various EE topics or issues that become educational themes for study. Some content is integrated across the disciplines, but no transference across discipline areas is achieved (Law & McConnell, 2000).

Model 3 (*interdisciplinary*) is the most central of the models, where discipline methods and contents fuse together. When the discipline (subject) boundaries begin to blur, as the overarching theme dominates, the model of integration slowly becomes more *interdisciplinary*. Here we see the creation of a discrete course, or series of courses or curricular unit. The traditional disciplines fade into the background as the overall theme becomes the principal organizing element, to which common knowledge and skills, and assessment are central (Drake, 2007). This may work well when all subjects are at par; that is, the status of their distinct knowledge claims is regarded equally. However, because of EE's historical and epistemic affinity with the subject of science, a particular current of EE (scientific current) tends to get reinforced. As a result, Law and McConnell (2000) suggest uneven disciplinary integration can make EE subservient to another discipline (e.g., science) and may be perceived to be better for integration.

Model 4 (*transdisciplinary*). Located just within the bottom right quadrant, it elevates EE above the rest of the discipline areas and begins to fuse maximally, discipline matter and content under the umbrella of EE. At the school level, a master EE curriculum plan[12] is developed and enacted. All traditional disciplines are subsumed by this plan. The school sets out specific goals, i.e., environmental plan, and develops specific objectives to meet these goals. Internationally, *Ecoschools*[13] has the potential to be a good example of this model.

Lastly, Model 5 (*disciplinary*) is located at the extreme bottom right of the bottom-right quadrant, below Model 4. EE assumes a degree of disciplinary status, with its own internal logic,

[11] The example of integrating EE with the subject of science is no coincidence. We use the subject of science for consistency but also, as we demonstrate later in the paper, to demonstrate science's historical relationship with EE and because of this a particular EE current referred to as *scientism* that is reinforced within the policy document.

[12] We are still equating a definition of "curriculum" with a prescribed course of study directed by a Ministry of Education. However, within a transdisciplinary ICM, the Ministry divests itself of the task, relegating it to local schools and teachers, i.e., teachers-as-curriculum makers.

[13] *Ecoschools* is an international program for environmental and sustainable development education for schools. Adopted at the school level, the program's methodology is premised upon ICMs. Schools and communities are required to develop vision and mission statements, and action plans. The potential for curriculum to be transdisciplinary is optimal (Foundation for Environmental Education retrieved March 24, 2013 from: http://www.fee-international.org/en).

unique methodologies, discourse, concepts, and so on. All other disciplines are completely subsumed by EE. Puk and Behm (2003) identify this as a preferred ICM: "Integration may be beneficial if, and only if, ecological education [environmental education] is at the same time a discreet, single focus set of courses like all the other school courses" (p. 227). The character of this ICM is best described as *hegemonic and holistic*.

Lest we create the impression the only reason why ICMs may underperform their integrative function is due to an inherent deficiency, there are other valid reasons that may contribute to a model's underperformance. For instance, Farman & Hollins (1981) cite teachers' lack of content knowledge and expertise, and pressure to cover the learning expectations of the recognized subject as contributing factors. The problem is compounded for secondary teachers. Singletary (1992) found that "secondary teachers have specialized training in one discipline, making it difficult [to integrate]" (p. 226). As we can see, several ancillary factors may contribute to an ICM's effectiveness.

Part III

Analyzing 'Acting Today's, Shaping Tomorrow's' Integrated Curriculum Model

Within the ATST policy document, a variety of goals and strategies suggest an integrated curricular approach to EE (OMoE, 2009). Keywords appearing within ATST from a curricular standpoint include: "integrate" and "interdisciplinary." For specifics, the OMoE (2011) has produced a resource guide called, *Environmental Education: Scope and Sequence of Expectations*. The policy document and resource guide provide a more accurate picture of how the terms—"integrate" and "interdisciplinary"—may be implemented, and where they are located within the typology of ICMs. More specifically, the resource guide contains a chart identifying specific expectations that have something to do with the environment as these appear in subject-specific curriculum documents. For example, the subjects of science, social studies, history, and geography are well represented in terms of expectations that have explicit connections with EE. To a lesser degree, the subjects of health and physical education and art also provide opportunities for EE (OMoE, 2011).

In sum, the scope and sequence expectation guide is simply an anthology of extracted learning expectations drawn from the various subject-curriculum guides—an assimilation of student learning expectations (or outcomes) drawn from school subjects with little concern given to the holistic and pervasive nature of EE. As various curriculum guides have been written or revised asynchronously with no collective assessment, a patchwork approach to EE has resulted.

It becomes clear that the ICM of choice, advocated by the OMoE (2009), could best be described as Model 1 (*infusion*) because selected disciplines have incorporated various EE content and issues (see Figure 1). This ICM is referred to as *pseudo-integration*, meaning little to no integration of disciplines or disciplinary content or methods occurs.

The Implications an ICM of *Infusion* has for Environmental Education and Limitations of the Analysis

After reviewing (Figure 1), an ICM of *infusion* is the least integrative of the ICMs available. And while certain ICM advocates see this as unproblematic on grounds that degrees of integration are "context dependent" and do not imply a hierarchy (Drake & Reid, 2010), we disagree. If the goal

is to preserve the holistic nature of EE as practiced in schools, then *infusion* falls short. A hierarchy of integration is significant for this reason: an ICM that is more integrative than *infusion* would significantly preserve EE's pervasive and holistic nature within schools. As *infusion* fails to do this, there are implications for the implementation of EE within schools.

If one of the arguments for using an ICM is to preserve EE's pervasive and holistic nature, we would need to qualify the argument by adding, those ICMs that are more integrative in nature, e.g., multidisciplinary, interdisciplinary or transdisciplinary, more effectively preserve the epistemic foundation of EE.[14] To make the argument on the general claim that any ICM will do is inaccurate and misleading to those trying to advocate for and practice EE in schools. Ask any teacher in Ontario today about how the implementation of EE is going under the curriculum model of "infusion" and you get mixed responses (Fazio & Karrow, 2013; Karrow & Fazio, 2014). Knapp (2000) corroborates this by adding that the infusion has been "a delusion of substantial proportion" (p. 33). A decade prior, Van Matre (1990) concluded, "that teachers. . . going to 'infuse' every part of the curriculum with environmental education. . . [was] a recipe for failure" (p. 13).

Other implications include a developing and exclusionary rhetoric that equates integration solely with *infusion* obfuscating other models of integration that more effectively maintain the holistic and pervasive episteme of EE. The infusion takes the holistic nature of EE, carves it up into pieces, and inserts these pieces into other curricular areas. It would be impossible to retain any degree of 'holism' through such a reductionist approach. That the 'whole' could manifest greater than the 'parts' is dubious. In a paradoxical way, EE becomes further marginalized through the rhetorical flourish of the original argument. In other words, EE is only superficially practiced in schools; superficiality becomes equated with educating *for, about,* and *in* the environment when this couldn't be further from the truth. It creates the impression in the minds of stakeholders that EE is occurring within schools, when in fact only a very rudimentary and superficial curricular form of EE is being practiced, if at all, notwithstanding the individual efforts of some educators who have committed themselves to effectively integrate environmental education in their classrooms.

An ICM of *selective infusion* supports the OMoE's (2009) message to emphasize certain currents of EE above others (Sauvé, 2005). Because so many EE-related learning expectations are located within the subject of science, a *scientific* current of EE tends to dominate, despite other currents of EE, to a lesser degree, being promoted within ATST (OMoE, 2009) e.g., *naturalist, conservationist/resourcist, problem-solving,* and *systemic*. The *scientific* current of EE is directed toward the "acquisition of knowledge in the environmental sciences, and the development of skills related to the scientific method" (Sauvé, 2005, p. 33). Whether such other currents of EE, e.g., *naturalist, conservationist/resourcist, and problem-solving*, are compatible with the subject of science, is an important discussion for future researchers. Nonetheless, an ICM of *selective infusion* reinforces a particular current of EE, as evidenced below:

> Environmental education is education about the environment, for the environment, and in the environment that promotes an understanding of, rich and active experience in, and an appreciation for the dynamic interactions of: the Earth's physical and biological systems;

[14] We do not wish to leave the impression that EE's pervasive and holistic nature can be entirely preserved simply through more sophisticated ICMs. A curricular solution is one solution to a complex problem requiring more fundamental shifts in teachers' epistemic and ontological foundations.

> the dependency of our social and economic systems on these natural systems; the scientific and human dimensions of environmental issues; and, the positive and negative consequences, both intended and unintended, of the interactions between human created and natural systems. (OMoE, 2009, p.6)

There is a focus upon the "Earth's" objects and the "scientific dimensions" of environmental issues, in this statement. Recognizing there are other currents of EE (Sauve, 2005), while advocating for the integration of Indigenous Knowledge (IK) with environmental education (*ethnographic current*), Longboat, Kulnieks & Young (2013) observe, "Environmental education curricula in North America is primarily based upon a scientific model of inquiry" (p. 18). To a lesser degree, we can discern *naturalist* and *conservationalist/resourcist* currents of EE (Sauvé, 2005). While the general affiliation of EE with a *scientific* current seems natural and logical from a curricular perspective within schools, there are further implications. To believe that by selectively infusing EE with science, such curricular design would allow for its effective teaching/learning is also misguided. Science education itself is suffering its own degree of marginalization, especially in the Ontario context (and elsewhere), due to the unintended consequence of high-stakes testing (Fazio & Karrow, 2013). Quite simply, science is struggling to retain its own curricular status. Selectively infusing EE in science, while well-intentioned, ironically compounds effective EE curricular implementation in schools.

The ATST policy document may have a more circumspect outcome. One might argue that a *selective infusion* model simply maintains the status quo of EE in Ontario at a level prior to the mid-1990s (Puk & Behm, 2003). At that time, neo-conservative government ideology was clearly incompatible with EE. Despite ATSTs release in 2009, one might argue we are not much further ahead of the lingering effect of this political ideology. Given the overcrowded curricula within schools there is little political or social motivation to designate EE as a stand-alone subject requiring a specific allotment of instructional time in the weekly schedules of teachers (Puk & Makin, 2006). Of course, stand-alone status might also make EE a target, easy to cut when politics change and/or budgets are cut. This is what happened in 1999 with the removal of secondary school environmental science from the curriculum. Moreover, some researchers who feel that recognizing EE as a timetabled subject would undermine its philosophical/epistemological underpinnings (Palmer, 1998). Yet, this need not be the case. One only need to consider how some fields achieve disciplinary status, i.e., in post-secondary settings women's studies, multiculturalism, and biotechnology, for instance, have had healthy debates about disciplinary status while retaining an interdisciplinary or transdisciplinary focus. Puk (2002) argues the same for field of environmental education: "Ecological education should be developed as a meta-discipline in the Ontario school curriculum, composed of an enriched subject-matter including sciences, social sciences, economics, health, philosophy, aesthetics, ethics, etc" (p. 228).

Regardless, a default position for policy-makers and politicians is to advocate "curricular integration" for EE. However, not all ICMs are created equally.[15] Further compounding this problem, since EE does not enjoy the disciplinary status, a hierarchy develops. It becomes almost irresistible not to put EE toward the service of some more "worthy" discipline in an effort to salvage it. In this sense, EE promoted on grounds of integrated curricula becomes a means to an end, instead of an end in and of itself. So, instead of the educational objective being more

[15] More than one peer-reviewer of the present article intimated perhaps we put too much faith in ICMs to begin with.

ecologically literate children, EE is used as a means to accomplish other educational goals, such as improved reading and writing scores (Lenoir, Larose, & Geoffroy, 2000).

Although an ICM of *selective infusion* has several negative implications for EE, there are some positive implications to note. First, an ICM of *selective infusion* creates a space within the OMoE curricula for EE where none previously existed for some time. Schools in Ontario are required, through ATST, to consider how to provide EE within their respective jurisdictions (OMoE, 2009). This is clearly a milestone of great significance. Second, despite criticisms of loosely defined ICMs, such curriculum models could allow the effective application, under competent school-based leadership.

Employing this analysis we wish to highlight some of its limitations before moving on. There are inherent limitations employing the typology of ICMs previously summarized (see middle of p. 8). Furthermore, perhaps the underperformance of ICMs, beyond any inherent limitation, is due to contributing factors such as teachers' lack of content knowledge (see p.10). As well, our critique assumes a pragmatic orientation to curriculum, guided by Petrina (2004) who asks, "What should be taught?" and "How should it be taught?" honouring a theory-practice dialectic. And while the context of the curriculum critique is a Ministry of Education policy document, we suspect some curriculum theorists may view such a critique as "low hanging fruit," while some curriculum designers may view such a critique as beyond reproach. Either extreme of position underscores the theory/practice divide. Furthermore, by uncritically accepting the answers to "What should be taught in EE?" we may leave the reader with the impression the problem rests strictly in our critical appraisal of the answer to the second question, "How should EE be taught?" Answers to each of these questions dialectically inform one another. Having admitted this, we see an opportunity for future work in this area. In particular, scrutiny of what should be taught in EE, and the overly Western orientation of ATST, for example missing opportunities to include Indigenous knowledge (Longboat, Kulnieks, & Young, 2013). Lastly, perhaps our critique puts too much faith in ICM solutions where what is called for are substantial epistemic and ontological shifts to be expressed more adequately through Ministry policy.

Conclusions and Recommendations

With the release of ATST policy document, EE returned to the K-12 landscape in Ontario. Nonetheless, successful EE implementation, aspired to by the aims of the policy document requires us to examine carefully, our curricular emphases and implementation models. Hence, our curricular critique of ATST leads us to the following conclusions and recommendations.

A *selective infusion* ICM does little to maintain the holistic nature of EE, favouring *scientific*, and to a lesser degree *conservationist/resourcist*, and *naturalist* currents of EE. Concomitantly, a scientific leaning of EE exposes poorly coordinated OMoE curriculum implementation efforts and points to the highly politicized character of EE curriculum. As well, given the marginalization of science education itself (Fazio & Karrow, 2013), the *selective infusion* of EE with the subject of science, especially in elementary grades, provides little hope for meaningful integration of EE. Revisiting Petrina's (2004) two orienting questions, our exegesis of the "How?" of curriculum exposes further challenges with "What?" EE curriculum is to consist of. Given an episteme of holism and pervasiveness, and the deficiencies around representing such sophistication and complexity within a curriculum form of integration, this comes as no surprise. On a positive note, ATST has created a space for EE within the province of

Ontario where none existed prior to the mid-1990s. This approach is open and flexible enough to encourage varied pedagogical interpretation by teachers in diverse school contexts.

From a pragmatic curricular perspective school EE could benefit through the following:

1. Closer liaising between Faculty of Education researchers and Ministries of Education around defining, modeling, and analyzing integrated curricula. It is incumbent upon curriculum theorists and curriculum designers to work together to nurture such a pragmatic orientation to curriculum to ensure that "what" EE is to consist of is accurately and fairly represented through the form of integration within schools, i.e., *DEEPER: Deepening Environmental Education in Pre-service Education Resource,* (Inwood & Jagger, 2014).
2. Collaboration between Faculty of Education researchers and Ministries of Education and the promotion of an ICM that preserves subject/disciplinary epistemology, i.e., EE's holistic episteme.
3. The promoting of an ICM that reflects a greater variety of EE currents and EE's definitional breadth, e.g., Indigenous knowledge perspectives (*ethnographic current*) see Longboat, Kulnieks, & Young, (2013).
4. Meaningful and sustained professional development opportunities for school boards, school administration, and teachers around Ministry policy frameworks and ICMs that support curriculum dimensions of such frameworks, i.e., see Karrow & Faxio (2014).
5. Comparisons with international school jurisdictions employing other ICMs providing important perspectives.
6. Effective modeling within pre-service and in-service professional development programs of ICM exemplars, i.e., see Law & McConnell (2000) for specific Ontario examples of ICMs and EE, and Karrow & Fazio (2014).

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Appendix A

Some of the Knowledge, Skills, and Attitudes Developed Through Environmental Education

KNOWLEDGE—Environmental education should enable students to learn about:

- the resources of the Earth, particularly soil, water, minerals, and air, their characteristics, and their role in supporting living organisms;
- the nature of ecosystems and biomes, their health, and their interdependence within the biosphere;
- the dependence of humans on environmental resources for life and sustenance;
- the characteristics of human societies, including nomadic, hunter-gatherer, agricultural, industrial, and post-industrial, and the impact of each on the natural environment;
- the role of science and technology in the development of societies and the impact of different technologies on the environment;
- the process of urbanization and the implications of deruralization;
- the interconnectedness of political, economic, environmental, and social issues in the present world;
- cooperative national and international efforts to find solutions to common environmental issues and to implement strategies for a more sustainable future.

SKILLS—Environmental education should enable students to:

- define such fundamental concepts as environment, community, development, and technology, and apply these definitions in local, national, and global contexts;
- use a range of resources, communications skills, and technologies in addressing environmental questions;
- develop problem-solving skills and critical and creative thinking skills, including the ability to reason and apply logic, to recognize and apply abstract patterns, to identify connections and relationships between ideas and issues, and to test ideas against new information and against personal experience and beliefs;
- work towards a negotiated consensus when ther[16]e are differences of opinion;
- detect and assess bias and evaluate different points of view;
- recognize the need to incorporate an environmental perspective in decision-making models.

ATTITUDES—Environmental education should enable students to:

- appreciate the resilience, fragility, and beauty of nature and develop respect for the place and function of all living things in the overall planetary ecosystem;
- appreciate that human life depends on the resources of a finite planet;
- appreciate the role of human ingenuity and individual creativity in ensuring survival

16

and achieving sustainable progress;
- become mindful of perspectives other than their own and be prepared to modify their ideas and beliefs when appropriate (e.g., understand and respect First Nation, Métis, and Inuit concepts of knowledge);
- appreciate the challenges faced by the human community in defining and implementing the processes needed for environmental sustainability;
- develop a sense of balance in decisions that involve conflicting priorities;
- maintain a sense of hope and a positive perspective on the future.

Adapted from Ontario Ministry of Education (2009). *Acting today, shaping tomorrow*: *A policy framework for environmental education in Ontario.* Toronto. ON: Queen's Printer and "Learning Outcomes" on the Learning for a Sustainable Future (LSF) website, at http://www.lsf-lst.ca/en/teachers/learning_outcomes.php.

Appendix B

Model 1: Curriculum infusion Each subject teacher selects material from an environmental education curriculum and independently treats it in its own way. Environmental education is claimed to be ubiquitous across the whole school curriculum but no cross-subject linkage is achieved.
Model 2: Multi-disciplinary or thematic (Teacher-centred approach) Primary or junior high teachers choose topics relevant to the environment and develop topic-based or issue-based classroom programs. There is a degree of content integration as the content knowledge is cross-curricular, but no transference across subject areas is achieved. The learning is largely promoted by teacher-contrived learning experiences.
Model 3: Interdisciplinary approach Junior or senior high school teachers from 2 or 3 departments plan together to develop a topic-based or issue-based program, which is an integrated curriculum. Children's needs are considered with meaningful connections made for students between the curriculum and their daily lives. Essential skills, attitudes and values are the major focus and transcend each subject involved in this program. But, the uneven cross-curricular integration can make environmental education an enterprise of the subject with better integration e.g. science.
Model 4: Transdisciplinary model A school develops and acts on an 'environmental plan' in that subject divisions are subservient to this action plan. The school aims at achieving the goals from that environmental plan and it becomes the school feature such as the Green Schools in both Taiwan and mainland China and Enviroschools in New Zealand, and Ecoschools in Ontario [our emphasis].
Model 5: Environmental education course approach Environmental education is treated as an independent subject or course such as an environmental education course at senior level of the secondary schools or university.

Law and McConnell (2000) with Ontario examples.