

Abstract

State partners of national environmental education (EE) programs contribute to professional development in EE through their program delivery. This study describes teacher perceptions of individual elements of EE workshops provided by one such program, Iowa Project WET. The study found that educators associate three types of workshop activities with successful classroom integration of Project WET activities: (a) Experiencing activities first-hand, (b) interacting with other educators, and (c) learning about the *Project WET Activity and Curriculum Guide*. Almost 90% of survey respondents integrate some of the activities they experience during the workshop into their classrooms. Some of these teachers also integrate additional activities not presented in the workshop. Multiple measures of activity use indicate the respondents select and use activities to meet curriculum goals. Survey data and phone interviews show that respondents utilize each activity they implement to meet multiple goals related to the curriculum, student interactions, and assessment of student knowledge. Respondents reported that insufficient planning and class time limited use of activities. Suggestions are made for improving the workshop model.

Introduction

The goal of Project WET (Water Education for Teachers) is to facilitate and promote the awareness, appreciation, knowledge, and stewardship of water resources through development and dissemination of classroom ready teaching aids and through the establishment of state sponsored Project WET Programs. Project WET is an international science-based environmental education program. The *Project WET Curriculum and Activity Guide* contains 91 interdisciplinary activities and is only offered in conjunction with a professional development workshop. WET activities are divided into eight conceptual units:

- ◆ Water education should utilize exceptional teaching strategies.
- ◆ Water has unique physical and chemical characteristics.
- ◆ Water is essential for all life to exist.
- ◆ Water connects Earth systems.
- ◆ Water is a natural resource.
- ◆ Water resources are managed.
- ◆ Water resources exist within social constructs.
- ◆ Water resources exist within cultural constructs

Program delivery is the major contribution Iowa Project WET and other state level EE Programs make to the environmental education equation. Because the Iowa Project WET has the most influence over the delivery model, this is the focus of the Iowa Project WET program's research efforts.

Problem Statement:

What elements of the Iowa Project WET Training Model result in teacher implementation and integration of Project WET Activities?

Secondary questions:

- ◆ How are teachers using Project WET activities in their classrooms following an Iowa Project WET workshop?
- ◆ What outside forces assist or limit implementation success?
- ◆ How can this information be used to improve the delivery model?

Iowa Project WET Workshop Model

- ◆ Ice Breaker
- ◆ Introduction to the Project WET Program
- ◆ Model Activity
- ◆ Introduction to the *Project WET Curriculum and Activity Guide*
- ◆ Peer Teaching Planning Time
- ◆ Peer Teaching
- ◆ Debrief and integration planning

- ◆ *Classroom implementation*

- ◆ Debrief of classroom experience
- ◆ Extension
- ◆ Reminder of Iowa Project WET Contact information
- ◆ Evaluation of Workshop

Methods

A survey tool was designed to collect:

- ◆ Demographic information
- ◆ Level of Classroom Implementation
- ◆ Level of Classroom Integration
- ◆ Teacher perspectives on individual elements of the workshop model

In the summer of 2002, a cover letter, survey and SASE was sent to all addresses collected for 1999 and 2000 participants. The survey was resent to all non-respondents in the fall of 2002. Collected data was placed onto tables and analyzed.

Population & Sample

Population—all Iowa inservice educators who have participated in an Iowa Project WET Workshop since 1996 (726 total).

Sample—1999 and 2000 workshop participants (284 total) selected because:

- ◆ Had sufficient time to process the workshop experience and implement the program
- ◆ Still able to recall details of workshop
- ◆ Largest # of participants in these two years

Sample Size and Return Rate

Group	Teachers trained	Undeliverable addresses	Sample size	Returned surveys	Unusable Returns	Return rate
1999	133	20	113	28	3	24.78%
2000	151	12	139	48	0	34.53%
Total	284	32	252	76	3	30.16%

Subject(s) Taught, by Number of Respondents

Subject	Frequency	Percent
Advanced placement/talented and gifted	4	5.48
Biology	12	16.44
Chemistry	4	5.48
Earth science	16	21.92
English/language arts/reading/spelling	24	32.88
Environmental science/environmental education	12	16.44
Mathematics	24	32.88
Physics	6	8.22
Resource room/special education	9	12.33
Science	36	50.68
Social studies	20	27.40
Self-contained classroom ^a	28	38.36
Librarian/media specialist/computer technology ^b	4	5.48
Nonformal education ^b	4	5.48
Other ^b	6	8.22
No response	8	10.96

^aElementary teachers who wrote in “self-contained” or who teach at least three of the subjects—English, mathematics, science, social studies.

^bCategories not provided as a choice on the survey, created from participants’ comments.

Results – Subject Demographics

Demographics of the sample closely matched the demographics of the population for years of teaching experience, grade levels taught, highest education level, subjects taught, and reason for participation.

Reason for Participation, by Number of Respondents

Reason	Total responses		Multiple response
	Frequency	Percent	
Professional development/college credit	47	64.38	10
At the request of an administrator	0	0.00	0
Recommended by another teacher	8	10.96	4
To meet state/local standards	4	5.48	3
Interest in subject	25	34.25	10
To assist in a specific course	0	0.00	0
Cost/value	7	9.59	6
Other	1	1.37	1
No response	1	1.37	

Teacher perceptions of workshop elements:

- ◆ Identify elements of the Iowa Project WET Workshop from a list of possible elements
- ◆ Select and rank the top 5 elements “that have helped you implement Project WET in your classroom.”
- ◆ Select from a list, all the activities that were a part of the workshop experience

Level of Classroom Implementation :

- ◆ Compare use of WET to materials from other peer teaching and water issues workshops
- ◆ Number of WET activities used in a year
- ◆ Select all WET activities used from a list
- ◆ Identify favorite activity and give reason
- ◆ Select from a list of obstacles to integration, provide others

Science Education BEPs

“Strategies for professional development should engage teachers in “the kinds of learning that teachers are expected to practice with students.”

(Eisenhower National Clearing House for Mathematics and Science Education, n.d., p. 8)

“Whenever possible, the context for learning to teach science should involve actual students, real student work, and outstanding curriculum materials.”

(NSES, National Research Council, 1996, p.67)

“When teachers have time to describe their own views about learning and teaching... and to compare, contrast, and revise their views, they come to understand the nature of exemplary science teaching.”

(NSES, National Research Council, 1996, p.67)

Teacher Ranking of Iowa Workshop Model Elements

Element ^a	Ranking (as percent)					
	1	2	3	4	5	Any
Activity modeled	13.79	17.24	8.62	8.62	3.45	51.72
Learn about guide	20.69	6.90	1.72	5.17	12.07	46.55
Talking during breaks	3.45	10.34	10.34	6.90	1.72	32.76
Talking during activities	13.79	13.79	12.07	13.79	6.90	60.34
Preparing to peer teach	8.62	13.79	10.34	5.17	12.07	50.00
Peer teaching	18.97	6.90	18.97	8.62	10.34	63.79
Diverse activities	18.97	17.24	10.34	10.34	5.17	62.07
Unit activities ^a		6.90	1.72	1.72	1.72	12.07
Discuss activities	1.72	3.45	10.34	18.97	8.62	43.10
Homework ^b			3.45	1.72	5.17	12.07
Classroom implementation ^b	5.17	8.62	8.62	3.45	13.79	39.66

^a Elements which fewer than 10% of teachers identified have been removed for readability

^b Two terms for the same workshop element.

Discussion

Teacher Implementation of Project WET

- ◆ Over 90% of respondents implement activities following workshop
- ◆ Activity selection is effected by the specific activities presented to during the workshop

Teacher Integration of Project WET

- ◆ Teachers use activities in variety of ways
- ◆ If placed into “Levels of Innovation Adoption” Project WET implementing participant are in levels of **Routine Use** and **Refinement**
- ◆ Teacher integration of Project WET is limited by planning and class time

Teacher Perceptions of Workshop Elements

- ◆ Three types of workshop elements as most helpful:
 - ◆ becoming familiar with the Project WET Curriculum and Activity Guide
 - ◆ experiencing activities first-hand (through modeling, peer teaching, and classroom implementation)
 - ◆ interacting with other educators

Implications for Water Resources Education Workshops

- ◆ **Engage participants in opportunities to experience activities in multiple ways.** Include modeling, peer teaching and whenever possible classroom implementation.
- ◆ **Encourage participants to engage in collegial conversation** including discussion during activities, discussion during breaks, and peer teaching preparation. The value of collegial conversation should be emphasized to facilitators who may be tempted to skip a break or rush a discussion in order to maintain the schedule.
- ◆ **Provide planning time for the participants by:**
 - ◆ Structuring peer teaching planning and reflection time to foster future planning, classroom integration, and participant interaction.
 - ◆ Involve participants in collaborative curriculum building.
- ◆ **Offer workshops targeted to specific grade-level or subject area teachers.** Respondents were most likely to implement an activity that connected to their curriculum and had been experienced during the workshop. A targeted workshop would allow each participant to experience more activities fitting their curriculum.
- ◆ **Offer a follow-up workshop.** A follow-up workshop will help reduce the effect of limited planning time and allow participants to collaborate with facilitators and experienced participants from other workshops. This strategy could be especially helpful to teachers in schools which have had a curriculum change since attending their original workshop.

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- ◆ **Target Audience:** Environmental/Conservation Nongovernment Organizations offering Educator Professional Development
- ◆ **Education/Outreach Theory:** Principles of Adult Education, & Technology Transfer and Diffusion of Innovation
- ◆ **Educational Strategies Evaluated:** Activity Modeling, Peer Teaching, Classroom Implementation, Collegial Conversations

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