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Learning Transfer: A Review of the Research in Adult Education and Training

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Abstract

Millions of dollars are spent every year on continuing education and training, yet some estimate that less than 10% of this expenditure pays off in improved performance at work. How to ensure for the transfer of learning from the classroom to the workplace has challenged adult educators and trainers for decades. This article reviews the empirical research since 1990 on learning transfer. Research findings with regard to participant characteristics, program content and design, and work environment are reviewed. Based on the research, three recommendations congruent with adult education and adult learning theory are presented: (a) that the learner be included in the planning of the educational program, (b) that strategies for transfer be built into the program design, and (c) that a supportive work environment be fostered to enable transfer. The article concludes with recommendations for future research on learning transfer.

Whether it be in the community, in professional settings, or in business and industry, educators who plan and implement programs for adults hope that what is taught is learned and that this learning transfers beyond the classroom. However, business and industry, which spends billions of dollars each year on training, estimates that only about 10% of this expenditure results in the transfer of knowledge, skills, and behaviors (Awoniyi, Griego, & Morgan, 2002). This estimate has prompted much attention to investigating which factors facilitate or hinder transfer; the result has been a voluminous literature on learning

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transfer, a literature growing primarily out of human resource development (HRD) and training enterprises. The emphasis in these settings is on the learning of skills and attitudes that have a direct impact on the workplace.

Certainly insights about transfer gleaned from the training literature are likely also relevant to adult educators who work in a wide range of contexts. As Caffarella (2002) points out, training "is an element of the [planning] process that is receiving increased attention as both participants and sponsors of education and training programs demand more concrete and useful results" (p. 205). Unfortunately, the adult education literature also suggests that few education and training programs actually account for transfer in either the planning or implementation phase of programming. Too often the application of what is learned in educational programs has been "left to chance" (p. 209). Further, perhaps because the adult education literature is relatively silent on the topic of transfer, many adult educators have only a cursory understanding of the nature of transfer, including what facilitates or what hinders the process. However, at the heart of our practice of adult education is what we know about adult learning, the context where it occurs, and how to design and implement programs. Attending to the notion of transfer would add an important component to both our practice and our theory base. The purpose of this article is to review first the recent research on learning transfer from both training and adult education; this review is followed by a discussion of practical applications for adult education as well as suggestions for future research.

Method

The literature on learning or training transfer (terms used interchangeably in this review) emanates from a number of disciplines, including psychology, management, education, and organizational behavior. The following databases turned up hundreds of citations on learning transfer: ERIC, Business Source Premier, Dissertation Abstracts International, and PsycINFO. It is a vast literature encompassing models, reviews of the literature, and empirical studies. Several decisions were made regarding focus in order to insure that this review would be a manageable task. First, we decided that empirical, data-based studies (both quantitative and qualitative) on transfer would be emphasized; non-empirical theoretical discussions were reviewed for what they could add to our assessment of the literature, but the review itself focuses largely on data-based studies. Second, given the volume of articles, we

reasoned that work since 1990 would most likely be informed by previous research and, thus, limited our review to those studies reported from 1990 on. Third, the largest volume of empirical research was found in training and HRD journals and publications; given their relevance to adult educators, our review reflects this selection. Finally, we sought empirical studies from adult education sources; the few studies we cite reflect the relative inattention to this topic from adult educators (versus HRD and training).

The Literature on Learning Transfer

While learning transfer can be defined simply, no researcher who has thought about it or attempted to study it would say that it is a simple concept. Thus we begin our review with a short section on definitions and models of learning transfer. This section is followed by a review of the variables affecting transfer. These variables are divided into three categories: participant characteristics, the design and content of the training program, and the larger environment or context of transfer.

Definitions and Models

Transfer can be defined broadly as "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). This definition is congruent with the range and diversity of adult learning and subsequent contexts where that learning might be applied. Most definitions are more specific to the training context, however, such as Detterman's (1993) definition of transfer as "the degree to which a behavior will be repeated in a new situation" (p. 4).

Detterman (1993) also distinguishes between "near" and "far" transfer. "The more similar the original learning situation and the new situation, the more likely the transfer is to be called near transfer" (p. 5). Conversely, the more dissimilar the two situations, "the more likely the transfer is called far transfer" (p. 5). Near transfer emphasizes specific concepts and skills, while far transfer "suggests that by learning the fundamental aspects of something along with specific skills, there is a greater chance for applying that information to more than one setting later on" (Kim & Lee, 2001, p. 445). There is also "specific" and "nonspecific" transfer. Specific transfer is the literal transfer of what is learned; in other words, those practices and skills exhibited in training are

later exhibited, in much the same way, within the workplace environment. Nonspecific transfer involves more general skills or principles. There is also the distinction between "deep" and "surface" structure transfer:

> The main distinction is between the deep and surface structure similarities of a situation. An example is that all car dashboards give the same information, but that their dial configurations are different. Deep structure is the same but the surface structure is different. On the other hand, an airplane dashboard contains dials similar to a car's, but the information presented by those dials is different. For car and plane dashboards, there is similar surface structure but a different deep structure. (Detterman, 1993, p. 5)

Detterman concedes that while the greatest interest is in the far transfer of deep structure, "it is the most difficult to get" (p. 5).

A case can be made that the far transfer of deep structure is what Daley (2001) investigated in her qualitative study of meaning-making in the professional practice of nurses, lawyers, adult educators, and social workers. Professionals in her study "did not see transfer of learning as an outcome of their educational endeavors; they viewed transfer as an integral part of the meaning-making process" (p. 50). Transferring information learned in continuing education programs to practice was not the end of the learning. Rather, it

> was essential to the process of meaning making because often, in this process of using information, the professionals again 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)

There are a number of models of transfer in the adult education and training literature. Best known and most often cited is Baldwin and Ford's (1988; Ford & Weissbein, 1997) model consisting of three sets of variables thought to influence the process: trainee characteristics, program design variables, and work environment variables. Cervero's (1985, 1988) model is similar but with the addition of a fourth variable, the nature of the proposed change. Broad and Newstrom (1992) propose a matrix for analyzing transfer. One dimension of the matrix consists of

relevant partners in the process, such as managers, trainers, and learners; a second dimension lays out the strategies each partner can employ for transfer before, during, and after training.

Some research draws from Kirkpatrick's (1994) well-known stages of evaluation. In his model the effectiveness of training programs can be assessed in terms of (a) the learner's reaction, (b) the knowledge acquired, (c) changes in participant's behavior as a result of the training, and (d) improvements at the organizational level. Ottoson (1997) has proposed five sources of influence on the "post-program experience: the educational program itself, the innovation or new ideas to be applied, the predisposition of the learner, enabling characteristics of the application context, and support or incentives for application" (p. 94). Kozlowski and Salas (1997) have proposed a multilevel organizational systems model of transfer, and, finally, Holton, Bates, Seyler, and Carvalho (1997) have developed a theoretical map and an instrument to assess the transfer climate of the work environment.

Variables Affecting Transfer

Drawing from Baldwin and Ford's (1988) model, this literature review is divided into three categories of variables affecting transfer. The first is individual professional/trainee participant characteristics. The second category addresses the content and design of the training program. The third category identifies work environment, social system, and transfer climate variables. The majority of articles reviewed are empirical studies published between 1990 and 2002.

Participant characteristics. An individual participant's motivation is one variable that affects the transfer of learning (Frazis, Gittleman, & Joyce, 2000). Facteau, Dobbins, Russell, Ladd, and Kudisch (1995) conducted a study involving 976 managers and supervisors taking part in a management development program. Results from a survey taken after the program was completed revealed a higher level of perceived transfer of training among those participants who reported a great degree of pre-training motivation. Survey results led the researchers to several conclusions, including that individual pre-training motivation was one of the variables that predicted transfer of training.

Kehrhahn (1995) investigated the relationships of individual characteristics and perceptions on transfer of customer service skills training and found that "motivation to transfer was the only independent variable that significantly predicted transfer of training" (p. 1). With

regard to individual motivation, similar results have been found throughout the transfer literature (Mathieu, Tannenbaum, & Salas 1992; Quinones, Ford, Sego, & Smith 1995; Warr & Bunce, 1995). Especially interesting for adult educators are the studies showing that having the opportunity to provide input into the training decision (Baldwin, Magjuka, & Loher, 1991; Clark, Dobbins, & Ladd, 1993; Mathieu et al., 1992) is linked positively to pre-training motivation, actual learning, and performance.

Closely aligned with a participant's motivation to learn and apply that learning is self-efficacy, that is, the belief that one has the skills and ability to apply the learning (Ford & Weissbein, 1997; Hirschfeld 1990). There appears to be a greater degree of training transfer by those individuals who report a higher level of self-efficacy. In short, those trainees who believe that they have the ability to apply specific information and skills to the workplace are more likely to do so. Further, a high level of confidence in one's ability has been shown to be related positively to skill maintenance (Stevens & Gist, 1997) and intent to transfer newly acquired knowledge and skills (Seyler, Holton, Bates, Burnett, & Carvalho, 1998). In a comparison of perceptions of managers and trainees as to the factors most affecting transfer, managers cited employee motivation and self-efficacy as important; trainees cited managerial support as critical (Vosburg, 2000). Also important is the trainees' perception of the practicality or relevance of the training program (Axtell & Maitlis, 1997; Broad & Newstrom, 1992). Fitzgerald (2002) also found that motivation to transfer and transfer design were related to transfer for state employees attending an ethical decision-making program.

Broad and Newstrom (1992) place a heavy emphasis upon the importance of trainee expectations: "One's expectations about a future event can often affect the likelihood of its occurrence" (p. 112). This transfer happens because a trainee's "expectation that something will happen [as a result of training] affects the priorities and energies [the trainee] devotes to making it happen" (p. 112). The authors refer to this phenomenon in the context of training as the Pygmalion Effect. There is also evidence to suggest that just the opposite of the Pygmalion Effect will occur if trainees exhibit cynicism and an apparent belief in the improbability that the training will have any impact (Tesluk, Farr, Mathieu, & Vance, 1995). Using expectancy theory to predict transfer, Clasen (1997) found that police officers attending a seminar on report writing transferred investigative report writing skills to the job depending

on "one's belief in his or her ability to write reports at a given level" (p. 1) and in one's belief that this performance would result in desired outcomes. Senn (2000) reports that internal obstacles, including trainee expectations, played a role in blocking transfer.

Some authors refer to a cluster of personality traits as important in transfer. Ford and Weissbein (1997) concur with Baldwin and Ford (1988), who state that the "big five" personality traits of "conscientiousness, openness to experience, extraversion, emotional stability, and agreeableness" (p. 33) can impact transfer as well as job performance. Broad and Newstrom (1992) offer a similar list of trainee characteristics. They aver that trainees will be more likely to transfer skills and information from the training environment to the work environment if they "have abilities and aptitudes for the new skills, personality traits such as high achievement needs and internal locus of control ('self-starters'), and a motivation to use new skills on the job" (p. 10).

In summary, there is strong evidence to suggest that those variables found within individual learners can have a profound impact upon the transfer process. Apparently those trainees with positive expectations are very likely to attempt to transfer learning from a training setting to their work environment. Conversely, those employees who lack motivation and who perceive the training in a negative light, more likely than not, will make little or no effort to attempt to transfer.

Design and content of the training program. There is evidence to suggest that a connection exists between certain design features of the training program and transfer of learning. Baldwin (1992) conducted a study involving 72 business students enrolled in a course designed to develop assertive communication skills. The researcher discovered that groups exposed to multiple instructional methodologies (scenario variability and model competency variability) demonstrated a greater ability to generalize desired communication skills to other contexts immediately after the program as well as one month later. Also related to instruction is the study by Kraiger, Salas, and Cannon-Bowers (1995). In their study, involving 40 undergraduate students taking part in a Naval TANDEM decision-making training program, the authors found that those participants who received an advance organizer before the training outperformed their control counterparts within a simulated decision-making situation.

The introduction of what is called post-training relapse prevention (RP) also appears to be a variable that has an impact upon transfer of training (Ford & Weissbein, 1997). Such a session is designed to cause trainees to think about possible situations where newly acquired skills could be abandoned back in the professional environment. During such a session trainees are also asked to develop strategies to combat relapsing into old patterns or behaviors. Tziner, Haccoun, and Kadish (1991) conducted a study involving 81 Israeli military instructors who were taking part in an Advanced Training Methods program. Half were assigned randomly to participate in a RP module. Data collected via questionnaires revealed that trainees who were exposed to post-training RP reported a greater degree of mastery and usage of newly acquired skills in their professional environment ten weeks after the completion of the training program. Supervisor ratings of the same trainees also demonstrated a greater degree of skill mastery and transfer than control group participants.

Similarly, Gist, Stevens, and Bavetta (1991), in an experimental study, found that MBA students taking negotiation skills development training with a post-training maintenance component had a greater degree of transfer two weeks after the program than students exposed to training only. In a subsequent study of 60 MBA students trained in salary negotiations who were divided into either a performance- or a mastery-oriented post-training session, Stevens and Gist (1997) found that the mastery-trained participants engaged in more "interim skill-maintenance activities, planned to exert more effort, and showed more positive affect than did performance-oriented trainees" (p. 955).

Burke's (1997) study of 90 trainees involved in assertive communication found that RP training improved significantly the treatment groups' "ability and motivation to transfer the assertiveness training" but that the training produced "no significant effects in the retention of course content, use of transfer strategies, or use of trained skills" (p. 124). Finally, in a dissertation study of "transfer enhancement tools" Bowne (1999) discovered that focusing on post-training behaviors of both trainees and their supervisors enhanced positively the transfer climate; further, trainees in the experimental group reported more usage of the training in specific job applications.

Providing trainees feedback during a training program also appears to be a factor that can increase training transfer. Lintern, Roscoe, Koonce, and Segal (1990) conducted a study of 42 flight students enrolled in an aircraft landing skills program. The researchers found that those

participants who received feedback (adaptive feedback and guidance) during their training were better able to transfer their training to a real flying context and needed fewer pre-solo flights before they attempted a solo flight. While Martocchio (1992) found that positive feedback could reduce post-training computer anxiety, it was also the case that negative feedback resulted in less learning and thus, presumably, less transfer.

Programs followed by one-on-one coaching appear to show a greater degree of transfer of learning. Olivero, Bane, and Kopelman (1997) conducted a study involving 31 managers from a public agency who took part in a conventional managerial training program. This training program was then followed by eight weeks of one-on-one executive coaching. Analysis revealed that the training alone increased manager productivity by 22.4% while coaching, which involved goal setting, problem solving, practice, feedback, supervisory involvement, evaluation, and public presentation, increased manager productivity by 88%. Peer coaching also turned out to be the most important influence on transfer of interpersonal skills for 43 teachers who were studied over a two-year time period (Pogust, 1994).

In a comprehensive study of both design and instructor intervention variables, Krijger and Pol (1995) report the following with regard to management development training programs:

> Attention to the transfer of insights and skills is essential in achieving lasting effects. The possibility of transferring learning and adopting other behavioral habits is achieved by practicing with the aid of pointers [from instructors]. . . . Practice, however, is not sufficient. (p.128)

They go on to identify five variables "which strengthen the transfer process": use of simulation games, follow-up three months after instruction, learning objectives determined by participants, a match between training context and organizational context, and action planning at the end of training.

It can be seen from this review that learning transfer is influenced directly by variables within the design of the program. Activities that attend to transfer, such as action plans, coaching, a variety of instructional techniques, and participant involvement with the planning, seem to make a difference in ensuring for some transfer.

Work environment. Early work on transfer tended to focus on the cognitive mechanisms involved, along with the structure of the learning

to be transferred (Detterman & Sternberg, 1993). Since the mid-1990s the work environment is being acknowledged as an important determinant in whether or not learning transfers. The work environment encompasses a number of variables, including trainee opportunity to use newly-learned skills, incentives to transfer learning, supervisory and social support, and the climate of the organization.

The opportunity to apply what has been learned in a training program is one contextual variable to be considered in learning transfer. In their work on transfer Broad and Newstrom (1992) found, of nine barriers to transfer, the lack of reinforcement within the practice setting to be the most significant barrier. Seyler et al. (1998); Ford, Quinones, Sego, and Sorra (1992); and Lim and Johnson (2002) all report that the opportunity to use new learning impacts transfer. According to Lim and Johnson (2002), a "key factor in learning transfer is the opportunity for trainees to apply what they have learned to their jobs. Without a strong match between the training content and the trainees' work roles, it is unlikely that transfer will occur" (p. 46).

Support from management and peers seems to be crucial in transfer. Research by Brinkerhoff and Montessino (1995) involved 70 trainees from one Fortune 200 company who were assigned to five training courses. Researchers found that trainees who had discussions with their managers before and after a training experience self-reported a greater degree of transfer of training one and one-half months after training. They also found that strong relationships, called "transfer partnerships," between trainers, trainees, and managers before, during, and after training were important in ensuring transfer. Likewise, Rouiller and Goldstein (1993) concluded that supervisory and peer support is a much stronger predictor of transfer than what trainees learned. Xiao's (1996) study of entry-level employees in four computer manufacturing companies found that, of the many organizational variables studied, supervisory behavior most affected transfer. However, a recent study of supervisory support in the transfer of training by Dutch and German bank tellers found only weak support for one of three dependent variables—task-related performance measures (van der Klink, Gielen, & Nauta, 2001).

Facteau et al. (1995) also found trainee support to be an important variable in the transfer process. Their study focused on 967 managers and supervisors involved in a management training course. Through the analysis of survey results the researchers discovered that those trainees who reported feelings of support from their subordinates, peers,

and supervisors in trying to utilize new skills self-reported a greater degree of transfer. Similarly, Ford et al. (1992) studied 180 Air Force graduates of a technical training program and their immediate supervisors. Surveys focusing upon opportunities to perform newly acquired skills in the practice setting were distributed four months following the training event. The authors concluded that those trainees who reported to have colleagues and supervisors with positive attitudes toward training reported to have had more opportunities to utilize new skills. Supervisor attitudes, as well as colleague support, were reported by trainees as key to performing newly acquired skills four months after an Air Force training program (Quinones et al.,1995).

Tracy, Tannenbaum, and Kavanagh (1995) examined climate and cultural factors in the transfer of newly learned supervisory skills of 505 supermarket managers. Of six climate indicators, social support was found to be most predictive of transfer. In particular, social support in the form of "supervisors encourag[ing] independent and innovative thinking" (p. 249), as part of a "continuous learning culture," was found to be most supportive of transfer. Peer support may be particularly influential for professional continuing education, as suggested in Daley's (2001) study of four professional groups and Donohue's (1996) study of school principals.

Several studies found that a negative and non-supportive transfer climate acted as a *barrier* to transfer. The negative attitudes of coworkers seem to have been a particularly powerful barrier for learners involved in workplace literacy programs (Taylor, 2000). Taylor quotes one trainee as saying, "When we come from our classes, many of our colleagues tease us about going to school. . . . These remarks hurt us a bit. . . . I don't want to show off what I've learned in front of them, because they will tease me even more" (p. 15). Likewise, Meers (1997) found that "neither training supervisors in ways to promote transfer of learning nor [their] participation in telemarketing training was significantly related to transfer of training" (p. 1). Anecdotal data revealed that three contextual barriers prevented transfer: lack of reinforcement, immediate work environment interference, and non-supportive organizational climate.

In a program with a finance group in a consumer products company, Ferdinandi (1995) found that only 4 of 15 training skills transferred to the workplace. Qualitative data suggested that lack of support from the subjects' supervisors, no performance feedback, and trouble integrating new tasks into routine work may have limited transfer. In a qualitative

study of the transfer of learning from outdoor, adventure-based programs back to the workplace, Leahy (2002) found three factors that facilitated transfer: perceiving the program as worthwhile, supervisory support, and positive and upbeat interoffice group dynamics.

In a follow-up, qualitative investigation of why there was minimal impact of training of social services personnel, Clarke (2002) uncovered the following factors, several of which are contextual: the short duration of training, limited on-going practice of skills back on the job, heavy workloads and time pressures, minimal support from supervisors to implement training, and a perception that training should be for personal development rather than career or organizational enhancement. Clarke's discussion of training transfer by professionals offers some insights into continuing professional education (CPE) and the potential for transfer. He observes that

> the characteristics of these workers, specifically the considerable autonomy they possess in relation to decision-making and far less direct supervision, may well contribute to very different expectations regarding how training is actually to be put into practice. . . . In relation to professionals, it may well be that the strength of professional associations and relationships within organizations mean that peer support mechanisms may be of far greater impact in determining the transfer of training than the emphasis that has been laid on supervisory support. (p. 157)

His observations are in line with Daley's (2001) study of four professional groups. She found that CPE was not seen as something to transfer but, rather, to make meaning out of, meaning that "is tied tightly to the nature of professional work" (p. 52). Further, she has identified four contextual variables that have an impact on what professionals learn in a CPE program "and how they use the information they gain" (Daley, 2002, p. 79). The first factor is how they see themselves as professionals: "If other professionals sanction, support, and affirm the learning as important in the professional role or the professional self-identity, then the information from a CPE program tends to be readily incorporated into professional work" (p. 82). A second factor is the nature of the work itself and, in particular, the needs of the clients and the services the person provides. Milne, Gorenski, Westerman, Leck, and Keegan's (2000) study of psychiatric rehabilitation staff training found

"benefits for clients" (p. 274) to be a motivating factor in transfer. The fact that professionals practice in a wide variety of organizational cultures leads to Daley's (2002) third factor, the organizational culture itself. The culture can be perceived as integrated, differentiated, or fragmented, and the politics of these different structures "shapes learning and the use of information in professional practice" (p. 84). The fourth factor, also identified by Clarke (2002) above, is the level of independence and autonomy. Daley found that "the level of independence, autonomy, and freedom the professional has to move within and around the organizational structure determines the learning and the use of information in practice" (p. 85).

Pursuing a somewhat different angle, Montesino (1995) hypothesized that an awareness and alignment of training with a company's strategic direction would affect transfer positively, as would practices to support transfer throughout the training. He found significant support for both of these variables. A variation on the idea of matching trainee and company perspectives to affect transfer is present in Awoniyi, Griego, and Morgan's study (2002). Using several scales, they measured the person-environment fit with 293 trainees in social service agencies and its relationship to transfer. The person-environment fit was found to have a significant positive relationship with transfer, but the amount of variance predicted was low. They also found that trainees from not-for-profit, non-governmental agencies reported higher transfer of training to the job than did trainees from the government sector. They did not speculate as to the reason for this difference. Finally, Tracey, Tannenbaum, and Kavanagh (1995) found that, if the work context was one of a continuous-learning culture where there is "a pattern of shared meanings of perceptions and expectations by all organizational members that constitute an organizational value or belief" (p. 241), training is more likely to transfer. This transfer is the result of shared perceptions and expectations that learning is important and integral to work.

In summary, a number of studies on transfer have focused on variables related to the work environment. Most studies recognize the complexity of the work environment and the difficulty in isolating particular variables for study. Nevertheless, much of the empirical research reviewed does seem to suggest that the opportunity to apply learning, supervisory and peer support, organizational culture, and congruency of trainee and organizational goals have some bearing on learning transfer.

Implications for Practice and Future Research

This article is a review of the empirical studies since1990 on transfer of learning or transfer of training. The purposes for writing this review were to examine the recent work on transfer and to offer suggestions for practice and future research. The implications for practice and research are made with particular attention to the field of adult education where little has been written about this topic. Adult educators and human resource developers have a big stake in understanding transfer. Incorporating "transfer-of-learning strategies and techniques often holds the key to whether or not program outcomes can be achieved" (Caffarella, 2002, p. 209). Further, learning transfer either has been ignored or has been assumed to be implicit in the adult learning and program planning literature. The discussion of the literature in this review is one attempt to bring this important construct to the attention of the field. From the literature we do know that factors having to do with the program participants themselves, with the design and content of the program, and with the organizational context have some bearing on transfer. However, what can we rely upon from the research on transfer that at least has a chance of fostering application back to the practice setting, and what needs more study?

Enhancing Transfer

The literature suggests that there are a number of strategies adult educators and HRD practitioners can employ to increase the chances of learning transferring to the work setting. These strategies include the following:

Include participants in the planning. Empirical studies of transfer from several fields confirm the wisdom of including participants in the planning of their own learning. This insight, of course, is a long-standing mantra of good adult education practice, dating back at least to Knowles's (1980) concept of andragogy, i.e., the art and science of teaching adults. Just as adults are responsible for other aspects of their lives, they can also take responsibility for their own learning. Pre-training motivation, having input into the program, and having expectations and the self-confidence to apply training all have been shown to relate to transfer. Engaging participants in the planning of the program, even inquiring minimally as to their prior knowledge and experience with the proposed

content and adjusting accordingly, should aid in predisposing participants to the learning and subsequent transfer. Taylor's (2000) study of 11 workplace literacy programs in Canada comes to a similar conclusion that focusing on "many of the principles of good program planning in adult education" (p. 8) enhances transfer. Most important in planning the program is that all stakeholders should have input into program content.

Incorporate strategies that link to transfer in the program design. Transfer has been shown to correlate with a number of program design features. These include providing advance organizers; segmenting the content into manageable "chunks"; using a variety of instructional techniques, such as simulations, group work, portfolio construction, etc.; practice of new learning; anticipating and planning for application problems; active learning; providing feedback; and making certain that the learning is relevant and useful. What Ford and Weissbein (1997) refer to as a "guided discovery" approach to instruction can affect both transfer and motivation: "Guided discovery can lead to greater transfer due to increased trainee motivation to learn since trainees are actively engaged in the learning process. Guided discovery also encourages the use of hypothesis-testing and problem solving strategies which require more conscious attention for their application" (p. 35).

"The use of questioning, problem-solving and scenario-building to extend learners' knowledge to novel situations" (Billet, 2002, p. 34) are strategies for transfer presented in Billet's recent model of a workplace pedagogy. In his model adults learn through work with pedagogic practices on three planes: through participation in work, through guided learning at work, and through guided learning for transfer. Questioning dialogues and group discussions are strategies "to assist individuals to appraise the scope and limits of their knowledge and evaluate the prospects of its transfer to novel tasks and new circumstances" (p. 34). In a case study of a major program to increase the reading, language, and mathematics skills of railroad employees in Illinois, Gorden, Morgan, and Ponticell (1997) provide a list of "success factors" in planning instruction for adult learners. Among their recommendations are to find out the students' learning strengths and problems, use relevant adult-training materials, provide opportunities for working together and learning from one another, provide feedback, and use a variety of instructional strategies, including small-group tutorials, peer tutoring, and computer-based material.

Given what we know about adult learners (Merriam & Caffarella, 1999), these instructional strategies make sense, especially if one takes a constructivist rather than knowledge-acquisition perspective; that is, constructing knowledge, or meaning-making, is what learning is all about for adults. Few want to learn/memorize something in isolation for its own sake; rather, previous learning is connected to new through a process of meaning-making. The more authentic the training experience, that is, the more closely it is linked to the actual practice setting and needs of participants, the more likely transfer will occur.

Ensure for a supportive transfer climate. The adult educator or trainer will have varying levels of control over this factor, but there are some things that can be done in the course of the program to facilitate such support. First, since studies show that supervisory support is crucial for transfer, program planners might clarify with supervisors what is to be learned and transferred and how that transfer will be reinforced, rewarded, and assessed back on the job. Follow-up assistance, such as individual coaching, peer mentoring, a refresher course and so on, can be built into the program. Participants can also be asked to assess the organizational climate and develop action plans for implementation, especially how to overcome perceived barriers to transfer. Finally, since alignment of company mission and participant goals and person-environment fit both predicted transfer, these areas could be assessed and discrepancies dealt with as part of the training program.

The context of adult lives, and the work context in particular, cannot be underestimated in its impact on what learning takes place and whether this learning is transferred from one setting to another. Ideally, the work environment is also a learning environment where "interactions take place in the context of practice and are characterized by modeling of both mastery of practice and the process of gaining mastery" (Jacobson, 1996, p. 23). Tracey et al.'s (1995) study, in which a "continuous-learning culture" was related to post-training behaviors, is further support for this point.

Directions for Future Research

The literature on transfer is vast. This review has concentrated on empirical studies from adult education and training since 1990. While the preponderance of the research suggests several participant, program design, and organizational climate variables as being significant in transfer, there are some studies that found little or no support for the

same variables. Some of these discrepancies can be attributed to differences in research design and differences in training clientele, training program, and assessment of transfer. In order to understand learning transfer better, several recommendations for future research are presented.

First, many of the studies isolate one or two independent variables and assess their impact or correlation with learning transfer. The literature does suggest, however, that transfer is a complex phenomenon and that it is the *interaction* of a number of variables that are better able to explain such transfer. For example, while pre-training motivation is important, if considered in conjunction with training design and practice context we will have a richer understanding of the conditions under which transfer is maximized. Models representing the complexity of transfer are needed to guide this research. There are some models (Holton et al.,1997; Ottoson, 1997; Yelon & Ford, 1999) that are good starting points; however, more needs to be done to operationalize the models so that we obtain a more integrated picture of how transfer occurs.

The means of assessing transfer has been accomplished predominantly through participant self-report surveys and experimental or quasi-experimental designs. Occasionally supervisor ratings and researcher observations have been incorporated into the study design. The issue with these designs is the pre-determination of what variables impact transfer and what measures to employ to assess transfer. It would seem that more work could be done from an inductive, theory-building, rather than theory-testing, perspective. In-depth interviews with stakeholders are likely to uncover factors and interactions not thought of on pre-designed instruments. Several recent qualitative studies on transfer (Clarke, 2002; Daley, 2001, 2002; Leahy, 2002; Ottoson, 1997; Senn, 2000) have, in fact, uncovered some provocative insights, especially with regard to the transfer of continuing *professional* education. In particular, it seems that a professional's knowledge base and perspective on work, and the "workplace" itself, converge to define learning transfer from a more constructivist perspective that is different from the predominately skill-based training of business and industry.

That the majority of research on transfer has been done with skill learning and performance of those skills after training is understandable. Skills are, of course, easy to see and more tangible to measure, but this is only one kind of learning. What of the more intangible "'soft' skills which would include such items as diversity training, team building, organisational [sic] culture and informational training related to more

cognitive and affective performance improvement? 'Soft' skills do not transfer as readily" (Olsen, 1998, p.70). Further, for much of CPE, learning is related to professional knowledge, and we have little to go on here. The exceptions are Daley's (2001, 2002) and Clarke's (2002) studies of professional groups. Daley found that participants from four professions viewed acquiring new knowledge as something to be integrated into their meaning making, rather than for direct transfer. Clarke, in his study of social service workers, found that heavy work loads and time pressures, and the view that training was for personal development, impeded transfer. Given these two studies, we concur with Daley's (2001) recommendation that other professions, such as teachers, engineers, and architects, should be studied to see how other "professions integrate new knowledge" (p. 52). Her work also suggests thinking about transfer in continuing professional education as something different from training's definition of moving learning from the classroom to the workplace; rather, transfer is embedded in the construction of professional knowledge.

Finally, most research fails to account for or address the larger sociocultural context in which training and transfer take place. Ottoson (1997), for example, found that participants' experiences in a continuing education program varied depending on their particular contexts:

> One community activist described the innovation as follows, "It all boils down to economics and self empowerment." The essence of this activist's political belief became the essence of her understanding about the framework. A researcher concerned with scientific credibility stressed that the innovation was "not intuitive." A public health participant was pleased that the innovation had roots in public health, rather than medical care. (p. 98)

Billet (1998) also points out that communities of practice have different norms in terms of problem solving and what constitutes expertise. For example, while a group of nurses may have attended the same educational program, "key components of nurses' work are likely to be undertaken differently in a major metropolitan hospital, country hospital or clinic in a remote aboriginal community or minesite" (p. 12). Further, "situational factors are key determinants in knowledge construction and transformational activities such as transfer. Hence, transfer from one community (e.g. vocational college) to another (e.g. workplace) depends on the norms and types of problems and goals that

occur in those communities" (p. 13). Though little investigated, a consideration of the larger community, its "cultural differences, and structural issues" (Caffarella, 2002, pp. 206-207), is also important to planning for transfer.

In conclusion, this review of over 40 empirical studies of transfer from adult education and training has revealed that we know quite a bit about individual variables that impact transfer. Of these variables, educators and trainers have the most control over those that pertain to program content and design. However, the participants themselves bring to the program certain characteristics that can affect transfer and that can be addressed, at least partially, by the program design. Further, the immediate work environment, as well as the larger professional and sociocultural context, can either promote or hinder the application of what was learned in an educational program. It is clear from this review that transfer is a function of the interaction of many factors. It is also clear that research in learning transfer is ready to engage more complex and theory-driven questions.

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