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LEARNING TRANSFER MEASURED WITH THE LTSI IN THE NETHERLANDS DIFFERENCES ACROSS ORGANIZATIONAL TYPES AND TRAINING TYPES

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Paper (refereed paper) for theoretical and methodological issues in HRD
of the 8th International Conference on HRD Research and Practice Across Europe
Oxford 27th -29th June 2007

Learning transfer measured with the LTSI in The Netherlands: differences across organizational types and across training types.
(theoretical and methodological issues in HRD)

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In this study in The Netherlands transfer systems have been compared across two organizational types (public and private) and across three types of training (soft skills, computer skills, job competence skills). Transfer has been measured by means of the Learning Transfer System Inventory that was filled out by 130 respondents from six organizations. MANOVA and ANOVA were used to compare transfer systems. The results suggest that transfer systems differ across organizational types, and training types.

Problem Statement, theory and research questions

In recent years, the Dutch economy has been developing into a knowledge economy, in which learning has a great deal of added value for organizations. Globalization, more and tougher competition between organizations, demands for higher quality of products and services, automation and new techniques force organizations to acquire new knowledge continuously to survive and prosper (Van Zolingen, 1995). Organizations can acquire new knowledge by training their employees. Reviews of the extend of corporate training in organizations show large investments, while, the relative and absolute number of trainees has increased significantly in the last decade (Streumer et al. 2002). A problem is that employees often do not apply the knowledge and skills acquired during training, in their work. This is the transfer problem. Or more precisely 'knowledge, skills and attitudes gained in training are considered to be transferred when they are applied in a way that is intended in training objectives, and maintained as such over the period, as intended in these training objectives (Nijman, 2004, p.11). Different theories and conceptual frameworks have been developed to describe the factors affecting transfer of training (Yamnill & McLean, 2001). Several comprehensive reviews of the literature on transfer of training have been published (Baldwin & Ford, 1988; Broad & Newstrom, 1992; Colquitt, LePine & Noe 2000, Ford & Weissbein, 1997). Research has focused on a variety of factors that influence transfer of training for example factors concerning training design (Baldwin & Ford, 1988, Lim & Johnson, 2002, Machin & Fogarty, 2003, Russ-Eft, 2002) individual differences between trainees (Baldwin, Ford & Naquin, 2000, Chiaburu & Marinova, 2005, Lim & Johnson, 2002, Lim & Moris, 2005, Mathieu, Tannenbaum & Salas, 1992, Noe, 1986, Seyler et al. 1998, Tracey at al. 2001) and factors in the organizational environment (Cromwell & Kolb, 2004, Gielen, 1995, Hawley & Barnard, 2005, Nijman, 2004, Rouiller & Goldstein, 1993, Tracey, Tannenbaum, & Kavanagh, 1995). Recently an instrument has been developed to measure transfer of training, the Learning Transfer System Inventory (LTSI) (Holton, Bates & Ruona, 2000, Holton & Baldwin, 2003, Holton, 2005). Holton et al. (2000) define the 'transfer system' as "all factors in the person, training and organization that influence transfer of learning to job performance" (p. 335). The transfer system reflects all internal and external factors that are related to trainees' transfer of training, and provides insight into the possible interrelatedness and interaction between these factors, and into their specific constellation at, for example, the level of the workplace (Fig. 1). Holton, et al. (2000) administered the LTSI to 1,616 people in a wide variety of industries (shipping, power, computer-precision manufacturing, insurance, chemical, industrial-tool construction, nonprofits, and municipal and state governments) and training programs (the municipal and state governments classes were offered by a central training organization, so that classes included representatives from a wide variety of agencies

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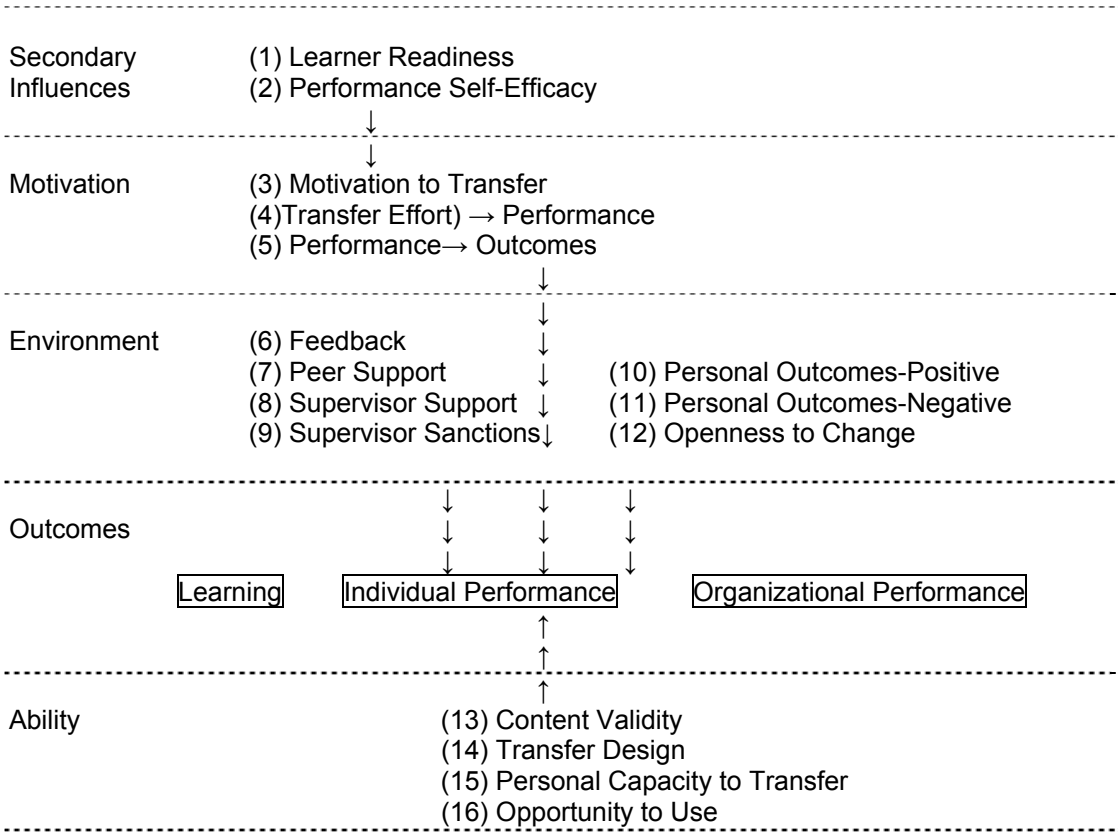
and functions such as secretaries, manufacturing operators, technicians, engineers, managers, professionals, sales people and law enforcement personnel) to develop a generalized scaling instrument that could be used across a wide range of training programs and organizations. Exploratory factor analysis resulted in 16 factors/constructs that form the backbone of the conceptual model of the LTSI (Fig 1). The LTSI (Holton et al. 2000) is a questionnaire of 68 items grouped into 16 factors. The 16 factors are categorized into four major groups: secondary influences (trainee characteristics, factor 1,2), motivation (factor 3-5), (work) environment (factor 6-12) and ability (factor 13-16) that influence transfer of training. The 16 factors (see table 1 for descriptions) distinguished in the LTSI are: 1)learner readiness, 2) performance self-efficacy, 3) motivation to transfer, 4) transfer effort expectations, 5) performance expectations, 6)feedback, 7) peer support, 8) supervisor support, 9) supervisor sanctions, 10) positive personal outcomes, 11) negative personal outcomes, 12) openness to change, 13) content validity, 14) transfer design, 15) personal capacity for transfer, 16) opportunity to use.

Figure 1 Conceptual model of the Learning Transfer System Inventory (LTSI) (Source: Holton, Bates and Ruona, 2000, p.339).



This paper will focus on the 16 factors that influence the transfer process according to the conceptual model of the LTSI. The identification and measuring of these factors makes it possible for employers to support employees so that it becomes easier for them to apply new knowledge and skills in the workplace. Yet, Holton et al. (2000) note that no optimal norm level for components of an organization's learning transfer system has been established. They suggest that, it is possible that a total overall level of the 16 factors of the LTSI, the transfer system factors, is needed-not an absolute level on any one of them (all of the items use a five point Likert-type scale from 1 = strongly disagree tot 5 = strongly agree). That is transfer system factors may operate together as a constellation to influence transfer.

Table 1 LTSI scale definitions

Factor	Definition (sample item)
Learner Readiness	Extent to which individuals are prepared to enter and participate in training (before the training I had a good understanding of how it would fit my job-related development)
Performance Self-Efficacy	An individuals general belief that they are able to change their performance when they want to (I am confident in my ability to use newly learned skills on the job)
Motivation to Transfer	Direction, intensity and persistence of effort toward utilizing in a work setting skills and knowledge learned (I get excited when I think about trying to use my new learning on my job)
Transfer Effort Expectations	Expectations that effort devoted to transferring learning will lead to changes in job performance (my job performance improves when I use new things that I have learned)
Performance Expectations	Expectation that changes in job performance will lead to valued outcomes (when I do things to improve my performance, good things happen to me)
Feedback	Formal and informal indicators from an organization about an individual's job performance (after a training I receive feedback from others about how adequate I apply what I learned)
Peer Support	Extent to which peers reinforce and support use of learning on the job (my colleagues encourage me to use the skills I have learned in training)
Supervisor Support	Extent to which supervisors/managers support and reinforce use of training on the job (my supervisor sets goals for me which encourage me to apply my training on the job)
Supervisor Sanctions	Extent to which individuals perceive negative responses from supervisors/managers when applying skills learned in training (my supervisor opposes the use of the techniques I learned in training)
Positive Personal Outcomes	Degree to which applying training on the job leads to outcomes that are positive for the individual (employees in this organization receive various 'perks' when they utilize newly learned skills on the job)
Negative Personal Outcomes	Extent to which individuals believe that not applying skills and knowledge learned in training will lead to negative personal outcomes (if I do not utilize my training I will be cautioned about it)
Openness to Change	Extent to which prevailing group norms are perceived by individuals to support the use of skills and knowledge acquired in training (people in my group are open to changing the way they do things)

Perceived Content Validity	Extent to which trainees judge training content to accurately reflect job requirements (what is taught in training closely matches my job requirements)
Transfer Design	Degree to which (1) training has been designed and delivered to give trainees the ability to transfer learning to the job, and (2) training instructions match job requirements (the activities and exercises the trainers used helped me know how to apply my learning on the job)
Personal Capacity for Transfer	Extent to which individuals have the time, energy and mental space in their work lives to make changes required to transfer learning to the job (my workload allows me time to try the new things I have learned)
Opportunity to Use	Extent to which trainees are provided with or obtain resources and tasks on the job enabling them to use training on the job (the resources I need to use what I learned will be available to me after training)

Source: Holton, Chen and Naquin (2003, p.464-465).

Some elements might be interchangeable or compensate for missing elements. For example strong reward systems might compensate for poor peer support or transfer design. Alternatively, a fit perspective might be more appropriate, whereby certain cultures require certain elements of a transfer system to be stronger than in other cultures. This perspective would explain why supervisor support is essential in a bureaucratic structure (such as a government agency), but peer support is less salient. Thus, there would be an optimal level for a given organization with a specific culture. Holton et al. (2000) suggest that it is best to search for leverage points for change. It seems likely that the particular factors in an organization's transfer system that are optimal for intervention will vary widely. The leverage point is likely to be a function of the absolute level of a particular factor and its salience in a particular organizations' culture. Fairly little theoretical research and even less empirical research has been done comparing differences in transfer systems across organizational types and across training types. Before the question of optimal norm levels of transfer factors can be considered, the basic question of how learning transfer systems differ across organizational settings has to be answered. Understanding transfer system differences across different situations would help organizations become aware of what parts of a transfer system need improvement to enhance transfer of learning. If research fails to show differences across organizations or training types, then norms can be considered in a broad sense. If there are significant differences, a more customized approach to transfer system change is needed. In 2003 Holton, Chen and Naquin have published empirical research that suggests that a difference exists. This paper will present empirical evidence from The Netherlands that supports this suggestion. The aim of this paper is to gain insight in the factors influencing learning transfer to ascertain if the transfer process differs across organizational types and training types.

Research Question 1:
Are there significant differences in transfer system characteristics between organizational types (private profit, public not-for-profit)?

Research Question 2:
Are there significant differences in transfer system characteristics between training types (soft skills, computer skills, job competence skills)?

Method

This study is based on the data of Gulen (2006). The study is a non experimental survey research in which data about transfer is collected by means of the Learning Transfer System Inventory (LTSI), a questionnaire in which transfer is operationalized by means of 68 items. The LTSI consists of two parts. One part with items that concern the specific training that respondents received, and a second part with items that concern training within the organization generally. All of the items (formulated as propositions) use a five point Likert-type scale from 1 = strongly disagree tot 5 = strongly agree.

Sample and data collection

In this study (Gulen, 2006) three training types have been distinguished (1) soft skills training, (2) computer training and (3) job competence training. During soft skills training complex interpersonal behavior such as communication, coaching and conflict management is acquired (complex, soft skills). Computer training teaches employees simple computer skills such as applying Word and Excel in their work (simple, hard skills). Job competence training is designed to develop specific (technical) competences that are important to do one's job. Next two organizational types have been distinguished: private profit organizations[3] and public not-for-profit organizations[4].

Two private organizations (an advice bureau and an a large organization from the pharmaceutical industry) and four public organizations (two hospitals and two health care organizations) took part in the research of this study.

Respondents of the organization from the pharmaceutical industry received one of the following three training courses e.g. a soft skills training (effective communication) or one of two job competence training courses (selection skills training or effective leadership). From the effective communication training 26 out of 35 respondents (74%) returned the questionnaire. From the selection skills training 10 out of 14 respondents (71%) returned the questionnaire. From the training in effective leadership eight out of 20 respondents (38%) returned the questionnaire. Seventeen employees of the advice bureau received a computer training (MS-projects) and nine respondents (53%) returned the questionnaire.

The soft skills courses (about conflict management and communication) of two public organizations are part of the empirical research. From health care organization A 36 out of 90 respondents (40%), that received training in conflict management, returned the questionnaire. From hospital A 14 out of 30 respondents (47%) that received the training in communication returned the questionnaire. For the computer training in a public organization, hospital B, eight of 31 respondents (26%) returned the questionnaire. For the job competence training (dispensing medicine) in a public organization, health care organization B, 19 out of 64 respondents (30%) returned the questionnaire.

To sum up the total number of respondents that have received a training is 130, 53 (41%) work in a private organization and 77 (59%) work in a public organization. From the 130 respondents, 76 (59%) received a soft skills training, 17 (13%) a computer skills training and 37 (28%) a job competence skills training.

Data analysis

Multivariate analysis of variance (MANOVA) was used to explore whether differences existed in transfer system characteristics among organizational types and training types.

Post hoc comparisons with univariate analysis of variance were then used to explore the findings in more detail. A Bonferroni adjustment was used because it is most appropriate for multiple analysis when overall type I error is taken into account. Prior to these analyses, the data were examined for adherence to MANOVA assumptions, and outliers were also investigated. No significant violations of assumptions or influential outliers were discovered. SPSS statistical software was adopted to conduct the statistical analysis.

For the 16 scales of the LTSI a Cronbach's alpha of minimal .60 was permitted.

[3] Private profit organizations are hereafter named private organizations to improve the readability of the paper.

[4] Public not-for-profit organizations are hereafter named public organizations to improve the readability of the paper.

Results

First the first research question will be answered:

1. *Are there significant differences in transfer system characteristics between organizational types (private, public)?*

In total 130 respondents gave their opinion, 53 respondents work in private organizations (41%) and 77 respondents work in public organizations (59%).

MANOVA analysis shows statistically significant differences (Wilks' lambda = 0.554, F = 5,68) between private and public organizations, indicating that transfer system characteristics differ across organizational types. When comparing private organizations and public organizations (table 1) learner readiness (gem. = 3.31 versus 2.73), negative personal outcomes (gem. = 2.27 versus 1.89), peer support (gem. = 3.71 versus 2.94), supervisor sanctions (gem. = 3.41 versus 2.92), openness to change (gem. = 3.55 versus 3.28) and performance self-efficacy (gem. = 3.77 versus 3.56) are experienced significantly higher by employees of public organizations than by employees of private organizations. Employees in private organizations only experience positive personal outcomes (gem. = 2.29 versus 1.76) higher than employees of public organizations.

Comparison of the two organizational types on the four groups of factors from the LTSI (secondary influences, motivation, environment and ability, see Fig.1) shows no differences between the transfer systems characteristics of the public and the private organization for 'motivation' and 'ability' (see table 1). 'Secondary influences' and 'environment' give a different picture. For the public organizations both scales of 'secondary influences' (learner readiness and performance self-efficacy) are higher than in private organizations. Also for the public organizations the scales of 'environment' e.g. peer support, openness to change, negative personal outcomes and supervisor sanctions are significant higher. Striking is that within this group of factors employees of private organizations experience positive personal outcomes significantly higher than employees of public organizations.

Table 1. Comparisons by Organizational Types.

	Organizational Type Means				
	Overall	*Private*	*Public*	*F*	*P*
Training specific					
Learner Readiness (SI)	3.07	2.73	3.31*	19.90	<0.001
Motivation to Transfer (M)	3.32	3.35	3.29	0.21	0.651
Positive Personal Outcomes (E)	1.97	2.29*	1.76	25.34	<0.001
Negative Personal Outcomes (E)	1.97	1.89	2.27*	7.84	<0.001
Personal Capacity to Transfer (A)	3.55	3.53	3.57	0.15	0.696
Peer Support (E)	3.39	2.94	3.71*	35.46	<0.001
Supervisor Support (E)	2.63	2.75	2.55	2.11	0.149
Supervisor Sanctions (E)	3.21	2.92	3.41*	17.70	<0.001
Perceived Content Validity (A)	3.61	3.51	3.67	1.74	0.189
Transfer Design (A)	3.79	3.68	3.86	2.33	0.130
Opportunity to use (A)	3.65	3.58	3.70	1.51	0.221
Training in General					
Transfer Effort Expectations (M)	3.60	3.50	3.66	1.94	0.166
Performance Expectations (M)	3.03	3.14	2.96	3.00	0.086
Openness to Change (E)	3.43	3.28	3.55*	5.92	<0.001

Performance Self-Efficacy (SI)	3.68	3.56	3.77*	4.97	<0.001
Feedback (E)	2.89	2.76	2.97	3.17	0.077

Note: Overall N = 130, Private N = 53, Public N = 77, factors with a * score significantly higher; SI= Group Secondary influences, M=group motivation, E=group environment, A=group ability.

Now the second research question will be answered:
2. Are there significant differences in transfer system characteristics between training types (soft skills, computer skills, job competence skills)?
MANOVA analyses shows significant differences (Wilks' lambda = 0.465, F = 3,26) between the three different training types indicating that transfer system characteristics differ across training types (soft skills, computer skills and job comparison training). Further a post hoc comparison, the Bonferroni test, has been done to analyze differences between the group means of pairs of training types. The between-subjects ANOVA shows that six of the 16 factors differ significantly. Comparison of the soft skills training with the computer skills training shows that four of the 16 factors differ significantly. The scores of the scales personal capacity to transfer (gem. = 3.78 versus 3.32), peer support (gem. = 3.58 versus 3.09), perceived content validity (gem. = 3.68 versus 3.24) and transfer design (gem. = 4.00 versus 3.37) are significantly higher for soft skills training than for computer training. For computer training only one scale is significantly higher than by soft skills training, e.g. feedback (gem. = 3.59 versus 2.97).
Comparison of soft skills training and job competence training shows significant differences between three of the 16 factors. The scales personal capacity to transfer (gem. = 3.78 versus 3.20), opportunity to use (gem. = 3.79 versus 3.45) and openness to change (gem. = 3.66 versus 3.17) score higher by soft skills training than by job competence training. Comparison of the computer training with the job competence training shows only a difference on one of the 16 factors e.g. feedback (gem. = 3.59 versus 2.97). This factor is judged higher by the respondents of the computer training than by the respondents of the job competence training.
Comparison of the three training types on the four groups of factors from the LTSI (secondary influences, motivation, environment and ability, see Fig.1) shows only significant differences in the groups 'environment' and 'ability'. The groups secondary influences and motivation show no differences (Table 2).

Table 2. Comparisons by Training Types.

		Training Type Means				
	Overall	*Soft Skills*	*Computer Skills*	*Job Comp. Training*	*F*	*P*
Training specific						
Learner Readiness (SI)	3.16	3.12	3.34	3.16	0.59	0.554
Motivation to Transfer (M)	3.44	3.37	3.74	3.47	2.07	0.130
Positive Personal Outcomes (E)	1.93	1.93	1.96	1.94	0.01	0.987
Negative Personal Outcomes (E)	2.12	2.13	1.78	2.26	2.37	0.098
Personal Capacity to Transfer (A)	3.56	3.78	3.32	3.20	14.35	<0.001
Peer Support (E)	3.50	3.58	3.09	3.53	3.42	0.036
Supervisor Support (E)	2.57	2.56	2.53	2.63	0.14	0.871
Supervisor Sanctions (E)	3.34	3.36	3.37	3.28	0.27	0.768
Perceived Content Validity (A)	3.60	3.68	3.24	3.61	3.02	0.052

Transfer Design (A)	3.84	4.00	3.37	3.72	7.86	<0.001
Opportunity to use (A)	3.68	3.79	3.64	3.45	5.25	<0.001
Training in General						
Transfer Effort Expectations (M)	3.69	3.64	3.84	3.72	1.02	0.362
Performance Expectations (M)	3.06	3.07	2.96	3.07	0.24	0.791
Openness to Change (E)	3.50	3.66	3.49	3.17	8.89	<0.001
Performance Self-Efficacy (SI)	3.68	3.69	3.50	3.74	1.21	0.301
Feedback (E)	3.05	2.97	3.59	2.97	7.12	<0.001

Note: Overall N = 130, Soft Skills N = 76, Computer Skills N = 17, Job Competence Training N = 37, SI= Group Secondary influences, M=group motivation, E=group environment, A=group ability.

To sum up a difference between the characteristics of transfer systems of different types of organizations (private and public) and between different types of training (soft skills, computer skills and job competence training) has been found, but not for all factors and also not for all groups of factors of the LTSI. Yet this study confirms the findings of the study of Holton et al. (2003) that transfer systems are significantly different across organizational types and training types.

Limitations of the study

A specific and limited set of 6 organizations with a limited number of respondents was used in this study. The sample consisted of two private organizations (an advice bureau and an a large organization from the pharmaceutical industry) and four public organizations (two hospitals and two health care organizations). Also the response rate was rather low for the computer training (26%), and for the job competence training (30%). Therefore the individual organizations could not be compared. Further this study does not represent all Dutch organizations or all specific Dutch transfer system characteristics. Secondly the LTSI data are based on self report and not on the observation of actual behavioral data on the transfer of training in the workplace.

Conclusions

In the first place the transfer systems of different organizational types have been compared (table 1). Overall the results show that employees in private organizations experience more positive rewards compared with employees in public organizations. Employees in public organizations experience on the one hand being personally more capable to apply the training in their workplace, that is more open to change, and offers more peer support than employees in private organizations but on the other hand they experience more supervisor sanctions and negative outcomes. Overall it seems that work 'environment' supports transfer of training more in the public organizations than in private organizations this study. Further trainee characteristics (secondary influences: learner readiness and performance self-efficacy) support transfer of training more in public organizations than in private organizations in this study. Finally the results indicate that the groups 'motivation' and 'ability' show no significant differences across organizational types This means that 'motivation' and 'ability' are independent of organizational type in this study.

In the second place the transfer systems of different training types have been compared. The employees that received soft skills training score higher on the ability group, they experience more openness to change, they have more opportunities to use their new skills and they receive more support from their peers than employees that received computer training or job competence training. A striking result is that employees that received computer training experience most feedback. Further the factor supervisor support is rather low and peer support is higher for all three types of training. An explanation is that most respondents of this study work in teams, in which peer support is more important for transfer and the supervisor is further removed from daily work.

On ‘environment’ and ‘ability’ most of the factors score higher for public organizations meaning that the work environment and the possibilities to apply the training are better for trainees in public organizations. The scores on the groups secondary influences and motivation show no significant differences across different training types. This means that trainee characteristics (secondary influences) and trainees’ motivation to transfer training are independent of the training type.
The results show that the transfer of training in both private and public organizations is supported by the adequate design of the training, e.g. the accuracy with which the training reflects job requirements, by the time, energy and space of the trainee to make changes required to transfer training to the job, and by the opportunity to use the training on the job. But the most striking result is that transfer design is the factor offering most support for transfer of training systems both for different organizational types and different training types.

It is interesting to mention a few similarities between the data from this study in The Netherlands and two other studies that applied the LTSI in research on transfer of training in the USA (Holton et al., 2003) and in Thailand (Yamnill & McLean, 2005). In the first place transfer design of the training, performance self-efficacy and transfer-effort expectations of the trainee and the opportunity to use the training on the job are the four most important factors to explain transfer of training in this study in The Netherlands. These results correspondent with the results of both the studies in the USA and Thailand. In the second place of all four groups of factors, secondary influences, motivation, environment and ability, only factors in the group environment show significant differences between organizational types in all three countries. This suggests that the work environment differs between public and private organizations in all three countries. In the third place on most transfer system factors rather low levels (most responses around 3) have been reported in all three countries. Finally, in all three countries transfer systems are significantly different across organizational types and training types.

Implications for HRD

The results of this study show that transfer systems differ significantly across organizational types and training types. This means that interventions will have to be matched to organizational types and to training types.

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