



Extension Program Evaluation

Dale A. Moore, DVM, MPVM, PhD
Extension Veterinarian
School of Veterinary Medicine
University of California, Davis
dmoore@vmtrc.ucdavis.edu

Because of our backgrounds in science, as extension educators, we know that controlled clinical trials or experiments help us to determine if a particular product worked with a group of animals or not. It helps us determine if we can significantly increase milk production in a group of cows or if a product can effectively treat a specific disease. This is product evaluation. What is less clear to us sometimes is how the product we deliver as educators can be evaluated. It is the purpose of this paper is to help you:

- focus your evaluation by providing background in the different levels of evaluation
- help you construct evaluation questions by providing examples
- provide a tool for data analysis
- explore learning stage theory for documenting outcomes

There are a number of questions you need to ask yourself before you conduct a program evaluation.

What is the purpose of your evaluation?

- Is it to improve the program?
- Improve teaching?
- Determine if the program “made a difference” in producers’ herds?
- Respond to higher-ups?
- Meet promotion requirements?

Who will use the evaluation?

These are likely the stakeholders in all your educational efforts.

- the public
- your extension unit or divisions higher-ups
- colleagues
- you and program planning staff
- your audience – they need to get feedback on the evaluations they participate in
- other stakeholders?

Levels of Evaluation

To understand how we might go about evaluating our programs, we first need to understand the different levels of educational program evaluation.

1. Perceptions of the program or course – “Happy Sheets”
2. Competence with new Skills/Knowledge/Abilities or Attitudes acquired – such as through a pre-test/post-test method
3. Individual Performance – a change in behavior in practice
4. Industry outcomes – changes in herd / regional performance outcomes

One educational event could actually impact all four of these levels and you could construct a project to evaluate at each particular stage. However, you must first decide what you are trying to accomplish with your program and what outcomes you want to occur. What do you want to happen with your participants?

What are your outcomes?

Are you trying to change their attitudes towards a particular issue?

Are you trying to increase their knowledge about some farm management?

Are you trying to teach them a skill or how to use a tool that they can take back to their farms?

Are you trying to increase herd performance? Decrease disease incidence? Decrease costs on the farm?

Are you trying to effect environmental or community changes?

Clearly defining the objectives of your educational intervention makes the job of evaluation much easier.

Mechanisms for Evaluations

Direct observations – Your observations or the observations of others about program impact are very useful. You just need to document them in some way. Another mechanism along these lines is a pictorial record.

Audience response systems – In a class-room setting, computerized audience response systems are the latest in immediate program feedback. You can identify knowledge gaps or attitudes at the beginning of a program, in the middle of a program to engage the audience, and at the end for a program evaluation.

Surveys – Surveys, quizzes (tests) or questionnaires provided at the beginning and/or at the end of a course can address many of your program evaluation needs. Follow-up surveys of program participants could focus on implementation three, six, or twelve months after your program.

Telephone or Face-to-face Interviews – Post-program interviews can better get at what changes individuals may have made personally or on their farms three, six, or twelve months after your program.

Focus groups – Focus groups can be used both for program needs assessment but also for evaluation. Impacts of the program in the community can be explored by using an experienced facilitator.

Expert or Peer-review – Having peers or experts in the audience who can provide program feedback is invaluable. A useful thing to do is construct an evaluation tool for peer-review that provides them guidance and answers your specific evaluation needs.

Testimonials – Documented testimonials can address program impact.

Industry data – Data on herd performance, diagnostic laboratory data, slaughter house data, may measure the broader impacts of your educational program.

Surveys in Detail

What are the steps in survey design? The following questions must be asked when designing a survey.

- Who is the audience?
- How are you going to deliver it?
- Are you going to randomly choose possible responders?
- What percent response do you need to make it meaningful?
- Pre- and post-program delivery to address immediate changes in knowledge?
- What kind of questions should I ask? The questions you ask must be simple, easily understood by your audience, in language they use, address your outcomes of interest, and be brief enough to have people complete the survey.
- There are four basic **levels** of outcomes and different kinds of questions to ask for each:
 - Reaction – the participants' reactions to the course. *Were course objectives met?*

- Learning – *Give an example of something you learned that you can use on the farm. List 3 ways to reduce injection site lesions....*
- Behavior – *follow-up survey; Have you done X since the course?*
- Results – *What effect has this program had on farm profitability? What effect has this program had on reducing injection site lesions in market cattle?*
- Types of questions:
 - Questions about satisfaction with different aspects of the program
 - Questions about speaker effectiveness
 - Questions about increased knowledge or skills (self-report or quiz)
 - Questions on change in attitude
 - Questions on “commitment to change”
 - Questions on new program ideas, etc.
- Structure of questions:
 - Open-ended -- gets you into “qualitative” data or response coding
 - Closed – Likert scale; specific responses, numeric responses; categorical responses
 - What are the advantages and disadvantages of each kind of question?
 - What are the nuances to the different kinds of analyses you can do with each kind of question structure?

What resources do I have for this evaluation project?

Your final (but perhaps your first) question should be: what resources do I have to conduct this evaluation project? The kinds of resources include:

- Time
- Money
- People to do the work, expertise in evaluation
- Are there existing data that can help me that is already being collected?

Data Analysis

You will need skills in data management, summarization, and analysis if you want to make sense of the evaluation information you gather. The statistical tests you should be most familiar with are:

- Student’s T-test to compare means
- A non-parametric test like the sign test to compare paired data for increases, decreases or no change
- Chi-square contingency table analysis
- Multivariate analysis

EpiCalc 2000

This is a free software program that you can download from the web. The URL is:

<http://www.myatt.demon.co.uk/epicalc.htm> It does many simple statistics, particularly if you have them summarized. It will compare means, compare proportions and do N X N contingency tables.

An Experimental Model for Program Evaluation: Using Learning Stage Theory

Behavior change is really what we’re after in most of our extension programs; a change in where to give injections to reduce injection site lesions, or a change in milking techniques. However, behavior change is often difficult to measure. And even if we do a follow-up study to identify behavior change, we can become frustrated when we don’t see the whole-scale changes we are after. Overcoming these frustrations is not always in our control. To help explain the lack of behavior change as a result of our programs, we need to look at adult behavior change theory.

Meta analyses of Continuing Medical Education programs have found that most traditional CME does not change physician behavior.¹⁻⁵ The results of these analyses have shown, however, that better results of educational programs are found when active learning and multiple exposures are used. These are two tenets of adult learning theory. When we try to motivate behavior change, we have other factors to consider, which can be explained using behavior change theories. There are three behavior change

models we can look at to help explain some of problems we have had with documenting change. They are from the psychologists Prochaska, Mezirow, and, in the field of continuing medical education, Slotnick.

Each of their theories suggest that change occurs in stages and that in each stage the learner has different needs. To become interested in the idea of change, the learner's mind must be opened and the learner must feel a need to attend to something, something has happened to unsettle them, or they have an immediate problem to solve.

Prochaska's theory can be summarized as: (1) Precontemplation – unaware or unimpressed by a particular problem; (2) Contemplation – interested but not sure what to do; (3) Preparation -- making a choice or decision about what to do; (4) Action – learning news skills, etc.; and (5) Maintenance – fine-tuning and maintaining the behavior change.⁶⁻⁸ Mezirow's Theory of Perspective Transformation has many more stages:

- 1) Disorienting dilemma
- 2) Self-examination with feelings dissonance or discomfort
- 3) Critical re-assessment of assumptions
- 4) Recognition of discontent and that others have changed
- 5) Exploration of options for new ways of seeing/behaving
- 6) Planning a course of action, gathering resources
- 7) Acquisition of knowledge and skills
- 8) Provisional trying of new perspective/behavior
- 9) Building of competence and self-confidence in new activity
- 10) Integration of new perspective/behavior into one's life.⁹

Dr. Slotnick and I have looked at four major stages that we may actually be able to document: scanning, evaluation, learning and gaining experience.¹⁰⁻¹² Each stage can be summarized as: Evaluation: *Learner decides whether to learn the solution to the problem at hand*; Learning: *Learner gains required skills and knowledge*; and Gaining experience: *Learner familiarized with the skills, knowledge & problems*. Our hypothesis is that: *It should be possible to document changes in prevalence of learners at different stages in addressing an educational program*.

In our studies we present clinical vignettes to the audience before and after the program and ask for their responses:

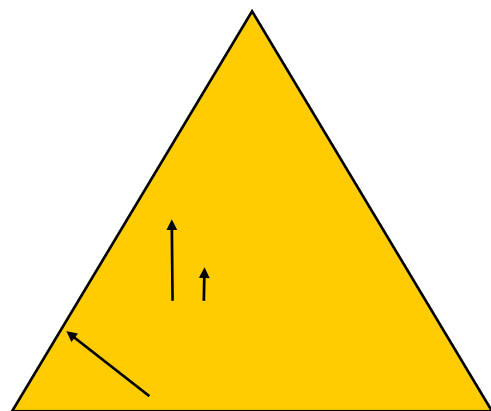
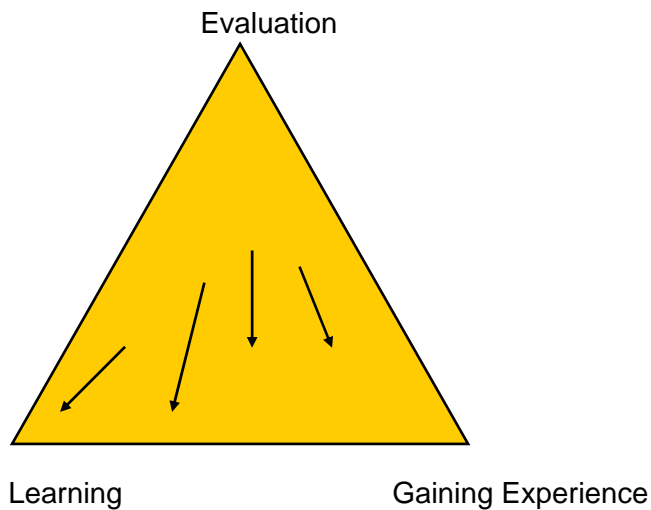
Evaluation: *I'm comfortable that I can handle the problem in the vignette; all I might be interested in is information so I can decide when next to update."*

Learning: *I need to update myself in the skills and knowledge needed to address this problem.*

Gaining experience: *I've recently updated skills and knowledge. All I might be interested in is hearing about others' experiences with similar problems.*

We expect to see changes in movement from one stage to another after the program to issues we covered in the program. However, individuals may be at DIFFERENT STAGES with respect to the problems that we present in the course at the beginning and may move at different RATES by the end of the course.

To document the movement, we are plotting the proportion of responses to all the clinical vignettes on a Triangular Graph¹³⁻¹⁵, to graphically present all the changes to all clinical vignettes simultaneously. The apices of the graph indicate the stage (at 100% of the respondents). Each side of the triangle thus represents 0 to 100% of the audience. Triangulating each set of responses, tells where the audience was at the beginning (start of the arrow) and at the end of the course (point of the arrow). The graph below indicates that for the four vignettes represented, the audience moved primarily from evaluation to learning. The second triangle shows the response results to topics not covered in the educational program.



We believe that this technique is useful to adult educational program providers and evaluators because: 1. It can evaluate group changes that are dependent on what stage the learners begin the educational program, 2. It can document the changes based on these stages, and 3. It offers a parsimonious graphical representation of responses to numerous practice problems simultaneously. From our practical applications of the technique, the data imply that with short-term interventions, we can make small changes in the educational status of individuals with respect to specific problems. With larger, intensive programs, we can make larger changes including moving groups of learners from evaluation through learning to gaining experience. Currently, we are working on statistical methods for documenting change in this way.

References

1. Davis DA, Thomson MA, Oxman AD, Haynes RB. Evidence for the effectiveness of cme. *JAMA*. 1992;268:1111-1117.
2. Davis DA, Thompson MA, Oxman AD, Haynes B. Changing physician performance: a systematic review of the effect of continuing medical education strategies. *J Am Med Assoc*. 1995;274:700-705.
3. Clark NM, Gong M, Schork MA et al. Impact of education for physicians on patient outcomes. *Pediatrics*. 1998;101:831-836.
4. Davis DA, Thomson O'Brien MA, Freemantle N, Wolf FM, Mazmanian PE, Taylor-Vaisey A. Impact of formal continuing medical education. *J Am Med Assoc*. 1999;282:867-874.

5. Whitcomb ME. CME reform: an imperative for improving the quality of medical care. *Academic Medicine*. 2002;77:943-944.
6. Parker K, Parikh SV. Application of Prochaska's transtheoretical model to continuing medical education: From needs assessment to evaluation. *Annales CRMCC*. 1998;31:1-3.
7. Parker K, Parikh SV. Applying Prochaska's model of change to needs assessment, programme planning and outcome measurement. *J Eval Clin Practice*. 2001;7:365-371.
8. Prochaska J, DiClemente C, Norcross J, et al. In search of how people change: applications to addictive behaviors. *Am Psychologist*. 1992;47:1102-1114.
9. Mezirow J. Understanding transformation theory. *Adult Education Quarterly*. 1994;44:222-323.
10. Slotnick HB, Passin SM, Mejicano G et al. Estimating prevalences of physicians' learning needs. *Almanac: Alliance for CME*. 2002;24:4-6.
11. Moore DA. Evaluating the stages of veterinary practitioner learning for continuing education needs assessment and program evaluation. *J Vet Med Educ*. 2003;30:50-56.
12. Moore DA, Gilbert RO, Thatcher WW, Santos JEP, Overton MW. Levels of continuing veterinary medical education program evaluation: Assessing a course on dairy reproductive management. *J Vet Med Educ*. 2004;31:146-153.
13. Latham J. Triangular graphs. *J Political Econ*. 1976;84:623-630.
14. Steele TE, Weaver TD. The modified triangular graph: a refined method for comparing mortality profiles in archeological samples. *J Arch Sci*. 2002;29:317-322.
15. Moore DA, Slotnick HB. Documenting the impacts of continuing education. *J Cont Educ Health Professions*. 2005;(In Preparation).