Measuring Extension Program Impacts:
2. Assessing Participant Knowledge Gain

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Within Cooperative Extension, we are required to report the number of participants who gain knowledge and apply practices as a result of participating in an Extension program. This can be quantified relatively easily using a variety of tools. It is vital to develop all assessment tools before an Extension program is offered to participants.

The measure of knowledge gain and application of practices is often referred to as **participant assessment**. The first step in participant assessment is the development of **goals and objectives** for each Extension program (Larese-Casanova, 2017a). Participant assessment is the measure of fulfillment of the program objectives, and helps to answer the important question of "did the participants learn anything from the program?" Using assessment to understand whether this happened is an essential component of broader **program evaluation** (Larese-Casanova, 2017b).

Participant Demographics

Understanding the demographics of the audience of an Extension program is essential to the assessment of learning. While we want to understand how and what the participants are learning as a whole, an Extension program may have a diverse audience of different groups that learn in different ways. For instance, participants may learn differently depending on age group (e.g., youth/adult, 20-30/60-70 year olds), education level (e.g.,

high school diploma/college degree), status in a field (e.g., amateur/professional), or level of prior participation in other related education programs (Larese-Casanova, 2011). A simple demographic survey containing only the relevant measures can be administered at any point during an Extension program.

Pre- and Post-Testing

It is relatively easy to use pre- and post-testing to accurately quantify knowledge gain among participants in programs of longer duration, such as summer camps, Master Gardener, or Master Naturalist programs. At times, we spend several days or even weeks with the same group of participants. Therefore, it is easy to assess what they know by administering an identical test at the start and end of a program. Ideally, the test would consist of several short answer questions, rather than multiple choice, to reduce the chance of answering correctly by guessing. Guessing the correct answer on a pre-test, especially, and a post-test can result in inaccurate assessment results (La Barge, 2007). It is also best to call the test a "knowledge survey" to help ease participants' fears of testing. It is important to include questions that cover the breadth of the program content to fully assess the topics in which learning is occurring.

The amount of knowledge gained from participating in a program is simply the difference between

the scores of the pre- and post-test. Statistical comparisons, such as t-tests, can then be used to compare test scores between individuals or among the group as a whole to determine if there was a significant gain in knowledge. Pre- and post-testing can even be used to assess learning between different audiences within the same program, which ultimately aids in targeting audiences in the future (Larese-Casanova, 2011).

Pre- and post-testing can also be used with participants in shorter-term programs. As an example, youth participating in a day-long fishing workshop are likely to gain knowledge and learn skills. This can be measured by having all participants cover their eyes while they are asked to raise their hands if they can complete basic skills (e.g., tying and baiting a hook, casting, safety) for themselves. Or, a parent can assist the participant in completing a short survey on these skills when they first arrive and when they pick up their child at the end. Conducting the survey at the start and end of a workshop will help quantify the number of participants who gained knowledge and skills. Alternatively, the post-test could consist of instructor observation of whether each skill has been attained. Assessment can be conducted even more simply by asking participants, for instance, how many constellations they can name at the start of a night sky program. If participants can identify more constellations at the end of the program, then knowledge and skills were gained as a result of the program.

Participant Demonstration

There are multiple ways to integrate opportunities for participants to demonstrate their knowledge and skill during an Extension program. Once participants have had an opportunity to learn content or skills, observing and documenting their ability to complete tasks related to that knowledge is a mea-

surable form of assessment. These can include demonstrations of skills through teaching others, synthesizing knowledge and skills to address a new situation, and creating a portfolio (Guskey, 2005). For instance, if an Extension program teaches participants to can fruits and vegetables, a participant should be able to effectively demonstrate their canning skills after watching the instructor, have a reasonable understanding of how to preserve different fruits and vegetables, and have a "portfolio" of several types of successfully preserved foods.

Retrospective Pre-Post Assessment

Pre- and post-testing can require considerable amounts of time for both the participants who are completing assessment tests and the instructors who are scoring them. Retrospective pre-post assessment is a method that requires considerably less time and effort while effectively measuring knowledge gain while devoting more time to program delivery (Pratt, McGuigan, & Katzev, 2000). At the end of a program, participants reflect on their experience and complete a survey asking if and to what degree their knowledge and skills changed in the categories relevant to the Extension program. It is essential to conduct this assessment at the end of a program, rather than at the beginning, because participants often are not able to accurately report what they know before learning more about a subject (Rockwell & Kohn, 1989). The one drawback to this method is that it involves self-reporting rather than direct measurement. However, knowledge change may be quantified using a Likert scale for participant responses, resulting in data that can undergo statistical analysis. When self-reporting is the measure used for participant assessment, retrospective pre-post assessment is more effective than administering individual pre- and post-tests (Pratt et al., 2000).

Viable Data Collection

It is important to consider the way in which we collect demographic and assessment data to ensure its viability. Keeping participant names anonymous is perhaps the most essential step. Connecting a pre-test with a post-test and evaluation form can be achieved through coding the documents (e.g., have participants write the month of their birth date and the same last four digits of a family member's phone number on each form). It is most ethical to collect only the data that is needed and will be used. Lastly, if any of the assessment information or data will be presented or published in a public medium, it is important to seek pre-approval from the respective Institutional Review Board.

Assessment is the key to understanding the direct impacts of knowledge and skills on the participants of an Extension program.

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