

Evaluating Conservation Education Programs at a South American Zoo

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Introduction

Traditional approaches to environmental education in zoo settings assumed that the act of simply exposing primary school children to live wild animals resulted in cognitive gain and improved attitude toward wildlife conservation. Thus, many zoos in developing countries still provide school groups with essentially unstructured recreational visits. Their educational materials, if available, often are designed intuitively, and the effectiveness of print and audiovisual media is not assessed.

Research assessing the effectiveness of environmental education programs has shown that students' active participation, and the preparation and reinforcement of conservation information received during a field trip to a zoo, nature center, or museum, influence the cognitive and affective gains of school children (Marshdoyle, Bowman, & Mullins, 1982; Balling, Falk, Aronson, White, Herman, & O'Connell, 1983; Gennaro, Stoneberg, & Tanck, 1983; Koran, Lehman, Shafer, & Koran, 1983; Bitgood, 1989). Birney (1986) observed that the affective aspect of zoo learning may be more significant than the cognitive one. Falk, Martin, and Balling (1978) warned that a novel setting can interfere with children's learning from structured educational programs during a field trip, but maintained that novelty, and the need for exploration that it generates, are important and can be used to enhance the educational objectives of the field trip experience.

A major constraint to implementing environmental education programs in both developed and developing countries is the lack of adequate preservice and inservice training of teachers in environmental education (Stapp & Cox, 1974; Hatley, 1990; Pomerantz, 1991). On the other hand, little research has been conducted on using informal settings for environmental education in a developing country. The present study originated from these concerns. It analyzes the effects of zoo-based educational approaches on the knowledge of, and attitude toward, wildlife conservation among Colombian fourth-grade

students (9 to 11 years of age). The objectives of the study were: (1) to develop a participatory training program in wildlife conservation for elementary school teachers, (2) to determine the effectiveness of this educational approach by measuring the knowledge gain and attitude improvement of those teachers' fourth-grade pupils, and (3) to compare these results to those obtained with similar groups who were exposed to a control treatment and two educational approaches already in use at the zoo. The rationale behind the study is that direct experience, coupled with adequate preparation and reinforcement, should improve children's knowledge of, and attitudes toward, wildlife.

Method

The study was conducted in 1992 in Cali, Colombia—a city whose population approaches two million. The park's collection comprises 800 animals ranging from Pigmy marmosets to White rhinoceroses. In 1991, the zoo received 194,000 visitors. Fourth-graders from 26 randomly-selected elementary schools in the area (1015 students, 32 classes) completed a written questionnaire containing an achievement test with 18 multiple-choice questions (e.g. "If someone in the street wants to sell you a baby turtle you like a lot, what would you do?"), and a five-point attitude scale composed of 16 items (e.g. "I can take home any pretty plants I find in the forest"). Equivalent forms were administered before and after students were exposed to one of four experimental treatments: a zoo workshop directed toward their regular teachers and followed by a class visit to the zoo, a zoo visit preceded by an audiovisual show, a zoo visit only, and a control treatment. The questionnaire was pilot-tested by 74 fourth-graders from two elementary schools in Cali.

Since entire classes were randomly assigned to the treatments, analyses of variance, with classes nested within treatment groups, were used to assess differences among students' knowledge and attitude scores due to the treatment effect. Pretest scores were used as the covariate, and weights were assigned to each class to compensate for the differences in numbers of students. Some student records were dropped because they were missing either the pre- or the posttest (184), or because the students had not completed more than one-third of the statements in the attitude scale (24). The Scheffé method was used to determine the significance of mean score differences found among treatment groups.

Results and Discussion

The analyses of variance showed a significant effect of treatment on students' knowledge ($F=17.47$; $df\ 3,28$; $p<0.01$) and attitude scores ($F=6.89$; $df\ 3,28$; $p<0.01$). The comparability of the treatment groups was verified

when no differences were found among knowledge and attitude pretest scores of students in all treatments (df 3,28; $p>0.05$, for both types of scores). The participatory zoo educational program for teachers yielded greater student cognitive learning and a positive attitude shift toward wildlife conservation, as compared to the other three treatments. Wildlife-related knowledge of students in this group was improved by 24.2 percent, while attitude scores increased from 3.3 to 3.7 on a Likert scale which ranged from 1 to 5. No effects on knowledge or attitude scores were found for the other treatments (slide show preceding a zoo visit, zoo visit only, or control).

The relationship between knowledge and attitude toward wildlife conservation revealed in the linear regression analyses showed a strong effect of the knowledge scores on the attitude scores ($F=44.96$; df 1,707; $p<0.01$ for the pretest, and $F=47.86$; df 1,707, $p<0.01$ for the posttest). In agreement with the study's hypothesis, these results suggest that favorable attitudes toward conservation can be fostered in young children by improving their teachers' knowledge of conservation-related topics. However, the causal relationship was not established, and the possibility cannot be excluded that students whose attitude toward wildlife conservation was improved, learned about wildlife more readily than students with more negative predispositions.

Exposure to wild animals appeared, by itself, to be insufficient to obtain affective and cognitive gains in elementary school children. Furthermore, preparing the students with an audiovisual show before their zoo visit had no effect on their knowledge and appreciation of wildlife. Systematic classroom preparation and reinforcement provided by informed teachers seem to be essential if cognitive achievement and attitude improvement are to be obtained from a field trip to the zoo. Zoos should support the development of educational programs involving teacher participation and emphasizing the use of hands-on activities. Given the proliferation of printed and audiovisual material intended to educate the public on the importance of conservation, the study findings serve as a warning to environmental educators. Programs reflecting solely the designer's own preferences and professional interest do not guarantee that their audiences will learn. Existing environmental education programs in use at zoos or at other conservation institutions should be evaluated and revised to increase their effectiveness in promoting knowledge and attitude improvement among their audiences.

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