After months of planning, the training event is now over. You have a sense of how it went, but you need to know how the participants think it went—and how it could be improved. This chapter rewinds back to the time when, as part of the early planning process, you and your fellow organizers began to discuss postevent feedback and weighed your options for how and when to conduct an evaluation. It will help you find answers to the following questions:

- What should I budget for evaluation? How can I keep costs down?
- Where can I find help with the evaluation? Should I hire a consultant?
- What should I evaluate? How will I know if the training has been a success?
- How should I gather information for the evaluation?
- When should I conduct the evaluation?
- How do I analyze the data?
- How will I apply what I’ve learned?

Note that the chapter is not intended to be a comprehensive treatment of this complex subject. The discussions that follow are meant only to highlight some of the issues to consider as you plan the evaluation of your event and to offer some pointers from people who have conducted and evaluated training programs in scientific management. Regardless of whether you are holding a small workshop or a multisession course, you should conduct a thoughtful evaluation and build on the results to plan your next event.

**WHAT TO BUDGET FOR EVALUATION**

Like everything else related to scientific management training, costs can vary wildly depending on the evaluation expertise involved, the size of the training program, and the method used to conduct the evaluation. For example, it could cost anywhere from $3,000 to $10,000 to hire a consultant to evaluate a workshop or a single-day training program. On the other hand, you could design and conduct the evaluation yourself, which means that you would need to pay for only photocopying (or access to e-survey sites) and staff time.
What are some strategies for keeping evaluation costs down?

One way would be to handle some of the tasks yourself. For example, you could collect and enter the data but have an evaluation consultant set up the data collection file (to make sure that it is in a format the consultant knows and can work with efficiently) and analyze and synthesize the outcomes. Another cost-saving approach would be for a consultant to construct the survey, collect the data, and format the outcomes (e.g., into charts and graphs) and for you to take responsibility for synthesizing the findings into “lessons learned.” Yet another approach would be to take advantage of Web-based survey tools.

WHERE TO FIND EVALUATION EXPERTISE

Depending on your comfort level with designing and conducting an evaluation and interpreting the results, you probably will want to get help with some—or all—parts of the process. Here are some ideas on where to go.

Finding Low-Cost Evaluation Expertise

Your own university or professional society is an excellent place to look for no- or low-cost assistance with the evaluation process. Human resources staff, for example, are often trained in evaluation tools and techniques. If you are at a professional society, you might be able to recruit program planning staff not directly involved in developing your training event who could advise you or perhaps conduct the evaluation for you.

“We solicit feedback on the events we hold, but we develop our own evaluations and mechanisms for interpreting the feedback. It’s as objective as we can manage on a minimal budget.”

—Crispin Taylor, American Society of Plant Biologists

Departments of medical education within medical schools are another potential source of expertise, as are the “internal learning departments” or centers at academic institutions, which can go by many names, such as training and development, teaching and learning, organizational development, or performance improvement. Similarly, graduate students of business schools, psychology departments, and statistics departments might be happy to help you design, tabulate, and analyze a course assessment for credit, for a low fee, or simply for the experience. Don’t be timid about approaching faculty members as well; you may find that they would be willing to lend their expertise to an endeavor that benefits their institution or helps fulfill an academic service obligation.

Hiring an Evaluation Consultant

The alternative to volunteer or low-cost assistance is the hired specialist. Figure 9.1 lists some pros and cons.
If you decide to engage a specialist, a good place to start is to ask colleagues for recommendations. Be sure to

- Know what type of work is needed.
- Look for solid experience, especially for projects similar to yours.
- Interview prospective candidates.
- Ask for sample reports.
- Check references.

**Working with an Evaluation Consultant**

Regardless of whether you rely on help from your university’s or society’s staff or from an outside consultant, you will need to provide as much guidance as possible about what you need. For example, if you want the speakers to be evaluated for content delivered but not for presentation style, you have to say so. You will get the best results if you

- Start early—rush jobs rarely yield high-quality work.
- Are explicit about your expectations, timeline, and budget.
- Communicate clearly and regularly.
- Are responsive to the consultant’s queries.
- Stay involved.

Once you know who will be doing the evaluation, you can proceed to other critical decisions such as what to evaluate, the instrument(s) to use, and when to conduct the evaluation.

![Figure 9.1. Pros and cons of hiring an evaluation consultant](image-url)
WHAT TO EVALUATE

Feedback from Trainees
The purpose of an evaluation exercise is to gauge how well you met your objectives, which should revolve around the information and skills you want to impart (see page 4, “Setting Goals and Objectives”). The best way to determine whether you have met your objectives is to ask the trainees. You want to collect and analyze their views on matters of both style and substance—such as quality of speakers, session length, session format, and topics covered—the value of the event, and its individual components.

Feedback from Speakers
Although the trainees are the primary focus of your evaluation, you might want to solicit comments from the speakers as well to improve the environment for them at your next event, thereby increasing the odds that those you would like back will accept your invitation. For this purpose, you can put together a speaker-specific questionnaire that gives them an opportunity to describe what worked well for them and what they would change. Don’t forget to also ask them about their satisfaction with accommodations, room set up, and other logistics matters. Finally, if any of the speakers attended sessions other than their own, they may have program-related insights to reveal through the same evaluation instrument you give the participants.

Data for Stakeholders and Funders
When you develop the evaluation, you also should be mindful of what your stakeholders (e.g., your organization’s leadership, collaborating partners) want. How detailed do they want the evaluation to be? What kind of format do they want to see? If you plan to seek external funding for future events, what kind of data do you need to strengthen your proposal?

Once you have decided what you want to know from participants and, possibly, speakers, and what your stakeholders want to see, you will be ready to design the evaluation.

DESIGNING THE EVALUATION INSTRUMENT

Designing an evaluation questionnaire is both an art and a science, with some trial and error along the way. It requires an understanding of how to frame questions to elicit specific responses. Responses to some questions can be easily quantified (e.g., “How do you rate the overall training in terms of relevance to your role as a scientific manager, using a scale from 1 to 5?”). Others are more challenging to encapsulate with numbers (e.g., “How did the training change how you manage and organize your lab?”). Because quantitative and qualitative data deliver different insights, both approaches are useful to include in an evaluation. The differences in these two approaches and examples of both are discussed next.
Quantitative Versus Qualitative Data

Quantitative data are finite, clearly delineated, countable numbers. Examples are yes/no answers, numerical rankings, or range-of-quality scales. These measures allow you to generate graphs and figures that tell your story with visuals. They also make it easier to compare sessions from year to year since you have actual numbers. Another advantage of quantitative data is that most people will answer the questions. If you ask only for open-ended feedback, fewer people are likely to respond.

An example of a quantifiable probe is “This session helped me learn how to write a letter of application for a faculty position” accompanied by a four- or five-point scale, for example:

- Disagree, Somewhat Disagree, Somewhat Agree, Agree
- A scale from 1 to 5, with 1 being Strongly Disagree and 5 being Strongly Agree

Note that the range-of-scale measure will give you important shadings of satisfaction that cannot be captured with a simple yes/no response format. However, interpreting these and other quantifiable measures correctly will likely require hiring an evaluation consultant or asking someone at your organization who is experienced in statistical analysis to help with this task.

Qualitative data (e.g., comments drawn from open-ended text boxes and interviews) are less concrete and often resist packaging in tidy numerical form. This can make them harder and more time-consuming to collate, yet they can deliver insights unobtainable through questions that yield quantitative data. Verbatim comments can not only underscore observations drawn from the quantitative data but also add punch to brochures and final reports. Qualitative data can also spark new ideas for subsequent training events. Most evaluation instruments ask questions that will produce at least some qualitative responses. Keep in mind that the use of open-ended questions and comment boxes is more feasible with small numbers of participants than with large groups.

What are some examples of questions that elicit qualitative data?

One program planner finds the following questions productive:

- What did you find most helpful about today’s program?
- What, if anything, would you change about the program?
- What topics would you like to see offered in future workshops?
**Tips for Developing an Effective Evaluation Questionnaire**

The evaluation questions should be linked to the goals and objectives of the training event. Consider using a mixture of short answer, multiple choice, and open-ended comment boxes in the questionnaire (see appendix 4 for an example of a mixed-format form used for the 2005 BWF-HHMI Course in Scientific Management). Evaluation pros offer some additional advice on designing the questionnaire:

- **Don’t ask the question if you won’t do something with the data.** Stick to questions that will help you determine whether you met your objectives. Avoid fishing expeditions—asking questions about things over which you have no control serves no purpose.

- **Steer clear of questions about intangibles.** An example of such a question is “How would you rate the university’s commitment to training?” Evaluation is all about meeting your objectives; direct your questions to those specific aims.

- **Avoid ambiguous wording.** An example is “Did this lecture (workshop, session, etc.) meet your expectations?” If you don’t know what the respondents’ expectations were before the training, you can’t evaluate their responses.

- **Ask questions that get at the root of purported benefit.** For example, you might ask participants to explain why they think they changed a particular behavior entirely because of a specific training session—why they could not or would not have made the change otherwise.

- **Keep the questions short and to the point.** Remember that no one really likes to fill out surveys, and if time and finances are tight, minimize the number of open-ended text boxes that elicit qualitative data.

- **Be aware of question bias.** Avoid framing the question to lead to the answer you want. For example, by asking “How do you think this workshop will improve your skills?” respondents are being prompted to talk only about positives. A better way to phrase the question might be “Please describe which of your skills have been improved by taking this workshop.” The answer may require more work to analyze, but you will get a better idea of how respondents view the training and it may help them crystallize their own opinions about how well their time was spent.

Even if you have obtained a suitable survey from a colleague or other source, it is a good idea to step back and consider whether it might benefit from tailoring to the specifics of your situation. Remember that whether or not a question is poorly framed depends on the objective of the question (see figure 9.2 for examples).
Figure 9.2. Framing the questions

<table>
<thead>
<tr>
<th>Objective</th>
<th>Poorly Framed Question</th>
<th>Revised Question</th>
<th>Explanation of the Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>You want to identify the most important topics in the course.</td>
<td>List the three best topics in the course.</td>
<td>Which topics were most useful to you? (Provide a list of topic names with room to rank order them.)</td>
<td>The initial question was too general—people may not remember the topics and they could use their own names for the topics, which you might not be able to identify. You should ask them to rank order the topics; otherwise, it will be difficult to analyze the data.</td>
</tr>
</tbody>
</table>
| You want to know if people will change how they respond to a situation after taking the training. | Do you think you have improved your scientific management skills? | Please estimate how the information learned in the workshop will change how you will manage people and situations:  
__ Significantly change  
__ Moderately change  
__ No change  
Comments: | Using the verb “change” rather than “improve” reduced the bias toward a positive response. The yes/no response was replaced with an opportunity for the participant to provide more thoughtful commentary. |
| You want to know how to improve the training. | What was the weakest part of the workshop? | How can we improve or enhance this kind of training in the future? | The initial question lent itself to negative bias. In addition, the question was too general: If the respondent doesn’t specify why the session was weak, you won’t know how to improve it. |
| You want to know if people thought the training was worthwhile enough to recommend to a friend. | What did you think about the workshop? | Would you recommend the workshop to a colleague?  
__ Yes  
__ No | The initial question was too broad, making responses difficult to analyze. Be direct: If you want to know whether people thought highly enough of the training to recommend it, then ask them that. |
HOW TO GATHER EVALUATION INFORMATION

You can collect comments on paper, in person, through e-mail, or via Web-based tools, or some combination of these methods. Each has its proponents.

On Paper
A form completed by hand has its advantages. You get a much higher completion rate because you can insist upon having the form returned to you immediately following the session. In fact, some event organizers tell participants that they cannot submit reimbursement forms without handing in the evaluation. Another advantage to having the form submitted immediately after the session is that you can collect participants’ feedback before they have a chance to talk with each other, thereby making it possible for you to collect a broader range of opinions. The main problem with handwritten forms, however, is that it is extremely labor-intensive to get the data entered into a format conducive to analysis. In addition, you are depending on the person entering the data to do it accurately.

How can participants maintain their anonymity on an evaluation questionnaire?
Although anonymous surveys are useful because they allow respondents to be candid, it is also important to tie the feedback with demographic information. For their courses, BWF and HHMI solved this problem by assigning participants a number that they wrote on their evaluation forms. The number correlated with a set of demographic data (e.g., M.D./Ph.D. versus Ph.D.), but the connection to the person was removed early in the process. That way it was easy to see which sessions were most useful to which group.

In Person
In addition to written surveys, you may want to interview participants before they leave—either one-on-one or in a focus group. If you hold a focus group, make sure that the participants are representative of the entire group of trainees. One disadvantage to a focus group is that it can be expensive and time-consuming. For example, you may need to compensate participants for taking an extra one to two hours after the training is over to provide their feedback. And if the focus group is led by a consultant, the price tag will rise even more. You will also need to designate someone to take notes during the session and to synthesize participants’ comments. Another potential disadvantage to focus groups (versus one-on-one interviews led by a third-party consultant) is that the participants may be reluctant to say anything negative about the training event in front of the organizers. Even if they do not have negative comments, chances are without anonymity they will not be as honest as you would like them to be. However, the back-and-forth brainstorming that occurs in a focus group can give you valuable insights into what did and did not work in the training.
Through E-mail
Some experienced program planners rely almost exclusively on e-mail, finding that it gives them the best response rate. After the training, follow up with a short e-mail evaluation form that captures the key points. Because participants can respond easily and quickly, in their own time, they are more likely to complete the evaluation. Another advantage is that electronic surveys eliminate the common problem of indecipherable handwriting in comment fields. One drawback to e-mail surveys is that it is difficult for respondents to maintain anonymity. Another difficulty is that tabulating the data can be time-consuming if you have a lot of participants.

Via a Web-Based Survey
Some program planners use electronic surveys delivered over the Web. These can be a cost saver in terms of minimizing the labor required to enter data by hand, and they can also be convenient. For example, you can send out automatic e-mail reminders to increase the response rate. Online registration allows you to verify your e-mail list by sending information to the e-mail address that registrants submit. It also reduces the likelihood of falsified information (see figure 9.3 for names of some Web-based evaluation tools). To conduct e-mail surveys or use online evaluation tools, you will need the participants’ e-mail addresses. To obtain this information, you can require it at registration or use an online registration system.

“IT’S WORTH INVESTING THE TIME AND ENERGY TO IDENTIFY E-SURVEY SERVICES. WITH THESE SITES YOU CAN EXPEDITE DATA ENTRY, EXPORT DATA INTO EXCEL, AND PREPARE SUMMARY REPORTS MUCH MORE EFFICIENTLY.”

—Krystyna Isaacs, BWF-HHMI Course in Scientific Management

There are downsides to using Web-based surveys, however. First, because you will probably not be able to administer them immediately after the session, responses will drop off significantly. Second, it is unwise to leave responses to the evaluation stored on the host Web site. Most e-survey services offer an export mechanism by which you can download your data onto your own computer. If the service does not offer this feature, you should look for another service. Another drawback when using Web-based surveys is that you usually cannot format the data or comment box statements. If the service provides you with the raw data, you can reformat it, but it may be worth your time when you select the service to review the service’s automatic survey reports and to select a service that provides output reports that meet your needs.
WHEN TO EVALUATE

The optimal timing for your evaluation activities is determined by many factors, but the primary ones are (1) what you want to know and (2) what resources are available to you.

The following section discusses the pluses and minuses of obtaining feedback from participants immediately after the event and a few or several weeks after it.

Gathering feedback at the event is generally the most cost-effective strategy, but, depending on the type of information you want to obtain, it may be worth postponing your evaluation or even carrying out several of them at different times. Also keep in mind that response rates for surveys depend on the type of survey—for example, e-mail versus telephone versus in person.

Figure 9.3. Resources for evaluation

Books

Literature Review and a Refresher on Evaluation Basics

Web-Based Evaluation Tools
Establishing a Baseline: The Pretest
Do you want to look for a change in attitude, knowledge, or behavior? If so, you will need some sort of pretest—a survey conducted before the training and a method of administering it, to establish a baseline—as well as a postevent evaluation tool. A good way to boost the response rate is to tie the pretest to registration. Knowing that trainees’ feedback might be influenced by their experiences or personal characteristics, you might also want to collect demographic information during registration. Typically, this would be data on gender, degree, professional level, and so on. (For ideas about what to ask for on the registration form, see chapter 7, “Recruiting and Registering Participants.”)

Immediate Impressions: The Exit Survey
The exit survey is a mainstay of evaluation because it is so easy to generate and copy the forms and to distribute to participants. Another benefit is the high response rate, especially if you require participants to submit the form before leaving the meeting room. Yet another benefit is the ability to capture impressions while they’re fresh. On the downside, exit surveys entail considerable time commitment on the coding and analysis end. Another drawback is that participants are often energized after a training session and this could lead to a positive bias in favor of the event.

Effective exit surveys are characterized by brevity. Typically, they tend to be only one page because if you want people to finish a survey before they leave the room, you have to keep the form short or carve out precious time from a packed schedule for completion of a longer form. If you plan to use an exit survey, be prepared to exercise restraint; a short evaluation instrument calls for discipline during the design phase.

Exit surveys can be designed to cover an entire multisession event or a specific session, or you can develop a generic exit survey to use for all sessions. For the 2005 BWF-HHMI Course in Scientific Management, organizers used the same survey for all similarly formatted sessions and another for the course as a whole (see appendix 4 for the course summary evaluation form).

How can I get participants to complete their evaluation forms?
It helps if participants know from the start what is expected of them in terms of completing the evaluation:

- At the first full-group gathering, they can be given instructions about exit surveys, or a sample survey form can be included in the welcome packet.

- Staff can remind participants to turn in a completed survey when they leave the room and station themselves at the door to receive the completed forms (and issue another reminder about the survey to empty-handed participants).

- You might want to make return of a filled-in survey a ticket to the next meal or the next session.
Time to Ponder: A Week-Long Delay

Response rates to evaluation instruments tend to fall off with distance from the event, but sometimes there is little choice. On the bright side, what you lose in numbers you may gain in thoughtful evaluation, when responders have had some time to reflect on the training—its value, what they appreciated most, what was disappointing, and concrete recommendations for what to do differently.

“There’s some value in having evaluations done a week after the activity, when participants have had time to think about it. In those cases, it helps to increase the response rate to let people know why you need the data.”

—Sandra Degen, University of Cincinnati and Cincinnati Children’s Research Foundation

A Longer Perspective: Measuring Change

If you want to identify a change in participants’ attitudes or behavior, for example, related to a new awareness of their personality type as a result of a session on the Myers-Briggs Type Indicator, you need (1) a baseline of where participants started and (2) time for them to absorb the information and begin to apply it. How much time is enough time to allow new lessons to take hold? That depends in part on what the lesson is, but even so, opinions on this question vary considerably. A starting point may be at least six months out.

Measuring change can be costly. You need to decide whether it is worth the expense in time and dollars to keep track of participants, design a tool to measure change, pester participants politely to ensure a response rate that has statistical validity, and analyze the findings. Another challenge is that participants may move, so you will need mechanisms to keep track of their contact information.

For the 2002 BWF-HHMI Course in Scientific Management, the organizers conducted evaluations at three time points: immediately after each session and the entire course, at six months, and a year later. They found very little difference between responses immediately after the course and at six months and at one year later.

ANALYZING THE DATA

Experienced evaluators note common pitfalls to avoid in analysis:

- Keep the coding straight. You will want to link demographic data obtained at registration to data collected on survey forms. If there are discrepancies between the two, it may be that a handwritten response (e.g., M/F, degree) is more accurate than the registration data, which could have been entered by a third person rather than the registrant.

- Watch out for insufficient response rate and biased responders—a situation where only those who really liked or hated the training were motivated to fill out the evaluation form. (Making return of exit surveys mandatory sidesteps this problem.)
Plan how you will treat data that are missing as a result of unan-
swered questions and empty comment boxes. This will significantly
affect data analysis.

Resist the temptation to overanalyze your data. Excessive number
 crunching is time-consuming and costly and rarely produces a signifi-
cant return on the investment. “Eye-balling” the data is usually
enough to tell you whether a session achieved its goals.

Look at the data with healthy skepticism. Respondents want you to
think that they learned something after exposure to your training—
and they may believe it—but you want to be able to sift through their
responses to confirm (or refute) that impression.

REPORTING THE DATA AND APPLYING
WHAT YOU HAVE LEARNED

What do you plan to do with the information gleaned from your evalua-
tion? If it is going to sit on a shelf, you will not want to spend too much
time or effort on analyzing the data and generating a report. But if you
expect to reprise the event or something like it regularly, a report can be
useful in identifying strengths to retain and weaknesses to correct.

The Evaluation Report

This report is the foundation for any changes you choose to make in the
next iteration of your training. It should tell you what worked well and not
so well and give you a good idea of why. When you need to justify revisions
in the training to your organization’s leadership, the findings in your report
provide a solid rationale. Another use of the report may be to demonstrate
success to a current or potential funder.

For usefulness and user-friendliness, it is hard to beat an evaluation report
that features a “lessons learned” section and an executive summary that
highlights the main findings with bulleted lists (and subheads, if the find-
ings are extensive). When a graph makes the point well, it can break up the
text to good effect.

If you use an evaluation consultant, make sure you discuss the format in
which you want the findings reported (e.g., level of detail, amount of narra-
tive, charts and graphs). Because outside evaluators are not invested in out-
comes, they often can give more objective analysis than a training session
organizer. If the outcomes are not optimal, it is important that the analysis
be accurate but also tactful.

Continuous Improvement: The Feedback Loop in Operation

If you have prepared carefully, your event is unlikely to disappoint, but some
elements are always bigger crowd pleasers than others. Organizers want to
know where to make improvements (e.g., to alter a session format or replace
a speaker). In this quest, they use feedback to guide revisions, and the
revised event elicits a new round of comments from new participants, which continue to direct adjustments of different aspects of the event, producing a process of continuous improvement based on evaluation.

When you analyze the feedback data, keep in mind that if a session garners bad reviews, it does not necessarily mean that you should not offer the session again. Instead, adjust the content or replace the speaker. In addition, sometimes participants may not think a session was valuable because of their career stage, but you know that the information will be valuable to them in the future.

“Our program is being tweaked all the time in response to feedback, so participants know the organizers are listening, and we point out how we’ve made changes in response to comments.”

—Amy Chang, American Society for Microbiology

“As a result of evaluation from the 2002 course, we tried to give more opportunities for informal interaction among participants. They told us that discussions over dinner and at breaks were as valuable as formal sessions, and they wished they’d had more time to ‘hang out.’ They also told us that they really valued what they learned in the Q&As, so we made sure that we included more time for those in each session.”

—Laura Bonetta, BWF-HHMI Course in Scientific Management

SHARING WHAT YOU HAVE LEARNED

If your event was like most, your evaluation findings will demonstrate that things generally went well. Now is the time to step back, appreciate the fruits of your labors, and congratulate everyone involved—yourself, your planning group, and others who provided assistance, including the speakers. The participants, too, deserve recognition for committing the time to learn how to approach their roles as scientists in a new light. Undoubtedly, you and your colleagues also came away with useful information. This is an occasion for celebration.

Having planned ahead for a thorough evaluation, you have a great deal of data to share with others, including the people at your organization who championed this new professional development resource. Plan to draft a brief report with some pertinent feedback and illustrate this text with quotes from your attendees. You might want to consider having a news release developed on the outcome of your training program or have a photographer attend the training to capture some images for your Web site or other relevant materials. A great way to thank your supporters is to share your success.