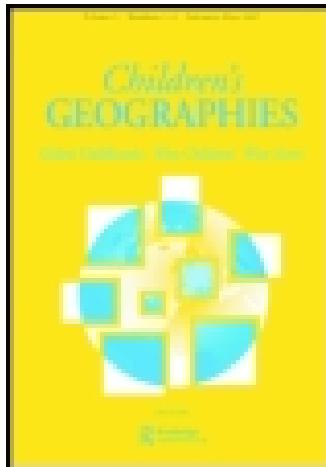


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Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/cchg20>

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Published online: 22 Apr 2015.

To cite this article: Nicole M. Ardoin, Maria DiGiano, Kathleen O'Connor & Nicole Holthuis (2015): Using online narratives to explore participant experiences in a residential environmental education program, Children's Geographies, DOI: [10.1080/14733285.2015.1033615](https://doi.org/10.1080/14733285.2015.1033615)

To link to this article: <http://dx.doi.org/10.1080/14733285.2015.1033615>

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Using online narratives to explore participant experiences in a residential environmental education program

Nicole M. Ardoin^{a*}, Maria DiGiano^b, Kathleen O'Connor^c and Nicole Holthuis^d

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(Received 10 January 2014; accepted 18 March 2015)

Field-based, residential environmental education programs are immersive, science-rich learning experiences that aim to achieve educational, personal growth, and behavioral outcomes. Evaluations of such programs typically use pre- and post-surveys or interviews and, in some cases, participant observation. Understanding how participants respond to, and make meaning of, their experiences in the moment is an understudied facet that could improve program outcomes; thus, this study explored participant narratives of their experience through online journaling, or 'blogging'. We piloted the blogging activity with students during their participation in a four-to-five-day program and conducted follow-up retrospective evaluation upon students' return to the classroom. Our findings demonstrate that connection to place, personal growth, and identity were critical aspects of the participant experience; these aspects may be conditioned by participants' previous nature experiences, as well as access to nature. We reflect on the utility of blogging in assessing intermediary and ultimate programmatic outcomes.

Keywords: environmental education; blogging; national park; field science; evaluation; nature

Introduction

How children interact with the world around them has been the subject of rich inquiry across many disciplines. Scholarship has evolved from thinking of children as adults 'in the making' to considering them as social actors who experience the world in fundamentally different ways from adults, while also being subject to structural constraints similar to those that affect adult experiences (Holloway 2014). Despite this recognition, there remains a paucity of research conducted from the perspective of children and, therefore, opportunities to enrich our understanding of how children experience their places and social spaces (Linzmayer and Halpenny 2013; Holloway 2014). Innovative methods, many drawing from visual representation, provide promising avenues to explore the distinct ways in which children experience, and make meaning of, the world around them (cf. Clark-Ibanez 2004; Linzmayer and Halpenny 2013, 2014; Ardoin et al. 2014).

In particular, children's experiences in nature¹ are garnering attention due to dialogues sparked by youths' increasingly urbanized lifestyle, characterized by what Louv (2005) terms 'nature deficit disorder'. Research suggests myriad benefits of spending time in nature, including

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improved health outcomes, cognitive functioning, and overall well-being (Bratman, Hamilton, and Daily 2012). Many researchers (e.g. Wells 2000; Taylor, Kuo, and Sullivan 2002; Wells and Evans 2003) argue that spending time in nature, and natural settings, has social and health applications for children. Moreover, broad multi- and interdisciplinary research interest exists among a range of scholars in this, and related, topics from fields ranging from environmental psychology to environmental education. Children's experiences in nature may be important precursors to undertaking environmental stewardship and civic engagement around environmental issues, fostering connectedness to nature, developing positive environmental attitudes, and motivating pro-environmental behaviors (Chawla 1999, 2009; Wells and Lekies 2006).

Environmental education, which is an active, lifelong, problem-solving process, focuses on developing attitudes, values, knowledge, and skills to address environmentally related issues and engage in stewardship behaviors among participants of all ages (UNESCO 1977). Environmental education can take place in a range of settings – from urban cityscapes to classrooms to national parks – and can include a variety of temporal forms – from hour-long guided programs to multi-day residential experiences (Ardoin, Biedenweg, and O'Connor 2015). Among these, residential learning experiences are characterized by their immersive, field-based qualities, including at least one night spent on site. Such programs, of which there are more than 300,000 each year (Lawrence Hall of Science 2013), may provide some youth with their first intensive exposure to the natural world, or – for others – may extend previous nature or science learning experiences. Often, the aim of residential environmental education programs is to create a memorable, positive experience that catalyzes further environmental learning and fosters environmental stewardship (NatureBridge 2012; Lawrence Hall of Science 2013; Ardoin, Biedenweg, and O'Connor 2015).

Despite the potential impact of such programs, understanding how participants experience, respond to, and make meaning within the context of residential environmental education programs is limited (Ardoin et al. 2014; Ardoin, Biedenweg, and O'Connor 2015). Indeed, disentangling the impacts of such programs is further complicated by the fact that participants come to these programs with a range of previous nature-related experiences, as well as from diverse socio-economic and cultural contexts. Research from a variety of fields suggests that race, class, and gender, among other attributes, shape concepts and experiences of nature and how individuals interact with the natural world (Linzmayer and Halpenny 2013). Yet, ideally, environmental education is designed to meet participants where they are, sparking interest in learning about the environment and becoming engaged in environmentally related activities as appropriate to the individual, context, and setting. Often, environmental education works toward achieving these outcomes through pursuing intermediary, short-term goals, such as fostering place-based connections, personal growth, and environmental identity (Zint 2013; Ardoin, Biedenweg, and O'Connor 2015).

Program evaluations are commonly designed to include such short-, medium-, and long-term metrics of program performance to allow educators to assess success toward meeting their ultimate goals (Zint 2013). However, often these evaluations focus primarily on what happens before and after the environmental education experience through pre- and post-experience surveys or interviews, rather than what happens *during* the environmental education experience (Ardoin et al. 2014). Moreover, these *post hoc* evaluations generally are conducted using tools that are educator- or evaluator-driven, thus producing findings that are one step (or more) removed from the actual participant experience.

Therefore, this study had two main objectives. First, during the course of an immersive, residential environmental education program, we explored how youth participants made meaning of their experiences by using online journaling, also known as 'blogging'. Second, we investigated how blogging could be used as an embedded research-and-evaluation tool to better understand participant experience and, ultimately, to consider progress toward the program's intended outcomes.

Understanding participant experiences in environmental education programs

Researchers and practitioners have long sought to demonstrate how, when, and why environmental education programs achieve their intended outcomes. Common intended outcomes, such as fostering and enhancing environmental learning and stewardship, are often considered in terms of cognitive, affective, and behavioral categories (Zint 2013). Environmental education evaluation efforts have had varying degrees of success due, in part, to the fact that ultimate outcomes may only become apparent months or years later, making it challenging to disentangle program effects from other life experiences (Carleton-Hug and Hug 2010; Ardoin, Biedenweg, and O'Connor 2015). Secondary or intermediary outcomes – such as connection to place, personal growth, and environmental identity occurring during the environmental education program – may be important steps toward achieving the desired outcomes and, therefore, suggest opportunities for evaluating program efficacy. These intermediary outcomes can be challenging to measure, especially using traditional evaluation tools, as they are process-oriented and highly dependent on participant characteristics (Ardoin, Biedenweg, and O'Connor 2015).

Understanding how participants construct meaning from their environmental education experiences is critical to characterizing intermediary outcomes. Researchers have argued that program impacts are shaped from the meanings participants attribute to their experience (D'Amato and Krasny 2011). Chawla's (1999) work on the relationship between significant life experiences, environmental sensitivity, and action suggests that meaningful experiences in nature during childhood may foster positive outcomes later in life, such as environmental awareness and stewardship. Environmental education programs can play a pivotal role in creating these kinds of significant experiences for youth. Understanding how participants interpret and internalize their experiences within environmental education programs – especially in terms of the aforementioned intermediary outcomes – is, therefore, critical in linking the environmental education experience with its potential long-term impact.

Outcomes of interest in residential environmental education

Historically, environmental education has converged on outcomes that stem from the classic definition, which suggests that environmentally related attitudes, values, knowledge, and skills are critical to informing citizen action (UNESCO 1977). With this holistic understanding, several common intermediary outcomes are apparent in residential environmental education programs (Ardoin, Biedenweg, and O'Connor 2015): connection to place, personal growth, and identity. These outcomes are viewed as interconnected and change holistically as a system rather than as independent parts. Thus, while our analysis considered each of these outcomes separately, we recognize that they are intertwined, both theoretically and practically.

Connection to place

Understanding how children interact with, and make meaning of, their spatial environment has long been at the heart of children's geographies. Research has demonstrated children's varying – and often distinct from adult – conceptions and value-judgments regarding place (Travlou et al. 2008; Lee and Abbott 2009; Ramezani and Said 2013). Sense of place is gaining increasing attention in resource management more broadly (Trentelman 2009; Williams 2014), and within environmental and place-based education in particular (e.g. Ardoin, Schuh, and Gould 2012; Kudryavtsev, Stedman, and Krasny 2012). Although sense of place is conceptualized in many different ways (Trentelman 2009; Lewicka 2011; Williams 2014), it is often envisioned as incorporating place attachment and place meaning (Stedman 2003; Kudryavtsev, Stedman,

and Krasny 2012). Some researchers have distinguished these elements by describing ‘place attachment’ as representing ties between people and places, and ‘place meaning’ as referring to the symbolic associations with places that define people’s individual and cultural identity (Stedman 2003).

Parsing these concepts of place for purposes of measurement and evaluation reflects the diverse epistemological perspective of researchers engaged in place studies (Lewicka 2011), which range from phenomenological to more positivistic (Trentelman 2009; Williams 2014). Researchers working within the social/discursive approach to place, which emphasizes place meanings and relationships, draw primarily on qualitative data – often interview or ethnographic – seeking to develop deeper understanding of how individuals and groups are situated within places and settings (Cresswell 2004), emphasizing the ‘lived experience of place’ (Manzo, Kleit, and Couch 2008).

Research suggests that ecologically informed sense of place may be influential in promoting behavioral intentions and pro-environmental behavior (Ryan 2005; Scannell and Gifford 2010). Emotional affinity to nature, as theorized by Kals, Schumacher, and Montada (1999) and Kals and Ittner (2003), may be rooted in positive experiences in nature that are inherently grounded in, and inextricable from, the place itself. Therefore, many environmental education programs strive to nurture and enhance a sense of place (e.g. Vaske and Kobrin 2001). However, the mechanisms by which sense of place is enhanced, and whether it is relevant beyond the specific program, are not entirely clear, thus leaving room for further study.

Personal growth

Many environmental education programs also focus on outcomes related to personal growth among participants as both intermediary and ultimate outcomes (Ardoin, Biedenweg, and O’Connor 2015). Hungerford and Volk (1990), for example, identify variables related to environmental sensitivity, empowerment, and feeling a sense of ownership toward, or personal investment in, environmentally related issues as predictors of environmentally responsible behavior. Research on immersive, field-based, adventure education programs, such as Outward Bound and National Outdoor Leadership School (NOLS), often highlights participants’ personal transformations as a result of spending time in nature (Hattie et al. 1997; D’Amato and Krasny 2011). D’Amato and Krasny (2011) note that participants frequently discuss personal growth concurrent with a desire to shift toward more pro-environmental behaviors. Similarly, a sense of empowerment and self-confidence resulting from overcoming personal challenges or taking on new roles may be associated with pro-environmental behaviors (Hungerford and Volk 1990; Pooley and O’Connor 2000; Chawla and Cushing 2007).

Another facet of personal growth is the development, support, and enhancement of interest. Some studies (e.g. Ballantyne and Packer 1996; Bogner 1998) find that outdoor and environmental education programs develop students’ motivation to learn and foster more positive views toward caring for the environment. Ardoin et al. (2014), for example, demonstrate how residential environmental education programs can spark interest in the environment via an array of triggers. Thus, for this study, we consider two aspects of ‘personal growth’ that have been found to positively affect participants’ experiences in nature: antecedents to personal growth and the ways in which they manifest.

Identity

Identity may be thought of as the amalgam of ‘drives, abilities, beliefs and individual histories’ (Marcia 1980, 159) that shape our behavior and interaction with the world. Drawing on the

work of Vygotsky (1978), Holland (Holland et al. 1998; Kempton and Holland 2003), and others, we take a socio-cultural view of identity, in which identity is dynamic and develops through practice and social interactions. According to Vygotsky's social development theory, children learn, and make meaning of, their environments through shared experiences and social interaction. For children, exploring their environment is integral to gaining autonomy and self-concept beyond their parents (Hart 1979). As children develop and move through different contexts, their identities evolve in a recursive manner: Prior experiences shape subsequent ones, and different aspects of one's identity become more and less salient, situationally. Individuals continually work to make claims about who they are (Goffman 1959).

In light of this perspective on identity, we examine how students talk about themselves and the activities in which they engage. In addition, we explore environmental identity as a subset of children's broader identity, specifically examining how children identify with the natural environment and its protection. Work by Kals, Schumacher, and Montada (1999) and Kals and Ittner (2003) suggests that, at an early age, children may develop an environmental identity, encompassing positive emotional reactions to nature, concerns about environmental risks, and even a sense of responsibility to reduce those risks.

Scholars disagree about whether and how environmental identity relates to responsible environmental behaviors (Kempton and Holland 2003). In environmental education, the goal is for students to incorporate environmentally related practices into their regularly used strategies, tactics, and ways of understanding the world. However, the relationship between environmental education and identity is complex and multidirectional (Payne 2001), and research has shown that students' identities can impact how they experience environmental education in the moment, as well as subsequent outcomes of such programs. Tzou, Scalpone, and Bell (2010) suggest that the positive effects of these programs may be diminished in cases where program goals clash with participants' identity. Thus, they recommend that environmental educators work to make connections between the places where environmental education occurs and students' own daily, lived experiences, and 'home' places. Moreover, the identity/programmatic relationship can be bidirectional: although participants' identities can influence program impacts, identity can also be affected by such programs. Subtle changes in students' identities, for example, can result from enhanced connections to place (Vaske and Kobrin 2001).

Online journaling as narratives of participant experiences

Chawla (2009) and others call for evaluation that delves more deeply into the learning processes that occur during environmental education experiences, with a focus on how knowledge, values, and attitudes may be transformed into environmental action. To characterize how participants experienced a field-based, residential environmental education program, we complemented retrospective focus group discussions with *in vivo* methods. We employed a narrative approach that encouraged participants to use their own words to tell the story of their experience via blogging during the course of the program. We built on the work of scholars who have used participant-elicited narratives to highlight the meaning(s) and significance of environmental education experiences (e.g. Schusler and Krasny 2010; Almers 2013).

This approach draws on both cognitive and social constructivist views of learning, focusing on the interplay of the individual with other participants, the environment more broadly (including physical spaces and socio-cultural context), and the writing process (Archer, DeWitt, and Wong 2014). Constructivist theory suggests that, through writing and other activities, students are provided the opportunity to construct meaning from their experiences (Piaget 1972). By engaging in a discursive process such as writing, students go through an internal negotiation in which they make sense of new information or understandings by rearranging their cognitive

understandings of the world. In this way, language is a means of sorting out one's thoughts (Michaels, Shouse, and Schweingruber 2008).

Of course, language also enables the sharing of ideas and, thus, once students' blogs are made public and/or receive a response, a type of dialogue is established. Social constructivist theory emphasizes the importance of society, culture, and language (Vygotsky 1978; Lemke 2001), viewing the construction of knowledge as a social process and stressing the fundamental role of language and dialogue in shaping meaning (Wertsch and Toma 1995). Using Vygotsky's (1978) notion of social construction, Driver et al. (1994) argue that observing and experiencing are necessary, but not sufficient, for learning; discourse and analytic reasoning are needed. In other words, students must be provided with more than just experiences; they also must be given opportunities for authentic, open-ended discussions (either verbal or written) with each other.

Blogging presents new opportunities for eliciting such writing and sharing. Today's 'digital kids' (Hsi 2007) employ digital media and tools to increase knowledge, participate in communities of knowledge/social networks, construct meaning, and enhance connections to people and places (Ito et al. 2008). Multiple studies have examined the performative nature of blogging and social media among youth, with particular attention to how youth construct and express their identities through digital expression (Buckingham 2008; Ito et al. 2008; Papacharissi 2011).

Despite their prevalence, digital forms of communication and learning have not been widely integrated into environmental education programs or research; thus, opportunities exist to further explore the role of technology in environmental learning. Although some have criticized the use of technology as detracting from children's authentic experience in nature (e.g. Louv 2005), others argue that technology provides a comfortable avenue through which digital kids can engage with the, at times, unfamiliar territory of nature (Arnold 2012).

Setting, sample, and methods

Setting

We conducted this study,² which considered blogging as a tool for exploring and understanding youth participants' experiences in field-based environmental learning, in partnership with NatureBridge, a nonprofit provider of residential environmental education in US national parks. Our study took place at NatureBridge's Golden Gate campus, located in the Golden Gate National Recreation Area north of San Francisco, California. Programs were four or five days long and included activities such as hiking, hands-on science labs, team building, art, and visits to historical sites within the park. In addition to teaching environmental field science, NatureBridge (2012) aims to foster personal growth, interpersonal skills, sense of place, and responsible environmental behavior.

Participants

We recruited participants from the pool of schools attending NatureBridge in fall 2012. Our selection criteria were that the two participating classes would include students of approximately the same age range. Given the limited number of schools attending NatureBridge programs within our predetermined timeframe, our sample was restricted to 59 fourth- and fifth-grade students from two San Francisco Bay Area public schools.

The two groups demonstrated differences in demographics, as well as in access to technology. School 1 is located in San Francisco and serves a predominately Latino neighborhood. School 2 is located in an affluent suburb of San Francisco.³ In School 1, student access to computers is limited

to bimonthly computer labs, whereas School 2 provides either a computer or iPad for each student in the classroom. Aggregate data on School 1 indicate a high level (more than 90%) of students participating in free or reduced-price meal programs, compared with School 2, where fewer than 10% of students participate in free or reduced-price meal programs. Level of participation in these school lunch programs is suggested to provide some indication of the socio-economic status of student households (California Department of Education 2013), and studies have linked socio-economic data with home access to computers, finding that youth from higher socio-economic backgrounds are more likely to have access to technology at home (Warschauer and Matuchniak 2010). Given this, we have assumed that School 2 students may have greater access to computers at home than School 1 students.

Data collection methods

We made initial classroom visits to both schools to introduce the project to the students and teachers.⁴ We used an online journaling platform that allowed us to strictly monitor content of, and access to, the blog (for privacy of the participants). In addition to posting comments via their individual user accounts, study participants could upload multimedia content, such as pictures and videos. Neither of the classes, nor any of the individual students, had established blogs before the research project.

Researchers asked participating students to write their first blog entry prior to the NatureBridge program (two days for School 1; 10 days for School 2). The purpose of the pre-trip blog entries was to obtain a sense of what the students thought were important aspects of themselves and their everyday lives. Students were instructed to write about what they would want a blog-reader from another school to know about them and where they live. Students from School 2 also wrote about what outdoor activities they enjoy. Participants wrote 56 total pre-trip blog entries (21 for School 1; 35 for School 2).

Upon arriving at NatureBridge, students were divided into predetermined hiking groups of 11–13 children. Each group was guided by a field science educator and accompanied by two or three adult chaperones. Participants spent the majority of their activity time within these small-group configurations for the duration of the program.

To provide additional insight into participants' blogs, researchers were also participant observers, spending each day with a hiking group and observing activities. At the end of each field day, researchers guided students in a 30-minute reflective session to create blog posts using iPads provided by the research team. (See Table 1 for blogging prompts.) Researchers also encouraged participants to write freely about their experiences. Participants created 148 blog entries while on the NatureBridge campus (40 for School 1; 108 for School 2).⁵

After the NatureBridge trip, researchers visited the schools and conducted focus groups with participants. At School 1, 14 students participated in two focus groups four weeks

Table 1. Blogging prompts.

How would you describe Marin Headlands to someone who has never been here?
What things about Marin Headlands are like the place where you live? What is different?
Write about something you have learned about here at NatureBridge and how you will use that information when you get back home.
What would you like to learn more about?
What activities did you like? Why?
Write a letter to other kids who will be coming to NatureBridge. What do you want to tell them about this place? What advice do you want to give them?

after their trip. At School 2, 20 students participated in two focus groups seven weeks after their trip. Although researchers allowed these conversations to flow organically, they did have guiding questions, including asking students to reflect on the following: their highlights from the NatureBridge trip; aspects of the trip that elicited emotions such as surprise, excitement, or fear; experiences at NatureBridge that were novel to them; and any changes they had made since returning home. The retrospective data helped illuminate what aspects of students' NatureBridge experience may have been salient even weeks after the program ended. When individual consent allowed, focus groups were recorded and transcribed for analysis; when individual consent did not allow, a researcher took detailed notes. Researchers asked School 2 participants to write blog posts reflecting on their trip, thus producing 24 post-trip blog entries.

Data analysis

Over the course of the two pilot tests, participants generated 228 blog entries, including 56 pre-trip entries, 148 entries during the program, and 24 post-trip entries. We analyzed the blog entries and focus group transcripts using NVivo 10, a qualitative data analysis program. We began with a deductive coding scheme; the *a priori* themes that guided our initial coding included place, identity, and personal growth.⁶ Two researchers worked collaboratively on data coding. Through an iterative process, the researchers modified the coding scheme to include more specific sub-categories within each of these themes. The text of blog entries and focus group transcripts was coded to all relevant categories. As such, an individual participant's narrative might fall into all three of the main themes. To ensure inter-coder reliability, two researchers independently coded a subset of blog entries and then discussed and resolved discrepancies in coding for any themes with an agreement level less than 80%. They repeated this procedure three times, resulting in levels of agreement over 90% for all themes, which content analysis researchers contend is a desirable level of agreement (Lombard, Snyder-Duch, and Bracken 2002). The researchers then proceeded to independently code the blogging data using the agreed-upon coding structure.

We compared coding across themes by school and over time (pre-trip, *in vivo*, and retrospective). To do so, we cross-tabulated our data and determined the relative weight of coding to each theme by school and/or time step.

Findings: themes of place, identity, and personal growth in participant narratives

Connection to place

Place was the theme most frequently described by participants, with more than 50% of coded content. We noted when students wrote or discussed their descriptions of the area, the activities in which they engaged while at NatureBridge, how the place made them feel, and any comparisons or contrasts they made between the NatureBridge site and their home environment.

Based on blog data, participants seemed to experience and feel connected to place primarily through program activities and direct experiences in nature. Participants often described the place in sensory terms by noting, for example, the feeling of the wind or the cold, and even taste: 'Did you know that ice plants look like ice when you open them up and taste like salt?' (School 2). Some participants articulated poetic descriptions of the beauty of the place, making statements such as, 'The ocean looked like a HUGE painting and we wouldn't be able to look at it from another angle unless we walked another 10 minutes' (School 2). We found that students' place descriptions focused primarily on the biophysical elements – animals, the beach, plants – and,

to a much lesser extent, on other key aspects of place identified by scholars, such as the psychological, socio-cultural, and political-economic dimensions (Ardoin, Schuh, and Gould 2012). This finding is not surprising, given the relative emphasis of NatureBridge programming on natural aspects of place (NatureBridge 2012).

Participants' affective responses were interwoven with references to place-related activities and descriptions of place. For the most part, affective responses were positive, with frequently used words describing the experience including 'fun' (95 mentions), 'cool' (49 mentions), and 'awesome' (38 mentions). A few participants expressed negative affect, using terms such as 'scary': 'On the way to the lighthouse, there is a tunnel that was made through the mountain by the Chinese, all handmade, no dynamite. It was kind of scary' (School 2). Another student stated, '... it was tiring, but worth it', when describing a hike (School 2). Kellert (2005) argues that 'negativistic values' of nature may be just as important as love and esthetic appreciation of nature in developing an environmental ethic. Indeed, many of the students' negative affective expressions in their blog entries were also accompanied by positive expressions: 'We walked across the suspension bridge, above the creamy, milky, foaming, white ocean. It was fun and scary' (School 2). Emotional connections, as demonstrated in the affective descriptions in participant blogs, may be important mediators to developing place connection (Lewicka 2011). Further, emotional affinity to nature, as theorized by Kals, Schumacher, and Montada (1999) and Kals and Ittner (2003), may often be rooted in positive experiences in nature that are inherently grounded in, and inextricable from, the place itself.

Entries written during the program often described place-based and program-related activities, including hiking, playing games, visiting the beach, participating in lab activities, or reading a story with the field science educator. One participant said:

Yesterday night we went on a night hike to the beach with our educator, Michael.⁷ He first told us to go near the ocean, but not too close, and feel around in the shaded part of the sand. I didn't know what he meant, but did it anyway. Soon, there were tiny stars in the sand, coming out one by one and then quickly disappearing out of sight. (School 2)

Participants described activities that were novel and out-of-the-ordinary when compared with their normal school and home routines. One wrote, 'We also did a Solo Hike. It was great because we saw and listened to the plants and animals out in the wild, unlike when I am with my friends, because I talk, talk, and talk with my friends' (School 2). In the retrospective focus groups, one participant commented, '[NatureBridge/the program] was fun for me because it was my first time going camping and first time going hiking a lot' (School 1).

Often, these activity-focused descriptions included references to new, place-specific knowledge that participants acquired through the activities. Many participants wrote about an area known by NatureBridge instructors as 'Ice Plant Hill', which is covered with an invasive plant species (*Carpobrotus edulis*, ice plant). To help control and/or locally eradicate this invasive species, field science educators teach the participants about the plant, discuss issues related to invasive plants, and encourage participants to roll down the hill to trample the ice plants. Many participants blogged about the experience, describing not only their affective response ('super fun'), but also the rationale behind it. One wrote, '[Field science instructor] Linda told us that ice plants are not good for the native plants who live there as ice plants suck up water. Some of the native plants that live there are lupins [sic] and coyote brush' (School 2). Echoing the novelty of the place-based activities, a School 1 participant wrote, 'We even rolled on the ice plants. It was fun because we don't do that in San Francisco.'

In some cases, researchers explicitly prompted participants to compare their home to the NatureBridge setting. Students' descriptions of these differences and similarities included:

I have never seen a dolphin and a deer. I usually just go to the zoo. In the zoo I see the usual animals.
 (School 1)

It's kind of similar to [my town] because it reminds me of a little city that doesn't have a downtown, yet we are right next to a city with a downtown, just like [my town]. It's also different because it is way more country like, but it's kind of hard to feel like the country because it's right next to San Francisco.
 (School 2)

One participant's blog (School 2) contrasted the NatureBridge experience with her urban home setting by saying, 'I don't want to leave [NatureBridge] because I am in the nature and not in the city.'

Participants' connection to place appeared to be conditioned and influenced by social experience of place with their peers. A School 1 participant said, 'The other good thing about NatureBridge is that you get to have free time for more than one hour and you get to have a lot of fun with you're [*sic*] friends or hang out.' In retrospective focus groups, several participants mentioned that they had returned to the same national park or visited a new outdoor area with their families, but it was not the same without the presence of peers. These findings allude to the importance of social context in fostering place attachment, as noted in previous research (Trentelman 2009; Lewicka 2011; Williams 2014). Further, as demonstrated by Ardoin et al. (2014), peer interaction is not only enjoyable, but it can also trigger interest in, and engagement with, the natural world.

Many participant narratives characterized nature and the program setting itself as something distinct from their home environment. This contrast was heightened by the novel experiences of participants on site, perhaps even more so for School 1 participants, many of whom had never seen the ocean. School 1 students were particularly struck by NatureBridge's non-urban setting. In his research on teens in nature, Haluza-Delay (2001) found that the disconnection that can occur between 'nature' at the environmental education program site and at home may translate into a sense of hopelessness and powerlessness for participating youth, resulting in a challenge to bridge concerns about the environment and environmental action. For this study, we did not deeply investigate how individual concepts of nature (shaped by aspects such as participants' worldview, cultural background, and previous experiences with nature) may have impacted participants' emotional response and connection to place. Certainly, this suggests an opportunity for more in-depth research to elucidate how sense of place and varying conceptions of nature may impact how participants incorporate the knowledge, skills, and behaviors experienced in the field setting into their everyday lives (Haluza-Delay 2001).

Personal growth

Personal growth was another common theme (14% of coded content) of student narratives. Specifically, we analyzed two aspects of personal growth: overcoming challenges (both physical and emotional) and knowledge acquisition.

Physical challenges most often referred to hiking activities. During a focus group, one School 1 participant said, 'For me it was scary when we went to the really big mountain and had to climb for a really long time.' Emotional challenges included references to being away from home and family, a theme that spanned the duration of our data collection, with students anticipating this challenge before the trip, experiencing it during the trip, and having overcome it after the trip. In a pre-trip blog entry, a School 2 student wrote, 'I am feeling nervous, since I've never left home without mom before, not even for a sleepover!' During the trip, a School 2 participant noted, 'Miss my parents, but staying brave.' In a post-trip focus group discussion, a School 2

student stated, 'After, when I came home, I felt really independent, because I've never been away from my parents for a whole week, like without other family.' Both physical and emotional challenges were described in positive, affective terms, suggesting that students overcame their challenges and developed emotionally in the process. In the School 2 blog, a participant described surmounting a challenge: 'We finally made it to the top of Wolf Ridge mountain ... I felt proud once I climbed the mountain because I had never hiked this long in my entire life.'

As illustrated by the examples above, narratives highlight participants' sense of empowerment after overcoming emotional and physical challenges. This finding is consistent with previous research in the field of outdoor education, which relates overcoming challenges with personal growth (D'Amato and Krasny 2011). Although *in vivo* blog entries may have focused more on overcoming physical challenges, retrospective blog posts reflected themes such as a new-found sense of independence and self-reliance gained during the environmental education experience.

Students often referred to knowledge they acquired during the program, as discussed in place references. For many participants, the informal experiential learning environment characteristic of environmental education programs stimulated participants' knowledge gain and sparked participant interest in program content. A School 1 student wrote in a blog entry, 'I will like to learn about waves. I want to learn about how the waves work, and how are they help us in life. Learning about waves could help me in school.' Positive affective responses such as these may be indicators of situational interest, which may impact long-term, sustained interest and engagement in environmental and science learning (Azevedo 2011; Ardoin et al. 2014). In this sense, knowledge acquisition and interest may be considered facets of personal growth experienced during the program.

The following excerpt from a School 2 focus group conversation illustrates the impact of the NatureBridge environment on students' experience as learners:

I liked it because it was really calm, and there was nobody really there. We were just all there, I mean when we were hiking and everything, we were all there by ourselves just learning, and it felt really calm, and ... it was easier to learn. I mean it wasn't noisy at all. It was more fun to experience it than just sit in a class ...

Identity

The final common category (15%) that students wrote about and discussed was identity. We coded identity into four categories: descriptions of self, nature experiences, roles, and conceptions of the environment.

A majority of the journal entries coded to identity were written before the trip. This is unsurprising, as, when we visited the students in their classrooms prior to their trip, we asked them to 'write a few sentences that tell the most important things you would want someone to know about you'. In response, students described themselves in terms of age, activities and hobbies, race/ethnicity, their school and grade, where they live, favorite colors, preferred foods, and favorite places to visit.

Of particular interest in exploring students' environmental identities was how they described their outdoor activities and nature experiences, which we defined as activities occurring in predominately non-human-made spaces (such as national parks and open spaces within their communities). Many students at both schools wrote that their hobbies included sports commonly played outside. However, discussion of outdoor activities unrelated to team sports was more common among School 2 students. Many of these participants wrote about activities in their own neighborhoods (e.g. hiking, spending time at a nearby creek, playing in their yard), in addition to activities away from home, such as visiting national parks. In contrast, only two School 1 students

mentioned nature experiences in their initial blog entries, and those referenced activities taking place at locations away from the students' homes. These differences, perhaps, may be related to the different geographical and social contexts of the school environments. School 1's urban location may limit students' access to natural spaces. In contrast, School 2 students may have greater access to natural settings on a daily basis, both because of the landscape and geography, as well as family resources. Other differences in blog entries, including the number of references to outdoor experiences from School 2, may be related to the fact that researchers prompted School 2 participants to write about if 'they liked to spend time outdoors', while no such specific prompt was given to School 1.

Retrospective focus groups suggest that the environmental education experience impacted how participants thought of themselves both presently and in the future. Some School 2 students commented that they felt more independent after the NatureBridge experience than before the trip. During a School 2 focus group, one student explained:

I never really was independent. My parents always come with me ... I'd never really gone over to somebody's house overnight. And last year my parents came to [the multi-day field trip] ... with me. So this year they didn't come, and it was much different. I actually didn't even notice they were gone for some parts.

Others described developing a greater affinity for nature and outdoor activities: 'Well, I sort of like nature more,' and 'Well, I have never really liked hiking or running or anything [before this week].'

Perhaps the most significant aspect of this finding is the way in which students' aspirations and interests may have shifted after participating in the program. Several students described future plans: 'I want to be either a marine biologist or, I forgot what it was called, it's like a biologist for plants' (School 2). Another School 2 participant commented, 'Also, I decided that I wanted to be a science teacher.' These statements are telling in the context of research, demonstrating how short-lived experiences can catalyze situational interest, evolving into broader 'lines of practice' where aspirations mature (Azevedo 2011; Ardoin et al. 2014). Further, the work of Wells and Lekies (2006) and Chawla (1999), among others, suggests that early experiences in nature-rich environments may have long-lasting impacts on environmental behaviors and professional aspirations.

Our findings suggest that identity is an important reference point for participants' experiences in field-based science education, framing not only how they view the program in the moment, but also how they conceptualize themselves in the future. In some cases, participants enhanced their environmental identity, discussing their affinity for natural experiences, as well as possible science careers. Interestingly, despite these emerging environmental identities, we found minimal references to environmental behaviors, either positive or negative. A few participants referred to NatureBridge's 'garbology' initiative, which is a program intended to raise awareness of food waste by separating and weighing the waste and trash following meals, in addition to teaching about composting. Although the students rarely mentioned behaviors in the *in vivo* blog entries, the retrospective data – including blog entries and focus groups – referred to some behavioral changes once the students returned home. Several School 2 students wrote about adopting new behaviors and encouraging their families to do so after the trip. One student wrote: '... My family brings reusable bags to the store, we use reusable cups, I encouraged my family and everyone else to separate compost, recycling and landfill.' Another stated, 'I have started bringing my own bags to the grocery store. That way I don't waste paper/plastic bags. I have also been walking more ... to places close by. I have convinced my family to do the same as me.' In follow-up focus groups, students made statements such as: '... Me and my family, we

were saying ... we want to do [the] recycling thing' (School 1). Also, 'My pledge was to not waste any energy and now I'm turning off all the lights that aren't being used and taking shorter showers' (School 2). These findings suggest that, although pro-environmental behaviors may not be salient to participants during the program, participants may take away the importance of such behaviors. This further suggests that intermediary outcomes, such as identity, personal growth, and connection to place, may be gateways to the ultimate pro-environmental behavioral outcomes (Ardoin, Biedenweg, and O'Connor 2015).

Discussion

Blogging provided a window into the experience of 58 youth participants in a residential environmental education program, offering insight into the prominent aspects of their experience, including connection to place, personal growth, and environmental identity. We argue that blogging – although currently underutilized in environmental education – offers a novel tool for research and program evaluation, capturing the lived experience of children in immersive, field-based educational settings, and nature, more broadly.

Three key findings of this study are relevant to the field of children's geographies and environmental education: First, children's experiences in nature, as expressed in their blog entries, resulted in a range of positive outcomes, including connection to place, personal growth demonstrated by sense of freedom and independence, and environmental identities linked to sense of connection to nature and environmental responsibility. The salience of place in participant narratives suggests the importance of the actual geographic site and children's experiences within those spaces as conduits for connecting to nature during the immersive experiences that comprise a residential, field-based environmental education program. In addition to describing a host of positive affective response to their experiences in nature, participants also blogged about feeling a sense of freedom and independence in nature; this kind of independent exploration of place is theorized as critical to children's cognitive development (Hart 1979). Together, perceived connection to nature and sense of freedom in nature are part of what Kals and Ittner (2003) describe as an 'Emotion Affinity to Nature', which may relate positively to future behaviors.

Participants also narrated their personal growth as they gained new knowledge and experienced physical and emotional challenges. And, although personal growth may or may not be an explicitly articulated outcome of environmental education programs (Ardoin, Biedenweg, and O'Connor 2015), references to personal growth in participant narratives suggest its importance as an intermediary outcome. Further, previous research demonstrates that personal growth and self-confidence, in addition to affective connection to environment, are critical precursors to environmental action (Almers 2013).

Second, findings support the assertion that children's experiences in nature do not occur in a vacuum, but rather are mediated by socio-cultural factors (Linzmayer and Halpenny 2014). We noted distinctions in participant narratives from School 1, which serves an urban, less-affluent and predominately Latino community, and participants from School 2, which is located in an affluent suburb of San Francisco. Differences in how participants described their previous or everyday experiences in nature, or aspirations for future visits to natural settings, reflect varying access and agency informed by not just the geographic, but also the socio-cultural and economic, contexts of the school and community environments. Although systematically comparing participant responses between the two schools is difficult due to the nature of our pilot study and limited data regarding individual home environments, histories, and experiences in nature, these variations suggest that participants' experiences in, and access to, nature may be critical in shaping how they connect to place and forge an environmental identity. Further, these

inferences demonstrate fertile ground for future research in this vein, both in the context of children's geographies and in environmental education.

This research aligns with previous studies regarding environmental education program experiences and learning in relation to socio-economic status and access to nature (e.g. Palmberg and Kuru 2000; Powers 2004). These studies suggest that the ways in which participants interpret, and make sense of, their experiences may depend on prior experiences, as well as affordances and constraints of their home environment. Similarly, other researchers (e.g. Jenks, Vaughan, and Butler 2010; Tzou, Scalone, and Bell 2010) suggest that environmental education programs and messages should resonate with existing values and attitudes, as well as previous knowledge, to enhance relevance within the context of participants' lives.

There are several practical implications of this finding. First, that improving understanding of participants' worldviews and experiences prior to the program can help enhance program efficacy. Further, it affirms the potential role of educators (in this case, field science educators), as critical intermediaries between children's diverse home environments and nature, building upon Vygotsky's notion of socio-cultural learning and the 'more knowledgeable other' (Vygotsky 1978; Linzmayer and Halpenny 2014). This role may be especially critical when children lack scaffolding to support pro-environmental learning and behaviors in their home environment.

Third, participant narratives generated through blogging help illuminate how youth from a range of backgrounds experience environmental education programs and nature more generally, as well as how participants bridge park and home experiences. In doing so, this study addresses a major challenge in children's geographies: that of capturing experiences from the point of view of children themselves. By allowing participants to directly process their experience in an open-ended, unmediated way, blogging can powerfully connect the field experience with home, creating a bridge between 'here' (e.g. the park setting) and 'there' (home). This can encourage participants to consider the similarities and differences between the physical and socio-cultural aspects of the places. Particularly for students whose home environments may differ dramatically from the field setting, blogging may help connect the two environments without threatening the participants' social, cultural, or personal identity.

Beyond more research-oriented goals, blogging and similar tools can offer evaluators and environmental education program staff insight into how participant experiences translate into realization of program outcomes. Such evaluation data can be used to adaptively manage programs, allowing for real-time reflection on goals and objectives (Jenks, Vaughan, and Butler 2010). In addition, blogging – as a new medium of twenty-first century storytelling – comes in many forms. Program evaluators can draw from a variety of digital and social media to tap into the ever-changing ways that students are sharing their experiences with peers, parents, and the wider community. Evaluators and researchers might consider how to transform the outputs of these media into tools that illuminate what youth choose to share about their experiences. This may be done through creating systematic protocols and theoretically framed analysis matrices that consider experiences and meanings being communicated through these participant-generated, free-form data sources. Further, the inherently social nature of blogging provides a platform for iterative, sustained, and reinforced social learning among program participants within a broader context (Wals 2007).

Certainly, this study has limitations. We conducted this exercise with two school groups over a period of two weeks; therefore, we present a snapshot of NatureBridge programming, which may or may not be indicative of other residential programming or environmental education more broadly. Because these programs include a range of audiences, settings, theoretical approaches, and intended outcomes, and the intended curriculum can differ from the enacted or attained curriculum (van den Akker 2003), the extent to which the lessons implemented during the week(s) of our study reflect the usual activities and/or the philosophy and curriculum of the program more

generally is unclear. We also recognize that the emphasis on tangible aspects of place by program participants may have been a reflection of the developmental age and stage of the participants, who may have been unlikely – in this medium – to write about deeper aspects of the program.

Our small sample and the pilot nature of our study prevent us from making generalizations about how these findings may have varied according to the characteristics of the participants, such as their demographic backgrounds and access to nature. More in-depth research, with a larger sample, could illuminate how participant experiences differ according to such variables, as well as across time, setting, program design, and implementation.

Finally, with regard to technology, we acknowledge that blogging is inherently a performative medium, which likely influenced students' representations of identity. Although not within the scope of this study to further explore this aspect of identity, we believe that an opportunity exists to further examine this aspect of youth/technology interactions, particularly within a nature-based context, as well as the context of similar bridging environments.

Conclusions

Research suggests that children's experiences in nature may be transformative, in both the short and long term (Chawla 1999; Wells and Lekies 2006; Bratman, Hamilton, and Daily 2012). Immersive, multi-day environmental education programs are well poised to provide such positive experiences for tens of thousands of youth.

This study endeavored to characterize varying dimensions of participant experiences in nature through using participant blogs. Our findings suggest that, in a relatively short period, youth can experience connection to place and personal growth that contribute to meaningful experiences in nature; these experiences may develop into longer-term learning and environmentally friendly behaviors (Chawla 2009).

By directly sharing and reflecting on what is special about the field experience in their own voices, and how it may (or may not) link with their home environment, blogging may help make a more explicit connection to something that is often only implied within environmental education programs: that what one learns in a field setting – about the environment, sustainability, and even oneself – is not intended to be left in the field, but rather taken home and applied in one's own community. For environmental education is not something to be done once; rather, it involves a process of constantly re-engaging with the natural and social context of the world at a variety of scales. Environmental education involves asking questions, exploring, connecting, and acting, with the intention of improving the environment, now and for years to come.

Acknowledgements

We appreciate the support provided by the staff, administrators, and board members at NatureBridge. In particular, the field science educators at NatureBridge's Golden Gate campus were critical to this study. We also appreciate the students, parents, and educators at the participating schools. Thanks to Noelle Wyman Roth and Tessaly Jen for assistance with data coding and manuscript preparation.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

We are grateful to the Gordon and Betty Moore Foundation for financial support of this study.

Notes

1. By “nature,” we refer to a range of physical spaces, including urban green spaces, parks, and wilderness areas, among others.
2. This study was one of three pilots that we conducted to test the feasibility of methods for measuring intermediary outcomes of residential EE programs. This was an attempt to understand whether blogging could be used to measure such outcomes; therefore, our methods were not entirely consistent between the two schools (e.g., blog prompts were fluid as we attempted to find those that were most effective).
3. The school is located in an area with an above-average annual household income compared with the surrounding county and state (www.census.gov/did/www/saipe/data/statecounty/data/2010.html).
4. This study was conducted under the IRB of Stanford University. Parents/guardians completed consent forms for participants; children gave verbal assent to participate.
5. School 1 was on campus for one day less than School 2, allowing fewer opportunities for end-of-day blogging. Additionally, School 1 had three hiking groups, while School 2 had two. Due to time restrictions, we could only accommodate two hiking groups per day for blogging. This accounts for the discrepancy in the number of on-campus blog posts, in addition to the fact that School 2’s chaperones brought laptops with them and allowed the students to blog in the dorm at night, if desired.
6. The initial coding went beyond these three themes to also include environmental behavior and social interactions; however, because the majority of participants’ words were coded to the three main themes of this paper, we discuss those here.
7. Names are pseudonyms.

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