

2006

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Recommended Citation

Daffron, S. & North, M. (2006). Learning transfer: Tips from software company professionals. *PAACE Journal of Lifelong Learning*, 15, 51-67

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Refereed Article

Learning Transfer: Lessons Learned from Software Company Professionals

Sandra Ratcliff Daffron
Mary Wehby North

Abstract

This article investigates how training and working environments, attitudes, and experiences influence transfer of learning for professionals in the corporate setting. A study of 54 software test engineers, software developers, documentation content managers, technical writers and editors, programming writers, and program managers looks at variables during three phases of the training process: the planning of continuing education programs, the presentation of the training, and the professional's application of the training after returning to the work setting. Findings indicate that several variables influence strongly successful transfer of learning: involvement in the pre-program planning process and self-motivation to participate, use of a variety of delivery approaches and involvement of the trainee in the learning process, and immediate application of post-training experiences with organizational support for the transfer of learning. The data also suggest that the professionals would have experienced a higher level of transfer if there had been a corporate expectation that the professional would share the skills and knowledge with others and the company had allowed time for implementation.

Introduction

The issue of transfer of learning for professionals, that is, embedding newly gained skills and knowledge into practice, is of interest from boardrooms to factories. Corporations spend billions of dollars annually

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on training and education. With the added cost to maintain skills and knowledge to compete in the global market, corporations are looking at large investments in training and education for their employees. However, it is estimated that only about 10% of the skills and knowledge gained from training and education programs actually are transferred into practice (Awoniyi, Griego, & Morgan, 2002). In their review of the literature on learning transfer Merriam and Leahy (2005) tell us that much attention is now focused on the factors that hinder or help transfer to practice.

Corporations struggle to determine how the transfer to practice should occur. Program developers and trainers have an obligation to do more to ensure that their programs result in transfer of learning. Merriam and Leahy (2005) say that adult educators can facilitate transfer by putting what they know about adult learning into context for program designers. This article suggests the context that program developers and trainers should establish and identifies positive variables within the program developer's control that affect transfer-of-learning outcome.

The term "transfer of learning" is used exclusively in this article, though the terms "transfer of training" and "transfer to practice" could apply as well. The definition of transfer of learning used in this article is "the effective and continuing application by learners—to their performance of jobs or other individual, organizational, or community responsibilities—of knowledge and skills gained in learning activities" (Broad, 1997, p.2). The purpose of this article is to make specific suggestions for planning, designing, and implementing programs for professionals to maximize transfer of learning.

The suggestions in this study for planning, designing, and implementing programs for professionals result from variables identified when professionals from one software company indicated that they were able to transfer the skills and knowledge acquired in continuing education classes to their work practice. Transfer of learning is identified as a change in attitude, a demonstration of the acquisition of new knowledge, or a change in behavior.

Method

As part of a class that was considering best practices pertaining to transfer of learning for professionals, the authors and several other graduate students undertook a research project to examine real-world

situations in which transfer of learning was or was not taking place. Each graduate student, under guidance of the instructor, conducted interviews with professionals in their workplace. Fifteen interview questions were crafted to assess the variables present when learning was transferred. The interviews identified the variables in place in the program-planning stages, during presentation of the program, and when the professionals returned to their jobs.

The authors asked for volunteers from a prominent software company in the Seattle, Washington, area. Initially 87 software employees agreed to be a part of the study and requested the interview questions that were transmitted via e-mail using a blind response-management system. In their answers the 54 respondents referenced a variety of classes that encompassed training in programming and software design, leadership, personal work skills, software applications, company policies, communication, and self-management.

The interview questions were grouped into four parts: the program-planning process, the delivery of the program, the post-program phase, and suggestions to help with transfer of learning to practice. The questions were taken from several studies that Merriam and Leahy (2005) include in their recent review of the literature on learning transfer. The questions were designed to measure the following:

- Variables within the pre-program process, including the planning process and the characteristics and mind-set of the individual trainee before the training.
- Variables within the delivery of the program, including program design, methods of delivery, and involvement of the trainee in the learning process.
- Variables in the post-training experience, including informal learning methods with immediate application, the environment within the workplace, support from the institution, and peer support.
- Variables to overcome barriers to successful transfer and suggestions for increasing the likelihood of transfer of learning.

These variables affecting the learning process mirror the findings of Cervero (1985), who posed the question of effectiveness of continuing professional education. The model considers variables in the training program itself, individual characteristics of the trainee, the nature of

the proposed change, and variables within the work environment where the learning is to be applied. This model has been examined and adapted within the transfer of training and learning literature and was used as a model for this study.

Study Results

The software professionals who responded to the interview questions said that they had meaningful learning experiences in their programs, and the majority said that the newly learned skills and knowledge would transfer in some way to their practice. Those who responded positively about transfer said the following:

- They were motivated to attend the training programs.
- They had preconceived expectations to learn and apply the information to their jobs.
- They felt that their needs were represented in the planning process.
- They learned best when delivery methods used in the program were varied and interactive with the participants.

They also said that, though they had been encouraged to attend the training sessions by their supervisors, there was no expectation of sharing the information when they returned to their jobs. Barriers to transfer were issues of time and applicability.

Variable One: Involvement in the Pre-Program Planning Process and Self-Motivation to Participate

Involvement in the planning process. The first series of interview questions examined the pre-program planning process and the learner's involvement in the planning process. The researchers wanted to know if the professionals were involved in the planning process and if they suggested topics or, if not, if they felt that their interests had been represented by individuals who shared their professional interests. The researchers also wanted to learn the motivation for participation, including who had made the decision that the participant should take part in the training. Mathieu, Tannenbaum, and Salas (1992) show that giving input into the program content is linked directly to motivation to attend and, ultimately, to transfer of learning.

Participants stated overwhelmingly that they were not involved in the planning of the course, yet a large number indicated that their needs were met; they felt that their needs were considered in the planning process because they knew that others from their professional groups had served as program advisors. They felt that the planners were thoughtful and were invested in making the program successful. They felt that individual work styles and behaviors were taken into consideration when the program was designed and that the programs were tailored to fit their needs and the needs of others with similar job responsibilities.

Motivation to participate. Questions also attempted to identify the motivating factors for the participants. Were the motivations intrinsic or extrinsic? Facticeau, Dobbins, Russell, Ladd, and Kudisch (1995) found the importance of this first variable. They examined the pre-training motivation of 967 managers and supervisors to determine whether pre-training motivation and transfer of training were connected. They found that pre-training motivation was an important variable in transfer and that motivation would lead to behavioral changes on the job. Training reputation and intrinsic incentives affected motivation to take the training.

What motivated the professionals in the company studied in this investigation to attend? The majority of respondents in this study said that they attended training classes because they wanted to attend, rather than being required to attend by their manager or corporate policy. Participants reported different reasons for wanting to be involved in a training opportunity. The motivation for the new learning was varied, and both intrinsic and extrinsic motivations were cited. Generally, their motivation was high because the training was work-related and addressed certain expectations that the employee was planning to meet.

The individual comments all related to performing their jobs better and furthering their career-development goals. Several wanted to find out about a new area of practice before they made career-changing decisions; others wanted leadership guidance. Many commented that they wanted to help the management team implement significant changes and needed the ideas and skills to accomplish this goal. Also, since most worked in a team, they were motivated to attend to gain skills for communicating with other members of geographically and culturally

diverse teams. This issue of self-motivation resonated with almost all of the participants.

Those who were required to attend training because of state requirements were less motivated and were less likely to transfer their learning to practice. The software professionals said their participation in the continuing education programs was usually voluntary.

A number of researchers have examined self-efficacy or self-confidence as a variable in transfer of learning (Ford, Quinones, Sego, & Sorra, 1992; Gist, Bavetta, & Stevens, 1990; Gist, Stevens, & Bavetta, 1991). They found that, when trainees have the confidence to apply the learning to the work place, they are more likely to do so and learning is transferred. We found that the software company professionals were confident in their ability to participate and learn.

Cheetham and Chivers (2001) found that adults need a “symbolic interactionism,” a term they coined that places emphasis on self-awareness, self-image, and self-esteem within the learning process. They say that this symbolic interactionism manifests itself in learners focusing more on what they feel they need to learn and on the need for change rather than on meeting the expectations of others. Learning is transferred when the learner is self-confident, is motivated to learn, and feels the need for information. Looking closely at the software employees’ motivations for involvement in training yielded interesting similarities to the data about meeting employee needs.

The number of respondents reporting that their needs were considered matched nearly exactly the number that reported wanting to take a training class rather than being required to take a training class. Delving deeper into the employee responses regarding their motivation for training revealed a similar split that reflects the strong work orientation of the respondents. A large majority of the respondents felt that the training would help meet objectives at their current job; a small minority took training for personal reasons. The similarity in numbers is not coincidental. A correlation can be drawn between learners having their needs considered, learners desiring rather than being obliged to take training, and learners who have a strong work orientation shown by taking classes to enhance skills at their current jobs.

Expectations for the training. Does learning transfer if the learner goes to the training session expecting to change his or her behavior as a

result of his or her participation? The time-tested reality of the self-fulfilling prophecy is proven true repeatedly. If there are high expectations, the gain is usually high; if there are low expectations, these are usually fulfilled to that degree. Such expectation is especially true in training environments. Mazmanian, Ratcliff [Daffron], Johnson, Davis, and Kantrowitz (1998) found a correlation between physicians' motivation in pre-program stages to change their practice and making the actual change after the program.

This study found that the majority of respondents who said that they used the skills and knowledge learned in the continuing education program went into the training with preconceived ideas. They expected the information to help them do their current jobs more effectively. This expectation speaks volumes about their motivation to learn. They expected to learn specific product-design principles for their job. They wanted great reference material to use both for their own work and to prepare for an internal job interview. Several expected some parts of the training to be relevant and other parts to be less so and were surprised to find that training exceeded their expectations.

Not all entered the training with high expectations, but they hoped, nevertheless, to come away with some validation that others used the approaches they were using on their jobs. They reported that they were on track with their approaches, and they also changed their approaches in mentoring and specific programming constructs. One programmer expected to learn strategic methods for negotiating; another wanted to gain entry level programming skills in several languages. Both found that their expectations were met in part. Several mentioned that they hoped that the instructors were active in the technology industry themselves and would bring personal knowledge in addition to printed information. They were pleased that the instructors all fit that desired category and were very helpful, and the participants indicated that they were able to use the applications on their jobs.

Perception of positive learning experiences reflects, to some degree, the expectations that students bring with them to training classes. Almost half of those responding cited the information they gained as the most valuable part of their experience. Others said that the instructor was most valuable, and the rest said that the opportunity to practice immediately what was learned was the most valuable.

Variable Two: Use of a Variety of Delivery Approaches and Involvement of the Trainee in the Learning Process

In delivering the program the continuing education professional educator has much of the responsibility for transfer of learning of the attendees. As in this study, Baldwin (1992) found business students in his study responded positively to a variety of delivery methods. The professionals interviewed from the software company were particularly outspoken about the training environment. They felt the success or failure of the programs rested directly on the instructors and how well prepared and engaged with the participants they were. Every professional that reported transfer of learning to the job mentioned the instructor and said that the learning setting was a dynamic experience. They used terms like “a positive learning experience,” “entertaining nature of the instructor,” “real-world setting,” and “hands-on activities.” They said that the instructor’s stories were the most valuable part of the entire training. The stories illustrated the points made and told about the experience of working with a variety of clients in a real-world setting. All of those who reported using the training-gained information on the job said that their instructors used teaching/lecture time mixed with lab exercises and tutorials. Many said that the most valuable parts were the role-playing and the problem solving.

Though only a minority of the respondents reported a negative experience, their insights are valuable to note as well. They said that there is nothing worse than having to sit for eight hours and have a PowerPoint deck read to them. Others said that the program was better than nothing, while several said that the instructor made them feel stupid and discouraged. Others reported that, about mid-way through the second day, they reached saturation and missed most of the remaining information. One participant said, “The program was not a positive learning experience for me, and I was vexed throughout the program—or at least as soon as I realized that the program content was very different than advertised.”

Does using a variety of delivery approaches really work? How do professionals learn best? The authors embrace the principles of adult education espoused by Malcolm Knowles (1990) and theories and research on adult learning reported by Merriam and Caffarella (1991), Elias and Merriam (2004), and others. However, we wanted to know if software professionals recognize how they learn best and if programs

delivered to them use enough variety in delivery methods to ensure learning. How do the way professionals learn and the delivery methods used in the learning process tie into transfer of learning skills?

We asked a series of questions: “How do you learn best?” “What methods of delivery did the instructor use in the training session?” “How did the speaker involve you in the learning process?” We categorized the responses generally into four groups: hands-on, interactive, cognitive, and observatory. About half of the respondents said that they learn best through hands-on activities; one-fourth said that they learn through such cognitive methods as reading, writing, or thinking; and the remainder said that they learn through interaction and observation. The results illustrate the difficulties presenters face if they use only one delivery method to teach professionals and verifies the principle that a variety of delivery methods are needed to reach all adult learners.

The comments from the respondents in this study are particularly meaningful to instructional designers and may provide some good clues as to how trainers can enhance transfer. Those responding said that the instructors should provide useful scenarios and let them practice; then they will go to the work setting and try again. They liked useful scenarios and realistic problems. They said that they learn by doing, especially by *repetitive* doing; then they can apply that practice to something they work on directly. This result puts the learning in a frame of reference. The term “hands-on” was used repeatedly in the responses, along with requests for demonstrations, role-play, and simulations. Respondents wanted to see, write, and speak, and it didn’t matter if the learning environment was face-to-face or online, as long as a variety of methods were used.

More than a few said that they learn best through experiences that elicit a strong emotional response. Others said that the learning environment should be positive, where errors do not count against the learner. A final comment emphasizes the importance of a positive environment, where one can question and re-question basic ideas until they make sense. Again, it appears that all the basic principles of adult education apply here.

How new information is used: Making meaning. Transfer of learning is all about how students use the new information that they have gained through training and make meaning out of it. Daley (2001) says that a case can be made for “meaning-making” and states that

in the process of using information, the professionals changed what the information meant to them based on the results they observed. In other words, incorporating new knowledge is a recursive, transforming process, rather than a simple, straightforward transfer of information from one context to another. (p. 50)

In this study a large majority of the respondents reported that they had applied the new skills that they were taught in their training classes. When asked how they have used the new information from the training program in their work, some respondents said that, after taking an interviewer training class, they knew how to prepare for an interview, how to phrase questions to be open ended, and how to probe for additional information. These were the exact skills taught in the training session. Other respondents reported that they were better able to confront gently pain/frustration/conflicts with their direct reports as a result of the training session and that they reached a new awareness of their own style and other styles within a team setting. The direct result was to make them better team leaders.

When asked, "Have you changed the way you handle your work as a result of the training program?" there was a more even mix of "Yes" and "No" answers. This mixture was probably due to the fact that not all of the training was specific to work. Those who answered "Yes" said that training also related to developing teams and managing others. Respondents answered that they have become better at dealing with conflict head on. They have a conceptual framework for change management that helps detach the emotion of change; consequently, they are able to help guide people through the change so that they can feel it is positive. Others said that they use some of the information learned almost every day and that they now can attempt to answer their own questions before walking down the hall to ask a colleague or developer.

Broad and Newstrom (1992) found nine barriers to transfer, several of which were listed by respondents in this study. Those who said that they did not change the way they handled their work as a result of the program stated that the training program just demonstrated the need for better tools and processes. Others said their current work didn't involve what they learned and that they might have a chance to use the information in the future. The "No" answers all related to the information not being applicable to their current jobs. Many said that they took the classes because they might use the skills in the future.

Variable Three: Immediate Application of Post-Training Experiences with Organizational Support for the Transfer of Learning

Expectations to share learning. A tool that enhances the transfer of learning most effectively is expecting the trainee to share the new information with his or her peers and/or management upon return from the class. When we combine a strong self-motivation to learn information with organizational expectation and support for immediate application, learning is transferred. Quinones, Ford, Segó, and Smith (1995) propose that the transfer process depends more upon individual motivation, ability, and personality characteristics than on other variables. They conclude that program developers should recognize the potential for trainees to affect their own learning and transfer of skills to the work setting.

Factaeu et al. (1995) examined the third variable, organizational support. They found that those who were committed to the goals and values of their organizations were likely to transfer their learning if the organization emphasized the importance of the training. In this study of software professionals, although career advancement motivation alone was not a sufficient incentive to learn, those who had support from supervisors for the training were motivated to take the training and were more likely to apply their learning in the work setting.

Respondents in this study said that they shared what they learned with others, are more confident users of specific software programs, and learned shortcuts that make the programs more practical for them. The result is that they can manage their work more efficiently. Others said that they now ask different questions in their work processes to get a better idea of the scope of what was taught in the training program. Not only did they gain new skills, but they also report often that they have gained confidence in their existing skills.

Campbell and Cheek (1989), Vroom (1964), and Noe (1986) all examined trainee motivation that was connected with employer expectations. Noe (1986) says that trainees are more motivated to learn if high effort leads to high learning, high learning leads to high job performance, and high job performance is tied to desirable outcomes. Mathieu et al. (1992) studied individual and situational characteristics that influenced the motivation of the trainee prior to the training, the reaction to training, and the impact of that reaction upon transfer of learning. The results of their study support Campbell and Cheek (1989), Noe (1986), and others who found that such situational constraints as

not being able to put learning immediately into practice had a negative effect on transfer of learning. Mathieu et al. (1992) suggest that a continuous learning environment be established to encourage transfer. They also found a link between high motivation in the training situation and transfer of learning.

Variable Four: Overcoming Barriers to Transfer of Learning and Suggestions for Making Transfer Happen

Overcoming barriers to transfer of learning. Other studies, like Broad and Newstrom (1992) and Kotter (1988), provide solid ideas about what prevents transfer from happening. However, when the present researchers asked participants if there were factors that prevented them from incorporating ideas presented by the training program into their practice, the responses differed significantly from the findings of previous studies. Time constraints and lack of applicability of the training to the work situation were mentioned equally often. Other concerns involved personal challenges and issues with their work group. Many respondents expressed frustration in finding the time to reorganize their work and management load to include the new skills and knowledge gained in the training. When mentioning time constraints, others said that there would be additional hurdles, such as making rather drastic changes and the time needed to set up the change process. They said that it was easier to continue with the status quo than to make changes at this time. The rest of the respondents said that there were no expectations to share what they learned with others. This result points again to a lack of expectation from the organization to share the information gained in the training.

Suggestions for making learning transfer happen. To gain a glimpse of the world of training from another perspective, the software professionals were asked to offer their advice to continuing professional educators about ways to make sure information presented at a program is put into practice. Everyone who answered was passionate in his or her opinion. The bottom line is that students really want trainers to improve the delivery of the training. The responses extracted below can be categorized and summarized in three components: content and applicability to the job, method and delivery of information, and transfer of learning to practice and follow up.

Content and applicability to the job:

- Ask students what they want to learn.
- Tailor classes to specific disciplines (sales, finance, publishing, etc.)
- “Pitch” the class to management.
- Make sure the course title describes what the class will experience.
- Make sure that the course teaches things that can actually be implemented.
- Make sure there is accountability after the class.
- Suggest job roles for which the training is most applicable prior to the course.
- Contact the students about what they are expecting and how they intend to use the information in advance of the class.
- Relate to the audience: Know what makes them tick, and leverage that angle to deliver materials.
- Get examples from students of the types of problems they are trying to solve to make the program more relevant personally.

Warr and Bunce (1995) reflect many of these comments in their list of eleven factors associated with trainees that have an impact on their transfer of learning. The eleven variables fit into three categories: looking at training as enjoyable, looking at a perceived usefulness and potential applicability on the job, and looking at the difficulty of the training and the difficulty of putting lessons learned into practice.

Method and delivery of information:

- Use a wide range of learning methods to cover a broad spectrum of learning styles.
- Be knowledgeable about your subject matter.
- Know the types of students you have and come up with a number of examples that can be used in a number of different scenarios.
- Use discussion.
- Create templates that help people do their jobs.
- Don’t use the classroom to pontificate; stay on topic.
- Scale the class according to the class size.
- Encourage participation and sharing.

- Have people use what you are teaching them during class, and then use the issues they uncover as grist for further discussion.
- Have the students bring in real-life projects to work on.
- Do lots of hands-on or role-playing. Use visuals.
- Use good written material to back up what has been said in lecture.
- Make sure instructors recognize that adult learners are accustomed to being actively engaged in life, work, and learning.
- Make sure that the class understands the *why* before focusing on the *how*.
- Make sure that the student practices in class first.

A study by Cheatham and Chivers (2000) of twenty professions in the United Kingdom concludes that both formal and informal learning are important and, sometimes, interrelated. They also conclude that while both modes of learning are important to the professional, the hands-on experiences appear to have the most long-lasting effect and produce learning that becomes embedded into practice.

Transfer of learning to practice and follow-up:

- Use a follow-up, check-in course with homework in between.
- Provide some take-home labs.
- Use follow-up exercises after class.
- Send an e-mail once a week for a while that reviews a main point from the class.
- Engage the managers; send them a note that says we took the class and talk about what we learned.
- Be prepared to work with students one-on-one.
- Require some sort of activity or project that puts the skill into use.
- Check back with the students to see how integration is going; offer some support for the students for at least a few weeks after the class.
- Management should recognize the training, talk about it, and lead by example if it is actually important to put the training into practice. Then it should be measured and incorporated into reviews and the results should be evident in the public reports of the division. Require application of the training

- Listen to questions with a mind to incorporate them into the training the next time the training is presented.
- Require refresher courses.
- Provide time to reflect on how best to use the information—both during and after the learning event.

A second study by Cheetham and Chivers (2001) found five factors that were considered important by professionals in becoming a “competent professional”:

- The opportunity to experience a wide range of developmental experiences.
- The motivation to acquire the necessary competencies and to improve them continuously.
- Adequate practice in carrying out the various key tasks and functions to master the requisite competencies.
- Persistence in overcoming difficulties and in persevering when things are not going well.
- The influence and support (when needed) of others.

Cheetham and Chivers (2001) would add “having the opportunity to put something into practice immediately” as a sixth factor that they gleaned from the results of their study of more formal training.

Implications of this Study for Future Practice

Studying software professionals from one company makes it possible to identify four variables that were in place for those who reported transfer of learning to their jobs. First, they felt that their interests were represented during the planning process so that the topics for the program were the topics they wanted. They were self-motivated to participate in the training. They wanted the information, skills, and resources provided. Second, the instructors used a variety of delivery approaches, and the learners reported that they were involved in the learning process. Third, the skills offered in the training had immediate applicability to the job in most cases. There was organizational support for attending the training, although a significant number reported there was little expectation from their supervisors to share or report the information gained. They said that transfer of learning would have

been greater with more organizational support for reporting skills learned. Fourth, the majority reported having a lack of time to implement into their practice the skills they learned.

The participants made valuable suggestions for program planners to use through the planning process, during the presentation of the program, and after the completion of the training to help with the learning transfer. The continuing professional educator can incorporate easily these four variables and the suggestions provided by the software professionals into their program planning strategies.

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