Success means more than good grades or high scores on assessments. Asking students and teachers what success means can lead to a broader—and more accurate—picture of students’ achievement.

Using Student Outcomes in Evaluation

This is a story. The bulk of it is about what it means for a student to be successful in a technology-oriented class. A smaller piece is about how an evaluation changes over time. The story begins with a seemingly simple question and tracks its evolution as data are collected, the question is revised, and new data are collected. I also consider the implications for broader evaluation practices.

The Story

This story comes out of the evaluation of a computer-engineering course sponsored by ExplorNet, a nonprofit organization whose mission is “to empower people through technology in education.” The course teaches high school students in schools throughout Arkansas, Mississippi, North Carolina, and North and South Dakota to build and repair computers, which are either purchased as kits or donated from local businesses or individuals and are then placed in schools or the community. In addition, the students provide technical assistance to the school district.

To begin the evaluation, I met with staff members. Initial conversations showed a concern that teachers were selecting students to participate in this class on the basis of
grades, previous course work, or behavior and that, as a result, the program was not serving at-risk students, a priority of ExplorNet. To collect information on this issue, I decided to identify the characteristics of students who were successful in the class, hoping to determine whether the characteristics teachers used in screening students were actually important to student success or whether there were other factors that might be more important. One of the questions driving the data collection at this point was, What are the characteristics of successful students in the class?

Implicit in this question, of course, was the definition of student success. The program already had a goal of preparing students to take the A+ exam, a multiple-choice exam that is the industry certification for computer engineering. In addition, the state administered a required multiple-choice test for the course. We at ExplorNet recognized that achievement on these tests could not be the entirety of what was meant by success in the class, but we were unsure what the other definitions of success were.

Because the idea of looking at characteristics of student success and expanding the definitions of success was exploratory, I did a pilot study, visiting five classrooms during a semester. These classrooms were purposely selected to ensure classroom diversity by race and sex. During the site visits, I observed at least one class period, interviewed each teacher, and interviewed a total of 40 students. What I saw and heard changed my starting question and the evaluation.

What I Observed

Marva White is a nurturing teacher who takes care of her extended family—in this case, her computer-engineering class. She baked apple turnovers for her students and made them breakfast when they passed her tests. During a surprise snowstorm one year, she tutored one student daily at his home. Of the nine students in her class, eight were Black, the majority were low-income, and three received special education services.

The day I spent in her classroom, I observed:

• Three boys clustered around an old laptop one of them brought in, trying to connect what they had already learned with the different computer. One of them asked to take the laptop to lunch to keep working on it.
• Two students who demonstrated how they take apart a computer and put it back together. One of the students, classified as learning disabled, said, “I like to take it slow and learn something new every time. I look for something I’ve never noticed before.”
• A visit from one of four teachers the students taught to build computers, who told me, “It is great to see these kids working so hard here. It makes you realize that they can do so much more than they are showing in their other classes.”
• Students who upgraded and maintained computers in the school. All of the student-built computers were still working.

After I left, White sent me a copy of the students’ state exam scores. None passed. By formal measures, this class would be considered a failure. But if you asked the students in White’s class to build or troubleshoot a computer, they could do it. At this point, I began questioning what was meant by “success” in this computer-engineering class.

My concern was driven home at another site visit. Frances Holcomb had been teaching computer engineering for three years and had very strong computer skills. Her class was diverse: four White female students, one Black female student, four Black male students, and eight White male students. Unlike White, Holcomb required that students take other basic computer courses before they could enroll in computer engineering.

On the day I observed the class, students were involved in a variety of activities: putting up a school website, troubleshooting a computer, and taking computers apart. Some students worked in the classroom while others were on the stage in the cafeteria, which Holcomb had taken over to provide her class with enough space for computer disassembly. All students were focused on their work, although many were working without any adult supervision. During the year, her students upgraded 400 computers and placed them throughout the district and one of the second level students was building his own UNIX server. Holcomb’s students also scored low on the tests.

The Teachers Speak

When talking to the five teachers from the classrooms I observed, I asked them to identify the best or most successful students in their class and the characteristics of those students. In two cases, the teachers did not identify individual students. When I posed the question to Holcomb, she replied, “Best in what way?” She then proceeded to list the strengths of each individual student in the class.

White’s response was similar:

“I can’t pick one. Everyone has different skills.” She then proceeded to point out three students, one who can troubleshoot anything, one who is able to answer the questions on the tests effectively, and one who is very persistent and solves problems. She then asked the students, “Who is the best at fixing computers?” They pointed to the student she had pointed out. “Who is the best at doing everything, including answering questions on tests?” They pointed to the student she had pointed out. Then, “Who is the student who won’t give up until it is solved?” They pointed to the third student she had pointed out.

—Field Notes, April 30, 2001

Samuel Lawton, another teacher, focused on the hands-on component. He identified successful students as the “ones who have the mechanical ability to do well.” He believed academic ability was not important: “GPA does not convert over to mechanical.” For example, a student who ranked fourth in her class was having difficulty with the course. Lawton also argued that students who have
difficulty in traditional classes could do well in technology classes: "Another student in networking class is failing half of his classes, but he does great on the hands-on." Still another teacher attributed success to interest, identifying the successful students as the "ones who have an interest in computers."

These descriptions of successful students and their characteristics illuminate these teachers' values for success, ones that might include test scores but only within the context of the students' ability to do hands-on work.

The Students Speak
Students did not perceive academic ability as a factor in how well a student did in class. Forty-seven percent of students interviewed saw the key to success as studying; 35% mentioned "paying attention," and only 18% said "knowing about computers." The students perceived success as dependent upon the amount of work that they put into the class. They also attributed success to being interested in computers and to the hands-on component. One student said that he did better in this class "because this is something I love to do. You get in and try to fix a problem hands-on."

Other students said they did better because:
• "It's easier. We actually get to do something in here; it's a learning experience."
• "I know more about it. You can relate to what you are seeing. The hands-on experience. The labs have helped us have more feeling [for the material]."

These comments show an awareness of the unique hands-on nature of the course. One student in White's class even made a comment that revealed his sense of a clear disconnect between the program's goals and the methods used to assess students. He said, "If I know how to do this (build a computer), I don't need to take the test."

Taking Stock
After these five site visits, it was apparent that my initial question—What are the characteristics of successful students in the class?—although important, was nevertheless a bit premature. What needed to be addressed first was the question that originally had been implicit: What are the definitions of success in the classroom? In addition, I realized that success did not need to be defined only by the organization running the program or by the policymakers; instead, all participants should contribute to an understanding of what defined success in that particular program. The question thus evolved into, What does success look like in a hands-on technology-oriented classroom according to the individuals involved in the program?

The Follow-Up
To understand what students defined as success, I visited an additional three classes at two schools and interviewed 20 more students. This time, I asked, "How do you know that you are being successful in this class?" Not surprisingly, more than half of the students (13) mentioned either grades or tests. Because good test scores and good grades
are generally the measures of success in schools, it is unsurprising that a large number of students would consider them measures of success.

More surprising, however, was that nine students focused primarily on students' ability to work on computers. Only three of those students also mentioned tests. The responses of these nine students, some of which I present, are illuminating:

• "You're making As [laugh].... You know how and why things work."
• "If you seem to have a grasp of what's going on with the computers. If you diagnose the problems and fix them. You don't need to know the specifics of every kind of hardware, but if you look at the situation and assess it."
• "When you have a problem to solve and you can do it or when you take a test. Basically, when you are asked to fix someone's computer and you immediately know what to do—you don't have to go back to class and get your notes."

The ability to identify and fix a problem was key to these students. Success for them represented internalized knowledge that is then applied. Further, another student recognized that success did not always require a finished product, saying, "If you get the task done or if you get closer than when you started or if you just don't mess up everything."

Thus, even among the students, there were different definitions of success. My existing data do not permit me to tease out the extent to which students' definitions of success are influenced by societal definitions. Still, to many students, doing well on the test was a meaningful measure of success. When asked, "How do you know you are successful?" one student replied, "I don't know. We don't get grades. We just work on projects. The only time I know I'm doing good is with those quizzes."

**Discussion**

This story raises two main points. First, it indicates the variability that can occur in definitions of success, a situation that has profound implications for the use of student outcomes in evaluation. Second, it indicates the inevitable and necessary fluidity of the evaluation process.

**Definitions of Success**

Student outcomes are viewed as important in the evaluation of education programs, but they are also the most problematic because there are no agreed-upon definitions for appropriate student outcomes (Kennedy, 1999). Too often, outcomes are restricted to standardized achievement tests. Yet when a class has primarily hands-on objectives and focus, such as ExplorNet's computer-engineering class, standardized assessments may not be the most valid or useful approach to use in assessing the effect of a program on students. In addition, there are serious questions about the validity of many standardized assessments for students from nonmainstream cultural backgrounds (McNeil & Valenzuela, 2000).

Deciding on appropriate student outcomes for technology-based programs is dependent on what one views as the educational goals (Heinecke, Blas, Milman, & Washington, 1999). Thus, defining what it means for students to succeed in the program can provide valuable information on appropriate outcomes to use for measuring the program's effect on students. Although evaluators frequently use a program's objectives to determine student outcomes (Worthen, Sanders, & Fitzpatrick, 1997), looking at the program from the classroom perspective, through definitions of student success, provides another way to identify student outcomes.

This exploratory study provides different views of student success. Several teachers viewed successful students as those who were able to build on their individual strengths. For example, success in one class meant a student who could troubleshoot anything, a student who could answer questions on the test, and a student who won't give up until a problem is solved. For some teachers, success was also related to the ability to do well on tests, coupled with an understanding of the course's hands-on focus.

The students' definitions of success also had a strong hands-on component. Many students viewed success in the program as the ability to identify a problem, troubleshoot it, and solve it, sometimes without relying on notes or books. To many, the ultimate level of success was building or fixing a computer so it worked.

What then, are the implications of these varying definitions of success? First, it is clear that defining appropriate student outcomes for an evaluation is challenging but must incorporate the definitions that the different groups presented. In my particular study, there was significant consensus in the different definitions of success. For example, both groups (teachers and students) paid attention to technical understanding as measured by formal assessments and both considered the hands-on component to be important. At the very minimum, then, valid student outcomes used to evaluate the computer-engineering program would include these components. For program evaluations, it would be wise to survey all groups involved to identify key outcomes on which the program should be assessed.

Using stakeholders to identify key outcomes is consistent with several larger themes in evaluation. First, recognizing the need to incorporate different definitions of student outcomes in evaluations borrows heavily from participant-oriented evaluation approaches (Worthen et al., 1997), which recognize the importance of having the stakeholders participate in developing the evaluation's questions and design. Stakeholders are generally the individuals or groups who are affected by or are interested in the pro-
program, and may include such groups as policymakers, administrators, practitioners, and primary and secondary consumers (Worthen et al.).

When identifying student outcomes for evaluation purposes, the policymakers’ input is often considered the most important, sometimes even the only, opinion necessary. Although their input should be valued, not the least for the practical reason that they provide necessary support and funding, the consumers of the program—the teachers and the students—can also provide valuable insight into what outcomes should be considered appropriate. It is this last situation that does not occur as frequently as it should.

Second, recognizing the importance of a variety of student outcomes is also consistent with developing alternative outcomes or assessment measures that do not rely exclusively on standardized assessments for technology programs (Mitchell, 1992). Evaluators have already moved toward recognizing the importance of including a variety of outcome measures in assessing programs (Henecke et al., 1999). I would argue that if we use alternative assessment measures, the various participants in the program can provide useful information that facilitates understanding what those varied and appropriate outcomes should be.

Finally, working with all the stakeholders to identify appropriate student outcome measures is also consistent culturally responsive evaluation (Frierson, Hood, & Hughes, 2001), which calls for the recognition of cultural perspectives in the evaluation process. Meeting with teachers and students from a variety of cultural backgrounds and identifying the outcomes they consider important can significantly contribute to developing culturally responsive methods of evaluating the program. It can also help in developing alternative measures that may be more appropriate in assessing students of different cultural backgrounds (Hughes, 2000). As a White woman who is conducting evaluations, I need to be particularly conscious of this issue as I struggle to represent the full range of experiences within this particular program.

**Fluidity of the Evaluation Process**

Many researchers and authors have noted that evaluation must be a flexible (Patton, 1997; Worthen et al., 1997; Cronbach, Ambron, Dornbusch, et al., 1980), permitting change in questions and criteria. My experience, although certainly not unique, validates this idea. This insight is not new, but it provides us with a continual reminder of the openness of the evaluation process.

This evaluation began with the notion of exploring the characteristics of successful students. It was only after collecting some data that the question shifted to focus on definitions of success. My experiences also highlight the need for evaluators to observe actual implementation of the program in the field and to revise assessment measures as needed to reflect what is actually happening. This is consistent with utilization-focused evaluation (Patton, 1997) and the need for evaluators to be “adaptive in altering evaluation questions and designs in light of their increased understanding of the situation and changing conditions” (p. 135).

**Conclusion**

My story recognizes the shifting ground that is inherent in any evaluation, describing the way in which evaluators must respond to different aspects of the program. It also argues that an evaluation of any program involving students must consider incorporating multiple outcomes as assessment measures. This is particularly important for programs for which traditional student outcome measures might be less appropriate, such as the hands-on technology-based program described here. By working with all of the program’s stakeholders, a more complete, and more appropriate, set of outcomes can be identified. PL

**References**


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