

Research Symposium

Factors Associated with K-12 Teachers' Use of Environment-Based Education (EBE)

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Despite the growing body of evidence supporting the educational efficacy of environment-based education and its foundation in characteristics of high-quality environmental education, environment-based education appears to be practiced by relatively few teachers. In the context of encouraging more widespread adoption of this formal instructional approach, exploratory survey research with a convenience sample of 287 teachers was used to investigate influences on teachers' decisions to use and ability to implement environment-based education. Using analysis of variance and discriminant function analyses, results suggest the importance of environmental literacy knowledge and skills and environmental sensitivity in teachers' decisions to use and ability to implement environment-based education.

INTRODUCTION AND LITERATURE REVIEW

There is a growing body of research literature supporting the educational efficacy of EBE. EBE is a school-based form of environmental education, where the environment is used as a context for integrating core subject areas and a source of real-world learning experiences. This type of school-based EE includes a variety of programs and instructional approaches, such as place-based education, "Environment as an Integrating Context for Learning" (EIC) model (Lieberman and Hoody 1998), environmental service-learning, "Investigating and Evaluating Environmental Issues and Action" (IEEIA) (Hungerford, Litherland, Volk, Ramsey, and Peyton 1990). Despite this variety,

there is a shared, primary emphasis on the following essential elements of EE: consideration of the environment in its totality; interdisciplinary; learner-centered instruction; and development of critical thinking and problem-solving skills (UNESCO 1978 in Disinger and Monroe 1994). Further, this type of school-based EE operationalizes the issue and action skill levels of Hungerford, Peyton, and Wilke's goals for curriculum development in EE (1980), which are addressed less frequently by teachers using EE in their classrooms (Survey Research Center, 2000).

There is little literature specifically addressing teachers' motivations to use EBE. Winther, Volk, and Shrock (2002) found teachers using the IEEIA model, for example, were initially motivated to learn this instructional approach by stipends or graduate credit, but ultimately persisted in using this instructional approach because it revitalized their teaching, empowered students, and supported other school goals, such as team teaching and authentic assessment. Shuman and Ham (1997) have suggested the importance of "significant life experiences," frequent contact with the natural world, for example, in the development of a commitment to teach EE. These "significant life experiences" could be a source of motivation for EBE teachers, inspiring them to implement EBE in spite of barriers. Drawing from the service-learning literature, teachers often have weighed the advantages and disadvantages of service-learning in their decisions to use this approach, coming to the conclusion that the perceived student benefits make the time and energy involved worth the effort (Wade & Eland 1995). Similarly, EBE teachers also may have decided that the potential for positive learning outcomes relating to EBE outweigh the time and effort involved.

In the context of encouraging more widespread adoption of EBE, exploratory survey research was conducted to understand teachers' motivations for using EBE and

what facilitates teachers' implementation of EBE. This study also sought to understand how factors influencing teachers' use of EBE differ from those influencing teachers' use of other, more common types of EE.

METHODS

A three-section questionnaire was developed for this exploratory study. The first section of the questionnaire used a two-column format, with the same 69 items clustered conceptually in each column. These items, representing potential influences, were developed from the EE literature and conversations with teachers. This two-column format stemmed from the possibility that what influences one's decision to use a particular type of EE may differ from what influences one's ability to implement it. The response format for each item used a rating scale, ranging from a value of 1 (no influence/did not help) to 4 (very strong influence/very strongly helped); the response, does not apply/did not experience, was scored zero. The second section addressed potential instructional barriers and was comprised of 18 items. The response format for these items ranged from a value of 1 (was not an obstacle) to 5 (very strong obstacle). The third section of the questionnaire included a series of questions for gathering demographic data and determining type of EE used.

After the questionnaire was reviewed by a panel of experts, it was pilot tested with 15 teachers at a local school. A reliability analysis using Cronbach's alpha correlation coefficient was conducted on the clusters of conceptually-related questionnaire items. The reliability of these item clusters ranged from $\alpha = .77$ to $.97$. The reliability of the section on barriers was $\alpha = .82$, using Cronbach's alpha correlation coefficient. Based on corrected item total correlations and pilot participants' feedback, revisions to several items were made.

The questionnaire was mailed to a national, convenience sample of 287 K-12 teachers using some form of EE in their classrooms). The 200 respondents were placed into one of three groups, based on the type of EE they used their classrooms: EBE as their primary instructional strategy; some EBE, but not as their primary instructional strategy; and a form of EE other than EBE. The data were analyzed using item and factor analyses in an iterative process, one-way analysis of variances, and stepwise discriminant function analyses.

RESULTS AND IMPLICATIONS

The results of this study suggest that to encourage decisions to use EBE, the following areas should be emphasized in professional development and other capacity-building efforts, particularly when the target audience is teachers who already are using some other form of EE: (a) environmental literacy knowledge and skills; (b) environmental sensitivity; (c) receptiveness to EBE; (d) supportive school climate; (e) positive environmental attitudes. An emphasis on environmental literacy knowledge and skills is warranted when encouraging the use of EBE, as this was the strongest influence on EBE teachers' decisions to use EBE, as well as the primary influence where EBE teachers differed from teachers using other forms of EE.

At the preservice level, this might include the opportunity to foster environmental sensitivity and develop knowledge, attitudes, and skills relating to environmental through environmental service learning experiences, alternative spring break trips, and campus outdoor recreation activities. Preservice efforts could also include opportunities for future teachers to develop an understanding of EE and how it can shape one's teaching philosophy through a "Foundations of EE" course. These experiences might cultivate an inclination to use EBE, once they are in classrooms of their own. At the inservice level

efforts to encourage the use of EBE might best be invested in teachers who already are using some other form of EE or teach in school climates that are supportive to EE, given the key role receptiveness to EBE and school climate appears to play in teachers to decisions to use EBE. Inservice teachers also may benefit from affective opportunities to develop an interest in and concern for their environment.

In efforts to help teachers become able to use EBE, the results of this study suggest the emphasizing the following areas, particularly when the target audience is teachers who already implement some other form of EE: (a) environmental sensitivity; (b) environmental literacy knowledge and skills; (c) receptiveness to EBE; (d) training in environmental content; (e) EBE training; (f) awareness of positive student outcomes; (g) supportive school climate. An emphasis on environmental sensitivity may be particularly useful, as this was the strongest influence on EBE teachers' abilities to use EBE, as well as the primary influence where EBE teachers differed from teachers implementing other forms of EE.

For preservice and inservice professional development, this might involve helping teachers develop a comfort level in teaching outside the classroom walls, an understanding of their local natural and social environment, and skills in the interdisciplinary, project-based pedagogy that underlies EBE. For example, coursework or professional development that involves learning and practicing interdisciplinary, project-based instruction or opportunities to develop thematic units where the local environment serves as the integrating context instruction could help develop future teachers' feelings of competency relating to EBE. However, given the importance of environmental sensitivity and receptiveness to EBE, teachers may also benefit from opportunities to bond with the natural world and opportunities to see where their

environmental actions make a difference, helping foster a sense of personal responsibility and commitment to environmental sustainability. Given the importance of school climate, professional development efforts that involve school administrators may also be useful.

This study also sought to understand barriers to teachers' implementation of EBE, in efforts to make EBE a more accessible formal instructional approach. Teachers perceived the same five barriers as strongest, regardless of their approach to EE: (a) emphasis on state testing; (b) lack of funding; (c) lack of planning time; (d) emphasis on state standards; and (e) lack of transportation. Because perceptions of barriers did not seem to differ by approach to EE and that even these strongest barriers were perceived as only relatively minor, efforts to reduce teachers' perceptions of these barriers might be more useful when targeting teachers who don't implement any form of EE, but not as integral to encouraging teachers who already implement another form of EE. However, EBE teachers perceived lack of planning time, lack of community partners, and counter to school climate as significantly less of a barrier than teachers implementing other forms of EE. Thus, these could be targeted in capacity-building efforts to encourage the use of EBE among teachers already using other forms of EE.

CONCLUSION

The results of this study consistently suggest environmental literacy knowledge and skills and environmental sensitivity are integral influences on decisions to use and ability to implement EBE. While the importance of these areas is echoed in the North American Association for Environmental Education's "Guidelines for the Preparation and Professional Development of Environmental Educators" (2000), emphasizing the development of teachers' environmental literacy knowledge and skills and environmental sensitivity seems in stark contrast to the more common practice of emphasizing EE

curricular materials and “lesson-level” methods in teacher training. Secondly, the results of this study suggest that what influences teachers’ decisions to use EBE is not exactly the same as what actually helps them implement it. This implies the need for addressing both angles in our capacity-building efforts. As we work to develop EE standards for teacher preparation programs and as we strive to improve our professional development opportunities for teachers, these results also are reminders to think broadly and creatively about professional development, incorporating not only knowledge and pedagogical skills, but the affective components of environmental literacy as well.

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