

A low-cost method of estimating outreach-based changes in recommended practices.

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Abstract

University Extension educators want to change behavior, not simply improve learning or change attitudes. Thus, it is increasingly important to demonstrate impacts rather than outputs. However, methods to survey changes in adoption of recommended practices typically are expensive, time consuming and have low response rates. This article presents a low-cost survey method used in Maryland that provides a rich source of audience-determined data that can be used for impact reporting, to generate ideas for research and to provide feedback to enhance educational outreach. The method is particularly useful for audiences such as pesticide applicators that attend periodic recertification classes.

Keywords: impact reporting, Cooperative Extension, Maryland, pesticide applicator training, program evaluation, survey methods

Introduction

Educational program evaluation endpoints

The value of educational programs is predicated upon the usefulness of the concepts and skills provided through the training process. Endpoints commonly assessed include an increase in knowledge, skill level or ability, or a change in attitude. Less frequently, educators assess changes in adoption of recommended practices. The assessment method chosen is often a survey, and evaluations often consist of a series of questions about how well the particular topics presented addressed the needs of the trainee (Cohen and Colligan, 1998; Buhler and Whipker, 2003). Another common technique to assess changes in knowledge is administration of pre-and post-training tests.

Increasingly, educators are being asked for data on impacts of training and education programs (Cohen and Colligan, 1998; Georghiou and Roessner, 2000; Hoffman and Grabowski, 2004; Zotz, 2004; Franz and McCann, 2007; Bateson, 2009). Particularly for programs funded partially or entirely with public monies, it is no longer sufficient to report merely the number of persons attending training programs, the number of training materials distributed, or the number of people visiting educational web sites. Providing trainees with knowledge and a particular set of skills can be an end in itself, of course, but the real goal of many educational programs, especially those offering continuing education units, certification or licensure, is effecting behavioral change. Influencing trainees to implement the acquired knowledge and skills, presumably to the benefit of society, is the end objective.

Anecdotal information indicates that some Extension pesticide safety educators have been asked to use existing data on adverse events to determine whether training efforts have been successful in changing pesticide-handling behaviors. Poisoning cases reported to Poison Centers and misuses identified through state inspections and/or

enforcement activities have been suggested as potentially useful data points. It is this author's opinion that use of such sources for this purpose is neither appropriate nor scientifically defensible. Poisoning cases include self-reported data and may not distinguish between potential cases and confirmed cases, and there is usually no record of whether anyone involved with a poisoning had received pesticide safety training. Using data from scheduled inspections by state pesticide regulators is problematic because knowing one is being observed may change behavior. Misuse inspections depend on someone reporting a possible case of misuse, and therefore are not good indicators, since uneventful misuses would likely not be reported. Another confounder inherent in using such sources is the time necessary to develop disease or cause environmental harm, leading to an unknown lag time between training and observation of the effect. Finally, a single misuse of a very toxic pesticide could result in widespread human illness or environmental contamination, whereas the same misuse of a less toxic pesticide might have little or no impact that would be reported to Poison Centers, enforcement agencies, or other public sources.

This article provides an example of a process used to estimate changes in pesticide handling practices by applicators trained through the Maryland Pesticide Safety Education Program (PSEP). The process uses self-reported exit survey data on use of recommended practices, but is constructed in a way that improves upon the commonly used "plan to adopt" strategy.

Maryland's situation

In Maryland, commercial applicators must recertify every year, either by re-taking the initial certification examination, or by attending an education program approved by the state lead agency, the Maryland Department of Agriculture. Many applicators recertify by attending training sessions offered by the University of Maryland's Extension (UME) PSEP. This provides the Maryland PSEP with the opportunity to collect data from a subset of repeat attendees.

Annually each spring, Maryland PSEP offers the Pesticide Safety Conference, a recertification session for commercial applicators in Right-of-Way Pest Control, Aquatic Pest Control, Forest Pest Control, Industrial Weed Control, and Demonstration and Research Pest Control. This group annually comprises 175 - 300 pesticide applicators, approximately 10% of whom are new applicators each year, 80% are returning every year, and 10% are only attending occasionally. Of the total, about 98% are seeking recertification credit and about 2% are not seeking recertification credit. Because such a high proportion is primarily dependent on this opportunity to maintain their certification, changes in pesticide handling practices can be tracked. The 2% who attend without seeking credit may be non-certified applicators, or certified applicators that already have enough recertification credits from other sources.

Materials and Methods

Overview

Those who attend the annual Maryland Pesticide Safety Conference are surveyed through a set of questionnaires distributed during the conference. Attendees are asked

to list pesticide handling behaviors they expect to change based on the information presented during the conference, and to check off pesticide handling practices they actually did change based on the previous year's presentations. Completed questionnaires are collected at the end of the conference, and results are tallied. The data are compiled and used in impact reporting and as feedback to improve future outreach to these applicators.

Questionnaire design and distribution

Each year, two questionnaires are distributed in the packet of materials issued during check-in for the Pesticide Safety Conference. The first questionnaire (example, Appendix A) asks attendees to identify any practices they expect to change in the coming year, based on presentations during the current conference. The questionnaire is organized by presentation, but the question is open-ended in order to encourage applicators to self-report what seems most important and/or applicable to their situation(s). The questionnaire is designed so the researcher can later fit the data into discrete categories. The categories are defined after all responses are collected. This process, understood as Grounded Theory, allows for a more context-sensitive view of qualitative data responses (Miles & Huberman, 1994; Corbin and Strauss, 2007).

Following the conference, results from the first questionnaire are reviewed by the PSEP Coordinator and categorized subjectively into as many categories as needed to describe respondents' answers. For example, the answers "purchase new gloves," "check and buy new safety equipment as needed," and "test-fit respirators" might all be categorized by the Coordinator under the heading "upgrade safety equipment." The answers "use adjuvants," "avoid treating next to sensitive areas," and "check nozzles for droplet size" might be classified as "improve drift control measures." Once the answers have been categorized and tallied, a list of the top category choices is compiled for use in the following year's survey.

The second questionnaire (example, Appendix B) lists the top categories identified by the applicators attending the previous year's conference. Repeat attendees are asked to identify which (if any) of the listed practices they actually changed in response to presentations at the previous year's conference. The listed practices comprise the top Coordinator-categorized responses for each of the topics presented during the previous year's program (example, Appendix C).

At each year's conference, the Conference Coordinator explains the purpose and use of the questionnaires during the introductory remarks, and again before the break. Attendees are informed that there are two questionnaires in the registration packet they picked up when checking in for the conference, and that both forms must be turned in at the end of the conference in order for the attendee to be considered eligible for recertification. Certificates of attendance will not be issued unless both forms are returned, and forms will not be accepted prior to the end of the last presentation. For added emphasis, these instructions are repeated on the back page of the conference program, which consists of the instructions for obtaining recertification credit in each state for which the Maryland Pesticide Safety Conference is approved (example, Appendix D).

Data collection and analysis

The attendees keep the questionnaires with their materials throughout the conference. They are instructed to fill out Questionnaire 1 as each presentation concludes. They are encouraged to fill out Questionnaire 2 prior to the beginning of the conference or during the conference break. To maintain confidentiality, applicators are instructed not to write their names on the questionnaires.

Although the forms must be turned in, there is no requirement that the forms be filled out. This avoids the potential for attendees to claim a change they have not made (or do not intend to make) solely for the purpose of obtaining recertification credit. Compliance with the request to return the forms is high, because the forms are used as part of the assurance that an applicator has, in fact, attended the entire program. When an applicator checks in for the conference, his/her name is checked off against the list of preregistered attendees, and he/she is given a packet of conference materials, including a program, directions for obtaining recertification credit in other states, the two questionnaires, and any handouts submitted by conference speakers. After the last presentation, each attendee must turn in his or her forms in order to receive the certificate of attendance, which serves as the applicator's record that he/she received training. Those who do not turn in both questionnaires are not given a certificate of attendance and are not eligible for recertification. Applicators who lose a questionnaire are given another and asked to turn it in before they can collect their certificate of attendance.

Following the conference, the PSEP Coordinator tallies the results. The Coordinator reports both planned changes from Questionnaire 1 and actual changes adopted from Questionnaire 2. These impacts have been reported to USDA through the Performance Planning and Reporting System (PPRS) and are used in other arenas where evaluation of program impact is necessary or desirable, including Logic Models for Extension program planning in the state and reports to the state legislature.

Discussion and Conclusions

Educators may resist designing and conducting surveys to determine impacts because of the costs associated with the methods. Salant and Dillman (1994) identified factors to be considered before choosing a survey method, including the number of people available to work on the survey, the time available to conduct the survey and analyze results, facilities, [including telephones (and this could be expanded to include e-mail and other Internet-based contact methods)], and available funding. The method of determining impacts described in this paper involves minimal expense in terms of both manpower and necessary funding. Costs include printing the two questionnaires (one page each) and time spent compiling the data for approximately 500 forms (250 copies of each). Compilation and data analysis are conducted by the PSEP Coordinator, a task that typically takes about two days.

The response rate from the method described is very high and requires no follow-up contact to collect unreturned forms, a necessary component of most survey methods. By contrast, typical mail surveys have a lower rate of response unless follow-up

requests are performed, each of which increases the overall cost of the survey.

Over the last five years, the return rate for the Maryland PSEP impact assessment method has averaged 98.3%, far above the “reasonable” response rate of 60% targeted by Salant and Dillman (1994), an estimate that included at least one or more follow-up contacts. The high response rate is directly due to the very high proportion of attendees seeking recertification credit, and to the requirement that attendees submit the questionnaires as a condition for obtaining recertification credit.

The open-ended nature of the questions is a strong positive factor. Asking presenters ahead of time to identify behaviors they think attendees should change has at least two drawbacks. First, the presenter and the applicator may have very different ideas of what needs to be changed. Second, the presenter may change his/her presentation at the last minute, may emphasize other points, or may present so much information that the choices requested are lost in “information overload.” Applicators may already have instituted the more obvious changes, but may have learned new information that will lead them to make important additional changes. Providing applicators with a set list means other choices are not available. Project directors lose the opportunity to identify possibly subtle changes in pesticide handling behavior that might contribute significantly to protecting human health or the environment, or to improving pest control practices.

There are also some disadvantages to the Maryland PSEP method. For groups larger than a few hundred attendees, it would not be feasible to use an open-ended format. Maryland’s format requires the data analyst to read each questionnaire before assigning categories for the completed Questionnaire #1, and a single individual should interpret each questionnaire in order to avoid misclassification. However, for larger groups, it should be possible to survey a random sample and to use the same or similar techniques.

The method described does not directly account for applicators who were following suggested practices before attending the conference. Thus, one cannot distinguish between those who are already using a particular recommended practice and those who simply did not adopt the practice. One could design additional queries for Questionnaire 2 to investigate this possibility, but a potential confounder is that respondents might be more likely to choose “already using good practices” rather than to identify themselves as recent adopters. It would be interesting to conduct a study to test out the reliability and effect of such questions.

The open-ended nature of the surveys somewhat limits comparisons across time or across states. Although it may be desirable to know whether a particular behavior or handling practice has changed across geographic regions, categories, or years, survey designers should take care not to compromise results. Training programs differ due to the exact nature of the work (i.e., the category of pest control), local needs, availability of trainers, state requirements, and other factors. It is unlikely that a single set of impacts would apply to all situations.

In summary, this method has many advantages. The Maryland data collection process is low cost, allows applicators to self-determine what is important, provides quantifiable

data and can be analyzed in a reasonably short time. The data collected can be used not only to satisfy demands for impact indicators, but also to identify effective speakers, to recognize trends, and to ascertain where additional training would be helpful. The two-questionnaire method could be more widely adapted to address impacts from any type of outreach education where a large proportion of the audience returns for regular continuing education, including health care professionals, engineers, bankers, teachers, and many other professions.

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Appendix A. Questionnaire 1 from 2009 Maryland Pesticide Safety Conference.
(Fonts and spacing reduced for this example.) Open-ended questions allow attendees to identify practices they intend to change.

EXPECTED IMPACTS – 2009 PESTICIDE SAFETY CONFERENCE

1. Please tell us which concurrent session you attended:

- Right-of-Way Forest Aquatic

2. For each session you attended, please list below any practices you intend to change as a result of attending today's seminars. Please list each item under the appropriate topic.

A. GENERAL SESSION

Impacts of Weather on Pesticide Application – Please list any practices you'll change:

Regulatory Update – Please list any practices you'll change:

Respirator Use and Fit Testing – Please list any practices you'll change:

B. RIGHT-OF-WAY / INDUSTRIAL WEED – Please list any practices you'll change:

C. FOREST – Please list any practices you'll change:

D. AQUATIC – Please list any practices you'll change:

Appendix B. Questionnaire 2 from 2009 Maryland Pesticide Safety Conference. (Fonts and spacing reduced for this example.) Choices represent the top actions identified in the previous' year's Questionnaire 1 (i.e., practices they self-identified as intending to change), after categorization by the PSEP Coordinator.

2008 PESTICIDE SAFETY CONFERENCE – IMPACTS

1. Did you attend the 2008 Maryland Pesticide Safety Conference GENERAL SESSION?

YES NO

Please check any actions you took as a result of attending that session:

- paid more attention to weather conditions / avoided spraying when conditions favor drift
- changed nozzles or checked nozzle function and pressure to reduce potential for drift
- improved recordkeeping
- improved employee training
- took advantage of pesticide container recycling
- improved vehicle transport conditions (security, spill control items, fire extinguisher, etc.)

2. Did you attend the 2008 Maryland Pesticide Safety Conference RIGHT-OF-WAY / WEED CONTROL SESSION?

YES NO

Please check any actions you took as a result of attending that session:

- watched for possible resistance development
- used new herbicides for resistant or hard to manage weeds
- rotated chemicals to prevent development of resistant weeds
- identified target weeds in order to choose the best product for them
- improved timing of my herbicide applications to ensure better control

3. Did you attend the 2008 Maryland Pesticide Safety Conference FOREST SESSION?

YES NO

Please check any actions you took as a result of attending that session:

- watched for emerald ash borer (EAB)
- watched for other invasives

4. Did you attend the 2008 Maryland Pesticide Safety Conference AQUATIC SESSION?

YES NO

Please check any actions you took as a result of attending that session:

- identified target weeds in order to choose the best product for them
- used a different product for control
- improved timing of my applications to ensure better control
- used a biocontrol approach
- treated pond in sections

Appendix C. List of topics addressed on the program for the 2008 Maryland Pesticide Safety Conference. Provided as comparison with choices made by applicators as seen in Appendix B.

2008 Maryland Pesticide Safety Conference

General Session

Introduction and Conference Details

Droplet Size and Drift Potential

Regulatory Update

What an Inspector Looks For

Right-of-Way and Weed Control

New Programs and Products for Hard-to-Control Weeds and Brush

Forest Pest Control

Emerald Ash Borer and Other Interesting Invasive Species

Gypsy Moth

Aquatic Pest Control

Aquatic Plant Identification and Control Options

Appendix D. Instructions for recertification credit, 2009 Maryland Pesticide Safety Conference. (Fonts and spacing reduced for this example.) The directions clearly state that the questionnaires (referred to as “evaluation forms”) must be turned in if recertification credit is desired.

STATE REQUIREMENTS FOR RECERTIFICATION AT THE 2009 MARYLAND PESTICIDE SAFETY CONFERENCE

All participants must attend the full general session plus one category session. You will be checked in for the conference when you arrive; late arrival will be noted on our enrollment list. When you turn in your evaluation form at the end of the conference, you will receive a certificate of attendance. This certificate is your verification that you attended the full conference. **If you do not pick up your own certificate, we must assume you did not stay through the conference, and we will not provide your name to the appropriate state agency for recertification.** To make sure you qualify for credit, check in when you arrive, pick up your certificate after your concurrent session ends, and follow the directions below for recertification in the appropriate state(s).

DELAWARE – 3 credits toward recertification in Forest, Aquatic, and Right-of-Way categories.

1. Print your name and certification number on the Delaware roster in the category session you attend.
2. Turn in your evaluation forms and pick up your certificate at the end of the conference. We will approve your name on the DE roster and we will send the roster to the Delaware Department of Agriculture.

DISTRICT OF COLUMBIA – Full credit for recertification in Right-of-Way, Industrial Weeds, and Aquatic categories.

1. Turn in your evaluation forms and pick up your certificate at the end of the conference.
2. Obtain and read a copy of the D.C. Department of Health Regulatory Fact Sheet 2006-2007 at the conference registration desk at the end of the conference.
3. Fill out the D.C. Verification of Recertification form at the conference registration desk at the end of the conference, and take the form with you.
4. Mail your completed Verification of Recertification form to the address on the form.

MARYLAND – Full credit (8 credits) for recertification in Right-of-Way and Weed Control, Forest Pest Control, Aquatic Pest Control, Regulatory Pest Control, and Demonstration and Research.

1. Turn in your evaluation forms and pick up your certificate at the end of the conference. We will approve your name on our conference roster and we will send in the roster to the Maryland Department of Agriculture for recertification credit. You do not need to sign a roster for credit in Maryland.

PENNSYLVANIA – 4 credits recertification in Core; 2 credits recertification in Private, Right-of-Way, Industrial Weeds, Ornamental and Shade Trees, Forest, Park/School, Aquatic, and Demonstration and Research categories.

1. Print and sign your name and enter your certification number on the Pennsylvania roster in your category session.
2. Turn in your evaluation forms and pick up your certificate at the end of the conference. We will approve your name on the PA roster and we will send the roster to the Pennsylvania Department of Agriculture.

WEST VIRGINIA – 4 credits recertification in General; 2 credits in Right-of-Way / Weed Control, Forest, and Aquatic categories.

1. Print and sign your name and enter your license number on the West Virginia course roster in the general session and on the West Virginia course roster in your category session.
2. Turn in your evaluation forms and pick up your certificate at the end of the conference. We will approve your name on the WV rosters and we will send them to the West Virginia Department of Agriculture.