

## **Title of Research**

A Case Study of an Outdoor Environmental Science Field Trip

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## **Research Abstract**

Field trips provide opportunities for students to experience many different contexts beyond the classroom, and are a popular choice of K-12 teachers in the US. Recent interest in learning that occurs at informal science education centers such as museums, zoos and aquariums has stimulated studies of the relationship between learning in and outside of schools. Field trip settings vary widely creating the possibility of new and different life experiences for students. Although many studies focus on the teachers, the contexts, and/or the students during the field trip, only a few look at the entire process of learning by including the classroom setting before and after the field trip.

This study was designed to address the student process of learning during an environmental science field trip to an outdoor setting. John Dewey's extensive writings on the relationship between experience and learning informed the analysis, creating a focus on active and passive elements of the experience, continuity within and across contexts, the interactive nature of the experience and the importance of subject matter. The students' active engagement with each other and the environment during the field trip supported meaningful remembrances of the field trip experiences one week after the field trip. Their accurate and detailed descriptions of plants and animals provided evidence of their meaning-making process and their new found skill of making observations about the environment. They made connections with their home life and prior experiences as they discussed the field trip and drew pictures that represented their experiences.

One implication of this study is that outdoor natural environments, although novel to students from urban environments, can provide a meaningful context for hands-on science explorations. Building long term relationships between schools and informal setting will support both student and teacher learning about the environment.

## **Description of Research and Findings**

Field trips to science-related educational sites have a long tradition as an alternative to school activities at all grade levels in the US. As resources become scarce, however, administrators and teachers must decide whether such excursions are worth the time, effort, and funding required. Advocates for field trips need documentation of what students learn and how that learning occurs (Rickinson, 2001, 2006). In addition, current interest in the process of life-long learning has created the need for increased understanding of the learning effects of experiences beyond the classroom (Falk & Dierking, 2000, 2001; Falk & Storksdieck, 2005). Recent concern about the amount of time that children spend indoors versus time spent in the outdoors has also generated interest in the frequency and quality of educational experiences that children have in the outdoors (Louv, 2006; U.S.Government, 2008).

## **Research Design**

The purpose of this case study was to develop an understanding of the experience and process of learning by a fourth grade teacher and her students surrounding a field trip to an outdoor environmental science education site. In order to develop an understanding of the student and teacher experience and learning process surrounding the field trip, the following questions guided the research:

- What meanings do students make of the field trip experience and of connections with their school, home and other experiences in outdoor environments?
- What meaning does the teacher make of the field trip experience for herself and her students?
- How does the site educator perceive the students' experiences during the field trip?

The following elements of the study were central to the development of an understanding of the participants' process of making meaning based on the field trip: 1) the students' perspective, 2) the educators' (classroom teacher and site educator) perspective, 3) the science content (in the classroom and related to the field trip), 4) the contexts (the classroom and the field trip site) and 5) the researcher's perspective. The actions and interactions among the participants, and the science content within the two contexts were the basis of the analysis and interpretation of the data. In addition, the sensory quality of the field trip was considered as important to the meaning-making process of the participants.

#### Results

This study contributes to the research literature through the interpretation of the students' learning process with data from the classroom as well as the field trip, using a Deweyan lens of an educative experience (Dewey, 1904/1965, 1938/1997, 1934/2005, 1916/2007). The classroom and field trip experiences were analyzed in terms of the following educative qualities: active and passive components of learning, development of continuity, the interactive nature of the experiences, and subject matter connections in the classroom and during the field trip. The results of this study are described in the following sections based on the above described educative qualities of the experience.

**Active and passive components of learning.** Students responded actively to a variety of teaching strategies used by both the classroom teacher and the site educator. The site educator explicitly described and then modeled the science process skill of making observations throughout the field trip. The students were responsive and began to use descriptive words as they made observations about new plants and animals found during their explorations. During the interviews after the field trip, they discussed what was found during the field trip using descriptive terms, and remembered many details about the plants, animals and habitats from the field trip.

The importance of reflective and interactive discussions as follow-up to a field trip was revealed during the interviews. During this time, students were actively involved with each other in sharing and remembering what was important about the field trip. They individually made connections with their lives and with other concepts from school.

The interviews and reflective journaling activities also reinforced the importance of social interaction, writing, and drawing to the process of developing abstract ideas from the concrete experience of the field trip for some students.

**Development of continuity.** There were several sources of continuity within and surrounding the field trip experience. Within the field trip, the students' experiences were linked or continuous in nature due to the site educator's repetition of terminology, ongoing observations of plants and animals, and investigations with tools. Before the field trip, the pre-trip visit stimulated student interest and prepared them to experience something new and different. After the field trip, the students made connections with their home lives. Although direct connections were not made with science lessons in the classroom, the classroom teacher's enthusiasm and willingness to try new things was consistent and included the field trip.

The study provides evidence of the detrimental effect of the No Child Left Behind Act on classroom time available to teach science, which contributed to the lack of

connections made with classroom science. In addition to a reduction in time spent teaching science, the control of the scope and sequence of science subjects by the school and county also put constraints on the teacher's decision making process regarding choice of content.

**Interactive nature of the experiences.** The students' interactions with the site educator were consistently energetic and responsive. The students responded actively as they participated in a variety of activities that involved interactions with others and with the environment during the field trip.

For example, in response to the site educator's explicit descriptions and observations, the students began to use descriptive words as they made observations about new plants and animals found during their explorations. During the interviews after the field trip, they discussed what they had found during the field trip using descriptive terms, and remembered many details about the plants, animals and habitats from the field trip.

Interactions in the classroom were more constrained by the static nature of the classroom environment and limited sensory stimulation. However, the psychological comfort level maintained by the teacher in the classroom contributed to student willingness to participate in the classroom and during the field trip.

**Subject matter connections.** Connections with environmental science were not explicitly made between the field trip and the classroom, partly due to differences in educator expectations for the field trip. The classroom teacher had two expectations for her students during the field trip. She wanted her students to have an experience in the outdoors that they might never have had before. She also wanted them to participate actively in hands-on activities during the field trip. Although she never used the word environment during the interviews, her goals are implicit in the goals and approaches of environmental education (EE). This contrasted with the site educator's stated goals of working with field trip participants in terms of environmental science (ES). The site educator chose to work with the students to develop their observation skills, including a mixture of EE, ES, and nature study in the field trip design and implementation. As a result of these differences, elements that would have contributed to continuity between the subject matter of the field trip and the classroom were not part of the students' meaning-making process.

## Conclusions

The learning processes for the students and their teacher were intricately entwined with the relationship between, and strengths and weaknesses of, the formal and informal educational systems that were the contexts for learning. The relationship between informal and formal institutions was central to this study. Both the teacher and the site educator had expertise and knowledge bases that were complementary to each other that supported the students' learning process in different ways.

In this case, the teacher in the study developed interesting teaching strategies for content with which she was not familiar. As a result, students experienced and practiced questioning and hypothesizing skills in the classroom. The students experienced environmental science content in more realistic ways through hands-on and investigative teaching strategies in the outdoor context of the field trip. The site educator also targeted the science process skill of making observations and modeled using the senses of sight, hearing, touch and smell for the students. This provided students with an in-context experience of skills that are frequently used by scientists.

## References

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