

Children's Role in Meaning Making Through Their Participation in an Environmental Education Program

J. Joy James and Robert D. Bixler

ABSTRACT: The authors conducted an ethnography investigating children's lived experiences in a 3-day residential environmental education (EE) program with 20 gifted 4th- and 5th-grade students. The authors also conducted participant observation and a series of interviews before, during, and after the trip. After the authors conducted the interviews and collected other data, they conducted analyses that identified domains describing the children's lived experience with a residential EE program (J. P. Spradley, 1979). Through domain analysis, a theme emerged: Children's nonformal environmental-learning experience is negotiated through the feeling of having choices and enhanced through sensory perception and personal relationships. Explicit recognition of the importance of informal social interactions, unstructured time and play, and perception of choice has potential to enhance the meaningfulness of residential EE programs.

KEYWORDS: choice, environmental education, ethnography, residential programs, social influences

One challenge for residential environmental education (EE) programs has been understanding how children's prior experiences, interests, and social influences are related to program outcomes (Falk & Dierking, 2000; Rickinson, 2001). Nonformal educators have been successful in evaluating the specific learning outcomes and satisfaction of children on the basis of organizational objectives (Rickinson, 2001). However, the measurement of learning outcomes does not provide insight into how students make meaning out of their participation in an EE program. Rickinson suggested EE research has focused on "educational interventions rather than as a process in its own right" (2006, p. 446). Examining a residential EE program from the students' perspectives can help environmental educators better understand what children find interesting and meaningful about the total experience.

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Literature Review

EE program learning can be incidental, relevant, or irrelevant to the student. What students retain, whether intended by the organization or not, are those things that are meaningful to them (Ausubel, 1968; Novak, 1998; Novak & Gowin, 1984). In meaningful learning, the learner is actively seeking to make sense of new information in light of prior knowledge (Ausubel; Novak). Falk and Dierking (2000) called attention to the social component in stating, "Learning is both an individual and a group experience. What someone learns, let alone why someone learns, is inextricably bound to the cultural and historical context in which that learning occurs" (p. 41). Hence, the meaningful-learning process cannot be understood without reference to the culture in which the individual is embedded (Tudge & Rogoff, 1989). Peer and parental influences and previous experiences with nature affect what is meaningful to the child (Bandura, 1989; Bixler, Carlisle, Hammitt, & Floyd, 1994; Harris, 1999).

To capture what is meaningful to children in a residential EE program regardless of organizational objectives requires a discovery approach to research. Vygotsky's (1978) sociocultural theory provides a framework that is sensitive to the multifaceted interplay between the child and the experience. This theory places emphasis on social interaction and culture as a mediator for learning (Martin, 2000). It also emphasizes children's surrounding cultural milieu (i.e., family, peers, community) and their prior experiences and provides perspective on human cognitive development in all contexts (i.e., formal, nonformal, informal). Children's surrounding cultural contexts—their social interactions as well as social practices—mediate behavior (Gauvain, 2001). Social interaction, previous knowledge or experiences, and culture act as filters for what becomes meaningful for a child participating in a new experience.

The purpose of this study was to describe children's lived experiences from a social-historical-cultural context through participating in a residential EE program.

Program Description

The 3-day residential EE program was held in a coastal beach environment. Instructors taught classes at the beach, estuary, inland pond, salt marsh, and a maritime forest. The classes were typical of EE programs with instruction on ocean environments, including opportunities for touching, viewing, and catching various animals. The informal features included free time in the cabin, meals, and breaks between classes. During these informal opportunities, the students could socialize with each other with minimal adult supervision. During free time, there were opportunities to interact with the natural environment.

Prior to embarking on the trip, the teacher conducted 2 weeks of in-class lessons on ocean environments and read letters to students from the previous year's participants that described the previous class's trip. After the trip, the teacher conducted postfield-trip lessons and had the students write thank-you notes to instructors and letters to next year's students describing the trip and what they should expect. The teacher provided extensive preparation activities, but informal interactions outside of school between peers and family members who had attended in previous years also shaped the students' expectations. On return from the trip, these same informal interactions helped each child further interpret experiences at the coastal learning center.

Method

The study participants were 20 intellectually gifted fourth- and fifth-grade students from two different schools who were taught by the same teacher. The study-group school system's definition of *gifted and talented children* is "those identified in Grades 2–10 as demonstrating high performance

ability or potential in academic and/or artistic areas and, therefore, require an educational program beyond that normally provided by the general school program in order to achieve their potential” (School District of Pickens County, 2003). Researchers have not previously studied gifted students’ participation in residential EE programs. We conducted an ethnography using field observations, interviews, and other assignments. To help with communication and attention span of the children while conducting interviews, we used drawings, games, props, and exercises that are familiar classroom activities (Hill, Laybourne, & Borland, 1996; Salmon, 2001).

Data Collection

Each child constructed a modified version of a Personal Meaning Mapping (PMM; Falk & Dierking, 2000) and Five Field Map (FFM; Samuelsson, Thernlund, & Ringstrom, 1996) in concert with the ongoing interviews. The literature identifies prior knowledge, meaningful learning, and social interaction as significant in understanding children’s social-historical context, and each mapping exercise provided insight into them. More specifically, we used these methods as prompts or cues for better recall and meaningfulness to the child (Salmon, 2001) to increase trustworthiness. We assessed prior knowledge and meaningful learning through the methods of a KWL chart and a modified version of PMM. The FFM method identified children’s perceptions of their social world. Last, the use of these prompts followed Vygotsky’s (1978) theory that assessment should allow the child to use tools (e.g., PMM and FFM) to enhance his or her learning (Gupps, 1994).

Overview of modified PMM. Interviewers gave a 12- × 14-in piece of paper with a prompt phrase in the middle to each child prior to participation in the program. In the present study, the prompt phrase was “ocean environment” because of the unit of study in the classroom and residential EE program. We asked participants to create words, phrases, or pictures about what they thought and knew about the word in black ink. Once they were finished, interviewers asked what they found interesting on the modified PMM. These interviews were transcribed.

Children then participated in the 3-day program. We used the children’s original PMM in the postinterview and asked them to add, delete, or elaborate on any ideas regarding the prompt word in green ink, allowing the interviewer to distinguish pre- and postideas about oceans. Once the modified PMM was completed, the interviewer probed for more detailed information regarding each child’s additions and changes to the modified PMM. Figure 1 shows an example of a pre- and post-PMM.

Whereas the modified PMM identified meaningful learning, another method captured the role social interaction played in children’s learning. We used the FFM to provide a graphical description of each child’s perception of his or her social network (Samuelsson et al., 1996). Prior to the development of the FFM, social network or support instruments relied on questions from either interviews or self-report instruments and were designed for use with adults (Samuelsson et al.). Children’s cognitive abilities to answer abstract questions made it difficult to assess their perceptions of their surrounding social world. As a result, researchers developed the FFM specifically for children.

Overview of FFM. Interviewers gave children a piece of paper with a drawing of six concentric circles on it. The drawing was also divided into five pie-shaped sections. Each of the five sections represented one of the following: (a) family, (b) relatives, (c) formal contacts, or people who are important to the participant but not relatives or friends (e.g., family doctor, policemen, leaders), (d) school, and (e) friends or neighbors. Interviewers gave each child instructions on how to complete the FFM. The instructions for the interviewers included the following: (a) the child is represented in the center circle; (b) using the following symbols, the child should draw the persons important to him or her in the

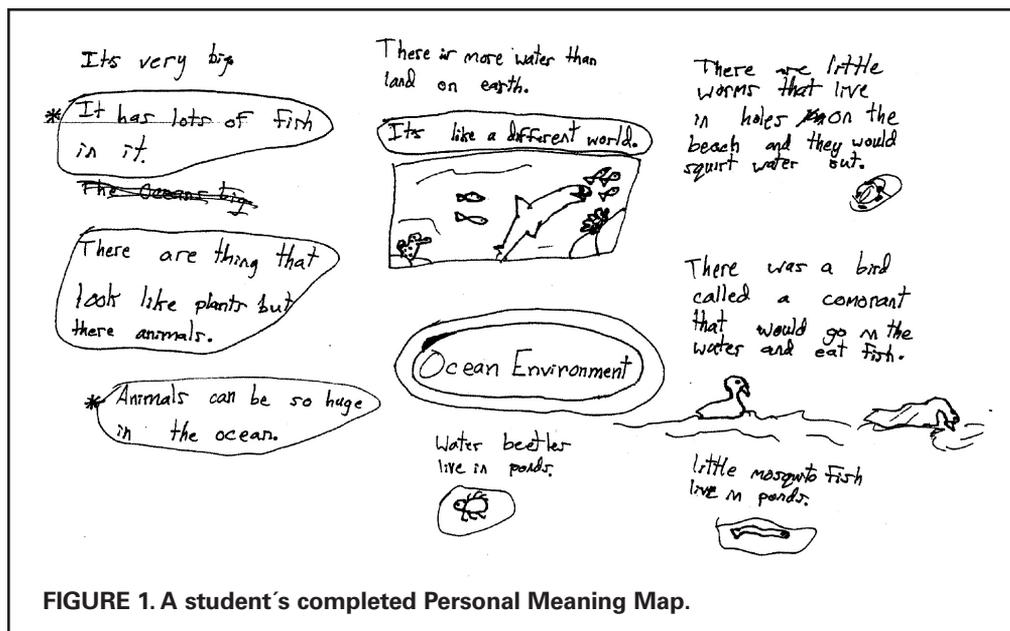


FIGURE 1. A student's completed Personal Meaning Map.

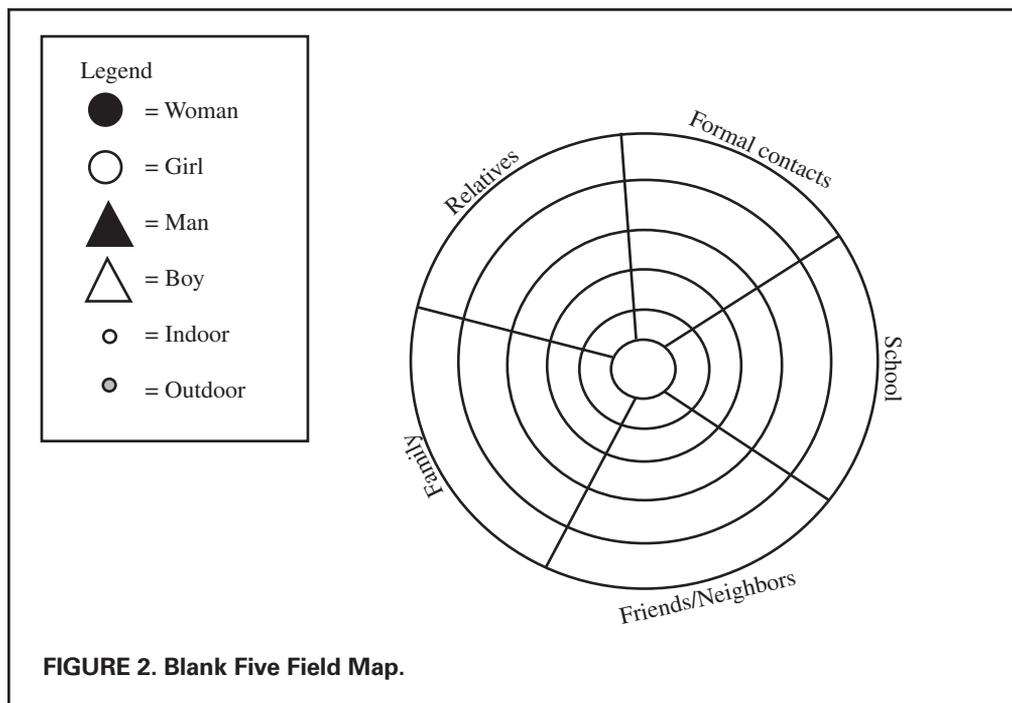
different sectors; (c) the symbols for men are filled triangles, women are filled circles, boys are unfilled triangles, and girls are unfilled circles; (d) placement of individuals is determined by importance to the child, meaning if the person is important to the child, then the symbol placement is closer to the inner circle—the person of least importance should be placed farther toward the fifth circle; and (e) in the farthest ring (sixth circle), the child should place the people he or she thinks are not as close to him- or herself. Figure 2 shows an example of a blank FFM.

In addition to the mapping exercises, we reviewed the teacher's coastal environment lesson plan. One project in the coastal environment unit involved the students' writing letters about their EE experience. These letters provided further insight into each student's social-historical-cultural context and experience. After the 3-day trip, the students wrote letters to next year's students along with thank-you letters to residential instructors and chaperones. We had access to these letters for analysis. They were helpful in establishing credibility of PMM and the interviews because they further identified what the students believed to be important for next year's students to know.

During the 3-day EE program, the students kept a journal of their experiences. Questions to be answered included what was interesting or disgusting, with whom they interacted during the activity, with whom they would share this information at home, and what they would do to find out more about this topic. These journals helped us to gain insight into the children's on-site perceptions, interests, and social interactions as well as changes and gains in cognition.

Interview Protocol

According to the literature review and the study framework, there were three a priori perspectives to explore (Creswell, 1998): (a) prior knowledge, (b) prior experiences, and (c) social or cultural mediation. We used these perspectives to guide and develop the framework of grand-tour questions for the interviews (Spradley, 1979). Typically, interviews were 15–20 min, conducted face to face, and audio recorded. Each participant was interviewed prior to, immediately following, and 2 months after the residential EE program. In addition, we chose and interviewed 6 students on site



during the 3-day experience. Prior to being asked the interview questions, each student completed a PMM and FFM. From the three categories and the mapping exercises, we created the following interview questions.

Prior knowledge (interest questions):

1. Circle (on the PMM) five to eight things that you find most interesting.
2. Describe what you know about the ocean and coastal environment.

Prior experience:

1. What do you do when you are not in school (outside, inside, or both)?
2. What is gross or disgusting about the outdoors?
3. Have you ever been to the ocean before? With whom? What did you do? What did you like or dislike?

Social or cultural mediation:

1. With whom would you share this interest (about the ocean) or talk about it?
2. Have you seen the movie *Finding Nemo*? What did you like about it or find neat?
3. What are your three favorite family activities or trips?
4. Are you a scout, YMCA member, or in an outdoor-type club? What do you like about it?

As the interview proceeded, the investigator prompted students to define or further describe things they mentioned.

The second interview protocol had two components: PMM and interview questions. Prior to the interview, students edited or added to their PMM. The interviewer then asked questions on the basis of the PMM additions or edits. The questions began as general questions, then became more specific. The general questions follow:

Tell me about the environmental education trip.

1. What were three highlights and the three worst things about the trip?
2. Did anything interesting happen during Pondering Life (pond study class)?
3. What were the differences between beach combing and the swamp walk?
4. What time did you wake up and do you know why?
5. Who did you tell about the environmental education trip?
6. Who was your favorite instructor?
7. What was the coolest thing that you found on the beach?

In addition to the general questions, interviewers asked more specific questions of each student. We developed these questions after the 3-day experience, a preliminary review of the student's first PMM and FFM, and after listening to the first interview. On the basis of this review, we created individualized questions for each student.

We developed the third interview protocol after transcription of the prior two interviews with each student. During the third interview, we did not use the PMM or FFM as prompts. This was done to determine what the students might recall on their own without any cues. However, prior to asking interview questions, the interviewer gave each student a blank sheet of paper and asked the students to write three things they liked and three things they learned. The interviewer then discussed the students' answers with them. We developed the following questions on the basis of the original categories (prior knowledge, prior experience, and social or cultural mediation) from the literature review.

Prior knowledge:

1. What do you find the most interesting about ocean environments? (interest question)
2. Describe what you learned about the ocean and coastal environments at Barrier Island.

Prior experience:

1. What do you want to know more about since the environmental-learning trip?

Social or cultural mediation:

1. With whom would you share these interests or talk about them?
2. With whom have you talked about Barrier Island?
3. Did your friendships in the classroom change since the trip? Are they friendlier or less friendly?

General probes:

1. Are you more or less interested in ocean environments?
2. Who is your favorite instructor?
3. What is your favorite class?

After we coded four student interviews individually, we consulted about them. In these meetings, we reviewed the initial codes and potential new codes and solicited suggestions, comments, and additions. We then developed a codebook for the study.

After we coded all student interviews, we organized the coded excerpts into domains, winnowing the data into manageable bits of information (Seidman, 1991; Spradley, 1979). In the interviews, the participants had vocalized their experiences and the interviewer had responded to their voice using experience and intellect for the process (Seidman). This process is a synthesis of the interaction of the participants' voice and the interviewer's response (Seidman).

Data Analysis

Once we identified domains, we looked for connections, patterns, and themes within the domains as well as between the domains. We compared and contrasted excerpts from the transcripts, taking

care to neither force fit data into a specific domain nor ignore data that negated a domain. Throughout the coding and winnowing process, we used the modified PMMs and FFMs, student journals, and student letters as indicators of consistency with the domain analysis. In addition, these indicators provided potential insights that may not have been vocalized by the combined interviews of participants. From the winnowing of data into domains, a theme emerged.

Trustworthiness

To ensure the trustworthiness of this study, the design and implementation of the research incorporated three techniques: (a) prolonged engagement, persistent observation, and triangulation, (b) peer debriefing, and (c) referential adequacy (see Table 1).

Prolonged engagement, persistent observation, and triangulation were encompassed in the first technique of increasing the likelihood of credible findings (Creswell, 1998; Lincoln & Guba, 1985). *Prolonged engagement* is how much time a researcher takes to learn about the topic, understand the nuances that may distort findings, and build trust (Lincoln & Guba). *Persistent observation* is more in-depth and identifies elements that are relevant to the research in question. This technique can be seen in the detailed description of how the process of identification was conducted (Lincoln & Guba). Last, *triangulation* is another aspect of credibility of the research: "The concept of triangulation by different methods . . . can imply either different data collection modes (interview, questionnaire, observation, testing) or different designs" (Lincoln & Guba, p. 306). Table 1 shows examples of how we carried out these techniques in the present study.

The second technique for evaluating qualitative-research credibility was peer debriefing. In this study, we used analytical discussion with an interested colleague regarding the ongoing research process. We kept written records of the debriefing sessions for understanding changes in research as well as documenting researcher efforts (see Table 1).

Referential adequacy was the third technique that provided insight into the merit of qualitative research. This technique uses electronic technology such as video and audio recordings. The idea behind it is that the data are captured for reanalysis or secondary analysis.

Once the interviews and other data collection were completed, we wrote a description of the children's lived experiences with the residential EE program. Then we conducted an analysis of the description to determine the domains that best described the children's lived experience with the program (Spradley, 1979).

Results

Domains are categories or patterns that best represent the children's lived experiences from the social-historical-cultural context of their participation in the EE program (Spradley, 1980). The five domains that emerged from the study description were: (a) sensory orientation, (b) social relations, (c) novelty, (d) free time, and (e) personal welfare concerns.

Sensory Orientation Domain

In the sensory orientation domain, the students used their senses to describe their experience. The sense of touch was foremost in the minds of the students. According to field notes, at any given opportunity, the students were on the beach touching the sand, picking up shells, throwing items into the ocean, and touching bird parts and live reptiles. One student noted, "It was freaky 'cause I had only touched big snakes, and I wasn't used to such a small snake 'cause I thought I might lose it or something like that. And it just . . . crawled around you, and it would feel all weird." Touch provided intimate interaction with natural objects and animals, making the experience memorable to students.

TABLE 1. Lead Author's Data Collection Methods Used to Enhance Trustworthiness

Data collected	Prolonged engagement, persistent observation, and triangulation	Peer debriefing	Referential adequacy
Observations	15 hr of observation before trip; 42 hr of observation during trip; 12 hr of observation after trip	Reviewed observations with coauthor after each time in the field	—
Interviews	Combined interviews: before trip, during trip, after trip, 2 months after trip	Discussions with coauthor	Audio recorded all interviews
Personal Meaning Map	Used as a prompt or cue for interviewing participants as well as an indicator for consistency (triangulation)	Discussed challenges and modifications of Personal Meaning Map	Hard copy of the participant's Personal Meaning Map
Five Field Map	Used as a prompt or cue for interviewing participants, as a gauge for social supportive network, and as an indicator for consistency (triangulation)	Discussed use of Five Field Map as establishing a description of the surrounding social network	Hard copy of the participant's Five Field Map
Lesson plan	Reviewed for better understanding of potential prior knowledge gained from teacher before 3-day experience	—	Obtained a copy of teacher's lesson plan
Letters from previous year's students	Reviewed for better understanding of prior knowledge the students obtained from peers before 3-day experience	—	Copies of the letters read to each class
Letters to next year's students	Reviewed after 3-day residential environmental education program for consistencies and inconsistencies with interviews and observations	—	Obtained copies
Journal	Represented participant's responses during the 3-day trip; reviewed after 3-day residential environmental education program for consistencies and inconsistencies with interviews and observations	Consulted with teacher and coauthor for journal design; received feedback from environmental educators' instructors about use of journals	Copied journals; participants were given their journal back as a souvenir

The senses of sight and hearing played a role in the students' meaning making. According to field notes, when students saw other students trying to catch a fish, touch an unusual object, or jump into a mud pit, it was enough to encourage or discourage them to explore and touch as well. Although the students mentioned hearing the sounds of the water and natural environment, what consistently captivated the students was the voice of one instructor. A student stated, "I liked the instructor 'cause she could sound like a guy, and it sounded really neat 'cause . . . whenever we were doing the great big moose she had a real deep and loud voice." The students also enjoyed hearing each other sing goofy songs at the campfire: "We got to sing songs and all of it stuck in your head and it was just really fun." Field notes indicated some of the songs were sung throughout the rest of the trip and later sung back at school. Sight and hearing provided other perceptual experiences, either encouraging students' participation or enhancing their recollection of the experience.

The sensory orientation domain permeated the students' description and conversation. Although much has been said about the importance of sensory experiences in EE, what is relevant is the students' use of sensory terminology to describe their experience. Sensory-rich perceptual experiences were meaningful experiences.

Social Relations

The next domain is social relations. On the basis of an a priori theoretical orientation (Creswell, 1998), we systematically observed three types of social relationships: (a) child to child, (b) child to instructor, and (c) child to chaperone. The child-to-child relationship was the predominant social influence. According to field notes, the students were predominantly focused on each other, almost to the point of being unaware of adult presence or others not in their social circle. The students tended not to make friendly overtures toward participants not from their school. As noted in the field notes, friendships and cliques during the program did not change from those observed during the pretrip classroom visits.

Although child-to-child relationships were dominant, some students gravitated to the program instructors. Field notes indicated that during classes, these students stayed close to the instructor, asking questions and conversing with the instructor during free moments. The students as a whole indicated the instructors were different from their classroom teachers. When asked about a favorite instructor in the postinterview, a participant indicated she had two. When asked what made them so "cool" for her, she indicated:

Mary Beth, just the way she acted and stuff. She had a really loud voice, and she was just a lot of fun. She wasn't one of those uptight people; she'd kinda hang; she was one of those hang-loose have-fun people. And Jess was the same way. . . . But Jen, she didn't seem like she had a big voice, but she was one of those hang-loose kinds of people.

The students described the instructors as people who were fun, laughed, taught about "cool" things, and did not make them do homework.

Field notes indicated that students whose parents or grandparents were chaperones enjoyed spending time with them during the 3-day experience. The students who enjoyed adult attention saved places at tables during mealtime so chaperones could sit by them. These students wanted to talk about their day and the things they had done. In the interviews, two students highlighted that having their parents on the trip was great. When we asked one participant about having her father on the trip she said, "That was neat. It wouldn't have been as fun if he wouldn't have been there." Another student cited his father as the "best instructor" in the EE program.

These social relationships among peers, instructors, and chaperones were central in both the observations and interview data. Field observations of the students revealed that the important relationships

during the experience were with peers and family. In actuality, the peer relationships were paramount to the actual cognitive learning during the trip. The students' focus was on their friends, their parent, or themselves. The natural environment was a backdrop, not the focus, for the social relationships. Peers reinterpreted experiences with each other. Instructors who were approachable provided special moments. Also, the presence of chaperones provided security and familiarity for the students.

It is interesting to note the reciprocal relationship between the sensory orientation and social relations domains. Sensory perception is available to all humans, although each individual's use of senses is unique. Social relationships permeate our existence. Whereas sensory perception is highly personal, the influence of the social-historical-cultural context of the individual is reflected in interpretations of sensory experiences.

Novelty Domain

The third domain is termed *novelty* because the students consistently expressed a fascination with new objects, people, or experience. In field notes and interviews, the students often used the word "cool" to describe these novel things or experiences.

Novelty objects. Animal life with unusual characteristics captivated the students. In an interview discussion of his PMM after the trip, one student labeled the moon snails "cool." When asked why, he said, "The moon snails kill each other." One characteristic of an animal viewed to be novel was a fish that had two eyes on the same side of its body and changed colors. A review of field notes and student letters suggested that friends frequently pointed out novel objects to each other using the term "cool."

Novelty people. Besides objects, the students identified the instructors as novel, often using the term "cool" in the interviews to describe the instructors. When asked what makes the instructors "cool," or novel, the students indicated things like "she's just fun and crazy" or "she was funny and nice." Also, in the interviews and letters, students indicated the instructors' teaching methods or behaviors were "cool" compared with their regular schoolteachers. One student commented on his reptile instructor: "It was cool when she grabbed that alligator and it's like jumping around and stuff." Another student thought it was cool seeing an instructor demonstrate how to do a full-body slide in the mud pit.

Being aware of which peer was the muddiest or wettest had social rewards or a cool factor. On the basis of observation at meals, laughter, and talk, we noted that the highlight of some conversations was assessing which participant was the muddiest. After the trip, the students remembered who was the muddiest or proudly informed others that they were the muddiest. In the postinterview, when a girl was asked what she told her family and friends about the trip she stated, "I told them that it was really nifty and slimy and what [the mud pit] was made of and that I was the dirtiest."

Novelty experiences. Many of the students commented on what some educators refer to as *teachable moments* (Goodrow, 2000). According to field notes, during a beach walk, the students were enthralled when an instructor pointed out the ghost crab's ability to blend into the sand. In the postinterview PMM exercise, a student drew a cormorant he saw on the trip. When asked why he drew it he said, "Well, I thought it was cool because it just swam down and caught [a fish] right there." In a postinterview, another student referred to how the instructor interpreted the cormorant's behavior to the class. "It was also cool learning how they fish, how the birds try to eat the fish, because if they eat them one way the fish fins will get in their throat. I didn't know that." As recorded in the field notes, students discussed these novel experiences with each other throughout the experience.

The novelty factor was associated with new and unusual experiences, often with much discussion by peers. Meaningfulness seemed to be associated with extraordinary animal adaptations, kid-like instructors, or almost any novel phenomenon.

Free Time

Interviews and observational data documented students' speaking frequently about enjoying free time. This time was characteristically unstructured, informal in nature, and did not involve environmental-learning classes. Chaperones were present but supervision was minimal when compared with the structured activities and classes. A characteristic of free time for the students was a sense of freedom to do as they wished, with or without peers.

According to the field notes, students' choices in free time included playing on the beach, digging holes in the sand, throwing objects into the water, and wrestling. A student indicated, "In the free time on the beach, you can go wherever you want, pick up whatever you want, and . . . just go where you want." In a letter to the future participants, a participant wrote, "You can play on the beach, in the cabin, and at volleyball." As noted in the field notes, cabin time allowed the students to interact with their friends, tell stories, play games, and attend to their personal welfare. In a journal entry describing cabin time, a student wrote, "It was fun before bed because we would play and talk." According to field notes and interviews, students cited cabin time as being a favorite part of the experience. In an interview, we asked one participant why she enjoyed her free time on the beach more than participating in an organized sport. She said, "You could do more stuff. Like you could make up your own games and stuff."

This domain describes how the students appreciated having the choice of what to do and with whom to do it in their free time. Their perceived sense of control and personal freedom made these activities meaningful.

Personal Welfare Concerns

The fifth domain, personal welfare concerns, describes students' concerns for their personal welfare in terms of their physical needs (e.g., rest, food), social needs (e.g., cabin time, missing parents), and leisure (e.g., free time). The concerns of the students were not immediately obvious in the interviews. These concerns showed up later in different types of data, including classroom observations of discussions, letters written to future students, and student journals. According to field notes taken prior to the trip, the students asked the teacher about what kind of food would be served, where they would be staying, and what kinds of beds there would be. In a letter to future students, a student wrote:

You will be going to Barrier Island field trip. You might not want to go to Barrier Island because you will be away from your parents but you will like it after the first hour. The food there is wonderful!!!!!! You will also love being in the cabin. Everybody in the cabin will be joking around or something. Also if you're at the cabin you can go to the beach or play volleyball (even though I don't really like volleyball). The view of the ocean is so neat.

In this domain, the importance students placed on physical, social, and leisure needs became apparent. In a postinterview, a student discussed what she told her sisters about the trip:

I had to tell them that they had to stop the bus for people to go to the bathroom and I was one of those people, unfortunately. 'Cause we was 26 miles from a rest stop and we had to go in the woods. We did, but I drank a whole 20-ounce thing of Mountain Dew and I couldn't wait. I was turning pink. I couldn't wait.

The interviewer responded, "So you had to go to the bathroom in the woods?" The student said, "In the woods, yeah, across the road and down the bank." The dialogue continued as follows:

Interviewer: Was there anybody, or was it just you who had to do it, or were there other people?

Student: No, the boys, all the boys in the back of the bus. Ms. Murphy said that she knew that the boys had to go, but she didn't know about me, so she stopped the bus.

Interviewer: And so had you gone to the bathroom in the woods before?

Student: Yeah.

Interviewer: So it was nothing. . . . So that didn't really bother you other than you just walking in front of the kids?

Student: Yeah, and especially I said, "They are gonna see me; that was my worse thing. They're gonna see me; I'm going to be so embarrassed." But I felt much better!

Whether it was embarrassing moments, missing family, or concern over getting enough to eat, the students' personal welfare concerns appeared throughout the data.

Theme

Once we identified the five domains (sensory orientation, social relations, novelty, free time, and personal welfare concerns), we began looking for connections and patterns in and between the domains. In the sensory orientation domain, the students reveled in touching items of their choice. In the social relations domain, the students' choice of relationships was reflected in whom they interacted with, be it peer, parent or chaperone, or instructor. Choice was apparent in the novelty domain through what they remembered or found interesting about the experience as well as what they paid attention to during the experience. In the free time domain, the students exhibited choice in unstructured time in terms of how they played, interacted, and explored. Last, for the personal welfare concerns domain, in letters written to future students about the experience, the students discussed not only their apprehensions but how they had freedom. After reviewing the domains, a theme emerged: Children's nonformal environmental-learning experience is negotiated through the feeling of having choices and enhanced through sensory perception and personal relationships.

The students' use of their sensory perception permeated their descriptions of their experience with a residential EE program. However, it became apparent that personal choice was crucial to the meaningfulness of the experience. Although the fact that most fourth- and fifth-grade students relate perceptually to experiences is obvious, the influence that personal choices can play is not obvious. In one journal entry, a student commented on his drawing of his favorite spot during the 3-day experience: "The beach is a fun relaxing place that people can play and chill out on. Do anything we wanted. Best place to wrestle since [the] sand is soft."

The residential EE program provided an atmosphere that not only encouraged students' learning about ocean environments but also allowed them to exercise choice and independence. Being in a different environment from their home evoked the students' curiosity. However, being away from home, constantly around their peers, and in the presence of instructors and chaperones allowed the students to experiment with their choices, both in learning and personal responsibility.

The freedom of the students to choose what interested them without the threat of admonishment was also relevant to the students' learning. One participant spoke of how his mother did not like him touching snakes: "Yeah, I have touched a snake before, which my mom wouldn't really like me doing, but . . . I touch 'em." If students were in the presence of someone who neither approved of nor shared the interest, their motivation to participate would be diminished. However, when freedom is given to explore in a socially supportive group, the students gain exposure to people who may share the interest or provide further insight into their interest (Bixler et al., 1994; Chawla, 1988; Peterson, 1982; Tanner, 1980).

The students' memorable moments were characterized by their ability to choose, regardless of whether it was during a structured, semistructured, or unstructured period of time. From this experience, novelty or social relationships helped to focus students' attention, providing a conduit for making choices. The experiences of tasting sea lettuce, touching a slimy bug, choosing how deep

to go in the mud pit, and showing a cool object to others were all linked through the individual's perceived freedom to choose. According to field observations and notes, this feeling of choice was illustrated in a class where the students went beachcombing for the purpose of finding something that was interesting to them. The instructor allowed the students to walk where they chose along the shore and encouraged them to pick up objects they found interesting.

Novelty socially enhanced an object's or experience's cool factor. Social relationships influenced students' choices in expressing an interest or disinterest. According to the field notes, students encouraged or prodded each other to taste sea lettuce. Additional field observations included the students being aware of who was the muddiest or wettest, which provided social rewards. Sharing the experience with friends or parents provided an additional supportive component. The students' choices were reinforced by their social relationships, past experience, and cultural milieu. What made the students' personal choice meaningful in this EE program was their ability to determine for themselves how to make and implement choices and reflect on their acquired knowledge.

Discussion

Our finding on the dominance of sensory experiences reconfirms the early childhood and educational literatures that have consistently informed experiential EE for children. Auer (2008) suggested, "In addition to clarifying cause-and-effect relationships between people and the environment, sensory perception makes students aware (literally, sensitive to) of their own biological connections to the environment" (p. 10).

The domain of perceived choice resonates with Vygotsky's (1978) sociocultural framework. Memorable moments were characterized by the students' ability to choose, regardless of whether it was during a structured, semistructured, or unstructured period of time. These interpretations are typical of *leisure behavior*, which is characterized as being freely chosen and intrinsically meaningful engagement (Russell, 2005). Future evaluators may want to consider incorporating the importance of choice as described in the psychology of leisure (Tinsley & Tinsley, 1986). In addition, it is important to note that meaningful experiences can occur during free time or interstitially during school or work (Kelly, 1983). A fleeting conversation during a class or free time can be meaningful.

Falk and Dierking (2000) stated, "Learning is both an individual and a group experience" (p. 41). The learning process is both cumulative and constantly evolving (Vygotsky, 1978). It is motivated by an individual's thoughts, feelings, and actions (Novak, 1998) and through the interactions of the surrounding social group in which the individual is embedded (Tudge & Rogoff, 1989). Given the complementary relation between the present study's findings and existing literature, the importance of children interpreting and reinterpreting their residential EE in terms of content and importance with each other, their teachers, and their family should become a regular component of evaluative research in EE.

According to several researchers, research in EE has moved from evaluating student learning to understanding how students learn in free-choice environments (Brody, 2005; Falk, 2005; Kola-Olusany, 2005). In documenting the students' perceptions, the domain of novelty identified in this study offers insight into what caught students' attention and what they then remembered and discussed. Although choice is highly important in learning (Ausubel, 1968; Falk; Novak, 1998), students participating in the present study talked not in terms of what they learned but of what they did, enjoyed, and thought was novel. The students noticed things both in structured and unstructured time because the things were novel. Although the novelty may not have had immediate scientific value or an EE outcome, our findings seem to resonate with Chipeniuk (1995), who found that immigrant children who foraged for wild berries with their families were better able to understand concepts related to biodiversity than were middle-class suburban children.

Our findings highlight the peripheral moments that are not planned by the residential EE program or the teachers but are important to the students. For the participants, these moments occurred in the unstructured portions of program: between classes and during meals and cabin time. Unstructured activities and play provide children opportunities to explore the world on their own terms and for their own purposes (Falk & Dierking, 2002). "Natural outdoor environments provide a context in which each kind of play is often more complex, extended, and self-determined" (Thompson & Thompson, 2007). Through play and exploration in the outdoors, learning occurs (Dockett & Fler, 1999; Malone & Tranter, 2003).

One of the study domains that is rarely discussed in the EE literature is personal welfare concerns. Adults forget how important physical needs are to children who are dependent on adults (e.g., going to the bathroom, privacy, food; Maslow, 1943) while away from home.

The data illustrated that the choices students made are interpreted through social relationships and shaped by past experience and cultural milieu (Falk, 2005; Vygotsky, 1978). What makes personal choice relevant in the present study are the opportunities the students had to make choices reflecting their specific interests throughout the structured and unstructured portions of their EE experience. Hence, prior knowledge, social support, the social context of learning, and the process of learning should shape future design and evaluation of EE programs (Rickinson, 2001).

Implications for Practice

This study provides a number of implications for practice in residential EE. Students tended to mention experiences that were sensory rich. For late elementary school students, this tendency is not surprising, as they are in a novel environment and learning about a portion of the concrete world that is complex and sensory rich. To encourage environmental educators working in field settings to provide sensory experiences, education and training should include in-depth exposure to natural history through field-biology classes. Staff planning for instruction should include analysis of objects and activities to maximize opportunities for sensory experiences. Taken a step further, EE curricula should include opportunities for sensory experiences as a formal component of each curriculum. Likewise, given the prevalence of sensory experiences in the students' dialogue, environmental educators should enhance, where appropriate, areas at their residential centers to increase opportunities for sensory experiences with nature.

In our data, social relations were evident in many forms. Discussion of events among students that occurred at the residential EE center were frequent well after the actual experience. Environmental educators can capitalize on these social interactions by making themselves available to students before and after classes and during meals and recess. A plan to provide less formal interactions between staff and visiting students should be in place, accompanied by training for staff on how to initiate informal conversations about environmental phenomena with students of various ages. Taken a step further, chaperones could be trained on how to encourage interactions with students about their residential EE program experiences. Various Internet programs can provide opportunities for communication between EE staff and students after a visit.

The novelty of experiences is not surprising considering how different the beach and maritime forest environments are from the students' home environments. Opportunities for application are similar to those discussed previously with sensory experiences. Environmental educators should seek to provide moderately novel experiences to students. Environmental educators should be sensitive to students' reactions to various content and methodological approaches, keeping in mind that perceptions of novelty will vary with age and particularly with previous experiences with environments. Evaluation of programs should include a measure of novelty, and some percentage of classes and whole programs should receive high marks for novelty. Novel responses to instruction

should encourage further discussion among and between students, EE staff, classroom teachers, and chaperones.

Much of what was memorable for the students occurred during free time, a period more similar to play than formal education. Playful activities that involved interaction with nature allowed students to interact with each other and natural objects on their own terms. Our observation of another school system playing sports during recess at the same time as the study classes suggested that residential EE centers should be discouraged from offering sports activities, which are commonly available in the students' communities. The students in this study readily engaged themselves in play opportunities on the beach, providing about 5 hr of additional informal contact during a 3-day period with the environments they were formally studying.

The personal welfare domain reminds us of Maslow's (1943) hierarchy of needs. Despite excellent food, clean cabins, and extensive preparation, a few unpleasant things were mentioned about food, classrooms, and access to bathrooms. Part of any residential EE program should include at least a daily review of when meals and snacks occur, the location of restrooms, and discussions of safety. Educators want children enjoying and thinking about the environment, not worrying about their stomach, bladder, or real or imagined safety concerns.

Our findings and final theme are consistent with those of child-centered learning approaches that provide choice and control for the learner (McCombs & Miller, 2007). They reinforce a growing body of literature that argues that environmental educators must attend to not only EE but also environmental socialization (Bixler & Morris, 2000; Vadala, Bixler, & James, 2007) and the many other informal and ephemeral aspects of residential EE programming that make for a high-quality and memorable experience worth discussing long after the event is over. Learning about environments and making responsible choices is typically the central goal of EE. Whether people become and remain attentive and interested in the environment may well be more related to the quality of the many informal direct experiences with environmental things and spontaneous social interactions surrounding those events. To traditional environmental educators focused on cognitive outcomes, these concerns may seem peripheral, but they may well be the critical peripheral.

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