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An exploration of future trends in environmental education research

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An exploration of future trends in environmental education research

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This article describes future trends in environmental education (EE) research based on a mixed-methods study where data were collected through a content analysis of peer-reviewed articles published in EE journals between 2005 and 2010; interviews with experts engaged in EE research and sustainability-related fields; surveys with current EE researchers; and convenings with EE researchers and practitioners. We discuss four core thematic findings: (1) EE researchers are highlighting the importance of collective and community learning and action; (2) EE researchers are placing increased emphasis on the intersection of learning within the context of social–ecological communities (e.g. links between environmental quality and human well-being); (3) a pressing need exists for research conducted with urban and diverse populations; and (4) research around social media and other information technologies is of great interest, yet currently is sparse.

Keywords: environmental education research; research agenda; mixed methods; interviews; content analysis; global trends

Introduction and study background

The urgency and interdependency of environmental and societal issues lead many to believe that immediate actions are necessary to stem the tide of biodiversity loss, climate destabilization, resource overuse, and other concerns (Ehrlich 2010; Orr 2009; Steffen et al. 2011). Environmental education (EE) can engage people of all ages to make informed decisions about these and similar issues, and to undertake actions appropriate to their local context (NAAEE 1996; UNESCO 1978). With application in urban and rural contexts, and drawing from natural and social science, EE is a multidisciplinary, interdisciplinary, and transdisciplinary field (Krasny and Dillon 2012; UNESCO 1997).

In the past, EE research has focused on pathways to engagement with environmental issues through such areas as curriculum, which promotes the integration of EE into formal schooling (e.g. Bartosh, Tudor, and Ferguson 2006; Lieberman and Hoody 1998); character development, leadership, and other life skills, which may

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result from EE programming (e.g. Stern, Powell, and Ardoin 2010); significant life experiences leading to interest in environmental action and career choice (e.g. Chawla 1998, 1999; Tanner 1998); variables associated with proenvironmental action conservation behavior (e.g. Hines, Hungerford, and Tomera 1987; Kollmuss and Agyeman 2002; Zelezny 1999); and evaluation to address the effectiveness of EE initiatives in formal and informal settings (Ernst, Monroe, and Simmons 2009; Zint in press). These traditional questions find themselves enmeshed in new, sometimes complicated, movements of politics, ecological change, theory, academic disciplines, and political economy (Krasny and Dillon 2012; Stevenson and Dillon 2010). In many senses, the field is maturing to what Low and Altman (1992) described as the move from 'theory development' to 'theory consolidation,' from which we can derive lessons for practice.

To build the capacity of the field and help unify what, at times, can seem to be divergent voices, EE researchers and practitioners have become increasingly interested in considering where the field is situated in light of today's cultural, technological, social, and political contexts (Stevenson et al. forthcoming; Strife 2010). This reflexivity, critical to producing relevant scholarship, may also help prepare researchers to pursue agendas that inform emerging societal trends. To this end, numerous EE researchers have suggested potential agendas for research in EE and related fields (e.g. Fleishman et al. 2011).

Summaries of EE research in the 1970s (Iozzi 1981), 1980s (Marcinkowski and Mrazek 1996), and 1990s (Hart and Nolan 1999) provided insight into themes, settings, audiences, and methods of interest throughout the late twentieth century. The twenty-first century has also seen a number of efforts to articulate and focus research in EE. In 2005, Lucie Sauv  reviewed 30 years of EE literature and identified 'currents' by which EE could intervene in the human relationship to the environment (Sauv  2005). In describing the 'problem-solving current,' Sauv  (2005, 16) asks:

Must environmental education be fundamentally oriented towards problem-solving?
Must environmental education necessarily engage learners in action projects aimed at solving a problem? Or is environmental education a preparatory phase for action? ...
[C]onsidering the state of our world, would it be unethical to conduct environmental education without focusing on concrete problem-solving?

William Scott, the founding editor of *Environmental Education Research*, addressed the 2007 World Environmental Education Congress, reflecting on the 30 years since the world's first intergovernmental conference on EE (Tbilisi, Georgia (USSR), 1977) (UNESCO 1978). Scott suggested critical directions for EE research over the next 30 years (full text published as Scott 2009). He argued that:

... we need greater openness to new cultures ... and more understanding across cultures about who we are and what we know, and a stronger research focus on understanding the relationship between sustainability, society and learning ... [A]s an environmental education community, we need to reach out to other researchers and users of research, and especially to policymakers ... because they need to know more about the significance of what environmental education researchers do, and ... because we need to work with them if we are to make a significant contribution to resolving the issues the planet faces. (Scott 2009, 155)

In 2006, Alan Reid and William Scott reflected on the first 10 years of *Environmental Education Research* through a special issue titled, 'Researching

education and the environment: retrospect and prospect.’ They asked authors to recommend research foci and approaches for future work, and distilled the responses into a list, including an increased attention to ontology, epistemology, and theoretical approaches; dominant educational and environmental discourses; the relationship between EE, education for sustainable development (ESD), and other related fields; an interrogation and exploration of the relationship between theory and practice; and relationship between race, culture, and power, and its influence on EE and EE research; among others (Reid and Scott 2006, 245).

In 2010, the *Journal of Environmental Education* published a 40th anniversary edition focused on a prospective and retrospective of EE. Hungerford’s (2010, 68–69) epilog called for EE to focus on improving overall environmental quality and on the learner. He said that the tension between EE and ESD must be given continued attention, and that EE had matured substantially in the 40 years of the journal. Hungerford emphasized that current efforts in the field are ‘... making strides towards actualizing the fundamental meaning and structure of this discipline.’ (2010, 68)

Sections of the forthcoming *International Handbook of Research on Environmental Education*, edited by Stevenson, Dillon, Brody, and Wals, also focus on the direction of a future EE research agenda. Editor and author Stevenson emphasizes the need for research in understudied areas, such as worldviews and belief systems linked with individual identities; the contexts in which people live and work; people’s emotional responses to education/learning and the environment; language and discourse; and social learning (Stevenson 2011). Stevenson extends these areas to practice suggesting that researchers ask what meaning people construct related to environmental issues and encouraging researchers to think pedagogically from the student/learner perspective. This suggestion resonates with Rickinson, Lundholm, and Hopwood’s (2009) emphasis in their book, *Environmental Learning: Insights from Research into the Student Experience*, which presents case studies that emphasize learners’ perspectives on environment and call increased attention to learner needs in designing and implementing EE efforts.

We undertook our work to coalesce and review research across the field in a similar spirit: our intention was to look to the future of EE research, based in the field’s past, but not rooted so firmly as to stifle innovation. Presented with an opportunity to envision an agenda for EE research in the San Francisco Bay area (in California, USA), we conducted a study to explore directions for EE research, grounded in the field’s history and influenced by broader societal trends. This article presents only the beginning of that dialog and is intended to open the conversation around how we might conceptualize future directions for research in this diverse field.

Research questions

This article reports research driven by the question: *What environmental education research agenda would best inform EE research and practice of interest to the field broadly, with specific findings of interest to the San Francisco Bay area?* From January to June 2011, we conducted an exploratory mixed-methods case study consisting of interviews with EE and sustainability thought leaders; a content analysis of EE journals; convenings with EE researchers and practitioners; and an online survey with EE researchers. The interviews, survey, and convenings were designed to explore the question of future EE research trends. The content analysis focused

on the ‘areas for further study’ text in published journal articles. In the discussion, we report areas of convergence and divergence among the data collected.

To position the research within a futures orientation, we developed the interview questions, content analysis themes, and survey items within a framework of key global trends as suggested by various sources. Those trends included:

- The technology revolution (Silberglitt et al. 2006).
- The urban age (Cohen 2005; Nussbaum 2009; United Nations Human Settlements Programme 2010).
- The implications of the global economic situation; for example, the Great Recession (Economist Intelligence Unit 2006; National Intelligence Council (US) 2008).
- Global climate change and the globalization of environmental issues (Najam, Runnalls, and Halle 2007).
- The health and wellness revolutions (Kickbusch and Payne 2003; Larsen 2006).
- The rising interest in green; the rise of sustainability (Adams 2006).

In the interviews, we asked: *How do you think the following global trends might influence the field of environmental education research in the next 5–10 years?* In the surveys, we asked: *How would you rate these global trends in terms of how they might influence EE research in the next 5–10 years?* We asked survey respondents to rate the influence of each trend on a three-point scale of low–medium–high. In the content analysis, we examined for these themes in the text of the articles in sections, including disciplinary area, tradition and methodological area, theories in the field, relation to sustainable development and environmental quality, and setting.

Research methods

We conducted an exploratory case study because we had questions that focused on contemporary events within an active context; our work was situated within a particular space and time; our research questions explore the ‘how,’ ‘why,’ and ‘what’ of a phenomenon; and we did not require researcher control of the events being studied (Yin 2009). Within this tradition, our study used an exploratory, triangulated, mixed-methods design in which different but complementary data are collected to explore the same topic (Creswell 2007). Further, we followed a parallel, equivalent status design using the framework from Tashakkori and Teddlie (2005), where the qualitative and quantitative phases are conducted simultaneously and the primary data are assumed, *a priori*, to have similar weights or importance to the outcomes.

Our goal was to explore EE research trends from both the researcher and practitioner perspective; as such, among the data collection methods, we emphasized the content analysis and interviews. The data from the convenings and online survey were collected with the intention of incorporating additional voices and lenses through which to inform the primary findings.

Interviews

In-depth interviews ranging from 60 to 90 min were conducted by telephone or Skype (an Internet voice and video call software) with 15 EE, environmental communications, and sustainability researchers from around the world.¹ In advance

of the interviews, we provided interviewees with an overview of the aims of the study. However, we did not share the entire interview protocol with the interviewees in advance to avoid biasing them and to encourage top-of-mind, blue-sky thinking that would most freely garner their impressions, concerns, and visions for the future of EE research. The interview protocol included questions about the participants' past and current research, sources of research funding, collaborators, and career history. Interview questions also focused on identifying seminal work in the field and sharing insights into gaps and hot topics for further exploration. (see Table 1 for sample questions.)

The interviews were transcribed and imported into Dedoose, a qualitative and mixed-methods research software.² We coded the text to themes developed inductively during the coding process, and in collaboration with the coding categories emerging from the content analysis of the journal articles.

Content analysis

Recognizing the importance of situating this work in the history of our field (Reid and Scott 2006; Sauvé 2005; Scott and Gough 2003; Stevenson 2011), we undertook a content analysis of journal articles to better understand what researchers have identified as critical gaps in research conducted in the five-year period from 2006 to 2010 (inclusive). Specifically, we analyzed text recommending future research needs; such text is conventionally included near the conclusion of peer-reviewed journal articles.

We analyzed articles in six of the primary journals in the field of EE, focusing on 2006–2010 – years from which articles could be electronically accessed. We analyzed 554 articles, representing about 900 authors from over 400 institutions in 51 countries (see Table 2). We included research articles and editorials, but excluded book reviews. For each article, we gathered author data (gender and institution [type, name, and location]), position of authorship (e.g. lead author and

Table 1. Interview protocol: sample questions.

-
1. What is the most compelling aspect of your current work in environmental education? How do you see this work unfolding in the next 5–10 years?
 2. How do you think the following global trends might influence the field of EE and EE research in the next 5–10 years?
 - The technology revolution – for example, the rise of social media
 - The 'urban age' – for the first time more of the world's population live in cities than in rural areas
 - The 'great recession' – implications of global economic situation
 - The globalization of environmental issues – global climate change, overfishing, bioaccumulating toxic chemicals, e-waste, and so on
 - The growth of interest in, or concern about, health and wellness, positive psychology, concerns about obesity, and so on
 - The rise of 'green' – sustainable cities, technologies, and so on
 3. What other major trends/issues are keeping you up at night? How might they impact EE research?
 4. Imagine you have 60 seconds to describe the 'hot' topics in environmental education research in the next 5–10 years? What would top your list? Why?
-

Table 2. Journals included in content analysis (all 2006–2010).

| Journal name | Number of articles |
|--|--------------------|
| <i>Applied Environmental Education and Communication</i> | 104 |
| <i>Australian Journal of Environmental Education</i> | 55 |
| <i>Canadian Journal of Environmental Education</i> | 74 |
| <i>Environmental Education Research</i> | 186 |
| <i>Journal of Environmental Education</i> | 91 |
| <i>Southern African Journal of Environmental Education</i> | 58 |

second author), and article data (title, journal, year, volume, issue, pages, type of article, keywords, and location of research). We categorized each article as original research; program evaluation; essay and/or analysis; or other. We then gathered quotes from each article that described its topic, salient findings, and discussion of future research needs or priorities. We imported these data into NVivo9, a qualitative analysis data software program, and coded the ‘future research’ text into themes developed inductively during the coding process and with an emphasis on the previously described ‘trends.’ Figure 1 provides an example of how we developed thematic nodes for one topical area, sustainable development and environmental quality, based on journal article text where authors described connections between these themes and future research needs.

Convenings

We further explored EE research trends at two convenings of EE researchers.³ The first was held in May 2011 at Stanford University in Palo Alto, CA (USA), and included 17 researchers and graduate students who, although physically located in the San Francisco Bay area, represented research portfolios with national and international perspectives. The second convening was held in July 2011 during the 11th Invitational Seminar on Research Development in Environmental and Health Education, hosted by Monash University in Victoria, Australia. The Invitational Seminar engaged 33 EE researchers and graduate students from Australia, Brazil, Canada, the Netherlands, New Zealand, South Africa, Sweden, the UK, and the USA.

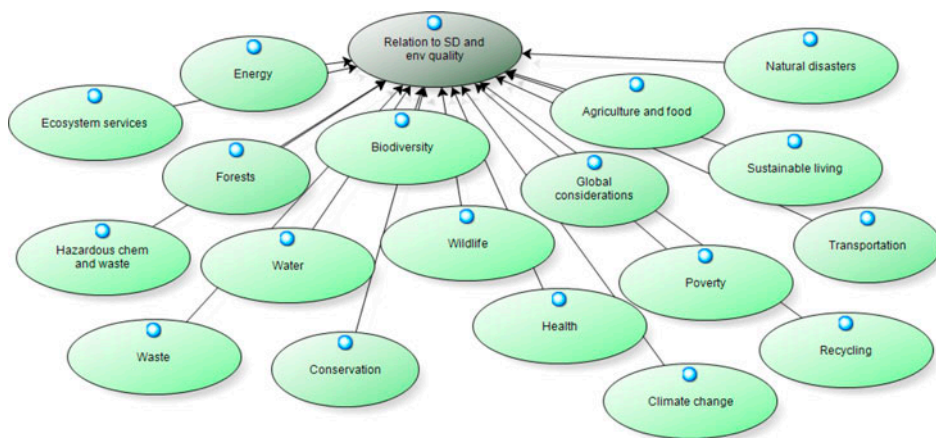


Figure 1. Sample coding diagram: sustainable development and environmental quality.

These convenings took the form of facilitated ‘conversation cafés,’ where participants engaged in open-ended dialogs about future directions for EE research informed by key global trends. In the case of the Stanford gathering, some elements of the discussion also included a lens of how future research directions might be contextualized within the San Francisco Bay area, although participants were encouraged to think broadly and not feel constrained by that geographic consideration. The conversational format recognized the importance of social learning and the socially constructed nature of knowledge (Brown and Isaacs 2005; Lave and Wenger 1991; Wals 2007).

Survey

Concurrent with the interviews, content analysis, and convenings, we conducted an online survey to gather perspectives from a broader range of self-identified EE researchers. Informed by initial themes arising from the other methods, and the six global trends, we developed the survey using an iterative process that included reviews of a draft survey by a panel of EE researchers ($n=6$). To improve clarity and usability, we revised the survey based on feedback received from the expert reviewers. The 20-item survey included open- and closed-ended items, organized into three sections:

- (1) Respondents’ views on emerging trends in EE research (e.g. broadly influential publications, future hot topics, influence of global trends on research, and research questions of interest).
- (2) The professional work of respondents (e.g. areas of study, where respondents submit work for publication, and influential works in their field).
- (3) Demographic variables (age, sex, race/ethnicity, country of residence, and educational background).

We issued invitations to complete the survey to members of three email listservs: (1) the Environmental Education Special Interest Group of the American Educational Research Association (AERA); (2) the Research Commission of the North American Association for Environmental Education (NAAEE), as well as registrants from recent years of the NAAEE Research Symposium; and (3) the research list of the *Environmental Education Research* journal. We also distributed survey announcements through the authors’ professional networks. The survey, which was administered through the online survey software program Qualtrics, was open from 25 May to 11 June 2011.

For quantitative analyses, we imported data from the closed-ended items to Statistical Package for Social Sciences (SPSS), version 18.0. We ran descriptive statistics on these data. We also examined for relationships among variables, such as respondents’ ratings of the impact of selected global trends on EE research, their frequency of submissions to selected journals, and demographic characteristics.⁴

For qualitative analyses, we imported data from the open-ended items to Microsoft Excel, which we used to organize our coding. We focused on coding the qualitative data to inform key themes that emerged from our other lines of inquiry. For the data reported in this article, we analyzed the responses to two open-ended questions in particular:

- (1) If you were given a year for sabbatical research anywhere in the world on the EE topic of your choice, please describe the EE research question(s) that you would address (2–3 sentences).
- (2) Please suggest one research question in the EE field on which you would like to collaborate in the next 5 years.

Working collaboratively and iteratively, two researchers developed five main coding categories for these two questions. We tested intercoder reliability by having each of two coders independently code 15 randomly selected responses (approximately 18% of the sample) from Question 1 – *What do you think will be the hottest topics in EE research over the next 5–10 years?* – and 15 randomly selected responses (approximately 18% of the sample) from Question 2 – *What topic would you like to study on your sabbatical research?* A Krippendorff's alpha test was run on each set of 15 items (Krippendorff and Bock 2009). The overall K-alpha was 0.82 for Question 1 and 0.96 for Question 2, demonstrating excellent consistency and reliability. Once we established acceptable K-alphas for the coding categories on both survey questions, the remaining responses were coded by a single coder.

We had 86 survey respondents, a satisfactory sample size for our purpose of cross-checking the data collected through the primary activities of content analysis, interviews, and convenings. Respondents were highly educated (54% held a doctoral degree and 35% held a master's degree) and experienced in the field of EE (26% have been in the field for more than 20 years and 36% have been in the field for 11–20 years). The mean age of respondents was 44 years old. Respondents were roughly evenly distributed in terms of sex (45% male and 54% female), but racial/ethnic diversity was limited, with 84% of respondents selecting white, 5% selecting Asian, 5% selecting Hispanic or Latino, and 9% selecting Other.⁵ Respondents in our sample did not indicate membership in the following ethnic/racial groups: African-American, American Indian, Alaska Native, or First Nations. Nearly half of our respondents resided in the USA (49%); other countries represented included, but were not limited to, Canada (22%), Australia (6%), and the UK (4%).

We asked respondents to select their current roles from a list of options, and respondents were allowed to make more than one selection. By far, the most populous category was university researcher (selected by 62% of respondents). The remaining respondents selected the following categories: other (28%), informal educator (28%), graduate student (27%), activist (23%), independent consultant (23%), or volunteer (23%).

Core thematic findings and analysis

Comparing data collected across all four methods suggested four recurring research trends. This section describes those themes with illustrations from each of the data sources.

A focus on community

Our findings suggest that EE and related research may be undergoing a shift in focus beyond individuals to communities. Some may argue that, rather than being a new direction for EE, this returns to the roots of EE as envisioned in the Tbilisi Declaration, which described EE as holistic, rooted in all aspects of community (UNESCO 1978).

In the convenings and interviews, tremendous interest existed in the numerous community groups and individuals who do not self-identify as ‘environmentalists,’ yet are members of communities focused on sustainability or groups whose actions are supportive of sustainability outcomes. For example, Arjen Wals, an EE researcher and UNESCO chair of social learning and sustainability, describes ‘hybrid learning configurations’ that blur boundaries between formal, nonformal, and informal learning (Wals 2007). Wals encourages the bringing together of multiple actors and organizations that, on the surface, may be divergent, but have the potential to create a multiplier effect for EE and the broader goal of sustainability.

A number of interviewees highlighted the potential of community gardens, farmers markets, and other forms of urban agriculture to serve as everyday life contexts and sites for bringing together social and ecological learning across diverse communities. In the following excerpt, one interviewee details how a community garden functions as a hybrid learning configuration:

A community garden ... provides a place for children to learn about connections between food and the environment, but it may also serve as a place for job training in horticulture or a site where elderly people or master gardeners tend community allotments and share their knowledge with local kids. In some cases, local restaurants use these gardens to grow local vegetables or exotic spices. They may cook a meal with the children for the community, using the ingredients they have grown together. For community developers engaged with social justice issues, the garden may be a site for empowerment of youth or under-served communities. The result is that a school, a senior center, a restaurant, a non-profit organization, a parents and tots group, may all be working independently on the common goal of converting school grounds into community gardens. Teachers and environmental educators need different kinds of competencies to guide such projects, to learn how to bring these groups together, and to facilitate the kinds of multi-generational, trans-disciplinary learning that such opportunities generate, while still connecting it to the curriculum of their students. They need to know who in society can become a part of their learning configuration and how to access them. (Interviewee 2)

Relatedly, in the survey, we coded for responses referencing place-based education or teaching about local places, communities, and issues. We applied this code to 6.9% of responses to Question 1 (hottest topics in EE research) and 4.7% of responses to Question 2 (sabbatical). For example, one respondent wrote a lengthy description of possible research on issues related to food and agriculture, and in doing so, traversed multiple community settings for EE:

I'd like to work ... on issues related to local agricultural systems: the ways that youth are learning (or not) traditional agricultural techniques and the ways that globalization of agribusiness is impacting local knowledge of agricultural systems. This research would include looking at the ways that schools integrate issues of local food production into their curricula, but also the informal (non-formal) methods that communities use to sustain traditional agro-ecological practices. It might also include the ways that young adults from diverse communities are ‘homesteading’ in small organic farms in the new local food movement in the US. (Hottest Topics, Respondent 6)

We also observed this shift to a community focus in the content analysis. We were inspired by a quote from McKenzie and engaged with her term ‘coalesced scholarship’:

We can track coalesced and coalescing bodies of scholarship and practice around place-holders such as ‘ecojustice’ education (e.g. Bowers 2001; Martusewicz in press), ‘place-based education’ (e.g. Gruenewald and Smith 2008), [but the] ... point is not what we call what we do, but how we understand and practise it, where it maps onto other approaches and where it does not, where we might usefully extend our palette of pedagogical ‘arts’ or ‘places,’ and how we too, as educators and researchers concerned with the social and the ecological, can coalition build at a range of scales. (2008, 368)

We think this term of coalesced scholarship aptly describes this theme, especially if one broadens the meaning of scholarships to practitioner, participatory, and collective work and thought. In reflecting on the 5th World Environmental Education Congress, Jickling et al. (2010) stated:

The results point to interest in exploring relationships between social and ecological systems, socio-cultural activism, social innovation, complex dimensions of culture-nature relationships, relationships within human communities and with the more-than-human world, Indigenous knowledge, and dependencies on ecosystems amongst others. (Jickling et al. 2010, 65)

A large number of the coded references spoke to the need for more research in conjunction with practitioners and the community. In fact, about two-thirds of the 102 references we coded to scholarship were contained in a set of subnodes directly related to collaborative, coalesced, and cross-cultural research (18 to ‘coalesced scholarship,’ 16 to ‘practitioner, policy-maker, research collaboration,’ 15 to ‘cross-cultural scholarship,’ 10 to ‘dissemination and research translation,’ and 9 to ‘capacity-building.’ All but one of the other 9 subnodes to scholarship were well below these frequencies (the exception was attention to historical basis, which had 13). For example, the most frequently referenced subcode under scholarship was that of collaboration – among researchers, practitioners, and policy-makers:

Further research is merited, including: identification of suitable topics and ways of involving wider members of the community in a continued community-based environmental education, alongside further consideration of the role of NGOs, informal learning spaces, farmers and agro-businesses in raising environmental awareness and supporting practices and behaviours to combat environmental degradation. (Waktola 2009, 603)

The previous quote hints at another aspect of many citations in this theme: the need for systems-level change, including consideration of links between individuals and communities, and the need for collective learning and action in addition to that by individuals.

By positing educational programmes, civic ecology practices and system-level changes as a series of nested feedback loops, the resilience framework also suggests questions about how educational outcomes for individuals might be linked to outcomes for surrounding communities. (Krasny and Tidball 2009, 478)

Authors discussed place-based education and the connection with one’s local environment, linking this to social and economic aspects of sustainability.

... [W]e know very little about the continuity of this learning and the extent to which outdoor experiences constitute a resource in discussions about environmental and

sustainable issues in other contexts: whether a strong attachment to the local environment also creates a strong environmental commitment in general; whether a concern for nature also leads to a concern for social and economic sustainable issues; or whether norms that are learned and followed in one community also function as guiding principles when participating in other social groups. (Sandell and Ohman 2010, 127)

The focus on policy, government, curriculum developers, and other decision-makers was echoed through the interviews, as revealed in this excerpt from a thought leader interview:

I'm really interested in the policy aspect and, for me, that's an underdone area ... in EE ... [W]e're living in a social and political environment that's not going to go away any time soon and we need to figure out ways to become better at working and engaging with those policymakers and government agencies ... That's a research gap we need to be thinking about filling. (Interviewee 7)

Connections between the social and the ecological

We also found consensus across our data points of an emerging and growing interest in EE research in the intersection of learning with social and ecological issues with a focus on social justice, health, well-being, and emotions. To this point, an interviewee said:

Increasingly, I think well-being, living well, having fulfilling lives, are seen as things EE ought to be interested in. Certainly, if you do take the work of [Herman] Daly or Donella Meadows seriously, then they are very clear in what the purpose of education and living is and that is to lead fulfilled lives ... So this putting together of environmental health is going to be a good thing. I think this is...a mainstream thing because the links between environment and social justice seem really clear, and health is a big aspect of all of that. (Interviewee 3)

With respect to the content analysis, many authors suggested the need for research to emphasize connections between learning and socioeconomic and ecological aspects of EE. In fact, among all the child topics we generated, the two that resulted in the highest number of coded references were those around ESD or education for sustainability (EfS) and cultural contexts. Further, both of these topics included coded references from each of the five journals analyzed, so the finding was broad.

In the 2006 retrospective special issue of *Environmental Education Research*, Reid and Scott wrote about a frequent tension between ESD and EE:

... [the] longstanding state of tension between camps for environmental education on the one hand, and ESD on the other ... might actually be a reflection of something of much greater significance: the tension between social justice and environmental protection arguments within the discourse around ecologically sustainable development; and also, perhaps, the tensions around whether environmental education goals are primarily educational or social (and where one draws the line here). (Reid and Scott 2006, 242)

From the interviews, it appears that the tension between ESD and EE may be being supplanted by a broader concern about the ethics of sustainability and education, particularly as they relate to everyday lives:

If you don't deal with poverty, if you don't deal with some of these social issues, urban – and a lot of them are urban-related issues – if you don't deal with those kinds of things, you're never going to get beyond the personal and the social values. You're never going to get to environmental values. You're going to talk about survival first and worry about the environment next, which is almost like a basic human positioning in terms of survival. So, yeah, it's a really fruitful area to pursue. (Interviewee 12)

A number of studies argued for global perspective of those who teach and those who learn, including greater understanding of global justice issues:

There are only a few research studies focusing on how people orientate themselves within the world society and the grounds on which they can support the ideas of global justice. At this point, substantial research could give insights into the motives, values and orientations of various target groups. (Scheunpflug and Asbrand 2006, 42)

Authors often wished for a greater link from education to not only action, but further to environmental quality and human well-being. Ratnapradipa et al. (2010) provide an example of this in linking with our key global trend on health and wellness:

Further avenues of study for monitoring the environmental health in this community must continue to include community-based approaches in the design, implementation, and evaluation of health promotion interventions and programs in order to be sustainable and resource efficient. More funding and research with obstetricians, family practitioners, and public health facilities is imperative to convey important messages to this community. (2010, 260)

These findings are consistent with our survey findings, in which 32% of respondents to Question 1 (hottest topics in EE research) and 26% of respondents to Question 2 (sabbatical) described wanting to conduct EE programming and EE research that are oriented toward environmental sustainability. A number of respondents described environmental sustainability within a social context. For example:

I would engage in cross-case anthropological research to understand how local cultures are reacting to global phenomena (climate change, neoliberal economics, food supply issues, energy, etc.). I would want to look specifically at social complexity and the use/naming of natural materials as they relate to the ability to sustain ecological balance. (Hottest Topics, Respondent 26)

This rising interest in situated, contextualized, culturally embedded learning within social-ecological systems may suggest an increased interest in research paradigms that focus on identity and capacity building within a framework of sustainability. As one interviewee expressed:

How to design, develop, create, facilitate, evaluate, monitor, hybrid learning configurations that have some kind of planetary conscience – that is a new role I think for environmental educators. It's not so much about transferring new knowledge, or cognitive or behavior change – making people change their behavior. It's much more about capacity-building for sustainability. (Interviewee 2)

Another says:

I think education should be about identity and place and space and time, more than it should be about the simple skills that it tends to be. (Interviewee 9)

Interviewees and participants in the convenings (both researchers and practitioners alike) also emphasized the importance of integrating EE – and, by the same token, contextualizing EE research – into everyday life. As Robottom and Hart (1995) suggest, EE is critical in building competency to act as individuals and, collectively, to cope with the complexity, uncertainty, and contested knowledge of issues such as climate change, peak oil, or food security.

Related to this theme, our findings suggest that research questions around building competencies to live more sustainably within the complexities of everyday life will become more prominent in the next 5–10 years. Our findings also suggest a rise in questions around how integrated social–ecological systems shift the structure, agency, and identities of communities, students, teachers, and schools; and how this recognition might affect EE curriculum planning, policy, and practice.

The urban context

Interviewees and convening participants emphasized the rising importance of the urban context. They noted a pressing need for EE research conducted with people living in areas shaped by processes of urbanization. Given that cities bring together people from many socioeconomic and ethnic backgrounds – and that cities are not only social, but also biophysical entities – incorporating social values, social outcomes, and ecological outcomes into urban EE programs poses a distinct opportunity and challenge. Thus, interviewees, convening participants, and journal articles emphasized the importance of models that recognize the particularities of EE in cities. As one interviewee noted, this may pose a challenge, but also brings opportunities for EE research:

... EE research certainly needs to think about environmental action related to the quality of the urban environment much more than it has done historically, coming out of conservation education and the emphasis on habitat protection – all of which remains very important. But, of course, that raises the challenge for EE; how to think about increasing awareness of the links between wilderness areas and rural areas and urban areas – how those are linked to action in the city – how the ‘nature of cities’ impacts the rural and wilderness areas. (Interviewee 10)

Indeed, a plethora of city-based EE initiatives have emerged (see reviews in Tidball and Krasny 2010; also Berkowitz, Nilon, and Hollweg 2003) creating a rich, timely, and robust platform for EE research within an urban context. The interviewees provided examples of these kinds of programs, such as research related to urban EE programs mediated through technology. For example, the following interviewee described a program that connects youth with their local environments through a program using mobile applications (apps):

(T)hey got all of the students on their way to school to plug in a little carbon dioxide monitoring device ... to map the pollution levels on their journeys to school. [W]hen they got to school, they simply had to text their data stream from their phone to a particular number and then on Google Earth, it showed a [time-series] map ... of all of the different readings and measurements... on the way to school. So, again, in terms of transforming what they were learning, it went from something which a teacher would never imagine doing, because, simply, to organize this, it would be impossible, to a mobile device which has GPS ... [I]nstead of students spending all their time preparing data and saying, ‘I can’t make sense of this,’ they’re presented with, ‘So, what can we see about the pollution levels on the bridge to school?’ (Interviewee 1)

The importance of EE in urban and diverse contexts was noticeable in the ‘future research’ text analyzed in the content analysis.

This emphasis not only points to the importance of grounding education in studies of culture, including indigenous and multi-faith values and beliefs. It also highlights the fact that education for sustainable development is not a global imposition on countries and education systems but an invitation for them to explore the themes and issues, the objectives and the pedagogies that can make education locally relevant and culturally appropriate in the search for a better world for all. (Fein 2006, 67)

Authors reporting on work from a single city or area often asked that future work expand to a larger geographic area (Alp et al. 2008; Hsu 2009). Other authors (e.g. Hurlimann 2009; Shava et al. 2010) discussed the need for extension of research around urban settings, such as to adults or indigenous science settings.

The survey responses shed an interesting light on the rising, but changing, context of EE practice and research. Perhaps not unexpectedly, given EE’s historic roots in nature study, survey participants were more likely to think of EE in terms of ‘nature’ or ‘the natural world,’ rather than as urban settings. Here again, community gardens appear to be seen as a bridge between urban settings and the opportunity to engage people with the other-than-human world. The following response is typical of those falling into this category:

I am interested in learning gardens on school grounds. What are students learning about their connections with the environment right on school grounds and how does this relate to the academic content? (Sabbatical, Respondent 69)

The rise of the digital age

All of the interview participants highlighted social media and other information technologies as opportunities for further study in EE research. Whether the interviewees personally feared the impact of digital media as disconnecting people from experiences with nature, or whether they welcomed the opportunities for heightened engagement that such media brings, interviewees shared widespread agreement on the importance of this research:

... EE does have its Luddite faction ... that are very anti-tech, and I think we have to get beyond that sort of false dualism. We’ve always used tools, this just happens to be a new one. So I’m hoping there’s actually going to be more serious engagement and discussion about new technologies in EE. [That’s] not to say that there aren’t things we should be critical about ... But I also think that there’s lots of potential there, and I think we’re going to see more discussions about how we can actually use social media. (Interviewee 4)

Imagine kids in their classroom listening to a teacher talking; at the same time they know that in their pocket is their iPhone and all kinds of stuff is happening in the world that is so fascinating and interesting. Their social capital is in their pocket, so to speak. It’s very hard to ignore that; it’s almost like outside there are fire trucks going by and there are fires going on, but you’re not allowed to watch. You must watch the teacher in front of you. And I think how this is effecting the way we think is going to be very interesting – for environmental educators to find a way to use it or expand it, so to speak, and on the other hand, to create other spaces where people can live outside of that wireless, digital age. (Interviewee 2)

The interviewees shared stories of research of EE programs mediated through technology, such as in this example of technology enabling commuters to make more sustainable choices about urban transport:

... When you are driving a car and you are stuck in traffic, there's this app where you can see quickly where people in the same traffic jam are commuting to every day. You can actually get in touch with people, for example, one mile from where you are in the traffic jam and start setting up carpool arrangements ... [A]s environmental educators ... we need to think more creatively about what kind of apps we ... should develop to help improve sustainability. (Interviewee 2)

Scholars wrote in the EE journals both about the need to research technology in accomplishing EE, and also about the need to better use technology. Open-access technology was specified in communicating about this research.

Environmental education scholars are making use of online, open-access technologies to contribute to the public global environmental cause. If so, is it the most effective use of these technologies, based upon the Wikipedia evidence? And if not, why is environmental education under-using open-access technologies? I encourage environmental education researchers to begin to explore and assess the ways (and the degrees) in which they could use their scholarly and communicative talents to take advantage of open-access technologies, to launch their positions into the public commons, and make their scholarly impact more accessible for the public good...Now is the time for environmental education researchers to open their imaginative possibilities as to what would happen if we meld environmental education research with youth's digital talents and open-access technologies ... (Korteweg 2007, 180)

Types of technology that could prove beneficial were also highlighted – from social media, to creative dissemination and translation approaches, to uses of technology both for research and practitioner training. The following quote, for example, interweaves themes of collaborative community learning and technology:

Future research could use Global Information Systems (GIS) to consider neighborhood level differences in effort. It may also be useful to better understand whether educators' perceptions of community needs are synchronized with the community's perceptions of their own information needs. Interviews revealed that [working environmental professionals] work collaboratively. Future research concerning the network relationships between education organizations may help understand the generation and perpetuation of common education programs. (Cutts, Saltz, and Elser 2008, 48)

Although nearly all survey respondents (93%) indicated that they found 'the rise of social media' to be a medium- or high-impact trend, few referred to media, communication, or information technologies in describing EE research they would like to conduct. Only 10% of respondents to Question 1 (hottest topics in EE research) and only 4% of respondents to Question 2 (sabbatical) indicated interest in any of these areas. One respondent was emphatic about the potentially powerful impact of EE on sustainability outcomes:

[I would research] the increased importance of social media in making environmental change. The power of media in all its forms can be used effectively to manipulate the mentalities into a more sustainable way of living. If the media can spread the message and influence, environmental action can be taken from all levels of society. (Sabbatical, Respondent 45)

Delimitations, limitations, trends, and future research opportunities

Delimitations and limitations

We recognize the somewhat tautological nature of our inquiry: we framed our study with six societal trends that influenced the questions we asked, thus influencing the responses we received. However, these trends have been noted on a broad scale; they have been cited as influential by numerous and diverse sources, as noted in this article's introduction. Therefore, we saw the trends as creating a platform for productive dialog, rather than predetermining the outcome.

Additionally, we acknowledge that the three primary researchers (the authors) most frequently conduct our research and practice in community and informal settings. Thus, our greater familiarity with these settings may have affected how we framed the study and/or interpreted the results. We attempted to address this potential bias by collecting data from many sources, including a range of voices among our informants, and, when possible, letting the informants speak for themselves through quotes, such as those highlighted in this article. Further, we hope that our use of qualitative data analysis software (NVivo, Dedoose) helped organize the significant amount of textual data collected in a manner to provide accurate and reliable subsets of data in particular themes. Our data analysis team also included a Ph. D. candidate in a curriculum and teacher education program with a background as a classroom teacher. Moreover, as a validity check, we discussed our preliminary findings with colleagues whose research focuses on formal settings.

Finally, the content analysis, in particular, posed some methodological challenges. We acknowledge that difficulties arise when attempting to parse complex research articles into discrete categories for coding purposes. Further, we were systematically investigating for text on 'future research needs,' a topic not found in all articles, and often mixed with discussion of study limitations (i.e. how a future study could be better accomplished rather than how it could extend the work), or of ongoing plans by the authoring investigator (what the author is already planning to do next, rather than how other researchers could extend the work).

For these, among other reasons, we emphasize the humility we bring to the task of presenting the findings herein. In the course of conducting this research, we have developed tremendous respect for the passion, creativity, and rigor brought to the field of EE by the thousands of dedicated researchers. We recognize the extraordinary diversity of perspectives on EE and related research – what it is, what it should be, to what ends, and with/for whom, among other philosophical questions. For this reason, we do not purport to suggest that our findings are *the* trends for the field, but rather *some* trends that reflect our specific geographic setting, research questions, research and methodological assumptions, and epistemological orientations.

Trends and opportunities for future research

In light of these caveats, and based on what our findings suggest, we recognize exciting opportunities for the vibrant field of EE research. EE and its research may be refocusing on collective and community learning and collective action. The relevance of EE research seems to be expanding as EE intertwines with health, justice, resilience, and other frameworks that recognize social–ecological interconnections (Collins et al. 2011; Krasny and Dillon 2012; Palmer 2012; Tidball and Krasny 2010). With the predominant shift of the human population to urban settings and the rise of the digital age, people are increasingly looking for opportunities for

connection – for a sense of community and well-being in alignment with the natural, online and human-built environments (Ito et al. 2009; Kellert 2005; Louv 2011).

In addition to the areas highlighted in this article, another frequently occurring theme in both the content analysis and researcher survey was the need for additional work on behavior change and related theories. As has been true for some time in EE journals, researchers continue to aspire to clear direction on the contribution of awareness, attitude, knowledge, skill, intention, value, competence, and social norms on behavior change. However, based on the overall combination of emphases we found in our work and also based on the great deal of attention given elsewhere to themes related to environmental behavior (e.g. Chawla and Cushing 2007; Heimlich and Ardoin 2008; Kollmuss and Agyeman 2002), we chose to highlight other trends here.

Yet another strong area of interest highlighted in many of the research retrospectives was the perceived insularity of the EE research community, which some suggested may hamper the field's ability to effect change with regard to issues related to either education or environment. The content analysis, for example, revealed authors who decried the prevalence with which EE researchers look inside the field (Potter 2009, Scott 2009). Partially for this reason, a number of the thought leaders interviewed emphasized that they do not self-identify as EE researchers, despite the prominence of their work in and influence on the EE field. One said:

If I were to be very critical of EE and environmental educators, I would say that they have lacked ambition, that they have been far too content at being a large fish in a small pond. They ought to have had ambition to take a greater risk, make a greater impact ... if your president or prime minister invited you into say what was the most effective research was in your field was that you were aware of and how it could help solve societies problems, what would you say? ... I'm not sure I'd be able to say anything. (Interviewee 3)

Whether or not insularity is indeed the state of the game for EE (Wojcik, Ardoin, and Clark in prep), this perception in and of itself may erode allegiance to the field among EE researchers. Frustration with the insularity and (lack of) impact of current practices risks hampering capacity of EE researchers and practitioners to create and identify with an influential EE research agenda. Subsequently, this may limit the field's ability to be innovative in its research agenda and, ultimately, have impact on outside audiences. Yet, this is a critical time at which the EE research community can play a vital role in shaping education and social policy that will impact people's lives and the sustainability of the planet. In fact, questioning whether the perception of insularity is indeed true and, if so, exploring how to expand the field both theoretically, as well as in application, could be a useful exercise, particularly as we consider connections with other disciplines and fields.

One final area of recurring concern that arose from among the various methods was related to the inaccessibility of research findings and the difficulty of translating research into practice. Concurrently, researchers conveyed a concern about the challenges of applying findings from specific audiences and contextualized settings to other audiences and settings. Some research has been done in this vein (e.g. Rickinson's (2005) study exploring how educators use research to inform practice, and the difficulties with attempting this direct application), but this appears to be an area warranting further research.

With this research, we hope to once again initiate dialog around the future of EE research; we invite others to contribute to what we have shared in much the same way that we have attempted, humbly, to build on what others before us have done. Our findings suggest many opportunities for EE research, and emphasize the importance of linking EE research efforts to broadly relevant social, ecological, and economic trends. The philosophical perspectives, theoretical lenses, research traditions, and practical tools that EE research can bring to bear on complex socioecological issues make EE researchers particularly well suited to engage in research at multiple scales that is both innovative and highly relevant for society. We believe this can be accomplished by staying rooted in our history as a field committed to the community context (UNESCO 1978), drawing upon the field's pedagogical and social foundations to engage people in productive and motivating dialog, and pursuing EE research that addresses the complexity of our changing world.

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Notes

1. Interviewees included, but were not limited to, editors or co-editors from the following journals: *Australian Journal of Environmental Education*; *Canadian Journal of Environmental Education*; *Children, Youth, and Environments*; *Environmental Education Research*; *International Journal of Science Education*; *Journal of Environmental Education*; *Local Environment: The International Journal of Justice and Sustainability*; and *Southern African Journal of Environmental Education*.
2. Dedoose was developed by Professors Thomas Weisner and Eli Lieber from the University of California Los Angeles (UCLA).
3. The researchers also co-hosted two additional convenings with EE practitioners – one in Washington, DC, USA, with national-level practitioners, and one in San Francisco, California, USA, with regional practitioners. The research questions described in this article were presented at both convenings and data were collected related to EE research questions of greatest interest to practitioners in the next 5–10 years.
4. We report on findings from these analyses and other findings from the survey data in (Ardoin, and Wojcik in review).
5. The percentage sums to greater than 100% as respondents were asked to select all applicable categories.

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