Environmental education: A time of change, a time for change ☆

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ABSTRACT

We join the authors in this special issue in their call to embrace a culture of evaluation. Obstacles to change are formidable. Educators debate their purpose – provide knowledge or achieve environmental goals – and we have limited evidence of the effectiveness of environmental programs and policies. Change requires collaboration across organizations and disciplines, targeted capacity building, and building systems of assessment into programs that enable more sophisticated evaluations. As in other fields, an evidence-based movement will increase the credibility and effectiveness of environmental education. A culture of evaluation offers educators a solid platform to collaboratively and efficiently achieve society's environmental goals.

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The field of environmental education is in flux, and contributors to this special edition recognize that not only is environmental education changing, but also that it must change. It must accept responsibility to change human behaviors now as well as empower future generations with the understanding and tools necessary to solve the environmental problems that our generations are creating. Improvements will require the environmental education community to embrace evaluation into its culture. By doing so, we will improve the community's ability to efficiently hone the lessons and activities that develop sustainable human behavior. We believe that the field of environmental education is both contributing to and learning from the 'adaptive management' used in other fields. Adaptive management is an iterative process that combines "design, management, and monitoring to systematically test assumptions in order to adapt and learn" (Salafsky et al., 2008). Integrating adaptive management and evaluation into programs, whether in the field of natural resource management or environmental education, involves similar knowledge, skills and processes. The essays contained in this issue provide both a background perspective on the theory of program evaluation, as well as practical case studies and resources for readers more interested in the how-to of evaluating environmental education

programs. We sincerely hope that this issue is read, considered, and influences the behavior of evaluators and educators.

1. Why the field must change

Many people want to protect the environment and conserve biodiversity, and, as Heimlich notes, many environmental organizations have similar fundamental goals. Flowers highlights the billions spent annually on conservation and environmental education—a fraction of the enormous investment in the design and implementation of a comprehensive portfolio of environmental problem solving approaches (environmental education is considered an approach). Some estimate that over $120 billion is spent each year on ecosystem protection in the U.S. alone, and there is a demand for evidence that approaches are effective (Christensen, 2002; Leverington & Hockings, 2004). However, like programs, policies and practices in other environmental disciplines such as biodiversity conservation and environmental management, environmental education programs, as reported by every author in this edition, do not routinely undergo quality evaluations and there is limited evidence of their efficacy (Blumstein & Saylan, 2007; Ferraro & Pattanayak, 2006; Kleiman et al., 2000; Pullin & Knight, 2009; Saterson & Christensen, 2004; Sutherland & Pullin, 2004).

2. Debating the role of environmental education

One fundamental obstacle to gathering evidence and improving our understanding of program efficacy is that the environmental education community still debates the role of environmental education. Should education enable citizens to make decisions or

should education be more proactive and work to change people's behavior? We find this debate troubling because we feel that there is simply no time to waste: if we wish to 'save' the environment and conserve biodiversity, we must change behavior. The Millennium Ecosystem Assessment (MEA) involved the work of more than 1300 experts worldwide and assessed the consequences of ecosystem change for human well-being (MEA, 2005). The MEA warns that Earth and its populations are in a time of crisis characterized by climate change, pollution, invasive species, global threats to biodiversity, over-exploitation, habitat change, and loss of ecosystem services. We must consume less, reduce our carbon footprint, and consistently make decisions that result in protection of biodiversity, ecosystems and our future well-being (MEA, 2005). We believe that environmental education has a fundamental role teaching people to both respect nature and behave in a way that will ultimately preserve it. Humans must adopt more sustainable lifestyles. We think that Heimlich's contribution explains this clearly.

Even more distressing is that the debate over the role of environmental education distracts us from focusing on the efficacy of environmental education programs on two fronts. First, as Flowers and Jenks et al. point out, we do not know which programs and strategies are working well and which need to adapt and evolve or be eliminated. Second, and this places the role of education in the context of the larger environmental community, if the environmental community as a whole lacks evidence of the effectiveness and unintended outcomes of its practices and policies, those attempting to achieve environmental goals through education and social marketing are at risk of setting inappropriate objectives and teaching or advocating the wrong behaviors and practices. To put it simply, if we do not know what works, how do we know what to teach?

Creating "new patterns of behavior in individuals, groups, and society as an outcome of environmental education," as Heimlich puts it, can cause enormous and irreparable damage to environmental and social systems when there is no evidence of environmental benefits and where we have not drawn out the causal chain to expose unintended consequences. For example, cellulosic biofuel cropping systems have the potential to provide both social and environmental benefits if implemented appropriately; however, if we commit to producing globally significant amounts of energy with biofuels without evidence to guide policy, production practices and accompanying education initiatives, we will "change the landscape of Earth" (Robertson & Dale, 2008).

Evidence may also help to improve the objectives of programs and policies with educational components related to the social and environmental affects of locally sourced, organic, and genetically modified foods. For instance, and perhaps contrary to popular perception, buying locally may not lower an individual's carbon footprint (Loder & Finkel, 2008), refraining from red meat and dairy can reduce carbon footprint more than eating locally sourced foods (Weber & Matthews, 2008), and engineered crops can be developed to cope with climate change, enhance a crop's nutritional value and incorporate pest resistance that reduces insecticide related illnesses (Loder & Finkel, 2008). What role does evaluation play in this?

Evidence can focus environmental education programs and, according to Heimlich, change behavior. Stewardship activities, such as the Windows Into Wonderland program that Carlton-Hug and Hug present, are common aims of environmental education initiatives. Evaluation helps to identify the causal basis leading to outcomes. What *other* roles can evaluation play in the field of environmental education to make certain that evidence supports the environmental messages, behaviors and practices that comprise educational initiatives?

We believe that formal, systematic approaches to adaptive management, as presented by the Conservation Measures Partnership and applied by Jenks et al. (CMP, 2007), and evidence-based practice, as described by the Collaboration for Environmental Evidence (www.environmentalevidence.org) and Conservationevidence.com (Pullin & Knight, 2009; Sutherland & Pullin, 2004) provide a conceptual foundation and practical tools for change in the field of environmental education. We realize that the concept and process of adaptive management is not new to the field of environmental education, yet every author in this edition emphasizes the on-going lack of evaluation. Change starts with this common understanding, and like other evidence-based disciplines, the emergence of environmental education as a field that actively creates, values and uses evidence will be part of its developmental growth that requires effort and focus.

3. Why we do not know what works

Why do we not have a better understanding of what works? In a line, the community of environmental educators have not embraced evaluation. Carleton-Hug & Hug, Heimlich, and Jenks et al. all argue that we must adopt a culture of evaluation, and we heartedly agree. Without evaluation, there is no way to systematically improve our messages.

The lack of an evaluation culture creates many challenges to evaluation. Carleton-Hug & Hug report that the diversity of disciplines and organizations results communication gaps. This is particularly important because they note that the cultural and contextual differences are often the cause for a given environmental education program generating different outcomes with different audiences. However, by clearly articulating the goals and objectives of an environmental education activity (or project), whether during program design or through evaluation, we can facilitate evaluation. Without clear goals and objectives, evaluations will be of limited use in determining program success (Bellamy, McDonald, Syme, & Butterworth, 1999; Kleiman et al., 2000; Thom, 2000), and, like the rest of the environmental community, educators will continue to struggle to explain the purpose of activities (Salafsky & Margoluis, 2002).

As Fleming and Easton note, a lack of a culture of evaluation in organizations and in the field is a major obstacle to developing the capacity necessary for more sophisticated evaluation. Educators cannot be expected to properly evaluate programs if they lack the knowledge, skills, funding, and access to the expertise of professional evaluators necessary to do so. Fleming and Easton point to educating the educators as essential. Capacity building resources advocated by Carleton-Hug & Hug, Fleming and Easton and Zint will help address this need. Jenks et al. and Flowers have found (and our experience supports their arguments) that it is important to collaborate with stakeholders in project and evaluation design. We also find that collaborating with stakeholders in the design phases helps to prioritize goals and the level of effort and resources necessary to assess progress toward achieving them.

Our intent should be, as Flowers rightly notes, to design evaluation into education programs and conduct both formative and summative evaluation. Environmental programs must integrate evaluation into the program cycle (Charnley & Engelbert, 2005; CMP, 2007; Ferraro & Pattanayak, 2006; Hockings, 1998; Kondolf & Micheli, 1995; Knapp & Kim, 1998; McDuff, 2001; Salafsky & Margoluis, 2003; Vlaenderen, 2001). An enlightening example comes from Rare's successes: through a formal system of adaptive management, Rare has integrated evaluation into the design of its organization's projects and strategies. Evaluation, as Heimlich notes, can be part of a system that drives outcomes, and we see the opportunity for more organizations to follow the lead of

Rare and account for uncertainty and make a commitment to continuous improvement by building evaluation into programs from the start.

4. How do we change the culture?

We believe that the environmental education community must embrace the evidence-based movement that is well established in many other disciplines (Donaldson, 2008). The challenges to evaluation that Carleton-Hug & Hug identify are not unique to the field of environmental education. Rather than rediscovering evaluation, environmental educators are gaining enormous efficiencies by joining and learning from the efforts of others who are also building a culture that embraces evaluation. Likewise, the understanding and experience shared by Easton and Fleming, Heimlich, and Jenks et al., regarding the false assumption that changes in knowledge lead to changes in behavior, is evidence that the field of environmental education has a unique perspective that can help us manage environmental problems that depend on changing human behavior. Special issues, such as this volume, will help raise awareness of opportunities to avoid the perpetuation of false assumptions as well as highlight effective approaches for achieving common goals.

However, we must do more than simply raise awareness about evaluation and the opportunities—we must do it in a meaningful way. As Carleton-Hug & Hug note, the challenge is to develop meaningful and non-trivial project objectives and to design ways to evaluate projects' effects over longer time frames. The environmental education community should avoid the evolution of a culture that trivializes evaluation, with programs and organizations evaluating only for accountability requirements and out of fear, rather than as part of a systematic effort to improving and achieving outcomes.

Building an evaluation culture that values robust evidence suggests that properly designed before-after, treatment-control designs, as used in the active adaptive management of fisheries and forestry programs, should be considered more often (Blumstein, 2007; Holling, 1978; Johnson, 1999; Lee, 1999; Underwood, 1992; VanderWerf & Groombridge, 2006; Walters & Holling, 1990). Though the authors in this edition agree that there is a role for such designs, we encounter others who are resistant to using controlled studies. Rather than simply dismissing their relevance to environmental education (after all, each class could be viewed as an experimental unit), we believe that it would be more productive to consider and pursue opportunities to for such studies whenever possible.

By building evaluation into program design from the beginning, a program has the opportunity to develop criteria (e.g., feasibility, capacity, importance to the field, clarity of causal chain) to weigh alternative approaches and assessment methods. Thus, if the type of evidence required regarding success in achieving a given goal is amenable to a formal experimental design, then the program has the opportunity to shape the program to fit the need. However, should another goal in the same program not accommodate experimental testing, the program should justify this and account for it in program design. While we recognize that experimental and quasi-experimental designs may not always be possible, under-standing their value, and seriously considering their utility in program management, can help in the formative phase of a project. Accounting for appropriate variables given the program and its context, such designs may help quickly identify educational strategies that work, and those that do not.

Jenks et al. tell us that most conservation practitioners do not understand their own theories of change and are generally satisfied just to get the resources to do their work, saying that "we still do not have a robust toolbox of solutions that you can pull off a shelf." Rare is addressing the uncertainty about the effectiveness of activities, practices, and behaviors by adopting a formal system of adaptive management to build evaluation into the organization such that assumptions are regularly tested and learning and improvement is continuous. Rare is not using evaluation to justify or legitimize its work in general, but rather to isolate what works and adapt or "pull the plug" on what does not.

Building a culture of evaluation will create (as Heimlich notes) effective environmental education strategies. We believe that identifying sources of uncertainty and planning for and using what the environmental community learns collectively about evaluation and the efficacy of its practices will build the credibility and help us achieve society's fundamental environmental goals.

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