time, effort, time, commitment, time, money, and time that the project will require — not just within the active planning, data gathering, and reporting of results, but over the long term.

Changes in direction require careful, sensitive development, not brusque imposition. Some research results *should* be implemented over a period of years because of their overall impact, both for the institution and its users. However, when desired changes don't take place immediately, it is easy for staff to become discouraged with the process and to lose enthusiasm for audience research generally.

One of the most important benefits of any substantive research project should be learning how to conduct research correctly, to be able to utilize this knowledge in future studies. Unfortunately, when institutionalization of results from the original study falters, enthusiasm for research may diminish, the lessons about conduct of research may be forgoten, and the organization may never undertake another audience research project.

6. The biggest drawback to institutional acceptance of research results is not bringing into the project at the outset everyone who will be affected by the results. When people are not offered opportunity for input at the beginning, they have no stake in implementing the results.

When trust in the process and its outcomes is built from the beginning and throughout the study by soliciting input and keeping everyone informed as the study progresses, people have some reason to "buy in." There is no surer way to defeat the goals of a project than to hand someone a report and say, "The research results say that you, or your department, should do this." Their most likely response is to ignore, demean, or subvert.

*Conclusions*: Therefore, if the institution allows adequate time and resources, solicits input and develops support for use of the results, and prepares several staff members to carry out implementation, the institutional acceptance of research results will be facilitated and the goals of a project will be accomplished.

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# A Summary of Recent Research and Evaluation Studies in the University of Florida Program on Learning in Informal Settings

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### Introduction

The Learning in Informal Settings Program at the University of Florida is housed in the College of Education and the Florida Museum of Natural History. Studies are also done in cooperation with faculty and students in the Latin American Studies Center which has a museum studies minor, as well as with the Program for Studies in Tropical Conservation housed in The Department of Wildlife and Range Sciences.

Research and evaluation that has been done in recent years uses as its guiding model four interacting variables: (1) visitor characteristics; (2) visitor processing activities; (3) exhibit type; and (4) other variables. The researcher or evaluator attempts to control to as great an extent as possible, the variables in one or more of these categories while manipulating the variable of interest. Outcome variables are a major consideration in all research and evaluation studies.

### Research Studies

While evaluation studies in informal settings are guided by evaluation models (Screven, 1990), research studies will usually have a theoretical foundation (Koran & Koran, 1995). Cognitive psychology research and theory and recent "Constructivist" extrapolations have formed the basis for most of the research studies that have been done at the University of Florida in recent years (Koran, et. al, 1988a; Koran, et al., 1984; Koran, et. al., 1983).

Two studies which are the best recent examples of this work have been Foster (1992) and Ellis

(1993). In the Foster study the researcher examined: "a) visitors' perceptions of museums on time spent on learning; b) media and task instructions on achievement; c) task difficulty on effort invested in learning from exhibits; and d) verbal ability, disembedding ability, associative memory and task preference on achievement as a function of treatment." Here exhibit type was held constant (Koran, et al., 1986) while the influences of learner characteristics and processing activity were measured by cognitive and affective outcomes measures. Results indicated that, "there was no positive relationship between the subject's perceptions of the amount of work involved and effort invested."

There was a positive relationship between amount of invested effort and time on task only for subjects who were expected to summarize each exhibit's content. "Time on task, task preference and verbal fluency were significant predictors of success in learning from museum exhibits." (Foster, 1992).

This study was significant in that it contributed to the mounting literature regarding task perception, effort invested, and time on task. More significant for museum practice was the finding that time on task, task preference and verbal fluency were significant predictors of success in learning. This suggests that providing visitors with clear information beforehand about the nature of a museum's exhibits could facilitate selection of high interest exhibits by visitors, possibly increase time at the exhibit and possibly learning from the exhibit. In addition, these findings suggest that if labels or other information require visitors to think, or puzzle about objects in the exhibit, holding power should be enhanced.

Foster's (1992) study led to a second study. Ellis (1993) sought to explore the visitor perception variable as well as the structure and sequence of an exhibit content. The thought was that it is less expensive to influence visitor perceptions to make exhibits more effective for visitor learning and interest purposes, than it is to continuously revise or redesign basically "good" exhibits.

Ellis (1993) explored the extent to which visitors could be influenced by perspective-taking instructions prior to visiting the exhibit, as well as the extent to which exhibit viewing sequence was more or less influential on cognitive and affective outcomes. This study also explored for whom these effects were apparent. The findings in this study have significance for both theory and practice. As the Foster (1992) study suggested, Ellis found that giving visitors perspective-taking instructions prior to visiting an exhibit (such as "think of yourself as a geologist," or "think of yourself as a paleontologist" and elaborations on the role) can create a mind set which produces significant positive effects on learning from the exhibit ($t=3.196$, $p < .05$). Why revise a good exhibit when its effectiveness may be increased by easy-to-prepare and inexpensive one page perspectives prior to viewing? He also found that prior knowledge significantly enhanced viewer learning from the exhibit ($t=2.174$, $p < .05$). This finding is consistent with a large body of instructional literature both inside and outside of informal settings. In practice, providing visitors with lists of key concepts or unifying generalizations may prompt prior knowledge and increase interest and learning from an exhibit. Carefully sequenced attention to an exhibit also enhanced learning rather than a more common random viewing pattern. Exhibit designers could take this into account and build into exhibits natural viewing pathways that focus visitors attention on the conceptual sequence of objects and paths for viewing. Finally, individual characteristics of visitors interacted with how they learned or responded to an exhibit, suggesting that adjuncts from which visitors with differing ability levels or perceptual patterns might choose, can enhance the museum experience.

The aforementioned studies, although research rather than evaluative in nature, clearly provide information useful for the design of exhibits. All of the traditions of experimental research were used in these studies such as randomization and manipulation and control of variables. Although many of these procedures are used in evaluation studies they are not as essential because generalizability to other settings and contribution to theory are not foremost evaluation objectives. The evaluation studies that follow will illustrate this distinction.

## Three International Evaluation Studies

Throughout this country, and the world, projects are being carried out in informal settings with little or no evaluation to either improve the nature of the project [front-end, formative, or remedial evaluation (see Screven, 1990)] or to determine the relative effects of the project (summative evaluation). Three studies in the museum studies program were conducted either within the Latin American Studies Center (Fisher & Koran, 1995) or with the Latin American Studies Center and the Program for Studies in Tropical Conservation (Gutierrez de White & Jacobson, 1994; Padua & Jacobson, 1993). Each of these studies was a "true evaluation" study in that it was not intended to contribute to theory; instead the effectiveness of developed materials and a training program in environmental education (Gutierrez de White, 1994; Padua, 1993) were being assessed to aid in decision making and judgments about the program. There was less emphasis on controlled conditions, not randomization and the resulting generalizability was not a major concern. Finally, the outcomes were primarily of local interest.

The former study, (Fisher & Koran, 1995) took place in the Yucatan and focused on visitor behavior at the Uxmal temple exhibits. It had the evaluation characteristics of the Padua study done in Brazil and the Gutierrez de White study done in Columbia in that it was considered a summative evaluation study. Although officials of the Yucatan Tourist Board were aware of, and interested in this study, the Uxmal ruin museum and other interpretive areas were not going to be revised and improved based on the findings. The major purposes of this study was to: "1) test visitor knowledge of the Maya; 2) examine epistemic curiosity; 3) assess visitor satisfaction; 4) record general visitor information, and 5) compare knowledge gain and epistemic curiosity arousal of males, females, Spanish speakers and English speakers." Fisher reported (Fisher & Koran, 1995) a significant increase in visitor knowledge ($p<.05$) as a result of the visit and differences between Spanish and English speaking visitors ($p<.05$). There was a positive correlation between time spent at the ruins with visitors who stayed longer retaining more information and leaving with their curiosity satisfied. From this study one could infer that this archeological site was meeting its cognitive and affective outcome objectives. Although some modifications to the museum and information panels could be suggested, they also could stand as they are.

The two environmental education studies (Gutierrez de White & Jacobson, 1994; Padua & Jacobson, 1993) were both designed to examine the effects of environmental programs with the intent of either using them again or rejecting them. A guiding evaluation model was the Jacobson (1991) Planning, Process, Product Model derived from Stuffelbeam, et al. (1971). This model provides for needs assessment, community participation, specification of goals and objectives, and the assessment of available resources and instructional support (Planning). It employed development of instructional activities, pre- and post-site visits, staff training and administrative (Process); determination of outcomes (expected and unexpected), program modification and dissemination (Product). Padua's study focused on the development of an instructional experience that would result in awareness and preservation of the black lion tamarin, along with the preservation of more than 300 species of birds and a rich mammal fauna including endemic and rare species. A pre-test, post-test, retention test evaluation model was utilized which compared the training program, consisting of a slide show and guided visit to the Morro do Diable State Park (Brazil) with a control group. One hundred-forty-four, fifth- and eighth- grade students were randomly assigned to both groups. Findings on a cognitive measure indicated that the program, as designed, was effective and its objectives achieved. Indirect outcomes based on community involvement were also assessed and confirmed program success. The use of randomization aided in contributing to the internal validity of this study, but did not have an intent of generalizing this program to other sites or countries.

Gutierrez de White, conducted her study in Columbia and compared three established meth-

ods of environmental training; 1) a zoo workshop in wildlife conservation targeting on elementary school teachers; b) a zoo visit preceded by a slide show; c) a visit to the zoo. Participants were students in 26 randomly selected schools in Cali. Test results indicated that knowledge and attitude scores about animals and conservation improved significantly for students whose teachers participated in the workshop in wildlife conservation, while these scores did not improve in the other groups. The teacher workshop group also exceeded the other groups and the control. This evaluation study is significant in that the training program that was evaluated will now become the established program in Columbia for conservation education. In this regard it satisfies the criteria for a summative evaluation and because of the large sample and randomization it was thought to be cautiously generalizable to other locations in the country.

This brief summary of research and evaluation studies is reported here to describe the ongoing program in learning in informal settings at the University of Florida. Currently, there are four research studies underway, one evaluation study in the planning phases to be conducted in Costa Rica, and six evaluation studies taking place in the Florida Museum of Natural History.

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