

Evaluating the Effectiveness of Field Experiences: 1939-1989

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Introduction

In 1978 the National Science Teachers Association published a volume titled What Research Says to the Science Teacher. One article, "Evaluating the Effectiveness of Field Experiences," provided a review of studies on the effectiveness of field experiences and comments regarding field trip groups of individuals. Major constructs considered were focusing attention, maturation, active participation, and the value of media attributes. Some generalizations from this review were: (1) teachers should be thoroughly familiar with the informal setting to be visited and establish objectives for the outcomes desired; (2) prior instruction such as films, slides, lectures, outlines and supplemental reading seem to contribute to developing necessary structures that visitors can use to incorporate and interpret field experiences; (3) focusing visitors' attention using objectives and advance organizers is critical; (4) experiences such as computing data, graphing data and responding to pre-questions all can have a motivational effect on visitors; (5) field and museum experiences should be "logically" structured and sequenced and related to prior instruction; (6) slides, films, field trips, and museum visits covering similar content can be combined to compensate for gaps in the attributes of one or the other; (7) active participation and media each contribute to positive outcomes in a variety of age groups and contents; and finally, (8) informal learning experiences should be evaluated considering a variety of outcomes and levels of knowledge. Feedback should be provided to students, teachers, visitors and curators.

This paper is an attempt to go beyond the earlier review and provide continued documentation regarding research in this area and to determine if a consistent pattern of findings is emerging.

Review of Studies

Natural history museums, science centers, zoos, and aquaria each are considered informal settings and are thought to contribute to the acquisition of knowledge and to influencing the attitudes and interest of visitors (Koran, et al., 1983). One issue that has interested researchers who study informal settings is what are the effects on visitors to these settings,

cognitively and affectively, when the visit occurs in organized school groups or individually? Table 1 presents the ever expanding literature in this field progressing from 1939 to 1989. Findings are summarized including the age of visitors, type of field experience and content (subject matter studied), outcomes measured in each of the settings and whether significant changes occurred on the criterion measures used.

Although the type of visitors studied, the subject matter, and the outcomes measured vary considerably it is possible to identify consistencies from the earlier review to this one. For one, regardless of the type of experience 20 of the 27 studies show some type of positive outcome. Of this 20, 18 of the studies looked at cognitive outcomes and 2 at affective. Two looked at both.

Further, the studies also point to the value of pre-information prior to a visit to an informal setting, as well as the value of combining experiences, e.g., visit plus classroom instruction, as opposed to one or the other alone. Related to this factor, carefully designed and structured public relations materials provided for visitors when they arrive may also serve to assist visitors in integrating subsequent knowledge communicated by the exhibits.

In addition, there seems to be mounting evidence that visitor involvement with exhibits rather than passive observation results in affective changes such as increases in interest or changes in attitude. A number of studies reviewed (Moles, 1988; Adams et al, 1989) also point to the element of visitor responsibility for profiting from an informal setting. Visitors must take the initiative to pay attention to an exhibit, remain in the vicinity of the exhibit and become actively involved in thinking about or manipulating objects in the exhibit (Koran, Koran, & Foster, 1989).

Taken as a group, the studies reviewed from 1978 to 1989 provide a more positive view of the effects of informal settings on visitors than the previous studies cited. In general, cognitive and affective outcomes have been positively influenced in 19 of 20 studies while only five reports found no differences. Although the data support the previously reported findings they also provide convincing evidence that visits to informal settings are profitable in a variety of ways and are certainly justified as part of school programs or individual visitor itineraries.

One factor which may be contributing to the most recent positive findings is the evidence of better research and evaluation methodology in recent studies and a broader range of outcome variables studied. Although earlier studies have concentrated primarily on low level knowledge outcomes, more recent studies have explored a broader range of cognitive outcomes as well as affective and psychomotor outcomes. Together, these results provide a powerful argument for continued funding and development of informal settings and continued efforts to influence visitors in these settings.

Table 1. Summary of Research on Field Trips (1939-1989)

Investigator/ Year	Grade Level	Type of Experience/ Content	Outcome Measured	Effect
Fraser, J. A. (1939)	High School	TVA FIELD TRIP/ Ecology & social problems	Attitudes/ knowledge	No change.
Harvey, H. W. (1951)	9th grade	TRIP TO BURN AREAS/ Ecology & environmental education	Scientific attitudes	Significant gains.
Delaney, A. A.	7th grade	TRIP TO BROOKHAVEN NATIONAL LABORATORY/ Physical science	Knowledge gains	Positive gains.
Mahaffey, B. D. (1969)	adults	STATE MUSEUM EXHIBITS/ History	Interest/ content	Positive gains.
Sunal, D. W. (1973)	Middle School	PLANETARIUM VISIT VS CLASSROOM OR COMBINATION/ Astronomy	Knowledge gains	Positive classroom/ planetarium combination; No difference classroom vs planetarium.
Hosley, E. W. (1974)	5th grade	FIELD TRIP &/OR SLIDES OF FIELD TRIP/ Balance of nature & environmental education	Knowledge gains	Positive slide/ field trip combination.
Screven, C. G. (1974)	ages 10-30	MUSEUM EXHIBITS/ Skull studies, animism, shamanism	Knowledge gains & retention	Positive.
Mathai, R. A. Deaver, N. E. (1976)	ages 6-11	INTERACTION, MANIPULATION/ Museum exhibits	Knowledge, interaction & manipulation behaviors	Positive effects.
Shettel, H. (1976)	High School	MUSEUM EXHIBIT/ Man & Environment	Knowledge gains	Positive for longer viewing; positive for knowledge gains.
Falk, J. H. et al. (1978)	ages 10-13	VISITS TO WOODS/ Foliage diversity & succession	Concept & novel setting	Positive effects for familiar groups.
Gross, M. P. Pizzini, E. L. (1979)	5-6th grade	ADVANCE ORGANIZER FOR WOODLAND FIELD TRIP/ Environment, preservation	Attitudes, environmental orientation	Positive

Investigation/ Year	Grade Level	Type of Experience/ Content	Outcome Measured	Effect
Wright, E. L. (1980)	6th grade	KANSAS HEALTH MUSEUM TRIP (CLASSROOM VS HANDS ON MUSEUM REVIEW)/ Health (human body)	Comprehension, knowledge	Positive for museum review group.
Sunal, D. W. (1980)	Preservice teachers	STUDENT TEACHING (CLASSROOM VS INCREASED FIELD EXPERIENCE)/ Elementary methods	Knowledge, performance	Positive.
Marshdoyle, E. et al. (1981)	4-6 grade/ teachers	ZOO VISIT/ Wildlife knowledge	Learning teach- ing objectives	Positive gains in knowledge and motivation.
Martin, W. W. et al. (1981)	ages 10-13	NATURAL AREA VISIT/ Ecological concepts	Effects of environmental novelty	Novel environments poor for imposed task learning.
Gennaro, E. D. (1981)	8th grade	SCIENCE MUSEUM OMNITHEATER/ Earth science	Previsit materials	Previsit materials valuable.
Mackenzie, A. White, R. T. (1982)	8-9th grade	ACTIVE & PASSIVE EXCURSION VS NO EXCURSION/ Geographical facts	Retention, learning	Positive retention of knowledge for students in active excursion group, better knowledge in students participating in both active and passive excursions.
Simmons, D. A. (1983)	Adults	ON-SITE VS SIMULATED VISIT/ Hazardous waste management	Effectiveness of presenting information	No difference between groups.
Stronck, D. R. (1983)	5-7th grades	MUSEUM TOURS/ Natural history	Cognitive, attitudes	More positive attitudes with less structure, greater cognitive learning with structure.
Fivush, R. (1984)	Kinder- garten	MUSEUM OF ARCHAEOLOGY/ "What happens vs what happened"	Longterm memory	No decrease over time.
Flexer, B. K. Borun, M. (1984)	5-6th grade	FRANKLIN INSTITUTE OF SCIENCE MUSEUM/ Simple machines (science)	Cognitive/ affective response	Positive for science content in visit vs non-visit group.

Investigator/ Year	Grade Level	Type of Experience/ Content	Outcome Measured	Effect
Kern, E. L. Carpenter, J. (1984)	University under- graduates	FIELD ON-SITE EXPERIENCES/ Introductory geoscience	Values/interest, attitudes	Positive for value, interest/attitude in experience group.
Kern, E. L. Carpenter, J. (1986)	University Under- graduates	FIELD ON-SITE EXPERIENCES/ Earth science	Affective responses	Positive for high order learning in experience group.
Ault, C. R. (1987)	Preservice teachers	INDIANAPOLIS CHILDREN'S MUSEUM VISIT/ General science	Museum as resource	Teachers expectations differed from actual outcome.
Finson, K. D. Enochs, L. G. (1987)	6-8th grade	SCIENCE-TECHN. MUSEUM VISIT/ Science-technology- society	S-T-S Attitudes	Attitude difference between visit/nonvisit/ grade level, Positive attitudes for visit, Planned activities visit -higher means/posttest scores.
Moles, J. A. (1988)	University students	FIELD STUDY N. CALIF./ SRILANKA/ Agriculture	Learning	Inquiring students found the experience challenging.
Adams, C. E. et al. (1989)	ages 15-16	PASSIVE EXHIBIT VISIT/ Wildlife education	Knowledge	Success dependent on student initiative, Knowledge gains positive when exhibit is viewed.

See the Bibliography on pages 11-13 for references in this table

A checklist of things to do:

- Order back volumes of *Visitor Behavior*.
- Order the *Proceedings of the Visitor Studies Conference*, both 1988 and 1989.
- Join the AAM Evaluation and Research Committee.
- Plan to attend the 1990 Visitor Studies Conference in Washington, DC, in July, 1989.
- Join NAME and the AAM Education Committee.
- Start a new visitor evaluation project.

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