

# Evaluating *Meaningful Watershed Educational Experiences*: An exploration into the effects on participating students' environmental stewardship characteristics and the relationships between these predictors of environmentally responsible behavior



Michaela Zint<sup>a,\*</sup>, Anita Kraemer<sup>b</sup>, Giselle Kolenic<sup>c</sup>

<sup>a</sup> School of Natural Resources and Environment, University of Michigan, Dana Building, 440 Church Street, Ann Arbor, MI 48109-1041, United States

<sup>b</sup> eeEvaluations, 1605 Park Grove Ave., Catonsville, MD21228, United States

<sup>c</sup> Center for Statistical Consulting and Research, University of Michigan, Rackham Building, 915 E. Washington Street, Ann Arbor, MI 48109-1070, United States

## ARTICLE INFO

### Article history:

Received 5 June 2013

Accepted 25 July 2013

Available online 27 August 2013

### Keywords:

Program evaluation  
Environmental education  
Outdoor education  
Behavior  
Multilevel analysis  
Path analysis

## ABSTRACT

This study evaluated *Meaningful Watershed Educational Experiences* (MWEEs) funded by the National Oceanic and Atmospheric Administration's Chesapeake Bay *Watershed Education and Training* (B-WET) grant program. It also empirically explores the relationships between predictors of environmentally responsible behavior (ERB) in the [Hines, Hungerford, and Tomera \(1986/1987\)](#) and [Hungerford and Volk \(1990\)](#) behavior models. Multilevel analyses identified associations between eight environmental stewardship characteristics, as well as between these outcomes and (1) participation in MWEEs (sample: 258 students in 20 treatment classes, 193 students in 12 comparison classes matched by grade) and (2) specific MWEE instructional practices (sample: 434 students in 29 treatment classes). Students who participated in MWEEs scored significantly higher in five of eight characteristics (i.e., knowledge of ecology, issues, and actions, individual locus of control, intention to act) than those in the comparison group. Students who were engaged in the science inquiry steps of analyzing data or reflection and those who participated in more of certain types of environmental actions also scored significantly higher in a greater number of environmental stewardship characteristics than students who did not have these experiences. Results suggest that MWEEs are likely to increase ERBs but are not reaching their full potential. Tests of the relationships between the variables in [Hines et al. \(1986/1987\)](#) and [Hungerford and Volk \(1990\)](#) models confirm that they predict a high amount of variance in intention to act and suggest that environmental stewardship characteristics are likely to interact in complex ways.

© 2013 Elsevier Ltd. All rights reserved.

## Introduction

Among the primary questions environmental educators, their funders, and supporters have is to what extent environmental education programs foster environmentally responsible behavior (ERB)<sup>1</sup> and which instructional practices this outcome can be attributed to. The first question is of interest because the ultimate goal of environmental education is to foster behaviors that contribute to conserving, protecting, and restoring the

environment ([UNESCO, 1978](#)). Answers to the second question are critical to informing environmental education practice, by identifying the types of instruction most likely to lead to behavioral outcomes.

Despite the interest in these questions, few studies are available to help answer them. Four syntheses of environmental education research and program evaluations, which reviewed work published between 1971 and 2008 ([Leeming, Dwyer, Porter, & Coburn, 1993](#); [Rickinson, 2001](#); [Zelezny, 1999](#); [Zint, 2012](#)), identified only seventeen studies exploring the effects of environmental education on elementary and secondary students' behavioral outcomes ([Chawla & Derr, 2012](#)). In addition, these studies often do not provide details about the environmental education programs they examined or how these programs were implemented ([Zint, 2012](#)). As a result, they offer few insights into the program characteristics or practices to which behavioral outcomes can be attributed. Nonetheless, based on the limited information that is provided in these studies, the authors of the aforementioned reviews conclude

\* Corresponding author. Tel.: +1 734 763 6961.

E-mail address: [zintmich@umich.edu](mailto:zintmich@umich.edu) (M. Zint).

<sup>1</sup> By environmental responsible behaviors we refer to any actions that directly or indirectly contribute to conserving, protecting, or restoring the environment. Environmental educators "foster" these behaviors by preparing individuals to independently analyze and respond to environmental issues in an informed manner. We are not suggesting the use of, or referring to persuasive, manipulative approaches to behavior change.

that longer programs are more effective in promoting ERBs than shorter programs (Rickinson, 2001; Zelezny, 1999; Zint, 2012), as are programs that engage students in active, experiential learning experiences including field trips, service learning, and investigations of local environmental issues (Leeming et al., 1993; Zelezny, 1999; Zint, 2012).

#### Environmental education behavior theories

Environmental education researchers have conducted few studies of the effects of environmental education on ERB or practices to which these outcomes can be attributed. However, they were among the first to identify potential determinants of ERB and explore the relationships between these predictors and ERB. Notably, almost 30 years ago, Hines et al. (1986/1987) published their influential meta-analysis of 128 studies assessing variables associated with ERBs. Their analysis identified reliable predictors of ERB and calculated the strengths between these variables and ERB (correlation range:  $-.15$  to  $.49$ ). The model proposed by Hines et al. (1986/1987) based on their findings suggests that intention to act and situational factors directly determine ERB. Intention to act is, in turn, viewed as predicted directly by cognitive and other individual predictors (Fig. 1). Hungerford and Volk (1990) subsequently proposed a revised behavioral model for environmental educators based on Hines et al. (1986/1987) as well as research by their other students. This revised model does not include situational factors, as they are beyond the control of environmental educators and nests the remaining predictors of ERB within entry-level, ownership, and empowerment variables (Fig. 2).

Alternative behavior theories have been introduced since that time (Heimlich & Ardoin, 2008). However, to the best of the authors' knowledge the models proposed by Hines et al. (1986/1987) and Hungerford and Volk (1990) have most influenced environmental education practice. More recent evidence suggests that their popularity is warranted. For example, a recent meta-analysis of studies assessing variables associated with ERBs published since 1995 found mean correlations similar to those reported by Hines et al. (1986/1987) (Bamberg & Möser, 2007). In addition, research on the effectiveness of "Investigating and Evaluating Environmental Issues and Actions" (IEEIA), a form of instruction developed by Hungerford and Volk to target the variables in their behavior model, consistently finds improvements in students' predictors of ERB and ERB itself (Marcinkowski, 2004; Volk & McBeth, 2012).

#### Environmental stewardship characteristics

The predictors of ERB included in the models proposed by Hines et al. (1986/1987) and Hungerford and Volk (1990) are referred to as environmental stewardship characteristics in this article. Although some of their names differ, variables in both models include knowledge of issues and actions, environmental sensitivity, locus of control, personal responsibility, and intention to act. Some predictors, such as knowledge of ecology, however, are only included in one model and not the other.

Knowledge of issues and actions refers to individuals' awareness and understanding of environmental problems and how to engage in actions that help address these problems. Environmental sensitivity refers to individuals' "empathic" feeling or attitude toward the environment (Hungerford & Volk, 1990, p. 11). Locus of control refers to individuals' belief about the extent to which they can bring about change through their actions. As suggested by Hines et al. (1986/1987, p. 4), this variable may be described as individuals' "efficacy;" i.e., the belief that their behaviors can help to address a particular environmental issue. Another distinction is made between individual and group locus of control with the former referring to individuals' belief that they can make a difference on their own and the latter that they can make a difference by working collaboratively with others (Nowak, Wilke, Marcinkowski, Hungerford, & McKeown-Ice, 1995; Volk & McBeth, 2012). Personal responsibility refers to moral norms, or the feeling that one has a duty to protect the environment. Intention to act is an expression of willingness and commitment to engage in a particular behavior. Knowledge of ecology refers to the understanding individuals have about ecological and related natural science concepts and principles.

#### The present study

The present study was conducted to evaluate the effectiveness of the Bay Watershed Education and Training (B-WET) program administered by the National Oceanic and Atmospheric Administration (NOAA) Chesapeake Bay Office. NOAA is among the U.S. federal agencies with an environmental mission (<http://www.ppi-noaa.gov/mission/>) which it strives to achieve in part through funding environmental education. One of NOAA's environmental education grant programs is B-WET. To date, organizations in seven US regions have received B-WET funding to provide *Meaningful Watershed Educational Experiences* (MWEEs) for students or professional development for teachers. As a result of these

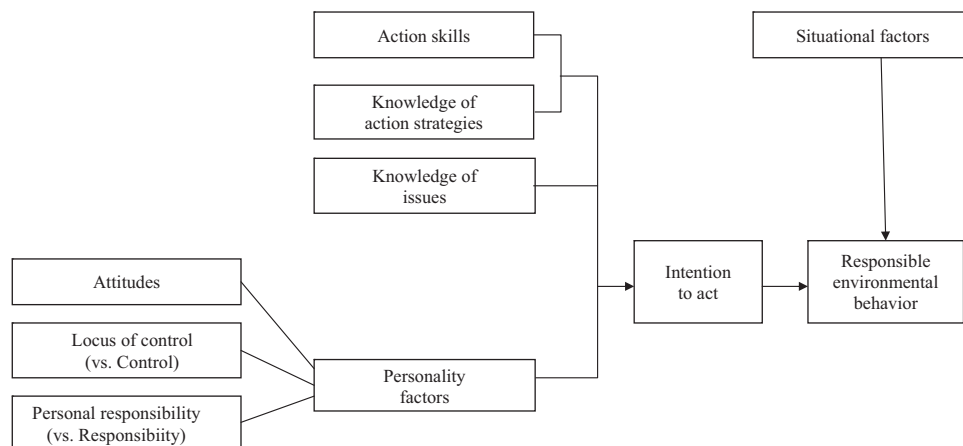


Fig. 1. "Proposed Model of Responsible Environmental Behavior".

© (2013) From analysis and synthesis of research on environmental behavior: A meta analysis by Hines, Hungerford & Tomera. Reproduced by permission of Taylor & Francis Group, LLC (<http://www.tandfonline.com>).

Download English Version:

<https://daneshyari.com/en/article/372638>

Download Persian Version:

<https://daneshyari.com/article/372638>

[Daneshyari.com](https://daneshyari.com)