

## School Field Trips: An Overview

Stephen Bitgood  
Jacksonville State University

### Introduction

As shown by the bibliography on pages 11-13, school field trips have received considerable attention. Koran, Ellis, & Koran (pages 7-10) summarize many of the research studies on field experiences. The current article attempts to provide a more general overview of the literature on field trips. Four phases of school field trip programs are reviewed:

- Planning of the program
- Pre-visit preparation
- On-site Activities
- Follow-up Activities

Studies addressing each phase of the trip will be cited and gaps in current research will be noted.

We assume (along with others, e.g., Eason & Linn, 1976; Screven, 1976) that evaluation should be a necessary part of any museum program including the field trip. Further, evaluation should take place in all four phases of the field trip program and adequate resources for evaluation should be provided. The major benefit of ongoing evaluation is continual improvement of the program.

Evaluation should attempt to identify all aspects of the museum experience, not just gains in factual knowledge. As Engel & Hein (1977) and Hein (1985) argued, if learning is measured only by pre- and posttests or questionnaires, then the experience is reduced to "some fairly dry facts and few of them indicate the value of the program, or indicate the time and effort spent on them by children and adults."

Many have argued that measures other than cognitions (e.g., facts) should be included in evaluation (e.g., affective and psychomotor responses). For example, Sneider, Eason, & Friedman (1979) used multiple measures to evaluate an interactive astronomy exhibit. These measures included a psychomotor skill, the use of a telescope. Flexer & Borun (1984) had children demonstrate their knowledge with simple machines as an alternative to the usual paper-and-pencil test. Bevins and Bitgood (1989) examined cognitive beliefs, emotional responses, and self-reported response tendencies to a live snake demonstration.

### Planning of the Program

As with any project or program, planning is perhaps the most important step. There are several points that need to be made before proceeding further:

- It is unrealistic to think that two or three hours in a museum or zoo is going to have a profound effect on

the amount of factual learning.

- Students can learn as much or more in a museum as in a classroom given equal time (e.g., Wright, 1980).
- A field trip program is usually more than just a museum visit. The museum experience is often integrated into the regular school curriculum. Thus, a field trip is difficult to evaluate in isolation.
- There is a danger that the museum program may become similar to classroom experiences, thus substituting one classroom experience for another.
- Paper-and-pencil tests, by themselves, do not adequately evaluate the field trip experience.

Several questions need to be answered regarding the content of what is to be learned on a field trip: How should the instructional objectives be defined? What input should be considered? Should the objectives include cognitive, affective, and performance reactions?

When considering the development of instructional objectives, it may be beneficial to engage in a logical analysis of the museum experience. To make the experience as meaningful as possible, a field trip should take advantage of the unique characteristics of the informal learning environment (e.g., Price & Hein, 1988).

What is unique about a museum or zoo compared to a classroom setting? Bitgood (1988) described seven dimensions that distinguish formal from informal learning environments. First, instructional stimuli differ markedly. For example, in informal learning settings exposure time to the instructional stimuli tends to be much shorter than in a formal classroom setting. In addition, the learner can have direct contact with objects rather than symbolic exposure (e.g., textbook description).

Other setting dimensions that distinguish between classrooms and museums/zoo include: characteristics of the environment, expected behaviors, social interactions, consequences of learning, instructional objectives, and audience composition.

One of the unique characteristics of museums and zoos is the presence of objects/animals. While this fact is widely recognized, only a few studies have attempted to examine its importance. Some have examined the effects of live and "dried" animal specimen on student learning and attitudes. Kress (1975) used live spiders and snakes in combination with adult or peer modeling to produce positive attitude

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changes in fourth graders. Wakeman (1986) found that live animals (the species were not listed) were no more effective than "dried" animals or video presentations in teaching most concepts. However, for teaching other concepts (e.g., dispelling a pet image for zoo animals), live animals resulted in greater learning.

Sherwood (1986) compared live, "dried", and videotaped instruction to fourth graders using horseshoe crabs and sea stars. Students who participated in a "touch-and-feel" session, whether live or "dried", retained more information from the lesson than students who did not participate in such activity. Longer retention for "touch-and-feel" students was also accompanied by a more positive attitude toward the subject matter.

Bevins and Bitgood (1989) found that a live snake demonstration changed students' beliefs about the usefulness and dangerousness of snakes as well as the students' affective reactions (anxiety). However, students' self-reported desire to touch, hold, and own a pet snake were unchanged by this experience.

Once the general subject matter of the field trip is selected, it is important to determine prior knowledge, possible misconceptions, and particular interests of students. Borun (1988; 1989) has shown that misconceptions can lead to faulty inferences about what an exhibit is all about.

Another question to be addressed is one of learning domains. In several studies, the instructional objectives included cognitive knowledge, psychomotor skills, and increased interest in the subject matter. For example, Sneider, Eason, and Friedman (1979) found that students experiencing an interactive astronomy exhibit (Star Games) demonstrated more cognitive learning, better skills in using a telescope, but no significant difference in interest level than students who did not use the interactive exhibit.

At least three suggestions can be derived from the above discussion: (1) consider the unique qualities of the field trip setting and formulate instructional objectives that take advantage of this uniqueness; (2) formulate objective with multiple response domains rather than with simple cognitive, factual knowledge; and (3) determine the knowledge, misconceptions and interests of students prior to developing the field trip content and use this information to plan instruction.

### Pre-Visit Preparation

A basic assumption of most professionals is that pre-visit preparation is a critical part of the field trip program. However, exactly how preparation should be conducted is not clear. How can students and teachers be prepared for the field trip in the most cost-effective way? The following discussion considers both teacher and student preparation for field trips.

### 1. Teacher Preparation

Although teacher preparation is not always a part of the field trip program, it is obvious that such preparation can have a vital influence on the outcome of the field trip experience. If teachers who escort students know the content of the lesson, know how to assist the museum staff, and are informed about the details of the trip's agenda, they are more likely to have a positive experience and more likely to facilitate a successful visit from the students' perspective. Unfortunately, there are no studies that address the question of how to maximize teacher involvement. In-service training and teacher guides are two common ways of preparing teachers. Hein (1985) reported that very few teachers attended in-service workshops in a science museum education program conducted by the Boston Museum of Science. However, in the same report, Hein pointed out that teachers want more worksheets and more information on the use of the museum resources.

It is important to point out that teachers who take part in field trips may benefit as much as children. Many of the teachers in the evaluation by Bitgood and Benefield (1989) reported teacher benefits from a sixth grade field trip to the Museum of Science and History in Jacksonville, Florida. Some stated that it made them more enthusiastic about teaching science. Others reported that it gave them new ideas for teaching.

Teachers can play an important role in the outcome of a field trip. We need to know more about the most effective methods of eliciting their enthusiasm and cooperation in such programs. Hein and his colleagues (Hein, 1985; Price & Hein, 1986; Price & Hein, 1988) have been one of the few evaluators to focus on the role of teachers in field trips.

### 2. Student Preparation

Instructional objectives. Several studies have addressed ways to improve the amount of learning that will occur in the field trip. Study lessons, films, lectures, supplementary reading, and outlines (e.g., Koran & Baker, 1978) are commonly used to prepare students.

Melton, Feldman and Mason (1936) studied the effects of a classroom silent reading lesson with a vocabulary drill and the lesson-drill with a silent reading test. Fifth graders benefited from the reading lesson without a test, but sixth graders did better when they were given the silent reading test. Adding pictures of the museum objects to this procedure produced even better learning. In another part of their report, Melton et al. (1936) reported a study that found that students learned best when the pre-visit exercise was the day before the museum visit rather than two, seven, or fourteen days before.

Gennaro (1981) studied the effects of previsit instructional material on learning for a museum field trip by teaching relevant concepts in the classroom prior to the field

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trip. A control group was given the same pretest and posttest but received nonrelevant material before their museum trip. The group receiving the pre-visit instructional material performed considerably better on the posttest.

To summarize, in order to optimize the accomplishment of the instructional objectives of a field trip, it is necessary to prepare students with some type of classroom lesson before the trip. The most effective techniques of preparation, however, remain to be empirically established. Koran and Baker's (1978) generalizations on field trips provide a starting place, but more research is needed.

Knowledge of the environment. Several studies have shown that students' prior knowledge of the environment is essential for successful accomplishment of the instructional objectives (Balling & Falk, 1982; Falk, et al., 1978; Martin, Falk, & Balling, 1981). Children in a novel environment may focus their efforts on learning about the environment rather than on learning the instructional material. In support of this conclusion, Hein (1980) reported that school children who made frequent trips to the same museum showed greater on-task behavior during their visit. Multiple visits to the same museum are associated with increased attention span and involvement.

The results of the above studies clearly suggest that it is important to determine the students' prior visitation before the field trip is scheduled. Time to adapt to new surroundings may be important if students have not previously visited the setting.

Knowledge of trip agenda. Falk (unpublished) reported a study conducted at the National Zoo in which learning was compared in several groups of children. One group was given a "cognitive orientation." That is, children were told what concepts would be discussed on the trip. A second group was based on process skills ("a successful zoo visit requires good looking skills; here are some strategies for improving your ability to "see" things at the zoo"). A third group was given a "child-centered" agenda ("here is how you will get to the zoo, where you will park, and what you will do while at the zoo; here's what you'll see, here's what you can buy, and here's what you'll have for lunch"). The group receiving the "child-centered" agenda demonstrated more learning than any other group. Falk's explanation of this interesting finding was that if children's interests and concerns about the trip's agenda are not addressed during the pre-visit preparation, these concerns are present throughout the trip and interfere with learning the instructional material.

Falk's study suggests that students should be given a complete agenda so they know exactly what they will do and when. Otherwise, it will be difficult to keep them attending to the instructional material.

## On-Site Activities

The basic question here is, "How can students get the most from the field trip experience?" On-site activities can include a variety of experiences including: (1) lectures; (2) demonstrations; (3) tours; and (4) audio-visual presentations (including planetarium shows). Many have argued that interactive experiences are most effective, however the activity may be structured (e.g., Koran & Baker, 1978; Price & Hein, 1988). Since tours are the most common type of field trip experience, they will be discussed first.

### 1. Field Trip Tours

Pre-tour lectures. Melton et al. (1936) compared a 15- and 30-minute lecture prior to the museum tour and found that a 15-minute lecture was more effective. They concluded that "some of the time usually spent by children in listening to an introductory lecture can be more effectively spent in direct contact with the museum exhibits." However, when they eliminated the lecture completely, they found that fifth graders did not perform as well, although the lecture didn't seem to make any difference for sixth, seventh, and eighth graders. Melton et al. (1936) concluded: "...Children of the sixth, seventh, and eighth grades learn more when they spend the usual introductory lecture time in further direct contact with the museum exhibits. On the other hand, the fifth grade children need a short introductory formal lecture (15-minutes), although a long introductory lecture (30-minutes) is uneconomical. The formal lecture is equally effective for the fifth and sixth grade pupils whether it is placed at the beginning or the end of the museum visit, if the discussion method is used in the halls." p.42).

Worksheets. Student worksheets are often used and occasionally criticized (Fry, 1987; Price & Hein, 1988). There is some evidence that this method can be useful. For example, Melton et al. (1936) used a "game card" in which a card with 10 questions was given to each child before entering each of four museum halls. They found that for fifth graders, the lecture was more effective than game cards; but, for sixth graders the game cards proved superior. Price and Hein (1988) present a more negative assessment of worksheets. They argued that worksheets "too often actually impede student learning by inhibiting true observation..." However, no empirical data are offered to support this argument.

Guided versus unguided visit. Even with unguided tours, children appear to learn a substantial amount. Carlisle (1985) observed the behavior of fifth graders in a Canadian Science Center. The following quote describes the typical behavior patterns of these children:

"The children approached an exhibit, looked, went on, or waited and/or participated. Few read the graphics on the exhibits. Most worked by trial and error, imitated what

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others had done, or were 'instructed' by friends. However, most did what was intended by the exhibition as indicated by the data on interaction levels." (p. 30).

The skills of the tour guide are also important. Melton et al. (1936) found that, even among a select group of skilled docents, marked differences in the test scores of children were found when analyzed according to the docent who led the tour.

Stronck (1983) compared the effects of docent guided versus teacher guided tours on learning and attitudes for fifth, sixth, and seventh graders taking field trips to the British Columbia Provincial Museum in Canada. Docent guided tours involved a highly organized lesson plan and were limited to 9 children per docent. Teacher guided tours were led by the students' own teachers and tended to involve relatively little structure. Each child was given a 10-item multiple-choice test of knowledge and a 10-item attitude questionnaire. The docent-guided groups performed higher than the teacher-guided groups on the test of knowledge, but students in the teacher-guided groups showed more positive attitudes than the docent-guided tours.

Van Rennes (1978) described a teacher-led inquiry method for teaching science concepts in a museum to fifth and sixth graders. Basically, the method involved a sequence of questions and instructions to students that were designed to assist students in drawing scientific conclusions about a science concept. The study suggested that the inquiry method was most effective when led verbally by teachers.

The above studies on structured vs. unstructured tours suggest that both experiences can be valuable for students. While structured tours may produce superior factual learning, unstructured tours appear to create more enthusiasm and interest in the subject matter. Perhaps it is wise to include both components in a field trip for maximum impact.

## 2. Lectures and Demonstrations

Lectures and demonstrations are most useful when they take advantage of the unique characteristics of the setting. Thus, as suggested above, when museum objects or zoo animals are used, a simple repetition of classroom experiences is avoided. Of course, some animals can be brought into the classroom. Care should be taken to avoid lectures that could be given in the classroom. In general, this is not a cost-effective use of the field trip.

## 3. Audio-visual Presentations

Audio-visual presentations may be particularly effective if they involve an overwhelming sensory experience such as is provided by the omnimax theaters or a planetarium show. Such programs should be of minimal duration and be carefully developed (see Miles, 1989).

## 4. Other On-site Factors to Consider

Duration of field trip. Little is known about how the duration of the trip influences students. In one evaluation

(Bitgood & Benefield, 1989) it was found that both teachers and students felt rushed in their two-hour visit and expressed a preference for a full-day field trip.

Size of the group. While size of the group is obviously important, there are apparently no systematic studies of this variable with respect to school field trips. How is learning affected by group size? Large groups in lectures and demonstrations have several potential problems:

- distance from the instructional stimuli
- opportunity to interact with hands-on materials
- space limitations in museum areas

Number of staff/teachers supervising students. Is the attention and behavior of children influenced by the teacher-student ratio? Do students pay attention more when there are more adults present? These questions need further study.

Grade level of students. There is evidence to suggest (see Melton et al, 1936 cited above) that the grade level of the student influences the effectiveness of the on-site museum procedures.

Time for shopping in museum store. Students generally want to shop in the store. How much time should be given for this activity?

Time for unstructured wandering. Should students be allowed free wandering time in the museum?

## Follow-up Activities

Often neglected is the chance to solidify the museum experience with follow-up activities. We could find no investigation of the effects of follow-up activities on learning. While a high percentage of teachers reported using follow-up activities provided by the museums in one evaluation report (Bitgood & Benefield, 1989), it is not known if this has any impact on student learning. Studies on the impact of various kinds of follow-up activities are needed.

## Conclusions

Much of the literature on school field trips has focused on: whether or not students learn; what they learn; or methods of conducting field trips. A review of the literature provides a convincing argument that students can learn as much or more on a field trip as in the classroom. Future research, however, should go beyond this simple question.

More attention should be paid to: (1) taking advantage of the unique qualities of the field trip setting; (2) determining the most effective ways to prepare students and teachers for the experience; (3) studying how to best structure the on-site experience; (4) determining how follow-up activities can be used to facilitate the experience; and (5) studying alternative approaches to field trip evaluation.

[See the Bibliography on pages 11-13 for the complete references on each of the citations.]