

1. Conference Strand: What Research Has to Say to Environmental Educators (Research Strand)

2. Title and Presenters:

Research and Evaluation in Environmental Service-Learning
Introduction: Dr. Tom Marcinkowski
Science and Mathematics Education Department, Florida Institute of Technology

Abstract #1: Ms. Yulia Malikova
Doctoral Student, Science and Mathematics Education Department, Florida Institute of Technology

Abstract #2: Dr. Julie Ernst (a) and Dr. Martha Monroe (b)
(a) University of Minnesota, Duluth
(b) School of Forest Resources and Conservation, University of Florida

Abstract #3: Dr. Beth Amy Covitt
Fulbright Fellow, Australian School of Environmental Studies, Griffith University

3. Abstract

The purposes of this session were: (1) present an overview of the nature/status of research and evaluation in the field of service-learning (S-L); (2) present summaries of three recent dissertation studies in environmental service-learning (Env. S-L); (3 & 4) engage the audience in a discussion of the implications of these studies for practice in Env. S-L, and for theory and research in the fields of EE and S-L. Attention to the Purposes (3) and (4) helped presenters and attenders connect this session to the companion session, "Theory and Practice in Environmental Service-Learning."

Purpose (1) was addressed through an opening presentation by Dr. Andy Furco (Service-Learning Research and Development Center, University of California - Berkeley), a nationally recognized expert in S-L (see <http://gse.berkeley.edu/research/slrdc/resdirectory>). A moderated Q&A session followed this presentation.

Purpose (2) was addressed through summaries of dissertation studies by Dr. Julie Athman (Univ. of Minnesota-Duluth; Ph.D., Univ. of Florida), Ms. Anita Kraemer (formerly with Chesapeake Bay Foundation, and currently with eeEvaluations) for Dr. Beth

Covitt (Ph.D., Univ. of Michigan), and Ms. Yulia Malikova (Doctoral Student, Florida Institute of Technology). Purposes (3 and 4) were addressed in the closing Q&A session.

4. 1,500 Word Paper

Introduction

The fields of environmental education (EE) and service-learning (S-L) share a mutual interest in the design and development, implementation, and assessment and evaluation of school-based environmental service-learning programs. In some cases, these programs were developed and are implemented by teachers who have been exposed to S-L, in others cases to EE, and in what appears to be a relatively small percentage of cases, to both. Further, many existing programs are relatively new (i.e., less than 3 years old), reflecting a growth in interest in environmental service-learning. However, while it may surprise some readers, some well-established environmental service-learning programs are more than 10 years old. Regardless of their origin or age, environmental service-learning programs are of vital interest to both the EE and the S-L communities. One reason for this is the conspicuous presence of federal, state, and local support for S-L in its myriad forms. A second is the growing popularity of S-L at the building and classroom level; teachers find it both efficacious and liberating.

Due to the growing support for and popularity of S-L, it should come as no surprise that this has become an area of emerging interest within both the EE and the S-L communities. The field of EE is older, and therefore somewhat more established than S-L. Thus, there is a lengthier research traditions and larger body of evidence regarding the effects of EE than is apparent in S-L. On the other hand, Furco and others have aptly pointed out that the evidence that does exist regarding the effects of S-L point to multiple effects (e.g., academic, career, personal and interpersonal, ethical, and civic), all of which are of interest to segments of the EE community.

The three dissertation studies summarized here are among the first (if not the first) dissertation studies into environmental service-learning. In that sense, they are plowing new ground by studying a newer generation of programs that appear to show promise for both fields. Collectively, these studies begin to explore the nature and effects of environmental service-learning programs with respect to both the more traditional environmental literacy-based goals of EE, and the newer standards-based

emphasis on school subject area learning (i.e., as in Lieberman's EIC, or environment-based education). Readers are encouraged to view these studies as starting points in an exploration of new programs. Readers are encouraged to consider if and how the results of these studies might apply to their own program or to programs with which they are familiar, as well as the kinds of questions they appear to raise. At very least, these studies have landed on what appears to be a fertile ground that holds implications for both fields, making dialogue between professionals/practitioners in these two field vital.

Members of this panel would like to thank Dr. Andy Furco for his wonderful introduction and overview. Those interested in learning more about his work are referred to the URL for his program included in the abstract. We would also like to thank the those at universities and funding bodies who helped make these studies and presentations possible. Further, we would like to thank the brave teachers who were involved in these studies, for they are the ones who are "making it happen" and thereby allow studies such as these to take place. Finally, we would like to thank the three dozen conference goers who attended this session, for your curiosity, interest, and questions helped to make this a very exciting session. We thank you one and all!

Abstract for Ms. Malikova's Study:
**Development and Refinement of Models of Less and More Established
High School-Level Environmental Service-Learning Programs in
Florida**

Chair: Thomas Marcinkowski, Florida Institute of Technology

The purpose of this study was to describe and develop models of Environmental S-L (Env. S-L) programs in Florida. The purpose of Phase I (Fall 2002-Spring 2003) was to describe the 9-16 Florida Env. S-L programs and associated partnerships. The purpose of Phase II (Fall 2003 - Fall 2004), based on Phase I results, was to develop, compare, and refine models for less and more established High School Environmental Service-Learning (Env. S-L) programs.

During Phase I, a comprehensive list of Florida High School and College Env. S-L programs was assembled and a four section instrument was developed (general information; curricular, instructional, and service program features; program results: outputs, outcomes, impacts; current partnerships). After Phase I data were analyzed and described, four options for Phase II data collection and analysis were discussed. Based on Phase I results and practicalities, it was decided to examine and compare less

established High School Env. S-L programs (up to three years and two partnerships; n = 4)) to more established ones (more than six years and four partnerships; n = 4).

The Phase II data collection was designed to validate, refine, and expand working models of programs. Phase II was conducted over four stages: (Stage 1) dependability checks on Phase I data and program summaries; (Stage 2) collection of data to refine and expand working program models; (Stage 3) transcription, summary, and final confirmation of data; and (Stage 4) final data analysis and model refinement. To capture the richness of program data, data for each program were summarized in two ways: a) data that reflects changes in the programs from one year to the next (case study data); and b) data pertinent to model refinements (information about program characteristics, including defining and differentiating features).

Preliminary findings indicate that a number of final model characteristics help to clearly differentiate between less established and more established Env. S-L programs. Less established programs have relatively few participating teachers, short program existence, and a small number of formal and informal partnerships. These programs usually use only one primary site. Other features unique to these programs include a limited number of teachers involved, limited number of courses in the program, and limited number of partnerships. An increase in administrative support for the program over the years serves as another differentiating feature.

More established high school Env. S-L programs address Env. S-L in multiple courses and/or subject areas. They are characterized by long duration of program existence and a large number of formal long-term community partnerships. Major program features include teacher enthusiasm, student willingness and initiative, and multiple S-L courses. Some of the features unique to these programs include development of more inclusive and cross-curricular programs, variety of awards and recognition, and collaboration with other schools and school districts. Increase in community support, partner support, and outside funding for the program serve as other differentiating impact criteria.

Abstract for Dr. Ernst's Study:
**The Effects of Environment-Based Education on Students'
Critical Thinking and Achievement Motivation**

Chair: Martha Monroe, University of Florida

This study examined the relationship between environment-based education and high school students' critical thinking

skills, disposition toward critical thinking, and achievement motivation. These outcomes were selected because of their relevance to both the formal education and environmental education communities. Environment-based education was defined in this study as formal instructional programs that adopt local environments as the context for a significant share of students' educational experiences; characteristics include interdisciplinary learning based on the local environment, project- and issue-based learning experiences, learner-centered instruction, and constructivist approaches.

Twelve environment-based programs in Florida high schools were selected for participation, and 586 9th and 12th grade students from 11 of these programs participated in the study over the course of the 2001-2002 school year. The instruments used were the Cornell Critical Thinking Test (critical thinking), the California Measure of Mental Motivation (disposition toward critical thinking), and the Achievement Motivation Inventory. A Pretest-Posttest Nonequivalent Comparison Group Design was used for the 9th grade study, and a Posttest Only Nonequivalent Comparison Group Design was used for the 12th grade study. Pretests were administered to the 9th graders in the fall, before the environment-based education programs began. Many of the 12th grade students had previously participated in environment-based programs; thus, a pretest for 12th grade students was not possible. Posttests were administered to the 9th and 12th grade students at the end of the school year. In addition, interviews of students and teachers were used to help explain the test results.

Multiple linear regression and SPSS 10.0 were used in the quantitative data analysis. When controlling for pretest scores, GPA, gender, and ethnicity, environment-based programs had a positive effect on 9th grade students' critical thinking skills ($p = .002$) and achievement motivation ($p = .025$). When controlling for GPA, gender, and ethnicity, environment-based programs had a positive effect on 12th grade students' critical thinking skills ($p < .001$), disposition toward critical thinking ($p < .001$), and achievement motivation ($p < .001$); the effects on achievement motivation were moderated by ethnicity. Student and teacher interviews reinforced these results, as they indicated that key elements of environment-based programs were responsible for increasing students' critical thinking skills, encouraging students to use their thinking skills, and making school more exciting and relevant. These results support the use of environment-based education in achieving goals of national education reform and can be used to help establish a place for environment-based learning in the formal school setting.

Abstract for Dr. Covitt's Study:
**Motivation in Environmental Education: Supporting Middle School
Students' Motives for Helping the Chesapeake Bay**

Chair: Michaela Zint, University of Michigan

This dissertation explores student motivation in environmental education. Motivation concerns the reasons why people choose to engage in various behaviors. Because a major aim of environmental education is to encourage engagement in behaviors that help the environment, an understanding of students' motivations is pertinent for informing environmental education theory and practice intended to foster commitments to environmentally responsible behaviors. Currently, environmental education emphasizes fostering students' motives related directly to the environment (e.g., caring about nature) but does not give much consideration to the broader range of student goals that may be connected with environmental learning and helping.

Building on Kaplan and Kaplan's Reasonable Person Model and Clary et al.'s Functional Approach to Motivation, this dissertation explores two main questions. First, if students' motivational goals are supported through environmental education experiences, are they more likely to report intentions to help the environment in the future? Second, what motives are important to students? These questions are addressed based on analyses of quantitative and qualitative data collected with 2,365 middle school students and 37 middle school teachers who participated in combinations of the Chesapeake Bay Foundation's curriculum, service-learning, and field trip programs. Three themes emerged. (1) Middle school students who fulfill personal goals through their environmental education experiences report greater commitments to learning about and helping the environment in the future. (2) Students share basic human motives, but they bring different motivational interests, preferences, and expertise with them to environmental education situations. (3) Although environmental education experiences have the potential to help students achieve their motivational goals, motive support in environmental education is not automatic. These themes form the basis for recommendations for ways environmental education can support middle school students' motivations and goals related to learning and understanding, meaningful participation, social affiliation, competence, and autonomy.

5. Reference List

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