

Best Education Practices (BEPs) for Water Outreach Professionals
Defining BEPs, Refining New Resources and Recommending Future Actions

RESEARCH PAPER PRESENTATION

Presenter(s): Mary Blickenderfer and Eleanor Burkett, University of Minnesota Extension Service And Water Resources

Title: Shoreland Revegetation Workshops Promote Environmental Stewardship

Abstract: The rapid increase in development around Minnesota's 15,000 lakes and along its rivers threatens the health of the shoreland environment. A decline in water quality, habitat, and aesthetics are of particular concern. In order to curb this trend, shoreland property owners and local associations need to take an active role in promoting shoreland best management practices (BMPs). The University of Minnesota Extension Service offers a Shoreland Education Program. As part of this program, the Shoreland Revegetation Workshop Series was developed to increase participants' ecological knowledge and sensitivity, their ability to analyze and investigate shoreland issues, their practical skill level in addressing these issues, and their motivation to take action in promoting shoreland BMPs at the local and regional levels.

Adult environmental education models were used to evaluate the effectiveness of the Shoreland Revegetation Workshop Series in making long-term participant behavior changes that promote protection of the shoreland environment. Participants indicated significant increases ($p < 0.005$) in knowledge and sensitivity of shoreland issues (85%-93% increase), practical skill level (92%-98% increase), and action taken in promoting shoreland stewardship (61%-77% increase) as a result of attending these Shoreland Revegetation Workshops. They specifically noted an increase in knowledge of the functions of shoreland vegetation, skill and experience of designing and implementing shoreland revegetation projects, and interaction with local units of government and natural resource agencies in affecting shoreland policy changes. These and other participant responses are being utilized in guiding future development of the Shoreland Education Program.

Target Audience(s): Landowners and neighborhood organizations

Educational Purpose: Capacity building

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RESEARCH PAPER PRESENTATION

Presenter(s): Joe Bonnell and Ann Baird, Ohio State University School Of Natural Resources

Title: Applying Principles Of Adult Education Theory To A Professional Development Program For Watershed Group Leaders

Abstract: This paper addresses best education practices for building the leadership capacity of collaborative watershed management groups. We explore the results of applying principles of adult education theory to a distance education course for watershed group leaders. The Ohio Watershed Academy, in its fourth year, is designed to build the capacity of watershed group leaders to facilitate the development and implementation of community-based plans that address water quality impairments. Curriculum development and course design were based on four principles of adult education (Merriam and Caffarella, 1991):

- Life experience as a content/trigger to learning
- Self-direction and autonomy
- Self-reflection
- Expression of learning

The course design includes two major components: face-to-face workshops and web-based instructional modules. The workshops provide an opportunity for peer-teaching, based on student designed team learning projects. The web-based modules allow students to complete assignments from the office, but also require students to interact with stakeholders.

Elements of adult education theory evident in the course design, include:

- Entry interviews with students to assess and co-create learning objectives.
- Flexible scheduling and selection of assignments to match students' work experiences and learning objectives.
- Numerous opportunities for reflection on practice.
- Opportunities for peer teaching.

Data on student reactions and changes in knowledge, attitudes, and skills were collected through surveys and interviews over a three year period. We found gains in knowledge and skills were most evident in the area of stakeholder participation. Implications for course design include providing opportunities for peer interaction and student-designed learning activities.

Target Audience(s): Environmental/ conservation non-government organization leaders

Educational Purpose: Adult education

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RESEARCH PAPER PRESENTATION

Presenter(s): Patrick Edwards, Portland State University

Title: Improving The Quality Of Aquatic Macroinvertebrate Data Collected By Students and Volunteers

Abstract: Educators and volunteer groups are increasingly using aquatic macroinvertebrate biomonitoring, not only as a way to engage the community in environmental stewardship, but also as a strategy for generating valuable water quality data. While the efforts of these groups have certainly increased understanding and concern for the health of our streams and rivers, the quality of the data collected through these programs has not been well documented. To be useful in both the research and policy arenas, biomonitoring data must be accurate and at a level of precision that can be used to determine water quality within an appropriate level of certainty. Research recently conducted at several Portland, Oregon high schools and a university shows that student-collected data is not of sufficient quality. In response to this finding, a data collection procedure and a new identification guide have been developed to improve the accuracy and precision of biomonitoring data collected by students. The findings of this study have implications nation-wide for how related resource materials are designed and how these types of education projects should be conducted. This paper reviews the literature on student and volunteer collected biomonitoring data, outlines a strategy for collecting and identifying insects, and presents results from a research project on the accuracy and precision of biomonitoring collected by students. Our findings indicate that the new procedures and guide are effective in increasing both the accuracy and precision of student-collected biomonitoring data.

Target Audience(s): Local decision and policy makers, Neighborhood Organizations

Educational Purpose: Education
(formalized process with a goal), Capacity
Building

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RESEARCH PAPER PRESENTATION

Presenter(s): Michael Dietz, University of Connecticut, Natural Resources Management and Engineering Department

Title: Education and Changes in Residential Nonpoint Source Pollution

Abstract: Urban areas contribute pollutants such as excess nitrogen and bacteria to receiving water bodies. Branford River and Long Island Sound have experienced excess nutrient loading, low dissolved oxygen levels, and high bacteria levels due partly to urban runoff. The objective of this project was to determine whether stormwater quality could be improved by educating homeowners and implementing best management practices (BMPs) in a suburban neighborhood. The paired watershed design was used, where a control and treatment watershed are monitored during a calibration and treatment period. Treatment consisted of education of homeowners and structural changes designed to minimize nonpoint pollution. Some changes in measured behavior were reported. According to the treatment period survey, 11% of respondents in the treatment watershed began fertilizing their lawn based on the results of a soil test, whereas none had done so before. In addition, 82% of respondents in the treatment watershed stated that they left clippings on the lawn as opposed to 62% from the initial survey. Twelve of 34 lots (35%) adopted some BMP following education efforts, indicating a significant ($p=0.0001$) increase in BMP use overall. However, χ^2 analysis of survey data indicated no significant changes in measured behavior in regards to specific questions. ANCOVA results indicated that a 75% reduction in $\text{NO}_3\text{-N}$ (change in intercept, $p=0.0001$) and a 62% reduction in fecal coliform bacteria (change in slope, $p=0.001$) concentrations occurred; total nitrogen, total phosphorus, and ammonia-N concentrations did not change significantly. Intensive education efforts appeared to produce water quality improvements and BMP implementation.

Target Audience(s): Homeowners

Educational Purpose: Education

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Best Education Practices (BEPs) for Water Outreach Professionals
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RESEARCH PAPER PRESENTATION

Presenter(s): Richard Enfield and Richard Ponzio, University of California Cooperative Extension

Title: From Dewey To Doing: How Experiential Education Theory Can Be Effectively Used As A Best Education Practice

Abstract: The presentation documents how the promise of best educational theory fares in the real world crucible of community-based education programs. For almost a hundred years, the work of John Dewey has inspired educators who adhere to an idea proposed by Aristotle that "what one learns to do, one learns by doing." We will argue that the need for experiences, distributed over time, and with time built in for individual and group reflection on action provide the best opportunity for learning.

The paper builds upon program and assessment examples, and the outcome data gleaned from hard-won lessons to describe how Dewey's principles of interaction and continuity are brought into play day after day in 4-H. The presentation makes visible the impacts of interaction and continuity in the context of a strong and ongoing experiential Ridges to Rivers: Watershed Explorations Program for youth. We will also discuss what makes an "experience" valuable to learners and how these principles can help educators understand the participant's learning experience.

The authors assert that although the principles of interaction and continuity are vague and often overlooked, they are important underpinnings of Dewey's philosophy of experiential education. Furthermore, a good understanding of the principles can help a practitioner in the field of experiential education refine and strengthen the effectiveness of their work.

Target Audience(s): Neighborhood
Organizations, service Clubs and
organizations with applied education
components

Educational Purpose: Education

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RESEARCH PAPER PRESENTATION

Presenter(s): Patricia Farrell, Michigan State University

Title: Evaluating the Impact of Farmstead Assessments: Providing Information, Educating and Changing Environmental Stewardship Behaviors of Michigan Farmers

Abstract: This presentation will focus on the evaluation process of the farmstead system (F*A*S) over the past few years, including three mail surveys to different target populations, to determine impact of the F*A*S program on environmental stewardship practices. The Michigan Groundwater Stewardship Program collaborates with local, state, and federal agencies to provide confidential information, assessment tools, and technical assistance to pesticide and nitrogen fertilizer users to identify and lower risks to groundwater. The F*A*S is voluntary and is required for the Michigan Agricultural Environmental Assurance Program's farmstead system. Evaluation of the program utilizes environmental education theories to drive the development of the surveys. Evaluation findings conclude that Michigan producers are becoming aware of and changing the high risks to groundwater on their farms. Fifty-percent of producers during the past year changed their environmental stewardship practices or structures. A few of the key practices that have been changed: 1) wells—closing abandoned wells (79.8%), testing well water (53.2%), and 2) pesticide storage and handling—changed storage structures (37.6%), created a drift management plan (52.7%), and created an emergency plan (56.1%). and when compared to non-F*A*S participants, F*A*S participants were found to be better stewards of the land through their management operations.

Target Audience(s): Agricultural commodity groups, farmers, local decision and policy makers, agency partners, soil and water conservation districts, and landowners

Educational Purpose: Information

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RESEARCH PAPER PRESENTATION

Presenter(s): Anita Kraemer, eeEvaluations and University of Michigan

Title: Evaluation of the Chesapeake Bay Foundation's Conservation Education Programs

Abstract: We conducted an evaluation of the Chesapeake Bay Foundation's conservation education programs to determine to what extent they promote participants' environmentally responsible behavior and reduce teachers' perceived barriers to teaching about the bay. We assessed outcomes of five youth- and two teacher-education programs through pre-, post-, and retention tests and mail questionnaires from samples of current and past participants. Based on improvements in characteristics that promote environmentally responsible behavior, such as perceived knowledge of issues and actions, environmental sensitivity, and—particularly—intention to act, we concluded that the education programs increased some youths' and many teachers' environmentally responsible behavior. We also concluded that the teacher-education programs facilitated teaching about the bay by reducing teachers' constraints. As a result of our evaluation, the Chesapeake Bay Foundation implemented several changes that administrators of other similar conservation education programs may also want to consider. These changes include focusing programs to target specific, suitable goals; coordinating programs to provide experiences that build on one another; and conducting periodic evaluations.

Target Audience(s): Youth (grades 6-12) and Teachers

Educational Purpose: Education (formalized process with a goal)

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RESEARCH PAPER PRESENTATION

Presenter(s): Timothy Lawrence, Ohio NEMCO/CAMPUSHED

Title: Local Control Of The Environment-Is This What They Asked For?

Abstract: The National Pollution Discharge Elimination System (NPDES) Phase II Storm Water Program, being implemented by many small to medium sized communities across the nation, provides a unique opportunity to investigate the role that federal, state and local communities assume to protect the environment. Local, state, and some federal officials, as well as political pundits and activists from both the right and the left, are increasingly questioning the judgment and value of relying on a central authority to protect the environment. These proponents of environmental devolution argue that locals have a better understanding of the problems and constraints to institute lasting and effective environmental protection to best meet the needs and interests of local residents. This presentation will discuss preliminary results of a research project that looks at local officials' perception of their ability to implement federally mandated environmental regulations based on knowledge; willingness to participate in multi-jurisdictional collaboration; the role of local watershed groups in protecting the environment; the balance between economic and environmental concerns; their ability to implement environmental regulations; their perspective on local control versus federal or state control; and their view of regulatory control mechanisms. The study utilized a mix methodological approach using both qualitative and quantitative data analysis. This includes interviews with key informants, document review, a census survey of local officials, and in-depth interviews with local officials. The results of this research will provide a better understanding of how environmental educators can meet needs of local public officials in addressing federal and state environmental regulations.

Target Audience(s): Local decision and policy makers: SWCDs

Educational Purpose: Information;
capacity building

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RESEARCH PAPER PRESENTATION

Presenter(s): Jennifer Levin, Recreational Boating and Fishing Foundation

Title: From Theory To Practice: Best Practices In Boating, Fishing, and Aquatic Stewardship Education

Abstract: In an ongoing effort to make aquatic education more effective and to increase support for aquatic education nationally, the Recreational Boating and Fishing Foundation commissioned a research project that would identify Best Practices in Boating, Fishing and Aquatic Stewardship Education.

In 2001, eleven aquatic, environmental and outdoor education researchers provided summaries of research and recommendations for the development of Best Practices in Boating, Fishing and Aquatic Stewardship Education. Twenty-five researchers, including the authors, then collectively reviewed the research and formed recommended basic practices for program planning, development and implementation; professional development; program evaluation; and educational program research. The resulting 180-page research document is available at www.rbff.org/educational/bestpractices.cfm.

The research describes processes that provide the best educational experiences for conveying knowledge, developing skills, and changing attitudes and behaviors. The authors took a broad approach, examining multiple disciplines including, but not limited to, community-based education, watershed education, environmental ethics education, outdoor education/adventure learning, and non-formal education.

The Best Practices document is a comprehensive compilation of research results and expert opinion on Best Practices in boating, fishing, and stewardship education.

From the Best Practices research, a professional team developed tools for educators to implement the researched recommendations (also available at www.rbff.org/educational/bestpractices.cfm). The tools include a workbook, information sheets, and workshops. These tools can be used for planning, developing and implementing programs; providing ongoing professional development; conducting program evaluations; and identifying relevant research to further understand and improve the educational process. Best Practices are meant to enhance, not replace, existing efforts.

Target Audience(s): Agency partners, recreational businesses, service clubs and environmental/conservation nongovernment organizations

Educational Purpose: Formalized process with a goal

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RESEARCH PAPER PRESENTATION

Presenter(s): Robert Mahler, Soil Science Division, University of Idaho

Title: Using A Survey Instrument To Determine Audience Preferred Information Delivery Methods For Water Quality In The Western USA

Abstract: In 2002 we developed a region-wide (AK, ID, OR, WA) water issues survey for our clientele (all citizens) to collect baseline information to document public awareness, attitudes, aptitudes and current actions toward water issues in the Pacific Northwest. We were particularly interested in the following: (1) current sources of water quality information widely used by the public, (2) the need for additional water education efforts, (3) the current use of Extension and land grant universities as a water information source, and (4) the program formats (workshops, brochures, etc.) of most interest to the public for future water education.

Over 900 surveys were returned completed. Newspapers, television, environmental agencies, and environmental organizations were cited as sources of water quality information by 60.4, 52.1, 43.1 and 37.7% of the respondents, respectively. Extension and/or land grant universities were cited as water information sources by less than 30% of the survey respondents. Over 90% of survey respondents cited the need for more educational programming about water issues. However, respondents are not willing to attend workshops lasting more than 60 minutes in duration – the traditional Extension educational venue. Survey respondents were interested in receiving brochures, PSA's on television and radio, and reading newspaper articles.

Target Audience(s): Households, homeowners and the general public

Educational Purpose: Communication
(two way)

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RESEARCH PAPER PRESENTATION

Presenter(s): Suzanna Roffe, Department of Land Resources and Environmental Sciences, Montana State University

Title: Assessing Extension Program Impact: Case Study Of A Water Quality Program

Abstract: Over a five year period, Montana State University conducted a voluntary, Montana based, private well water test program to educate the public on water quality issues, as well as improve the decision-making skills of private well owners. The program provided an array of water quality resources including instructional videos, written instructions, sample collection and submission, and an impact assessment questionnaire. Data collected from the program were based on the following outcomes: comprehension of test results; changes in land use practices to improve water quality; purchase of point-of-use treatment systems; level of improved ability to make decisions about water quality; and overall assessment of the program. Assessments of various delivery mechanisms within the program concluded that extension faculty could improve the effectiveness of future distant delivery education by, 1) targeting specific educational resources, 2) specifying audiences by need, 3) structuring to the educational level of audiences, and 4) providing information that has immediate utility to the program.

The invaluable information MSU Extension WQ Program gained from the well test program has not only guided them in implementation of BEPs, but will be the basis for design and delivery of a sister program planned for 2004 and 2005. The revitalization of the well water test program will address the evolving water quality needs of Montana private well owners, help MSU WQ specialists continue to effectively serve the water quality educational needs of Montanans, and provide BEPs that can be shared as a regional resource in water quality education.

Target Audience(s): Homeowners - private well owners

Educational Purpose: Education

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RESEARCH PAPER PRESENTATION

Presenter(s): John Vickery, Palmer Land Trust

Title: Application Of Marketing Techniques To Extension Programming Decision Making: Minnesota Livestock Producers, Etc.

Abstract: A combination of focus groups and pre-discussion survey with livestock producers was employed to identify preferred Extension education methods and topics. The focus groups took place in the spring and summer following a winter education program conducted at the county level that focused on manure application practices, nutrient management, and protection of sensitive areas. By exploring issues in detailed discussions with small groups of producers, we gained information and valuable insights that can guide future information, communication, and education efforts to serve this audience. We were also following an important principle of adult education: the audience or participants should have the opportunity to inform the topics or issues covered, as well as the media or format. By discussing and surveying the practices they employ and the reasons for not adopting recommended practices, we also gained knowledge about the topics or issues that ostensibly should be addressed—through Extension outreach and/or through regulatory, incentives-based, or social-marketing approaches. We found that among seven suggested ‘educational items or opportunities’, the preferred format was ‘publications’. We present some advantageous features of the focus group–questionnaire combination of approaches, including the fact that by beginning with the questionnaire, participants had time to reflect on the questions prior to entering into discussion. We conclude that the combination is effective. However, the resources required for employing both methods is significantly higher than for one method alone, suggesting that the use of the combination is more appropriate for relatively larger projects or Extension programs.

Target Audience(s): Farmers

Educational Purpose: Information,
education and communication

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