2006

Environmental learning: Reflections on practice, research and theory

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Introduction

The environmental and interdisciplinary nature of environmental education presents extraordinary challenges to our abilities as a field to clearly conceptualize, theorize and communicate findings about what we have learned about practice, research and theory in environmental learning (Disinger, 2001). Unfortunately, these factors also make it difficult for practitioners to identify research-based advice on what we know about the principles and practices of environmental learning, and for researchers and observers to understand what we agree and disagree about in our research. These problems contribute to what appears to be a lack of general understanding of an important point for environmental educators—that inquiry in environmental education has identified a body of warranted judgements about learners that is useful for guiding work with them. This is the case despite the need for substantial research into the experiences of learners, learning and teaching in environmental education (Rickinson, 2001). In this vignette, I summarize these key recommendations and set out the case for the importance of developing a working epistemology to help us resolve the apparent contradiction between, on the one hand, the view that we do have adequate evidence to guide our work, and on the other, the view that we need much more research and inquiry regarding these matters.

Our field's challenge is similar to others in terms of the difficulties a research community has in synthesizing research and agreeing upon 'what we know' about, for example, the recommended content and methods that ought to be used in environmental education. Literature in other professions, such as public policy, or the law, might be useful for helping us explore how others address this problem by distinguishing between different degrees of certainty in what is and can be known. For example, if we need to make a choice about our educational endeavors, there are many occasions where professionals should use their best professional judgment to identify what a preponderance of the evidence suggests we ought to do—as opposed

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to higher standards typical in the physical and life sciences (for example, a criterion of 99+% probabilistic certainty). Based on my best professional judgment, and as I illustrate later, I argue there is more than sufficient knowledge to justify broad agreement and understanding in the field regarding which particular activities and content should form the foci of the activities of environmental educators. Simultaneously, however, I note that the strength of the research base is nowhere near as strong as many researchers and practitioners would like, for example, in terms of either the conceptual validity or generalizability of what we have learned, so I would advise great care be taken to acknowledge these limitations—a fine point made by those who emphasize the contingency and situatedness of what we know (Scott & Gough, 2005, p. 96).

Education as a two-sided coin

Rickinson's (2001) wide-ranging review of research on environmental learners and learning noted the paucity of research concerning the act of environmental learning, that is, study concerning the processes whereby learners learn. Furthermore, in distinguishing research on environmental learning processes from the significant quantity of research into environmental knowledge, attitudes, and behavior, he also argued that the latter has been too teacher-, and not learner-, oriented. I tend to agree with his observations about the formal education sector, yet would temper it with Dewey's (1966) observation that educational activities in institutional settings can (and should) be viewed from two perspectives: the learner's and the educator's (see Meyers, 2005). Here, environmental education is a coin with two sides: environmental learning (heads might be appropriate) and environmental teaching (tails). To the extent that educators do not respect the uniqueness and complexity of the learning process for learners, it seems fair to critique them for being 'educator-centric'. But if the educator is respecting this in the learner, yet speaking from their own perspective of what they are thinking and what actions they are taking with learners, then it seems unmerited to critique them for acting on their point of view about teaching. Likewise, if an educator speaks only of the learner, and not of the educator's goals and teaching methodologies, the situation would seem to be, 'learner-centric'. Attention to both sides of this coin of environmental education will then accord with Dewey's insight that education is a process that occurs between a learner and an educator, with the educator responsible for constructing a productive learning environment, and facilitating a learning process intended to bring about (educator) valorized changes in the learner.

In what follows, my observations concerning 10 years of research about learning in *Environmental Education Research* are organized from three perspectives: theory, research and practice. The first perspective concerns theory and how it should inform our practice. The second perspective concerns research methods to help environmental educators and researchers identify what is important to learn about environmental learning. The final perspective, from practice, includes substantive recommendations about the content and teaching methods important for environmental learning. This should be of more immediate use to practitioners.

Theory

According to Gutek (1997), the linkage between educational practice and theory should be construed as follows:

> Every teacher knows that education is a powerful instrument for the shaping of individual lives and society. When the teacher begins to reflect on his or her role, that person is beginning to pass from preoccupation with the immediately practical to an examination of the theory that underlies and sustains practice. Because it is a moral enterprise, teaching requires the careful blending of theory and practice. Theory without practice is insufficient: practice unguided by theory is aimless. … When the teacher begins to reflect on the conception of reality, of human nature, and of society, he or she is philosophizing about education. (Gutek, 1997, p. 1)

The need for additional work on our theoretical understandings of environmental education is well documented (for example, Disinger, 2001). It includes addressing fundamental challenges to the epistemological foundations of our profession (Hart, 2003) in, for example, considering pragmatic and postmodern approaches to what we take to be knowledge. As Dewey and Gutek suggest, practice, research, and theory are each necessary so we may act intelligently in our daily lives when we make specific decisions about actions we might take when engaging with learners, guided by what we have learned from systematic inquiry and theory. The question arises, what is the role and place of theory in environmental education in all this?

Drawing on Dewey (1966), I find it helpful to view educational theory along a single continuum, with philosophical theory anchoring one end, and practical decision-making and action at the other. By definition, if theory does not link with practice, it is not pragmatic (and in those cases, rightfully tends to be regarded as useless by practitioners). A pragmatic educational theory is useful at many levels. Once developed (after extensive consideration of the greatest range of possibilities) it provides, for daily/frequent decision-making, an efficient narrowing of the range of practical decisions about the content and teaching methodology that need to be considered in lesson and curriculum planning. This does not mean that the educator never considers these questions, but occasionally uses the sort of inquiry suggested above to develop their own teaching philosophy that can be used to guide their daily work. Research and inquiry to explore or test the usefulness of environmental learning theory in practice is the link between *pragmatic* theory and practice.

Gutek (1997) suggests that it is helpful for educators to identify five aspects of education that greatly influence learning and teaching, that altogether comprise a philosophy of education. These are: their organization's aims for education, including ideology; the epistemology and/or philosophy of science used to identify what counts as knowledge (if anything) and how it is obtained; the curriculum's general content, including the aggregate content of material and experiences in the formal or non-formal setting; the learning theory through which learners learn that content, and; the teaching methodologies that are considered acceptable to use. Understanding each of these is important for educators—not so they can slavishly copy them but so they can make informed choices about how to engage them when making decisions about their own work. Early efforts to engage each of these and link theory to practice take

enormous effort and reflection, but can 'pay off' in the long run for educators. To the extent that the field of environmental education has difficulty in identifying the critical components of a teaching philosophy, and comparing the many different beliefs that are held about each of the component, it is incumbent on the wider community to develop comparative methods that clearly identify what has already been developed, and the struggles this has entailed to help novice educators and researchers. As educators develop their own working understanding of Gutek's five aspects of education, this can become a steady guide for the constant work of developing and adjusting lesson plans, courses, curriculum, and programs. This process of reflection and deliberative action, since it includes explicit attention to the aims and ideology of education, should also be useful for helping environmental educators understand how each aspect contributes to the maintenance of or challenge to the socio-political status quo—a point crucial to the critical reflection sought by 'post'-oriented researchers and educators (see Hart, 2005).

Challenging trends in educational theory: epistemology and methodology

The challenge (noted above) to our ability to agree upon 'what we know' reflects the reemergence of an ancient philosophical problem concerning whether or not knowledge exists, and if so, can we know it, and if so, what standards might we use to identify it. Dewey (1916) and Gutek (1995) indicated that it is vital for educators to identify their beliefs about what counts as knowledge in a discipline, what philosophers formally call their epistemological stance. These beliefs profoundly influence all aspects of education and learning and guide how we view research, what is sometimes termed a philosophy of science. Unfortunately, I believe we are not yet sufficiently skilled as a research community in discussing epistemological commonalities and differences, or understanding how the strengths and weaknesses of different notions of knowledge can be drawn upon to help our efforts to improve environmental education.

Perhaps the most significant change in educational research and practice in the last ten years has been the steady increase in attention to 'post' theories and practices. These developments have brought many worthwhile challenges to theory, research and practice in environmental learning (Scott & Gough, 2005, p. 25). It has also created enormous tensions in the communities of environmental education and research that reduce our ability to share valuable discoveries and insights across what can amount to a widening gulf in discourses, experiences and practice. Productively engaging what is now an amorphous epistemological and communal schism is critical to the future of environmental learning and inquiry, requiring hard theoretical work and disciplined discussion and dialogue about established and emerging principles and practice. While there appears to be a schism between those who are self-ascribed postmodernists and those who are not, it is not always clear what theoretical differences actually exist (Meyers, 2005). While many different phenomenological and epistemological stances might be roughly grouped together, necessitating clear definition of the term wherever used, I define *postmodernism* as the epistemological stance

that reject notions that there is an absolute truth (either a priori or post priori) and/or that we can absolutely know it; i.e., that we can have absolutely justified, absolutely true, belief. Nor, despite the strong condemnation of the uncritical use and promotion of empirical/analytical approaches in, for example, the work of Robottom and Hart (1995), is it clear that there are actually any "positivists" publishing in environmental education journals. In fact, the term 'positivist' seems not only confused, but also problematic, even as it has become commonplace in the last decade. As Swann and Pratt argued in *Educational research in practice*:

> If you pluck from the shelves of almost any university library a set of standard texts on educational research, you can expect to find discussion that divides approaches to research into two categories, quantitative and qualitative. The categories are often then associated with two paradigms, respectively, positivism and interpretivism, which may in turn be associated with science and non-science, or with natural science and social science. We appreciate that these dichotomies are offered with the intention of making research methodology easier to understand. But the use of dichotomous categories can be misleading. For instance, we do not think that there are quantitative or qualitative methodologies as such, only quantitative and qualitative techniques. (Swann & Pratt, 2003, p. 4)

And regarding the contributors to that volume, they also noted (ibid.):

> The trouble with the positivism/interpretivism dichotomy is that it excludes many approaches adopted by researchers. None of the nine educational researchers who contributed to the book describes themselves as either a positivist or interpretivist. Also, and of no little importance, the practice of equating science with positivism ignores 70 years of debate in the philosophy of science— … Popper (1934) [1972]—and disregards the diversity of scientific endeavour. Many scientists are not positivists.

Swann and Pratt's point challenges our field to move beyond positing a false dichotomy of positivism and interpretivism, where scientists who are not positivists tend to be misrepresented as positivists. Indeed, when positivism is argued to be the cause of injustice and environmental degradation, interpreting a researcher's work as 'positivist' is often used to signify that empirical/analytical research irrevocably contributes to injustice and environmental degradation. Such attributions are not only unfair to the researcher, but also to those who might actually benefit from their efforts. As I argue below, to bridge this schism requires an updating of the epistemologies and philosophies of science in environmental education and research that directly affect what we count as knowledge and how we conduct, interpret, and guide our inquiries in environmental learning.

Furthermore, while it may not appear to be the case in the literature, quantitative researchers have long acknowledged the need for better theory to help identify what questions are important to ask, and to make sense of the data collected through quantitative research. Unfortunately, it appears that attention to the expressed need for theory and theoretical sensitivity tends to be marginalized, especially by those social scientists that have followed Campbell's (1963) dictum to be value-free and emphasizes empirical findings, even as Campbell modified the original stance. House and Howe (1999) excellently critique the early Campbell and suggest how to move past the positivist–interpretivist divide.

Research

As has been previously noted (see Scott & Gough, 2003, p. 96 and EER, Volume 9(2)), the tremendous quantity of findings about learners' beliefs and the relationship of environmental educators' actions to changes in those beliefs are challenging to summarize, as are developments in research methods and methodologies of inquiry to generate findings. Given the conceptual and theoretical challenges noted above for comparing and interpreting research, there is the need to develop better methods for interpreting the generalizability of results and recommendations based upon them. Single or small N case studies have tremendous value, especially for exploring the complexity of learners' beliefs and experiences, and identifying what questions are important to pursue. Yet when research in environmental education is undertaken with little to no random selection of participants, or controls for treatment, it becomes challenging to generalize beyond those persons involved in the original studies. This situation arises primarily as the result of insufficient support (or researcher disinclination) for researchers in environmental education to devote the time and energy to conduct large-scale research projects using sophisticated research designs. The lack of long term, broad-scale and multi-level inquiries that use advanced methods to control for potentially intervening variables results in the development of a body of research that lacks generalizability and transferability. Existing small-N and non-random studies must be carefully interpreted within their methodological confines and contributions to avoid the fallacy of overgeneralization.

Because of our reliance on non-randomized or intentional study designs, it is critical that practitioners and researchers in environmental education acknowledge that we have virtually no generalizable evidence (at a $p=>90\%$) to richly characterize K-12 learners' experiences, knowledge, attitudes and behavior; or the relationship of these characteristics, including causal relationships, at the international, national, state, province, or regional scale for any setting. This holds true (nearly) for adults, though there are a number of valuable sets of polling data (under-utilized in environmental education) of adult environmental beliefs in many countries. It would help enormously if researchers made clear the limitations of their findings, and when they contribute to a large picture, so stakeholders in the field can be aware of the highly contingent nature of our knowledge about environmental learning. This amplifies the point made in the opening section of this paper concerning the need to identify and use clear standards for when, despite this situation, we believe we have sufficient evidence to make warranted judgments about learning and teaching. This is clearly the case since environmental education research to date has been largely non-randomized, providing little ability to use inferential statistics to generalize beyond the group that was studied. We should also use the fruits of interpretive inquiry (with its in-depth focus with small groups of people) and the findings of small scale, non-randomized studies. Another enormous challenge to synthesizing the findings is in our lack of a reasonably agreed-upon set of definitions in our work. This reflects a lack of due attention to research and conceptual theorising that also contributes to the challenges in developing clear definitions of the concepts we use to investigate these

questions, and can make comparison of what was studied, and the implications for environmental learning, nearly impossible. This last point can hardly be overstated.

An apparently increasing trend for the field is to draw upon both substantive content and developments in research methods from other fields, such as sociology, psychology, and political science, as Ballantyne *et al*. (1998) did with psychology in their study, and Ernst and Monroe (2004) have done in using general linear models more widely used in political science, psychology, and sociology. These two papers demonstrated how environmental education researchers might respond to the need for: (1) increased consideration of the theoretical foundations of environmental education, particularly the purposes of education; and (2) increased attention to the standards for research that are emerging in other disciplines in the social sciences, particularly those concerning measurement theory.

Ernst and Monroe's (2004) work is sophisticated, using generally well-characterized assessment instruments, controls, and multiple linear regression. Their study included a relatively large population (N=412) of students from 11 Florida high schools, pre- and post- survey test measures with open ended and closed items, and interviews of students and teachers. They controlled for pretest scores, grade point average (GPA), gender, and ethnicity, and concluded that their results supported use of environment-based education to increase middle and high school student critical thinking skills. They distinguished important concepts rather finely (critical thinking and dispositions to use those skills). However, it is difficult to evaluate what they assessed because the testing items were not included in the article. This ubiquitous problem, often a matter of publishing constrictions, is a serious challenge in reporting and evaluating environmental education research. Their research did control for environmental content, by ensuring that it was included for all students, but the research report would have been enhanced had they noted that they did not control for significant additional resources and effort brought to the learner from educators whose self-appointed purpose was to test the curriculum. In addition, a major variable in their study that was not adequately addressed in the report concerns the difference in the teaching methodologies used. The control groups were taught using what appears to be a variation of scholastic learning, of memorization, with limited lab work to engage learners actively in memorizing set material. The environmental education curriculum sought to engage the learner using constructivist methods. Thus, the research appears to be a study of comparative teaching methodologies.

Ballantyne *et al*'s (1998, p. 285) work sought to critically review, 'education and social science literature concerning intergenerational influence' and outline an approach 'to guide future efforts in research and programme development aimed at encouraging students' to act as catalysts of environmental communication and learning beyond school boundaries'. Their work drew on a body of literature suggesting the potential effectiveness of educational approaches that aim to teach students pro-environmental actions and skills and encourage them to share these skills in the home and community, and to achieve this, school environmental education programs could be designed to help students become competent and motivated to act responsibly to do just that. Ballantyne *et al*'s (1998) paper impressively drew upon other disciplines

to show there is sufficient evidence to support educational strategies of engaging learners in investigating and taking actions on environmental problems in their community. However, they caution educators who would use their strategy (teaching children to engage their families and communities in pro-environmental behavior) not to indoctrinate children by telling them exactly what to do or coercing them. Both articles emphasize the importance of engaging the learner in actively exploring environmental issues, and, given the sociopolitical aspects of the issues, with Ballantyne *et al*'s work, building and enhancing action skills.

Practice

In my review of environmental education research, there appears to be a significant, albeit unrecognized, consistency in findings from research that provide justified recommendations for researchers and practitioners in terms of how we should work with learners.

Learning theory in practice

There may be the most convergence around learning theory, where constructivism appears to have become the accepted norm, and myriad variations of it have been developed. Interestingly, the variations incorporate differing ideological and epistemological stances that veil this convergence.

Educational methodology

Applying the analogy of learning and teaching as two sides of a coin, the agreement on the usefulness of constructivist learning theory suggests the value of educational methods designed to achieve constructivist learning through semi-structured learning experiences designed by an educator. These experiences should help learners experience the natural environment, gain direct acquaintance with ecological processes—their fragility, human need for them, human impact on them—and gain the skills needed to investigate how to take effective actions on their environmental concerns (which are critical thinking skills). The latter would include understanding of how to: analyze the human dimensions of environmental problems, identify feasible solutions, and take action on the student's own convictions of what needs to be done in response to an environmental issue.

To achieve this contextualization of environmental knowledge, educators are increasingly focused on engaging practitioners and learners in research that is meaningful to them. There appears to be near unanimity of opinion in environmental education research that providing students with significant opportunities to conduct a guided inquiry into the sociopolitical aspects of an environmental question, be it through participatory research, action research, critical reflection, or issue investigation, is a key teaching methodology for facilitating environmental learning. For example, Hungerford *et al*'s Investigating and Evaluating Environmental Issues and Action

Curriculum (2003) is founded upon respecting learners' own interests and perspectives, having them identify and conduct, albeit guided, an investigation into environmental issues, interpret their findings, and report out to their group what decisions they have made for themselves about the state of the environment, people's belief about it, and what the students believe they want to do about it. There is use of quantitative methods, yet the learner is encouraged to construct the meaning of their experience and choose what, if any, actions to take, based on what they value, in order to change their situation. When I focus upon these essential elements of teaching methodology, there appears to be much in common between this approach and action research (Brody, 2005) and participant action research.

Curricular content

With curricular content, I observe affirmation that it is important to develop learner understanding of ecological processes, human impacts on them, and human need for ecosystem amenities. There appears to be increasing recognition that we not only need to teach ecological knowledge, but also to develop learner understanding of the sociopolitical systems that affect human beliefs and actions towards the environment, and develop their skills and dispositions for engaging these systems (Hines *et al.*, 1986; Ballantyne *et al.*, 1998; Hungerford & Volk, 1990; Kyburz-Graber & Rigendinger, 1997; Ernst & Monroe, 2004).

There is, however, a complex debate concerning the importance of knowledge, addressed in *Environmental Education Research* Volume 8(3) (2002), as the perceived gap between knowledge and pro-environmental behavior, and will not be addressed here, except to note a troubling development in the interpretation of Hungerford and Volk's 1990 work, i.e. that changes in environmental knowledge do not change environmental attitudes or behavior. Hungerford and Volk reported that the traditional model used in environmental education to describe learning as a simple linear process of the educator teaching knowledge that changed attitudes which changed environmental behavior was wrong, suggesting the need to include other conceptual variables that preceded knowledge (including sensitivity), and complex feedbacks. Their conclusion about knowledge might be usefully restated as the view that knowledge gains are a necessary but not sufficient aspect of learning. Hungerford and Volk made no explicit epistemological claims about what counts as knowledge, and further exploration of their views would be enormously helpful.

Looking ahead

The growing schism in environmental education about how to work with learners, based on differences in epistemological frameworks, threatens our ability to draw productively on the diversity of work being done. Developments in critical pragmatism from the humanities, including black studies, feminist theory, and in sociology, particularly European schools, have shown how it is theoretically and practically possible (and desirable) to use both quantitative and qualitative methods in ways that

appear sensible to those interested in reconstructing our beliefs and social systems in order to improve our environment and our lives. Meyers (2005) suggested how these variations in critical pragmatism (post-modernism) are related to the classical pragmatists, and would benefit from reexamining that relationship, particularly for how quantitative methods were treated, and the value of finding warranted assertions to guide our work, assertions regarded as working beliefs that are expected to be revised in the future. It would be of enormous benefit for environmental education to make a concerted effort to draw upon such insights to engage and reduce the growing epistemological and methodological schism.

I am not suggesting that I expect us to be able to develop and agree upon one epistemological theory or one educational theory to guide research and practice. Rather, my overview argues that the field is almost at the opposite point: theory is often seen as useless by practitioners; many research papers are too thin on theory (though rich with research methods) that it is difficult to identify where they are situated in relation to a philosophy of science or educational epistemology, and; it is difficult to identify any leading set of epistemological theories in our field, and meaningfully identify exactly what is different and similar about each. These are needed to help us make better sense of an evidentiary base (be it qualitative or quantitative) that we use to support learners by identifying valuable content and skills for their curriculum, a point similar to that made by Reid and Nikel's (2003) response to Rickinson's review of environmental education research (2001). Without an ability to understand what distinguishes different theoretical approaches, it is difficult to make sense of how they differ in their implications for practice, to develop research that will help us advance them, and to interpret the results of our work to improve them. This state of affairs accounts for part of the challenge of providing an overview of progress in environmental education research, and our difficulty in developing a shared understanding of the meaning of our findings (even if we disagree with each other), be they through interpretive inquiry or quantitative methods, for practice, research, and theory.

Looking ahead, I recommend that we make a concerted effort to identify the standards for what to count as knowledge, based on the efforts suggested above, and use these to help us collectively summarize our research findings for the field. Fortunately, Dewey's pragmatic epistemology showed how to utilize conceptual analysis (interpretive inquiry) and empirical and quantitative methods while recognizing that knowledge developed through them is contingent, is situated in socio-political circumstances imbued with unjust allocations of wealth and power, and is value-laden. Our field would do well to carefully examine how his theories, regarded as the genesis of postmodernism (Ryan, 1995; Boisvert, 1998) might be updated to provide a common epistemological foundation for the divergent methodologies of use to our field. He, as many of us do, sought to identify the aims, epistemological approach, learning theory, educational methods, and curriculum content that we can use to improve the lives of learners and others, in part by developing educational methods and content that sought to reconstruct society by focusing upon learners' struggle to make sense of the world, identify values to guide their actions, and empower them to

be citizens who engage the sociopolitical institutions of their day to improve their own and the common good. The field must rise to Dewey's pragmatic challenge to combine excellence in technical specification with attention to the meaning those specifications produce in theory, research, and practice.

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