An Update on the Learning Transfer System

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Learning transfer in organizations is a central issue in HRD. Much of the research of the 1980-1990's informed the development of the learning transfer system inventory (Holton, Bates, & Ruona, 2000). However, it's vitally important to continually enhance our understanding of the learning transfer system. In this paper, we reviewed the new findings from research studies published between 2000-2006 and suggest how they might be incorporated into Holton et al.'s (2000) learning transfer system framework.

Keywords: Learning Transfer System, Transfer of Learning

Human Resource Development (HRD) professionals work hard to provide learning opportunities that improve individual and organizational performance. However, in reality, learning is a necessary, but not sufficient, condition for improved performance. If we admit that the purpose of training is not only new knowledge but also new behavior created through transformation of experience, then the ultimate goal of training should be positive transfer to the workplace (Lim & Morris, 2006). Thus, the learning transfer problem has been one of the classical issues in HRD research. Learning transfer in organizations is defined as the degree to which trainees apply the knowledge, skills, behaviors, and attitudes gained in training to their jobs (Holton, Bates, Seyler, & Carvalho, 1997).

There has been a lot of research on transfer of learning in organizations during the past twenty years. In 2000, the Learning Transfer System Inventory (LTSI) was developed by Holton, Bates, and Ruona (2000). At the time, this represented the most comprehensive accounting of the factors that facilitate and inhibit transfer of learning in organizations. However, since the LTSI was developed, many studies have identified additional factors that influence learning transfer. Several factors are potentially significant and should likely be considered as potential additions to HRD professionals' understanding of what influences transfer of learning. Also, ongoing changes in organizations make it necessary for us to keep updating our knowledge of factors influencing learning transfer.

The purpose of this paper is to review the new additions to the scholarly literature (that is, published peer-reviewed research) on transfer of learning between 2000-2006. The new findings on factors influencing learning transfer will be discussed in terms of how they relate to the four major categories that are suggested by Holton et al. (2000). Finally, we map the factors that have emerged in the literature between 2000-2006 to Holton et al.'s (2000) framework.

Methodology

This paper is an integrative literature review which, according to Torraco (2005), is "a form of research that reviews, critiques, and synthesizes representative literature on a topic in an integrated way" (p. 356) such that new frameworks on the topic are generated. An integrative review of a mature topic like learning transfer can result in "fresh, new understanding and, in most cases, significant reconceptualizations" (p. 357) of the topic reviewed. This form of research is appropriate for this paper because we hope that the synthesis of existing research might contribute to furthering the expanding knowledge base of learning transfer.

A literature search was conducted through three electronic databases—EBSCOhost, ERIC, and PsychInfo—to collect relevant information. The keyword, "transfer", was used in combination with other keywords like "training", "learning", "learning transfer system", and "LTSI". In addition, an article-by-article search was conducted of all volumes of *Advances in Developing Human Resources, Human Resource Development Quarterly, Human Resource Development Review,* and *Human Resource Development International* from 2000 to 2006. Additional references were collected through secondary sources which had been cited in relevant literature that we uncovered.

Understanding the Learning Transfer System: A Brief Overview of Earlier Research

Even in the late 1980s, there were some systematic approaches to try to understand and label the factors that affect learning transfer in organizations. Two of the most seminal were certainly that of Baldwin and Ford (1988) and Ford and Weissbein (1997). Baldwin and Ford's work was one of the first to introduce a model which proposed three sets

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of factors related to learning transfer: trainee characteristics; training design; and the work environment. Ford and Weissbein updated Baldwin and Ford's model after reviewing twenty published peer-reviewed studies on learning transfer which had been done since 1988. They added more dimensions to our understanding of learning transfer factors. Holton et al.'s (1997) work then sought to factor-analyze nine constructs for transfer climate based on these prior two seminal contributions.

Based on the results from these previous research studies, Holton et al. (2000) developed the LTSI. They expanded Holton et al.'s (1997) framework by connecting the factors to Holton's (1996) evaluation model and also added additional factors that had emerged in the literature related to motivation (e.g., expectancy, motivation to transfer), ability (e.g., personal capacity for transfer), and trainee-characteristics (e.g., learner readiness, performance self-efficacy). Through a rigorous construct validation process, this research confirmed sixteen factors that affect learning transfer; eleven factors which they believe affect a specific training program and five factors that affect all training programs more generally. As Holton (2003) reiterates, the factors represent those most commonly identified in transfer research and have been validated by construct validation studies. Defining these sixteen factors was an important step in learning transfer system research. There is now widespread recognition that the transfer process is the result of a complex system of influences (Swanson & Holton, 2001). In addition, this work also provided HRD professionals a tool to use to diagnose that system. With the well-validated and comprehensive set of scales in the LTSI, HRD professionals can improve learning transfer systems in organizations.

Recent Findings on Learning Transfer Factors: Contributions between 2000-2006

There have been a lot of research studies about factors related to learning transfer since the landmark research of Holton et al. (2000) was conducted. As the issue of both learning and transfer has been a fundamental research area in various academic areas such as psychology, education, and management, the published articles vary widely in their topics and intended purposes. Thus, first, we selected articles that are specifically relevant to HRD research and practices. Second, we selected articles that dealt with individual performance and/or organizational outcomes (i.e. we didn't include articles that focused only on individual trainee's learning outcomes). Lastly, in order to understand new findings on factors influencing learning transfer, we selected only empirical research studies. However, we did not include those research studies that used Holton et al.'s (2000) framework with no additional factors. For example, there are a few empirical studies which applied the LTSI in the international context (e.g., Bates, Kauffeld, & Holton, 2007; Chen, Holton, & Bates, 2005; Khasawneh, Bates, & Holton, 2004; Yamnill & McLean, 2005). Even though we acknowledge the importance of these studies, given the purpose of this review we did not include them in this review. In all, this review of the literature between 2000-2006 resulted in 24 published research studies focused on the factors that affect transfer of learning.

In the following sections of this manuscript we aim to identify the key contributions of these 24 studies and how they connect with the Holton et al. (2000) model of the learning transfer system. In that model, they incorporated constructs related to trainees' *ability* to transfer learning, trainees' *motivation* to transfer, the transfer *environment*, and *secondary influences*. Since this framework effectively hypothesized the causal relationship between HRD interventions and outcomes, we believe there is value in continuing to understand new contributions in terms of where they might fit within these four categories. Some of recent findings confirm and strengthen the model, while others broaden, modify, or challenge it.

Ability

Among the four categories, ability has traditionally received the most attention in training research (Noe & Schmitt, 1986). Generally, ability has been understood as the cognitive and psychomotor skills that trainees possess which directly influence whether or not they will be able to master the content of training. Many studies have dealt with the relationship between trainees' prerequisite ability levels and mastery of the training content. Also, many of them actually showed high correlation between cognitive ability and learning transfer (Colquitt, LePine, & Noe, 2000). However, we need to broaden the concept of ability as related to transfer of learning to not only include a trainee's cognitive ability but also the elements that enable a trainee to *have the ability to transfer learning* (Holton, 1996). Therefore, as Holton et al. (2000) did, we incorporated enabling elements that we uncovered in the literature in this *ability* category. These recent findings related to ability category of learning transfer system are summarized in Table 1. In cases where the new contribution "fit" within a variable already included in the LTSI, we simply organized the new insight in relation to that category. If the new research on transfer of learning seemed to warrant the addition of a new factor (that is, did not appear to be included in the LTSI), we added it at the factor-level in Table 1. We utilize this same convention in all tables throughout this manuscript.

Transfer design. Lim and Morris' (2006) work reinforced this factor already present in the LTSI by empirically showing that the match between training content and job tasks is a strong variable affecting learning transfer. They

explained that the trainees experienced a certain degree of need to transfer learning to their jobs and tasks if training content and job functions are related. Similarly, Lim (2000) found that trainees regard the job-related reasons, such as lack of opportunity to apply on the job or information that is not directly related to their job, as the reason for low perceived transfer.

Personal capacity for transfer. A few studies during the past seven years have confirmed and/or expanded the emphasis that Holton et al. (2000) place on a trainee's capacity to transfer learning. Awoniyi, Griego, and Morgan (2002) showed that sufficient resources (such as access to appropriate facilities, equipment, funds and information), freedom (freedom to decide how to accomplish tasks) and autonomy (sense of control over work and ideas) enhanced trainees' capacity for transfer. They also found that workload pressure such as unrealistic expectations, insufficient time, and distractions limited trainees' capacity for transfer. Clarke (2002) also found out that both heavy workloads and time pressures posed significant barriers to implementing any training. In order to have the capacity to apply new knowledge to their jobs, trainees should be free from these social barriers. Similarly, Cromwell and Kolb (2004) conducted a longitude study on the relationship between work-environment factors and learning transfer. They conducted a survey at one-month, six-month, and one-year points after the training, and findings were significant for only at the one-year point. This result showed the necessity of giving trainees time to implement new strategies and learning since positive transfer was found only at the one-year point.

Workplace design. Kupritz (2002) provided us with more detailed explanation on the influence of workplace design on learning transfer. This research study showed that the office workers perceived workplace design to be one of the main organizational factors facilitating and impeding transfer. Specifically, the workers identified a broad range of design features, including physical enclosure, layout, furniture, flexibility, ergonomic design, acoustical privacy, visual privacy, appearance and window as influencing transfer. As noted by Kupritz (2002), HRD professionals need to acknowledge the pervasive mismatch between the quiet, structured classroom training environment and the noisy, interruption-filled real-world work environment. Trainees are better prepared to cope with the physical environment if training approximates the physical conditions of the actual work environment.

Opportunity to use new knowledge. When trainees lack the opportunity to use what they have learned in training, it is unlikely that a high degree of transfer will occur. At least two studies between 2000-2006 reinforced the importance of this factor and further legitimize its inclusion on the LTSI and our conception of what affects transfer of learning. Lim (2001) and Lim and Johnson (2002) showed that the opportunity to apply knowledge immediately to trainees' jobs is an important factor influencing learning transfer. Thus, assigning work projects related to training content to trainees is an effective way to promote learning transfer.

Table 1. *Recent Findings on Ability Category*

Factor	Variables
Transfer design	• Match between training content and job tasks (Lim & Morris, 2006)
Personal capacity for transfer	• Resources (access to appropriate equipment, funds, information) (Awoniyi et al., 2002) • Freedom and Autonomy in one's work (Awoniyi et al., 2002) • Environmental favorability (low workload and time pressure) (Awoniyi et al., 2002; Clarke, 2002; Cromwell & Kolb, 2004)
Workplace design	• Physical enclosure (e.g. density of the workspace and cubicles) • Layout (e.g. proximity, efficiency, sharing of the workspace) • Furniture • Flexibility • Ergonomic design (especially comfort level) • Acoustical privacy • Visual privacy • Appearance (in particular aesthetics and image) • Windows (All variables in this cell were identified by Kupritz, 2002)
Opportunity to use	• Immediate use of new knowledge in trainees' job (Lim, 2001; Lim & Johnson, 2002)

Motivation

Expectancy theory tells us that individuals will be more motivated if they perceive their effort will lead to the rewards they value. That is, in training situation, high expected utility of organizational results from performance change should result in greater motivation to transfer learning into individual performance (Holton, 1996). Therefore, factors influencing motivation to transfer are critical to better understand motivation in learning transfer. New findings that pertain to motivation in learning transfer are summarized in Table 2.

Transfer effort-performance expectations. Ruona, Leimbach, Holton, and Bates (2002) reviewed the role and value of trainee reaction measures. By analyzing how the LTSI correlated with typical Level-1 reaction measures,

they found that utility reactions rather than affective reactions are directly related to motivation to transfer. However, this does not mean that this study supported the widespread use of reaction measures. On the contrary, Ruona et al. (2002) suggested that "reaction measures have limited use in evaluating the outcomes of training and development, perhaps serving only as some indication of participants' antecedent ability and motivation" (p. 226) and that "if reaction measures are to be used at all, utility reactions may be of greater value in evaluating outcomes than traditional affective reaction" (p. 227). Lim and Morris (2006) also showed that the immediate training needs or expected utility of training content in a transfer environment is a strong variable affecting learning transfer.

*Motivation to improve work through learning***.** Naquin and Holton (2002) suggested a new construct, called "motivation to improve work through learning (MTIWL)." Since the HRD process requires trainees to acquire knowledge and transfer that knowledge, what employees are really engaged in is the process of improving work through the learning process that necessarily entails transferring learning into job application. Even though this was the first known study to examine MTIWL, Naquin and Holton's (2002) suggestion that motivation to learn and motivation to transfer should be understood as integrated is noteworthy.

Table 2. *Recent Findings on Motivation Category*

Factor	Variables
Transfer effort-performance expectations	• Expected utility (Lim & Morris, 2006; Ruona et al., 2002) • Immediate training needs (Lim & Morris, 2006)
Motivation to improve work through learning	• Motivation to learn (Naquin and Holton, 2002)

Environment

Much of recent attention on issues of learning transfer has focused on how work environment factors affect learning transfer. Even when learning occurs in training, the environmental factors may either support or inhibit application of learning on the job. These new findings that fit within the environment category are summarized in Table 3.

Supervisory support and peer support. There are a lot of studies dealing with supervisory and peer support (e.g., Cromwell & Kolb, 2004; Gumuseli & Ergin, 2002; Kontoghiorghes, 2001b, 2004; Lim, 2000, 2001; Pidd, 2004; Russ-Eft, 2002). Lim (2000) showed the detailed importance of supervisory variables: discussion with supervisors about using the new learning, the supervisor's involvement or familiarization of the training, and positive feedback from the supervisor. Similarly, Gumuseli and Ergin (2002) showed that, all other variables being the same, the group members who were oriented and supported by their managers naturally indicated a significantly greater change in their behavior and in the way they transferred their learning to their jobs than those who were in the group not supported by their managers. Cromwell and Kolb (2004) examined the relationship between four specific work-environment factors (organization support, supervisor support, peer support, and participation in a peer support network) and learning transfer. Findings were significant for organization, supervisor, and peer support; however, participation in a peer support network was not a significant factor. The fact that peer networks seemed not to have a positive effect on transfer should be investigated further to understand how peer groups might facilitate and inhibit transfer. The challenge comes in designing a system or process that will work well to link people for information and social exchange purposes without creating an overwhelming time burden for the participants.

Pidd (2004) showed that the influence of workplace social support on training transfer was moderated by the degree to which trainees identified with workplace groups that provided this support. This result indicates that the degree to which workplace support facilitates learning transfer is strongly influenced by the characteristics of individual trainees, specifically their identification with the workplace.

Goal relevance. Based on social cognitive theory and goal-setting theory, several studies have examined the effectiveness of goal-setting transfer interventions. Recently, Brown (2005) studied the degree to which transfer interventions containing proximal plus distal goals, distal goals, and no goals (being urged to "do your best") could increase trainee transfer in workplace setting. The result of this study showed that distal outcome goals are not an effective training intervention; these goals resulted in lower transfer than being urged to "do your best" or setting proximal plus distal goals. In addition, setting proximal plus distal goals has been found to be superior to being urged to "do your best." According to Brown (2005), the potential explanation for these findings is that when the environment is dynamic, people need more feedback concerning their performance. Thus, these proximal goals serve as benchmarks because they provide more regular feedback concerning performance than do distal goals. Similarly, Kontoghiorghes (2001a) found that measuring trainee knowledge immediately after training facilitates trainee learning and training transfer. In addition, Richman-Hirsch (2001) examined the effectiveness of two post-training interventions, goal-setting and self-management training, on improving learning transfer. The results of this study showed that the goal-setting trainees exhibited greater generalization of behaviors than the self-management

trainees. Also, it showed that perceptions of the work environment moderated the effectiveness of post-training interventions on learning transfer; the goal-setting trainees experienced greater transfer when they worked in an environment supporting skill acquisition and transfer, while the self-management trainees experienced few significant differences in either supportive or unsupportive environments.

Linkage to organizational goals. There have been a few studies which showed the relationship between learning transfer and organizational goals/strategies. Montesino's (2002) work is notable in that it directly related learning transfer to the strategic direction of the organization. He examined the linkage among training, the strategic direction of the organization, transfer enhancing behaviors, and usage of training on the job. The results of this study showed that "those trainees who saw more clearly the connection of the training program with the strategic direction of the organization were able to apply on the job the skills they learned in the training program in greater proportion than were the trainees who did not see that connection clearly" (Montesino, 2002, p. 103). This study emphasized the importance of linking an organization's training programs with its strategic direction in a way that is explicit, clearly communicated, and evident to the trainees and their respective managers. Similarly, Lim and Johnson (2002) also showed that trainees perceive higher transfer when their departmental goals match with their new learning.

Table 3. *Recent Findings on Environment Category*

Factor	Variables
Supervisor support and peer support	• Support from supervisor (Cromwell & Kolb, 2004; Gumuseli & Ergin, 2002; Kupritz, 2002; Lim, 2000, 2001; Russ-Eft, 2002), Availability of mentor (Lim, 2001) • Support from coworkers and peers (Cromwell & Kolb, 2004; Kupritz, 2002; Russ-Eft, 2002) • Organizational support (Cromwell & Kolb, 2004) • Trainees' identification with workplace groups (Pidd, 2004)
Goal relevance	• Type of goal-setting (e.g. proximal plus distal goals, distal goals, and no goals) (Brown, 2005; Richman-Hirsch, 2001) • Measuring trainee knowledge before and immediately after training (Kontoghiorghes, 2001a)
Linkage to organizational goals	• Perceived congruence between training and organizational goal (Montesino, 2002) • Perceived alignment of training with the organization's strategic direction (Montesino, 2002) • Match between departmental goals and trainees' new learning (Lim & Johnson, 2002)

Secondary Influences

As noted by Holton (2005), some of the most intriguing research in recent years has been focused on learner dispositional influences. These new findings that fit within the secondary influences are summarized in Table 4.

Trainee's dispositional factors. Some studies focused on innate and psychological characteristics which are not as prominent or do not appear to be attended to in the LTSI. In order to understand the role of individual differences in training success, Herold, Davis, Fedor, and Parsons (2002) divided the training they examined into several phases and analyzed how person variables interact with specific phases of training and how the outcomes from these phases affect performance in subsequent phases of training. The result of this study suggested that those trainees with high levels of emotional stability and openness to new experiences were able to acquire the necessary skills faster. Naquin and Holton (2002) showed that each individual has a dispositionally affected motivational profile for improving work through learning based on four factors: positive affectivity, conscientiousness, extraversion, and agreeableness. More studies across various jobs seems to beare necessary to draw consensus. However, it is evident that organizations whose performance depends on their employees' willingness to learn continually and use their learning to make changes in the workplace must be concerned with the dispositional profile of those employees.

Employee attitudes. Kontoghiorghes (2001b, 2004) showed that organizational commitment influence trainees' motivation to transfer as well as motivation to learn. Similarly, Naquin and Holton (2002) reported that work commitment (including work ethic, job involvement, affective commitment, and continuance commitment) influenced motivation to improve work through learning. Research studies report a conflicting result concerning the influence of job satisfaction. Whereas Kontoghiorghes (2001b, 2004) showed that job satisfaction positively influence motivation to transfer, Egan, Yang, and Bartlett (2004) reported that there is not a statistically significant relationship between job satisfaction and motivation to transfer. We need more research on the effect of employee attitudes and motivation to transfer.

Organizational learning culture. A few studies dealt with the relationship between cultural variables and motivation to transfer. Some research studies showed that cultural variables such as expectation of using new knowledge, growth opportunities (Kontoghiorghes, 2001b), organizational support for creativity (Awoniyi et al., 2002), and risk taking and innovation driven culture (Kontoghiorghes, 2004) influence motivation to transfer. Egan,

Yang, and Bartlett (2004) took more comprehensive approach to examining the relationship between organizational learning culture and motivation to transfer learning. Using the DLOQ (Dimensions of Learning Organization Questionnaire) to assess organizational learning culture, they also suggested that organizational learning culture is important in determining employees' motivation to transfer learning.

Table 4. *Recent Findings on Secondary Influence Category*

Factor	Variables
Trainee's dispositional factors	• Emotional stability (Herold et al., 2002) • Openness to experience (Herold et al., 2002) • Positive affectivity (Naquin & Holton, 2002) • Conscientiousness (Naquin & Holton, 2002) • Extraversion (Naquin & Holton, 2002) • Agreeableness (Naquin & Holton, 2002)
Employee attitudes	• Organizational commitment (Kontoghiorghes, 2001b, 2004; Naquin & Holton, 2002) • Job satisfaction (Kontoghiorghes, 2001b, 2004)
Organizational learning culture	• Expectation of using new knowledge (Kontoghiorghes, 2001b) • Growth opportunities, Opportunities for advancement (Kontoghiorghes, 2001b) • Organizational support for creativity (Awoniyi et al., 2002) • Risk taking and innovation driven culture (Kontoghiorghes, 2004) • Sven dimensions of DLOQ (continuous learning, inquiry and dialogue, team learning, embedded system, system connection, empowerment, provide leadership) (Egan et al., 2004)

Discussion

The learning transfer process can be simply summarized as follows: trainees who have the ability to transfer learning, who are highly motivated to transfer their learning, and who experience positive transfer conditions (in the environment) are more likely to actually transfer their learning. In order to improve individual performance and organizational outcomes, we should continue to explore this learning transfer process and refine our understanding of what affects it. If the process is not working well, we should analyze what the problems are and how we should intervene to improve the process.

Since Holton et al. (2000) developed the LTSI, research studies on the learning transfer system have contributed to a more comprehensive and systemic view of the factors that affect transfer. In this paper, we discussed new findings on factors influencing learning transfer in terms of how they are related to the four major categories that are suggested by Holton et al. (2000). As we mentioned above, some of them strengthen this model, while others broaden, modify, or challenge it. The factor-level findings are summarized in figure 1.

Future research needs to be done to validate these newly added variables in order to update our knowledge on HRD process in organizations. Also, research should demonstrate how the factors are interacting with each other and integrated in the learning transfer system. For example, some factors in the ability category, such as autonomy to carry out one's job, a low workload pressure, and the availability of resources, might be determined by environmental forces like supervisory leadership style, HR practices, and organizational performance.

In addition, to better understand the learning transfer system, we need to pay more attention to the factors outside the individual performance domain in Holton's (1996) model. For example, even though the factor "linkage to organizational goals" had been included in the organizational results domain in the model, Montesino (2002) showed that it can directly influence learning transfer. This conclusion is consistent with the increasing need for HRD to be a strategic partner. In sum, rather than focusing only on learning and the individual performance domain, we need to broaden our interest to the organizational results domain in order to fully understand the factors influencing learning transfer.

The recent research studies mentioned in this review are valuable not only in that they contribute to furthering our understanding of learning transfer system, but also in that they give a lot of practical guidance to HRD professionals. For example, Brown (2005) showed how a very short proximal plus distal goal-setting intervention can have a positive effect on transfer. This result recommends HRD professionals to let the trainees set a goal, discuss the goal with co-trainees, and then record it on paper. This simple but effective exercise could easily be added to many organizational training sessions.

Needless to say, the new factors in figure 1 need to be explored further by research studies conducted across various settings in order to be considered as additional constructs in the LTSI. However, an attempt to incorporate new findings into the already established model is valuable in that the model itself should be open to change in order to adjust itself to an unstable organizational environment and therefore to become more robust. The ultimate goal is not to make an elaborate model, but to diagnose problems with the right tool and to make a sound intervention that

leads to real improvement.

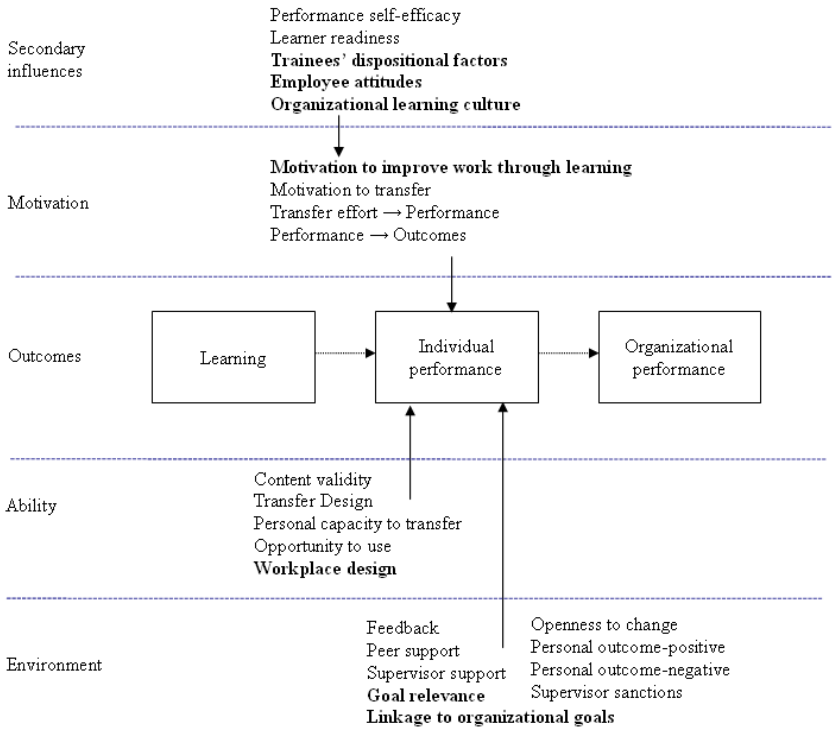

Figure 1. Update on Holton et al's (2000) learning transfer system framework

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