



Best Practices for Field Days

Factors That Influence Students' Learning in an Environmental Field Day

Authors: Hui-Hui Wang and Stephan P. Carlson

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Abstract

A field trip is a common strategy used by educators to bring out-of-school learning experiences into schools. Many research studies suggest a field trip will not only bring an individual close to the real-world, but may also increase an individual's environmental knowledge and responsible behaviors. Therefore, many environmental educators use field trips as a tool to strengthen their in-school curriculum. Thus, program evaluations usually focus on the predetermined outcomes, such as increasing environmental knowledge and responsible behaviors, which were decided by environmental educators and program designers. Students rarely have active voices in program evaluations. How do students evaluate their field trip experience? This study focuses on students' perspective and the factors that influence students' field trip experience. In this study, we found that an interesting and fun learning environment is a critical criterion, which students believe can increase their satisfaction level, can help them focus on field day activities, and can contribute to their learning in an out-of-school experience.

Introduction

Environmental educators are aware of the importance of bringing real-world experiences to their teaching. Also, a lot of research studies suggest that students must integrate in-school environmental literacy with out-of-school natural world experiences (Dori, 2000; National Research Council, 1996; Tonye, 1993). However, one of the biggest challenges for in-school environmental education is its inability to bridge a student's environmental knowledge with their personal experience and the natural world (Palmer, 1998, pp. 134-135). Therefore, a field trip becomes the most common strategy, which is used by most school teachers, to bridge students' environmental knowledge with real-world experience. For example, in Minnesota, over 10,000 fourth to sixth grade students will participate in an Environmental Field Day in an academic year (Carlson, 2008). Environmental Field Day not only provides various learning opportunities in different subjects, such as biology, chemistry, and wildlife and natural resource conservation, but also is a place that can bring students close to the natural world. Normally, these field day events require significant investment, such as time, people, and money. Therefore, having program evaluations to improve the effectiveness of a field day is necessary. However, in most existing environmental education studies, program evaluation primarily focuses on educational intervention (Rickinson, 2001). Most program evaluations for environmental education have already decided what predetermined outcomes that researchers and educators want to access. For example, much of the research focuses on learners' knowledge, attitudes, and behavior (Barney, Mintzes, & Yen, 2005; DiEnno & Hilton, 2005; Farmer, Knapp, & Benton, 2007; Goth & Hall, 2004; Knapp & Barrie, 2001). In these research studies, students played a less active role in terms of expressing their experience in a field trip. In other words, since most program evaluations of field trips have predetermined outcomes, rarely research studies consider what students really feel about a field trip. Rickinson (2001) suggests when applied to students' learning in a field trip, program evaluations should

consider what students want to say. After all, a field day program is built to help connect students with the natural world. How can we improve field days without knowing what students think a quality field trip should be? The focus of this study is to explore the factors, from students' perspective, that have an influence on students' field day experience and how these factors interact with other factors.

Literature Review

There has been an increased interest in schools to use field trips as part of environmental education programs (Martin et al. 1981, Knapp & Benton, 2006; Stern et al., 2008). However, few research studies have focused on how student evaluate their field trip experiences. Some literature suggested that a meaningful field trip should address students' educational needs, or be based on school curriculum, or state standards (Carlson, 2008; Nabors, Edwards, & Murray, 2009; Orion & Hofstein, 1994). However, when James and Bixler (2008) asked fourth- and fifth-grade gifted students what makes a meaningful field trip, the answer was not addressing students' educational needs, or the state standards, or school curriculum. They found that students think a meaningful field trip should connect to their personal experience suggesting that students holds the key to meaningful field trips. Orion and Hofstein (1994) suggested high quality and novelty are two important factors that influence students' learning on field trips. In order to have a high quality field trip, environmental educators and program planners should consider the quality of learning materials, structure, and teaching and learning strategies. Their findings also pointed out three novelty aspects, cognitive (previous knowledge), geographic (acquaintance with the field trip environment) and psychological (previous outdoor experience), had influence on a field trip experience that relates to learning. Other research focused on students' learning experiences on field trips and suggested that affective perception and social interaction with others had a strong influence in creating a meaningful field trip experience. For example, Cline's (1996) study suggested that students emphasized the importance of social interaction with others on a field trip. Jones and his colleagues (1994) also suggested that the most memorable things for students were related to social and environmental factors, such as friends, night hikes, black flies, and campfires. These studies pointed out that salient things that students remembered the most, such as a party, hiking and campfires, were not only the things that they did with others, but also involved their affective perception, such as happy, afraid, likes and dislikes. These research studies suggest that affective perception and social interaction are important factors to consider in providing a meaningful field trip experience for students.

Method

The Field Day Descriptions

This study was conducted at the eleventh annual Metro Children's Water Festival (MCWF). The MCWF was held at the Minnesota State Fairground in September, 2008. The setting included both indoor and outdoor activities where thirty-one learning stations were set up. Each station had a theme that was relevant to water. All the learning stations were designed to provide students with hands-on, mind-on learning experiences. Most of the volunteer instructors in MCWF were scientists who work for State or Federal agencies, nonprofit organizations, or the University Extension. Each instructor had approximately thirty minutes to deliver his or her programs to twenty-five to thirty students. After thirty minutes, classes rotated from station to station. The sequence of the rotation for the learning stations and classes were assigned by the MCWF planning crews. During the days, one class visited five to six learning stations, and a one-hour large group presentation. Although there were thirty learning stations at the MCWF, a class visited less than 25% of them.

Participants

There were close to 1,200 fifth grade students from sixteen schools. Forty-four different classes from each of the seven Metropolitan counties in Minnesota attended MCWF. Although MCWF had approximately 1,200 participants, 841 valid surveys (89%) were returned within a week of the field day.

Instrument

The student's instrument was originally designed for another purpose, to test the validity of a field day observation tool. A secondary use of the tool was to identify factors and model learning in field day programs. The tool was approved by IRB and appropriate forms were sent to principals, teachers and parents. The tool was designed to complement the constructs found in the observation tool for field days which was built from the literature and a Modified Delphi study. The data from the student's survey, based on field day constructs, can be used to validate constructs found in informal learning environments.

The survey contained forty-three multiple choice items and four open end essay questions. The student survey intended to measure three different dimensions, 1) MCWF learning objective, 2) overall field day experience, and 3) student content knowledge. The survey had twelve multiple choice items that measured learning objectives for MCWF, and had thirty-one multiple choice items that assessed the overall field day experience. The last part of the survey had four open end essay questions to evaluate students' content knowledge. For the purpose of this study, only the second part of the student's survey, overall field day experience, was analyzed. However, there were seven reversed items in the survey that showed a lot of inconsistency, suggesting that the 5th grade students didn't have the ability to comprehend the reverse questions. Therefore, we excluded these seven reversed items. A total of twenty-four survey items were analyzed in this study. These survey items were designed on a five point scale. Based on the purpose of the items, there were three sets of scales on a one to five rating for students' level of agreement or disagreement. The three sets of coding were 1) 1= strongly disagree, and 5=strongly agree; 2) 1= never, and 5= all of the time; and 3) 1= no way, and 5= oh yeah. After students filled out the MCWF student survey, school teachers mailed the surveys back to the researcher.

Analysis

In order to determine the factors that have an influence on students' field day experiences, exploratory factor analysis was used to analyze the student surveys.

Result

841 valid surveys were analyzed. Twenty-four items (See Appendix 1, p. 7) in the survey were selected for the analysis. This study used the principal axis analysis correlation matrix with orthogonal (Varimax) rotation. The choice to use principal Axis Analysis was because the commonalities of the factors were the main focus of this study. Factor loading exceeding 0.35 were considered when identifying the factors. The reason that we chose to report the factor loading exceeding 0.35 was because square of .35 goes over 1. Therefore, factor loading exceeding 0.35 could explain for at least 10% of the variance. Four factors were identified. The four factors retained 42.66% of the total variance. The Cronbach's Reliability coefficient for the total 24 items was 0.911 and with positive direction. The principal axis analysis yielded 4 factors with eigenvalues greater than 1. Four factors that comprised the remaining 18 items, which had factor loading exceeding 0.35, were: 1) satisfaction, 2) attention, 3) learning, and 4) instructors. The resulting factor structure is shown in Table 1, p. 7.

Conclusion

Satisfaction

One of the common indicators to evaluate a successful educational program is student satisfaction. Student satisfaction is often study in other field, such as on-line learning (So & Brush, 2008) and higher education course evaluation (Endres, *et. al*, 2009), but rarely can be found in a field trip's evaluation. Endres and her colleagues (2009) found that if students are satisfied with a course, students tend to recommend the course to others. So and Brush (2008) suggest that course structure and emotional support are two important factors that will lead to

successful on-line learning. In our study, we found that satisfaction of a field day was composed of three important factors. First, students have to enjoy the things that they did at the learning station. Second, a learning station has to be interesting enough to students. Third, other students should also have fun at the learning station. These factors suggest that course structure and emotional support (peer interactions) are important for a student to enjoy a field day, and our result reflects So and Brush's finding. Our finding also suggests if students like the field day, they will recommend the field day to their friends, because they think the friends who did not come to the field day would enjoy the field day, too. Students also would like to come back to the field day again if given a choice.

Attention

Attention has been recognized as one of the critical factors that has an impact on learning in an out-of-school environment (Cone et. al., 1978). In our study, the interaction between students and field instructors is important to increase students' attention levels during a field day. When students enjoy a field instructor, it is more likely that they will pay attention to the program. The finding also suggest that students will enjoy a field instructor if 1) the field instructor creates a friendly learning environment to students, such as using appropriate language and content knowledge to deliver the programs, and 2) the field instructor provides sufficient opportunities to interact with students, such as giving enough time for students to ask questions.

Learning

As most existing research studies propose, social interaction with peers is an important factor that may help students' learning in a field trip (Jones et. al., 1994; Cline, 1996, and James & Bixler, 2008). However, our result suggests that social interaction factor may not exist without having a fun and interesting learning station. When considering social interaction as an important factor that can help students' learning, a fun and interesting learning environment is a prerequisite condition to support the social factor. In other words, in order to help students' learning, an effective field trip should provide student opportunities to interact with other students in a fun and interesting environment.

Instructors

One of the factors for ensuring a good education is quality instructors. To students, they may have a meaningful field day experience if they have knowledgeable and friendly field instructors, who are nice and can relate or connect to them. Age appropriate activities help students connect to the learning outcomes (Carlson & Hartz, 2002).

Discussion

One of the critical criticisms that an out-of-school educational program, such as a field trip program, faced is that some educators believe students only have a fun experience, but learn nothing from out-of-school educational experiences (Shortland, 1987; Wymer 1991). However, our finding suggests that an interesting and fun learning station is one of the most important factors that contribute to satisfaction, attention and learning in a student's field day experience. In other words, from students' perspective, an antecedent for learning to occur is that students need to have fun and enjoy the field trip experience. Although in this study we cannot conclude what an interesting and fun learning station in a field day should look like, we do understand an interesting and fun learning station should have a knowledgeable, skillful and friendly instructor who can create a positive social interactive environment. Therefore, field instructors play an important role in creating an environment that may contribute to meaningful field trip experiences for students.

On the other hand, in order to create a fun and interesting field trip experience, instructors and program planners should provide various opportunities for students to interact with other students. Positive interaction with other students not only can increase students' attention and learning, but also amplify students' satisfaction level, which relates to students' enjoyment of a field trip.

Our study captured 42.66% of the total variance that influences students during a field day experience. There are more than 50% of other latent variables that our survey was not able to measure. Because this is a pilot study, we suggest further studies in order to explore all the factors that influence students' field trip experiences. We suggest first, more studies to investigate other variables that influence students' field day experience. For example, other than a knowledgeable, skillful and friendly instructor, what other factors will increase students' attention in a field trip? What do students think a fun and interesting learning environment should be? Second, a study should be done to verify the ways these factors interact with each other, as we report on in this study.

Hui-Hui Wang

Ph.D. Candidate
Department of Curriculum and Instruction
College of Education and Human Development
University of Minnesota

Stephan P. Carlson, Ph.D.

Professor
Environmental Science Education
University of Minnesota Extension

www.extension.umn.edu/fielddays/

University of Minnesota Extension is an equal opportunity educator and employer.

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Appendix 1 Questionnaire

- 1 At the learning stations, I knew what would happen
- 2 Presenter told us who they were
- 3 Presenters asked us questions that I could understand, even though I did not know the answer
- 4 I had a chance to ask my questions
- 5 I enjoyed the presenters
- 6 I could hear and see the presenters at the stations
- 7 I love the things we did at the stations
- 8 I learned something new at the stations
- 9 The Water Festival felt like being in school
- 10 I paid attention at the stations
- 11 I found the stations interesting
- 12 Kids in my class listened when they were supposed to
- 13 Kids in my class really got into the activities at the stations
- 14 Kids in my class had fun at the stations
- 15 I got to do, hear or see new things
- 16 I enjoyed being away from school
- 17 I enjoyed at the Water Festival
- 18 The presenters at the Water Festival knew a lot
- 19 The presenters at the Water Festival were nice to me
- 20 I would recommend the Water Festival to a friend
- 21 I would like to come back next year
- 22 Other kids who did not come to the Water Festival would like the Water Festival
- 23 The Water Festival was what I was hoping it to be
- 24 I liked the Water Festival

Table 1 *Four Factors Solution of the Student's Field Trip Experience Using Principal*

Items	Factor 1	Factor 2	Factor 3	Factor 4
Presenters asked us questions that I could understand, even though I did not know the answer		0.480		
I had a chance to ask my question		0.526		
I enjoyed the presenters		0.453		
I could hear and see the presenters at the stations		0.440		
I love the things we did at the stations	0.467		0.467	
I learned something new at the stations			0.366	
I paid attention at the stations		0.416		
I found the stations interesting	0.492	0.370	0.418	
Kids in my class really got into the activities at the stations			0.691	
Kids in my class had fun at the stations	0.362		0.597	
I enjoyed being at the Water Festival	0.675			
The presenters at the Water Festival knew a lot				0.479
The presenters at the Water Festival were nice to me		0.353		0.473
I would recommend the Water Festival to a friend	0.763			
I would like to come back next year	0.812			
Other kids who did not come to the Water Festival	0.669			
The Water Festival was what I was hoping it to be would like the Water Festival	0.659			
I liked the Water Festival	0.817			

Axis Analysis (PAA)