Making It Better:
Using Data to Improve Projects and Programs

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At the end of a summer program to encourage girls to go into the sciences, participants became LESS interested in science careers. Interviews with the girls found they were taking to heart all the discussions, lectures and readings about the barriers women face in the sciences. Discouraged, they were deciding that it just wasn't worth it.

The above example is a project director's nightmare. We all want to believe that our projects, programs and strategies are working well, but that isn't always the case. Even some of the seemingly strongest efforts result in no impact or even a negative one. It doesn't have to be this way. In the above example, since staff had been collecting impact data, they knew the program wasn't working and were able to discover why and determine how to fix it. Based on their findings, they decreased the emphasis on barriers to women in science and increased the time spent on how to overcome barriers. The following year, "failure" turned into success as girls' interest in science careers increased.

> **Four Steps to Improving Projects and Programs**
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> **Collect the data**
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> **Analyze the data**
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> **Take action based on the results**
>
> **Provide feedback**

Data collection and evaluation can be used to improve almost any program. This can be done through *summative evaluation*, which focuses on program impact, and *formative evaluation*, where data are collected, analyzed and used as the program proceeds. Using formative evaluation data, programs are often able to make adjustments all along, saving time and money while increasing their chances of success.

Formative evaluation need not be difficult and time consuming. Any program staff member who speaks regularly with teachers and students about a program is already getting potentially useful information. For example, after speaking with teachers, an administrator learned that students' interest waned during the first math unit and picked up during the second unit. Teachers now start with the second unit so that higher student interest and motivation will carry over to the other unit.

There are four basic steps to using data to improve programs: collect the data; analyze the data; take action based on the results; and provide feedback.

STEP 1: COLLECT THE DATA

Easy Ways to Collect Feedback

On The Bean

Take three different kinds of beans or buttons. Label one kind Great, a second OK, and the third Awful. Have participants put different beans in a glass jar based on how they feel about what's happening. Looking at the jar tells you how it's going.

Words, Words, Words

Ask people to list three words that best describe how they feel. By examining the most frequently listed words, you can get an idea of what's happening and its impact.

The Big Three

Ask participants to list what they liked best and least about a program and how to improve it. The most frequent responses will provide an overview of what's going on and what can be done to improve things.

I Learned...

Ask participants to complete statements such as the following: Today I learned … In the future I will … The most frequent responses will give an idea of program impact.

Collecting information can be simple and even fun. It is not always necessary to use sophisticated or complicated evaluation techniques. The box at left features some simple ways for beginners and others to collect information from participants.

As important as participant perceptions are, they are not enough. Information is also needed to see if a program is moving toward desired goals. In the earlier example, since increasing women's participation in science was a goal, data on girls' science career interest was collected. For other projects, data might be collected on student achievement and/or teacher classroom behavior. Collecting such data at the beginning of the project establishes a "baseline." Participants' demographic information should also be collected. Subsequent changes can then be looked at in terms of "what works for whom."

Surveys

Developing surveys is not easy. When it is not possible to employ an experienced researcher or evaluator, it may be worthwhile to contact local colleges to seek the involvement of students—under the supervision of their professors—to develop the survey. Regardless of who develops the survey, the key to success is KISS (Keep It Short and Simple). The shorter the survey/questionnaire, the more likely people are to respond and, the simpler the questions are, the more apt respondents are to understand the questions and answer appropriately.

You will also need to decide what data collection format you wish to use—paper and pencil, telephone or in-person interviews, or even a web-based survey. The methods you use depend on your target audience. A pencil and paper survey assumes a degree of print literacy while a web-based survey requires access to technology. Along with knowing the best methods to use, you need to learn the most appropriate times and locations to reach participants to get a high percentage of responses. Knowing your response rate, the percent of surveys that were returned, and the degree to which those who responded differed from those who did not, will help you decide how much confidence you have in the survey results.

No matter what formats you use, "pilot-test" your survey with people like your target group. Having pilot testers complete the survey and critique the questions and their wordings greatly improves a survey.

Discussion / Focus Groups

Discussion groups are good techniques to get more in-depth information than can be collected in a survey. Groups of 5-7 participants, all of whom are from the same peer group (students, teachers, etc.) tend to be the most effective. Make the session short, an hour or less, and give everyone a chance to talk. Have a prepared set of questions covering areas of interest. A good note taker and/or an audio recording are needed so that nothing is lost.

A good way to begin is to introduce yourself and your note taker and to give participants an overview of the goals of the meeting including how the information will be used. You may want

to explain that everyone's input is important and that there are no right or wrong answers. Ask the group to keep the discussion confidential and assure them that no information that could be identified as coming from a specific person will be used. If you are planning to tape the group, be sure to ask each individual if that is OK. If any member of the group does not want to be taped, you may not record the session.

It is good to have a round of introductions. As they introduce themselves, the facilitator should record each person's name. Using people's names can greatly improve the discussion. To begin the discussion, bring up the first sub area and ask people what they think. It may take a while for people to start talking, but they will. If you want, you can start by asking someone, by name, what they think. If you do this, be sure to pick someone who won't mind being first.

STEP 2: ANALYZE THE DATA

Once you have the data, it is of little value until it is summarized in a usable format. The easiest way to do this is to use descriptive statistics (frequency counts, percentages, means/averages)[1]. Descriptive statistics should also be used in the analysis of open-ended questions and the results of discussion groups. Often, people simply enter open-ended responses into a computer file and print them out. This isn't an efficient or even accurate way to analyze the data as the more articulate, most positive, or even the strangest responses tend to stand out and be remembered. It is much more useful to code the information into various categories that are then summarized using descriptive statistics.

One way to code open-ended responses is to read all the responses to one question and develop a list of the categories into which they fall, remembering that one answer may fit into two or more categories. The goal is to come up with a list that is balanced between too few categories that are so general that they don't provide any useful information and so many specific categories that no summarizing has been done. Initially it is better to create more rather than fewer categories as categories can always be collapsed. If you are going to be comparing people's responses over time or comparing the responses of different groups to the same questions, it is important to use the same categories each time you analyze the answers.

Whether you use the fun techniques, the surveys or discussion groups, the patterns and trends that come out of your data should help you learn such things as:

- participant perceptions of your program;
- which, if any, participants are being underserved;
- whether there is movement toward program goals.

STEP 3: TAKE ACTION BASED ON THE RESULTS

Once you have analyzed the data and have some results, the next step is to use those results to improve the ongoing program. Program improvement can be as small as including longer

[1] There is a second set of statistics, inferential statistics, that are used to determine the degree to which group differences or relationships are real rather than random but that is beyond the scope of this brochure. Those wanting to learn more about inferential statistics may want to start at http://www.statsoft.com/textbook/stathome.html .

breaks or as comprehensive as rethinking the curriculum. Recommended changes should be tied to the results of the data analysis. The following are some examples of how this has been, and could be done:

Improving Math Teachers' Professional Development

Prior to conducting a summer institute for the math teachers in an urban high school, student performance on the state's math achievement tests was analyzed for student strengths and weaknesses. Math teachers were surveyed to identify specific mathematics content they wished to learn, as well as areas of little interest. Data analysis was done to find overlaps between teacher survey results and areas of student academic weakness on the state tests. The proposed content of the summer institute was then modified to reflect the needs found in the data analysis. Evaluation of the institute found the highest ratings were given to sessions on the topics most teachers had identified as wanting to learn. Data collection and analysis helped make the first summer institute a success.

Using Science Mentors

Historically, girls at one middle school left their technology class one day a week to work with female engineering students at a local university. Last year, the female mentors conducted an in-class technology project with both girls and boys instead. Through focus group discussions with girls and teachers, it was found that having the mentors in class:

- bolstered girls' confidence about co-ed technology projects;
- reinforced messages about women's capabilities in engineering and technology;
- allowed boys to observe girls successfully using technology.

Based on these findings, administrators decided to continue working with girls *and* boys in female-led technology classes, while offering more mentoring opportunities for girls.

STEP 4: PROVIDE FEEDBACK

Providing Feedback

Lesson Learned:
Students responded more positively to role model speakers who had been trained on ways to interact with high school students.

Action Taken:
All new in-class speakers are now requested to take a short training/orientation session.

It is not enough to collect, analyze and use the data. To keep the process going, program participants and other stakeholders need to know that their information is valued and how it is being used. One way to do this is with short presentations that focus on the lessons learned from the data and any changes that are being made. One page summaries of the data, focusing on the lessons learned, are another effective way to provide feedback. Charts can help make the results easier to read and understand. While both positive and negative results should be given, feedback tends to be better received if information on what is being done to fix whatever problems exist is given along with any negative results.

The four steps of collecting data, analyzing, taking action based on the results and providing feedback should not be seen as one time events. They are part of an ongoing process that will help your programs continue to improve and will convince those involved that you value them and their information. The time invested in collecting and using data is one of the best investments a program can make.