The Influence of Activity-based Environmental Instruction on High School Students' Environmental Attitudes

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SUMMARY. As human pressures on the environment increase and as conflicting demands on education become focused, schools have a greater responsibility to educate children to care for their environment. Results from this study demonstrated that students who were involved in the actual propagation and restoration of ecosystems, and who had positive experiences in doing so, were more likely to have positive environmental attitudes.

In general, young peoples' attitudes toward the environment begin to develop at a very early age. By the time they reach adolescence, they have acquired an adequate level of environmental understanding of issues such as ecology, technology, and economics to formulate their own views on these issues (Bryant and Hungerford, 1977; Ram-

sey and Rickson, 1976). Knowledge is clearly a prerequisite to structuring appropriate environmental behavior. However, an individual must also know how to effect a change in this behavior. Several researchers have studied environmental attitudes and the influence of hands-on or action-based learning. Ramsey (1993) conducted research involving eighth-grade students and found that, when students were shown how to take action on environmental issues, responsible environmental behavior resulted. Jordan et al. (1986) found that high school students who participated in environmental programs that stressed issues and action strategies engaged in more environmentally appropriate behaviors than students receiving only issue-awareness instruction.

The purpose of this research study was to determine if educators, by using school curricula and hands-on activities, or action-based learning, can ultimately influence the environmental attitudes of students. Ninth through twelfth grade students participated in the study. Classes of students were volunteered by their teachers for the study. Forty-four students participated.

Environmental instruction materials emphasizing environmental values of wetland ecosystems were developed for the study. The school materials were comprised of short hands-on activities that were integrated into high school horticulture and environmental science classes. The lessons and labs in which students participated included ecosystems, plant identification, plant propagation, restoration, and legislation. Each incorporated an activity as the main focus of the lesson. Time spent on each lesson was divided into one-third classroom lecture and two-thirds activity time so that most of time spent on each unit would be spent completing hands-on experiences. Students also participated in one semester-long propagation experiment using actual wetland plants. Three wetland plant species were used for the experiment including *Sesbania* sp. (rattlepod), *Elocharis* sp. (spikerush), and *Salix* sp. (willow). At the completion of the experiment, students transplanted their plants at a local nature center.

Changes in students' environmental attitudes were assessed from a pre- and post-test questionnaire. Some of the statements for the attitude section were from the New Environmental

Paradigm (NEP) developed by Dunlap and Van Liere (1978). The statements from the NEP were set up on a Likert-type scale (Likert, 1967), with students responding to forced-choice agree or disagree statements based on a 1 to 4 scale. To determine if a difference existed in environmental attitudes between students who experienced success in their propagation experiment and those students who did not, the students were asked to record what percent success they had on their propagation experiments. Success scores ranged from 1 to 11, with higher scores indicating a higher level of success. Other hands-on activity success rates were not analyzed since most were completed within a very short period.

Findings indicated that student environmental attitudes were correlated to student success with the propagation experiment. Students successful in propagating wetland plants showed a more positive environmental attitude at the end of the curriculum than before exposure to it. A Pearson product-moment correlation of success scores and environmental attitude scores was 0.70, showing a high correlation. These results are encouraging and indicate that, as students become more involved in actual restoration of ecosystems, their environmental attitudes may improve.

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This research was funded in part by the Texas Education Association in conjunction with Temple High School. We gratefully acknowledge the assistance of Tony Owen (Temple High School science instructor) and John McNamara (Temple High School agricultural education instructor).

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