Overcoming Training Dilemmas Brings Greater Training Value

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This article discusses how to avoid training dilemmas such as "they came, they taught, they left, and nothing changed." (It does not include how to train a dilemma, which might be of interest to some managers.) Fundamentally, this article address-es getting more value from technical training. Organizations do not get the full value of the skills taught to their people without planning to determine training objectives and following up to evaluate progress. Many skills can be learned and readily applied on an individual basis, while other skills require an established organizational business process within which to effectively apply. Finally, students and managers may benefit from training on how to receive training effectively.

Many organizations have invested a significant amount of their resources in training because effective training has given them vital knowledge. Timely training can provide a significant edge over competitors' or opponents' capabilities. However, some training does not result in recognizable improvements to individual skills or organizational prac-tices. Without careful planning and fol-low-up, information acquired during training often dissipates into oblivion. Except for a course handout lying around collecting dust, no sign remains in some organizations after a few weeks that any-one received training on a particular topic.

Managers often invest thousands of dollars and several days of work effort for their employees to take a particular course. They often have high expecta-tions for improving skills from training. However, some managers seem to be unaware that many individual skills that are taught cannot be applied unless a *sup-porting business process* is in place within which employees can perform those skills. The skills taught to employees are often evaluated as ineffective since the organization did not readily adopt them.

For example, software document review practices require a supporting organizational process to be consistently and effectively performed. Some docu-ment review skills can be applied individ-ually. But my experience is that until an organization plans and conducts a disci-plined document review process improvement effort, which includes appropriate training, software document quality will not significantly improve.

Since training is so important, esti-mating its return-on-investment (ROI) could provide important insights to guide further training efforts. However, a Software Engineering Institute (SEI) study found that leading software devel-opment organizations rarely try to com-pute training ROI [1]. (See the sidebar "Measuring Training ROI" on page 8 for information on computing training ROI.) They also found that only 18 percent of respondents indicated that their training resulted in significant improvement in their software engineering skills. What can be done to improve the value of training and how can training ROI be estimated to help in understanding its value? One thing is clear: There are many opportunities for improving the delivery and reception of training in both govern-ment and industry.

Determining Training Success

Training success is addressed here in terms of learning success and teaching success. A common measure of *learning success* is for students to demonstrate mas-tery of individual skills taught in class [2]. Learning success can be partially evaluat-ed through exercises and tests. However, few business people like tests during training so instructors generally rely more on discussions and exercises.

An important measure of *teaching suc-cess* must include the level of adoption of advocated individual skills. In other words, do students actually accept and use the skills and technologies on the job that they learned? A key responsibility of trainers is to try to significantly *affect* stu-dents' attitudes so that they actually try out new skills on the job. Of course, the training might be covering an outdated technique with respect to some new prac-tices in the industry. If a student does not adopt the methods because he or she knows a better way, then the training was certainly not successful.

Measuring skill adoption is very diffi-cult especially when many individual skills support an overall business activity. How much does individual skill competency contribute to overall productivity? That certainly depends on many factors, including, but not limited to, skill com-plexity and the likelihood of performing the skill incorrectly (e.g., injecting defects into the product).

Another method of measuring indi-vidual skill adoption and training success is to conduct post-training surveys. If a student professes to be performing the skill as taught, then it may be assumed that training was basically successful. However, some performance monitoring and evaluation is prudent to ensure the student performs the new skills effective-ly. If the student has not had a chance after several months to perform the skill or has refused to perform the skill for whatever reason, then the success of the training is questionable at best and could potentially be considered a total waste of time. If the organization has adopted supporting practices wherein individual skills can be practiced and observed, the likelihood of achieving training success is increased.

A key measure of training success is the level of adoption of organizational practices that are taught. Adopting improved skills and practices is a signifi-cant challenge often requiring weeks of effort to plan, define, pilot, and imple-ment. However, without a concerted adoption effort, many useful practices never get off the ground in some organi-zations. Their method of improving prac-tices never seems to get beyond the *desire to improve* stage.

To continue the earlier example regarding adopting disciplined document review practices, it is generally easy to understand the mechanics (the process) of a disciplined document review. Also, individual skills to effectively participate in disciplined document reviews are fairly easy to learn. Understanding the docu-ments under review is certainly the hard part. However, when people are first introduced to disciplined document reviews, they are often amazed at the number of defects they find in their tech-nical documentation. Without the process infrastructure, people often revert to poor review practices such as

Measuring Training ROI

Just because measuring a return on investment (ROI) for training may be difficult does not mean we should not try to do it. One method for measuring training ROI is to try to measure resultant project savings following training. A Software Engineering Institute study observed that "it is not always possible to attribute improvements entirely to training" [1]. However, we might be able to estimate an ROI for training and process improvement combined.

How do you measure the ROI for process improvements? One perspective is that you need to know something about the size of the effort and amount of time and resources it costs to perform that effort. Then you need to know how the new or improved skills and practices improve the organization's capability to perform that effort. This means that you need to estimate and then track short-term and long-term gains and losses from the improvement effort. ROI changes throughout the project life cycle. Initially it is often less than one (costs more to change than the value received) but then it grows to be greater than one (gets more value than the investment). Some skills and practices show an ROI greater than one fairly early such as disciplined document reviews [9, 10, 11].

One method for determining ROI is to estimate the number of defects created by current practices and the effort it takes to fix those defects, i.e., determine the cost of rework before improvement (CRB). Then measure the number of defects after adopting new and improved skills and practices and the effort it takes to fix these defects, i.e., determine the cost of rework after improvement (CRA). Then normalize CRB and CRA to reflect the amount of rework per 1,000 lines of code (KLOC [or some other relevant normalizing factor]). I used KLOC and the sample numbers below as an example.

$$\text{Normalized CRB (NCRB)} = \$150,000 / 25 \text{ KLOC} = \$6,000 / \text{KLOC (before improvement)}$$

$$\text{Normalized CRA (NCRA)} = \$100,000 / 50 \text{ KLOC} = \$2,000 / \text{KLOC (after improvement)}$$

Next, calculate the normalized cost of training and process improvement (NCTP). If $50,000 was invested in training and process improvement and 50 KLOC received the associated benefits, then:

$$\text{NCTP} = \$50,000 / 50 \text{ KLOC} = \$1,000 / \text{KLOC}$$

Finally, calculate an ROI for training and process improvement (ROITP):

$$\text{ROITP} = (\text{NCRB} - \text{NCRA}) / \text{NCTP} = (\$6,000 - \$2,000) / \$1,000 = 4$$

In this example, $4 were saved for every dollar invested in training and process improvement. This only considers the current project. Conceptually, the process only needs to be changed once to implement an improved capability. However, training is needed for each new staff member as he or she enters the organization, i.e., it happens as needed. The ROI will increase as additional projects receive the benefits of the training and process improvements. If you lose people and you have to train new people, then the ROI changes.

The key point and basis for ROI estimates is that defects cost a lot in terms of time and money if we do not find and fix them early. We should be able to estimate current practices and compare them to new practices that have been implemented in the organization and on which the staff has been trained. Thus, rework avoidance should help us gain a realistic perspective of the value of training and improved practices.

skim reviewing for finding defects. Skim reviewing is briefly reading a document without taking the time to (1) check for consistency and completeness against all source information and to (2) check against appropriate evaluation criteria (e.g., checklists).

Some discipline is always required to effectively perform organizational process-es. Unless the organization adopts a business process infrastructure within which employees can perform many learned skills, training cannot be successful because many skills will not be performed. I call this *The Process Not in Place to Support the Training* dilemma. The following section addresses a few other training dilemmas.

Training Dilemmas

I have observed several dilemmas over nine years of providing software quality and test-related technology training. The following training dilemmas have inhibited adoption of individual skills and organizational practices.

They Came, They Taught, They Left, and Nothing Changed Dilemma

Managers often have not assessed training needs adequately before preparing plans for implementing needed skills and practices. Trainers often have not advocated planning for implementing individual skills and organizational practices that they teach. Students often have not made a sincere effort to learn and practice the skills they are taught. Many organizations need training on how to receive training effectively. Students should know their objectives and strive during and after class to achieve them. In other words, students need to be proactive learners to support their organization's training goals. Getting the most value from training is a shared responsibility between trainers and managers and their staff.

The SEI reported, "When employees were involved in the training process and the associated needs analysis, they felt that they were getting skills improvement that would be beneficial to them in their careers" [1]. Managers need staff input in skill needs analysis and process improvement planning. Effective training must consider what should happen after class. Maintaining the status quo back on the job will not achieve the ROI desired from training. Managers and students must plan to change and implement appropriate improvements to minimize this dilemma.

On-Site Training Room Dilemma

When training is held in the same building where the employees work, they will often arrive late or return from breaks and lunches late because they go to their desk and are caught up in the normal work activities. In addition, when managers give extra assignments or require previously assigned projects to be completed during the training period, employees may miss several hours of important instruction. Working long (often unpaid) hours into the night to finish projects can take its toll on employee comprehension and participation. Managers should not require their employees to work on projects during the period that they are attending class. Also, managers should not require more than a normal day's effort (eight hours maximum) during training periods.

Effective training can occur in on-site training rooms but it often requires a concerted effort to avoid the temptations to continue project effort during training. Trainers should include some fun incentives to encourage on-time attendance such as providing interesting (but not essential) information in the first five minutes after breaks or lunch [3].

I Am Here Because I Was Told to Be Here Dilemma

Occasionally, a trainer is blessed with one or more students who come to class with their arms folded and a look on their face that challenges the instructor to try to teach them anything. You know the type – they were told to be there, and they would obviously rather not be.

It is the trainer's responsibility to hold attendee attention by providing interesting and informative material and experiences. All effective trainers continue to work on that. However, the attitudes of some students can infect others to the point that progress can be inhibited. Establishing training objectives ahead of time can help with this dilemma. If some staff members do not want to attend, then maybe there are underlying issues that need to be dealt with before training will be effective.

Martha Kelly, course leader for several Langevin Train-the-Train courses, said:

> In any training you conduct, the learner should work harder than the facilitator. Training is a place where people come to practice their jobs. It isn't prison; it isn't a vacation; it isn't home. It's an extension of the office were real-world problems should be discussed and potential solutions to problems should be learned and practiced. [4]

One way to overcome a complacent attitude is for trainers to show they sincerely care about attendees' issues and problems. People often will not listen to you until they know you care about them. Trainers should get to know attendees, when the class size and time permits, by talking personally with each attendee at breaks, lunch, and after hours. This can go a long way to overcoming this dilemma. Activities to help students get to know each other can help as well.

Bad News Dilemma

Sometimes it does not take much to turn a group of students against a trainer. Bad

news travels faster than good news. Even experienced, highly entertaining trainers can have difficulty answering some questions, leaving some students dissatisfied. If a student then chooses to share his or her opinion or concerns with others, the door to communications and effective teaching closes to some degree with the other students as well. What can be done in this case? Trainers could answer all questions correctly with evidence to back claims and do so delightfully. That is a tall order.

Certainly, if a trainer does not know the answer to a question, he or she should say so. Langevin's course on Advanced Instructional Techniques reminds trainers that they should not take themselves too seriously, and that they should adopt the role of a leader and guide rather than an expert [4]. Opinions should be expressed as opinions rather than facts to help students understand that we are all still learning. When an opinion is not *sold* adequately to a student, we can then agree to disagree and move on. Sometimes trainers can invite other attendees to respond or give added attention to the matter after class hours. The point is that we need to encourage students to discuss their concerns and not harbor them with resentment.

Not a Jay Leno Dilemma

How much value is the entertainment factor in instructing technical courses? As mentioned above, it is the trainer's responsibility to hold student attention by providing interesting and informative material and experiences. However, most students today have always had ready access to TV and the movies. Usually student expectations are high with respect to the entertainment factor in the courses they attend. Some trainers move into this industry with little prior experience in training let alone in stand-up comedy. All of a sudden, these new trainers not only have to teach someone how to perform a technical skill in the context of an organization's business practices, they have to be sensational to the students they are teaching.

Part of the answer is for trainers to receive training on becoming more effective and engaging. Perhaps part of the answer may also reside in students somehow valuing the technical content of the courses a little more than the entertainment factor. This could be done in part through a measure of the student adoption of new skills. Again, the ability of the instructor to affect attitudes is vital in adopting new skills.

There are dozens of books dedicated to increasing the *entertainment factor* in training. They are often based on the

actual experiences of practicing trainers and many of their ideas are great. But when it comes down to it, each trainer needs to be authentic by being themselves and not someone else. Trainers can be taught to increase their level of animation to be more engaging and entertaining. Trainers do not need to be a Jay Leno-type entertainer to be effective. The key is certainly the level of enthusiasm a trainer shows for the material being taught.

No Management Endorsement Dilemma

Having no policies, no champion, no process, or no improvement plans are each indicative of a lack of management endorsement. Policies are required to identify and establish management support for key business practices [5]. Champions are needed to demonstrate capabilities and get people excited about new and improved skills and practices. Active management involvement in identifying and empowering process improvement leadership is vital to success. Documented processes are required to establish (1) the sequence of events or phases to be performed, (2) the associated entrance and exit criteria for those phases, (3) the inputs provided and the outputs expected from each process phase, and (4) key measures to be collected to evaluate the process success [6]. Improvement plans are needed to change old business practices to new.

Organizations need to consider the difficulties inherent in changing an organization's way of doing business. See the SEI's IDEAL(SM) Model for information on effectively changing processes [7]. The SEI has also published a People Capability Maturity Model that states, "The most common reason for the failure of improvement programs is lack of executive support" [8]. Get management endorsement for the specific training or do not train.

Responsibility

Make no mistake; the responsibility is squarely on the trainer's back to deliver effective workshops. However, too many managers have the mistaken perspective that their employees will *automatically* adopt skills that were learned as their new way of doing business. This may lead to the conclusion that the training was not effective if their employees and organization did not readily and *automatically* adopt what was taught.

Trainers should warn students that certain skills would require management endorsement and effort to become the

accepted practice. Trainers can also prepare students to effectively adopt improved practices. However, process improvement is a business decision that many managers have not delegated, and unless management initiates a process improvement effort (which they often do not because of product delivery pressures), processes remain as status quo. This fundamentally means that the organization should not have acquired the training in the first place since all that happened was money and time were spent with no recognizable benefit.

Recommendations

Organizations that are aware of the issues surrounding these training dilemmas work toward gaining more value from their training decisions. Many training dilemmas were not listed in this article. However, many publications exist that identify similar and other training challenges and how to deal with them. Be careful not to make the assumption that the burden for training success is completely on the trainer, and that students automatically know how to get the most value from training. These are dangerous assumptions no matter how much training has been acquired.

Many organizations could benefit from training in how to receive training effectively. Train-the-trainer programs can answer this need by teaching students and managers how to get more value from training. These programs should not just be for trainers. Train-the-trainer programs can help students learn how to be better students.

Do not expect the status quo to help your organization remain competent and competitive. Acquire training that gets adopted and makes an economic difference.◆

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