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Linking “Knowing” and “Doing” The Evaluation of Transfer Competence

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JANA SEIDEL

Linking “Knowing” and “Doing”

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The Evaluation of Transfer Competence

Abstract

Employers have become aware of the crucial discrepancy between learning success in training and the actual application of the acquired knowledge to everyday working situations. Excellent learning results notwithstanding, a transfer does not necessarily occur to the extent it is supposed to. Therefore, evaluating the effectiveness of in-house training is highly relevant for employers. In order to understand better this gap between “knowing” and “doing” the purely cognitive focus of traditional transfer research was combined with modern competence research. This led to the idea that transfer is caused by individual transfer competence. Based on a theoretical model, an instrument was developed and verified to measure transfer competence as well as its influencing attributes in a longitudinal study.

The statistical analysis of the quantitative data confirms that “knowledge about transfer barriers” and “applicability” are suitable predictors of transfer competence. Furthermore, preliminary data lends support to the assumption that transfer competence is an important predictor for effective transfer of training knowledge to the working situation.

The results show that transfer motivation and transfer skill are not time-stable. This leads to the assumption, that these variables determine transfer competence on a different scale. In order to gain a high level of transfer competence, it has to be developed and strengthened permanently – in a first step during the training and in a second step on the job.

Keywords: Transfer, Effectiveness of Education, Competence, Training

1 Introduction

Many companies still consider success in professional education to be closely connected to employee satisfaction or learning success. However, companies are increasingly forced to justify their expenses on further education, especially with respect to the long-term effectiveness of such training. Consequently, this gives rise to the following requirements: firstly the need for a definition of the desired long-term effects expected to arise from an investment in training, and secondly the need for suitable criteria and methodologies to systematically apply to measure these target variables.

An essential criterion to evaluate long-term effects of professional training is the employee's ability to apply newly acquired training knowledge to their actual working situation. This requires a change of working behavior in accordance with the contents of the training activities. According to this, the (long-term) effectiveness of further professional training is crucially influenced by the extent and quality of the *transfer* from the training situation to the everyday working situation.

But what actually causes employees to apply newly acquired knowledge to their everyday working situations? To provide insight regarding the transfer of knowledge acquired during in-house training the construct of "transfer competence" was introduced. This comprises of, firstly, the *motivation* to use acquired knowledge and, secondly, of the *ability* to transfer knowledge and behavioral patterns. It is reasonable to assume that "transfer competence" can help to bridge the gap between "knowing" and "doing" and therefore is an important prerequisite for change in employee behavioural patterns.

Although transfer is analysed in different fields of research, "transfer competence" as a separable and discrete concept has, until now, not been scrutinised. Nevertheless, research on this concept appears to be of a high practical interest, particularly for companies which invest substantial amounts of money in employee training.

2 State of Research

The evaluation of knowledge transfer as an indicator of training effectiveness is a complex proposition. Today's transfer research is based on results presented by various scientific disciplines which focus on transfer from their individual research perspectives. Pedagogical psychology examines approaches to instructional theory on authentic, problem-oriented learning in order to avoid "inert knowledge" and, respectively, to transform it into applicable knowledge (e.g. Gerstenmaier and Mandl, 1999; Law and Wong, 1996; Renkl, 1996). Research in the field of teaching and learning has explored didactical requirements of teaching that facilitate the transfer of acquired knowledge by turning from one task to another one which is contextually similar (see overview in Sonntag, 1996; Thorndike, 1914). Work and organisational psychologists deal with the analysis of learning potentials concerning job activity (Frei et al., 1984; Hacker and Skell, 1993) and develop approaches for work and organisational structures which are conducive for learning (Gebert and von

Rosenstiel, 2002; Wilkesmann, 1999) and for learning at work itself (Sonntag, 2000 as well as the articles featured in Mandl et al., 2000).

Aebli (1993) refers to a theory of "application" when thinking about transfer and focuses the internal relationship between situations and reactions. If you have situations with existing cognitive schemes for your action it is called a cognitive application. But these schemes are flexible and can be adapted due to different situations (Aebli, 1993). A transfer has taken place in situations that are different (but similar) to the situation in which a cognitive scheme has been built. In contrast, Aebli calls it recognition if the situations are identical (Aebli, 1978).

Messner (1978) uses the term "behaviour" when analysing transfer. He differs between different situations in which a specific behaviour is shown. He calls it reproduction if a person shows a special behaviour in an unmodified way and under familiar conditions; if the person shows a slightly changed behaviour in a similar situation he calls it a transformation. A transfer can only exist if situations change significantly (Messner, 1978). A growing variance between the situation of application and the learning situation means that it is getting more difficult to transfer a scheme (Messner, 1978; Aebli, 1993).

The analysis of empirical research shows that recent investigations concentrate on influencing factors and do not attempt to explain the (lack of) transfer itself (Hager et al., 2000; Hasselhorn and Mähler, 2000). Furthermore, investigations focus on partial aspects of transfer processes only, e.g. the impact of personal and situational factors on learning success or performance on the job (cp. the meta-analysis of Colquitt et al., 2000; Fecteau et al., 1995; Mutzeck, 1988; Strittmatter-Haubold, 1995). Support of superiors and colleagues has been determined to be particularly essential factors for transfer (Kehr et al., 1999).

Until now, no detailed model has been elaborated that could be used to explain and measure the ability to bridge the gap between learning and doing (Hasselhorn and Mähler, 2000). However, research agrees on knowledge acquisition being a necessary condition for successful transfer (von Cranach and Bangerter, 2000). Nevertheless, motivation, considered highly important for any effort taken, has not been examined specifically in the context of training transfer (Kehr et al., 1999).

An important approach regarding this problem is presented by Mutzeck (1988), who analysed subjective theories about teachers trained in how to deal with disruptions in class. Mutzeck was able to prove that teachers are more likely to realise an intended action, if they feel competent enough and are interested and sufficiently motivated to transfer previously acquired knowledge to their working environment. Kehr et al. (1999) deliver a further important insight by showing that motivation, more than cognitive abilities, has a significant influence on the implementation of a transfer intention.

In order to develop and enhance knowledge about bridging the gap between "knowing" and "doing", the approach was to combine the purely cognitive focus of traditional transfer research with

research on motivation as well as professional skills and abilities that recent competence research, in particular, is concerned with. Therefore, the idea was established that transfer, as an intentional action, is caused by individual *transfer competence*.

Today, various sciences, including psychology, educational sciences, sociology and organisational research, deal with competence as a field of research. As each discipline analyses competence from its own analytical perspective, competence is considered a multi-level phenomenon, and understanding and interpretation differ according to the various prevailing insights (cp. Weinert, 2001 about the absence of a differentiated "competence" term). Nevertheless, all approaches consider competence to be a determining factor for the sustainable acting of a person (cf. Pawlowsky et al., 2005).

In line with Weinert (2001) competences are constituted by the complex interaction of knowledge and beliefs. According to his criteria of a psychological-pedagogical definition of competence, handling a complex task involves several necessary requirements, i.e cognitive, motivational, ethical, volitional and social components. Furthermore, coping with dynamic and complex task structures essentially requires the event of learning. Erpenbeck and Heyse (1999) also emphasise the importance of the constant development of a competence.

Sonntag and Schaper (2006) focus on professional competence. For an analysis of this concept approaches have to be applied that essentially comprise fundamentally cognitive-oriented aspects such as the action regulation theory, as well as approaches focusing on motivational, social and emotional conditions of working activity. Therefore, it is necessary to reflect the contextual nature of professional competences. Competences have to be adapted to a wide range of requirements and therefore need to be trained bearing in mind the particular context in which they are supposed to be applied (Klieme et al., 2007).

Similar to professional competence, transfer competence can be defined as a combination of cognitive skills and motivational factors (Erpenbeck and von Rosenstiel, 2007) with a high contextual specificity. There are two attributes which constitute individual transfer competence:

- transfer motivation (the motivation to use acquired knowledge); and
- transfer skill (the ability to transfer knowledge and behavioral patterns).

A higher level of transfer competence is generally assumed to enhance the probability of employees changing their working behavior according to the contents of training activities. Transfer competence, in turn, is influenced by a large number of different factors which relate both to the individual and the working situation. The most essential ones have been analysed in this study and will be briefly outlined in the following.

Factors related to the individual cover cognitive as well as motivational aspects. Cognitive aspects particularly refer to two different types of knowledge. Expertise, on the one hand, is a requirement;

it includes procedural and conceptual knowledge (1). However, despite having expertise, employees might not start making transfer attempts due to a lack of time or support from supervisors, due to other organisational and personal problems. Thus, on the other hand, transfer competence is influenced by the extent of knowledge on how to deal with (possibly) occurring transfer barriers (2). Employees need appropriate techniques to overcome these transfer barriers.

The motivational factors are derived from Deci and Ryan's Self-Determination Theory (1985). This theory postulates three psychological needs which motivate the individual to initiate behaviour and specify nutrients that are essential for the psychological health and well-being of the individual. These include the needs for autonomy (3), competence (4) and social connectivity (5). It can be assumed that the development of (integrated) extrinsic and intrinsic transfer motivation can be positively influenced by targeted fostering of these three factors.

Factors related to the situation cover aspects of both the training and the work environment. The former includes the employees' perception of the training benefit for their own work (6). Furthermore, a scale has been developed to measure the extent of support the trainer offers to participants in planning and initiating future transfer activities (7). This scale particularly aims at verifying the effect of preparation of transfer activities during the training on the development of transfer competence.

Attributes of the work environment include individual target goals agreed on before the training. Assumingly, if common goals and expectations have been discussed and agreed on between participant and superior (8), transfer competence increases. Finally, it is essential to offer different options to perform transfer, as competences can only be developed with exercise. Application possibilities can be created by senior personnel (von Rosenstiel, 2000), by the employees themselves or the framework conditions allow for the creation of application scenarios (Geldermann et al., 2005). Therefore, the applicability of training knowledge in working routines is included as the last independent variable (9).

Due to time restrictions, however, this article focuses only on two factors affecting the transfer competence: (2) "knowledge about transfer barriers" and (9) "applicability" (for further results of this study see Seidel, 2012). Various studies have examined the influence of "applicability" on the transfer rates (learning transfer system inventory by Holton et al., 2000; survey of Ford et al., 1992). Results have shown that applicability is of great relevance for successful transfer. However, researchers have not been able to determine with certainty whether applicability is a constituting (Ford et al., 1992), or an influencing factor of transfer (Holton et al., 2000). Applicability assumingly has a direct influence on transfer competence and thus affects the transfer process itself indirectly.

The "knowledge about transfer barriers" is of special interest due to the fact that it has not been examined neither in research nor by companies offering training to their employees. Responsibility for teaching techniques on how to handle arising transfer problems and how to better reflect their

application in different working situations does not only pertain to superiors but is an integral part of the training. We assume that knowledge about transfer barriers is of great importance for the development of transfer competence and therefore devote special attention to it in this study.

3 Hypotheses and Method

To measure competence a self-assessment was approached. This method appears to be most suitable for the analysis of transfer competence, as it adequately gives consideration to different spheres of human actions and decisions. Mutzeck (1988) argues that, whether or not previously obtained knowledge is applied depends less on the actual level of competence and rather on the *self-perception* of one's own competences. Standardised questionnaires were developed and the scales verified in a pilot study in June 2008. The aim was to accomplish the first task: to develop an instrument to verify and to measure "transfer skill" and "transfer motivation" as well as attributes influencing transfer competence.

Subsequently, the main survey took place from July to December 2008. In order to record the individual changes of transfer competence, the survey was prepared as a longitudinal study. Participants were interviewed with respect to their individual perceptions of relevant attributes at three different stages; at the beginning of the training (t_1), at the end of the training (t_2) and six months afterwards (t_3).

Based on a causal perspective, the following hypotheses were developed and tested:

1. Transfer skill and transfer motivation are influenced by:
 - the knowledge about how to deal with transfer barriers at work, and
 - the opportunity to apply this knowledge to existing working routines (Hypothesis 1).
2. Higher levels of transfer competence cause higher rates of transfer attempts (Hypothesis 2).

These hypotheses were tested on data gathered from young professionals of a big accounting and consulting company. The sample consists of employees who had participated on a job related professional training focusing on auditing techniques. The sample size varied between 123 participants in t_1 and 79 in t_3 .

The questionnaires comprises of 11 factors, each constituting of four to six items. Data for "transfer motivation" (four items) was collected three times, data for "transfer skill" only in t_2 and t_3 . The scales "applicability" (five items) and "knowledge about transfer barriers" (four items) were included in survey t_3 . The applied scales mainly consist of self-developed items, but a few items have been derived from the rating system for evaluation of work activities by Hacker et al. (1995) and some from Sonntag et al. (2005). A six-level answering-scale ranging from 1= "does not apply at all" to 6 = "applies totally" was offered to the respondents. One item of each scale is shown as an example below:

- Transfer motivation: "I would really like to contribute to the annual audit of internal control system".
- Transfer skill: "I know how to apply my knowledge when meeting a customer".
- Applicability: "I have already experienced on the job what we learned in the training".
- Knowledge about how to handle transfer barriers: "I am able to proactively work on problems that might occur when applying acquired knowledge to my present working situation".

In t_3 , one indicator was used to measure the realisation of transfer attempts. Participants were asked to respond according to a six-level answering-scale, ranging from 1="never" to 6="frequently".

- Transfer attempts: "Have you tried to apply your newly acquired knowledge and techniques to your daily working situation?".

SPSS 17.0 and Amos 17.0 were used for the quantitative analysis of the data. The analysis methods include factor analysis to validate the scales, correlation analysis and descriptive evaluations. Furthermore, the level of influence of non-dependent variables is estimated by multiple regressions.

4 Results

Due to high response rates, a total of 123 questionnaires were collected in t_1 (response rate 100%), 107 questionnaires in t_2 (100%) and 79 questionnaires in t_3 (83%). 80% of the respondents are between 23 and 29 years old, 60% of the participants are male and 40% are female. The few missing figures (between 0.98 and 1.29%) were imputed with the expectation-maximisation-algorithm (Igl, 2004).

Factor analysis with a sub-sample confirmed the identifiability of the latent variables in the pilot-study. Thus, the questionnaires were used for the longitudinal study. Table 1 shows the reliability of the scales that are examined in the presented article.

Table 1: Reliability Indices (Cronbach's Alpha)

Survey	Scale	Reliability
t_1	Transfer motivation	Cronbach's $\alpha = .770$
t_2	Transfer motivation	Cronbach's $\alpha = .817$
	Transfer skill	Cronbach's $\alpha = .846$
	Knowledge about transfer barriers	Cronbach's $\alpha = .923$
t_3	Transfer motivation	Cronbach's $\alpha = .806$
	Transfer skill	Cronbach's $\alpha = .821$
	Applicability	Cronbach's $\alpha = .923$

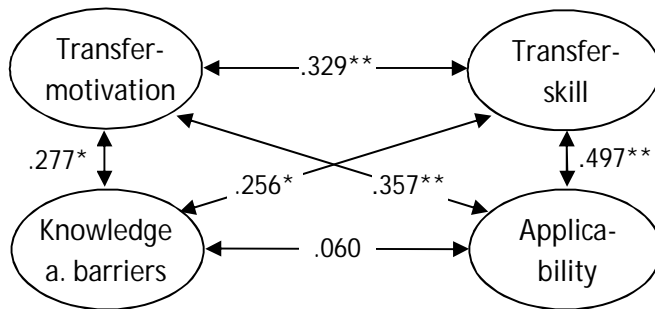
According to a first descriptive analysis of the data collected, “transfer motivation” seems to be at a constant high level in t_1 , t_2 and t_3 . “Transfer skill”, however, appears to be perceived in diverse ways: After the training, half of the employees generally trust their “transfer skill”, whereas the other half of the participants are less confident. Surprisingly, this result does not change in t_3 . Although respondents have gathered working experience for six months, their diverging perception of “transfer skill” has remained unchanged.

Hypothesis 1: Transfer skill and transfer motivation are influenced by

- knowledge about how to deal with transfer barriers at work, and
- the opportunity to apply this knowledge to existing working routines (applicability).

This hypothesis has been tested by calculating the Pearson and Spearman-Rho correlation coefficient (Backhaus et al., 2006). Results are shown in Figure 1.

Figure 1: Results of the Correlation Analysis in t_3 (Hypothesis 1)



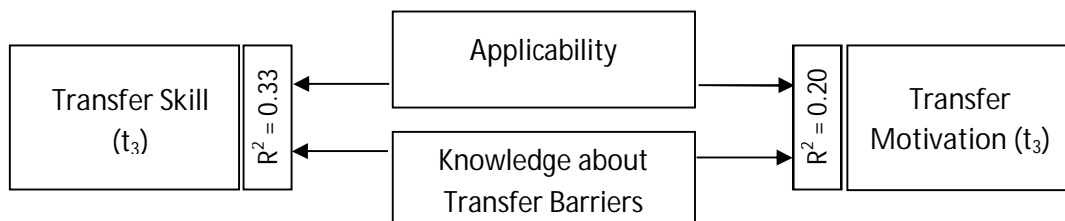
* The correlation is significant on the level of 0.05 (2-sided).

** The correlation is significant on the level of 0.01 (2-sided).

It appears that the perceived “transfer motivation” and “transfer skill” are significantly, but not very strongly connected to “knowledge about transfer barriers” ($r=0,277$ and $r=0,256$), whereas the “applicability” shows a high significance and much stronger connection with both of the aforementioned variables ($r=0,357$ and $r=0,497$). This leads to the assumption that six months after the training the work environment is more important for transfer competence than the characteristics of the person.

Multiple regression analysis confirms that “knowledge about transfer barriers” and “applicability” are suitable predictors for “transfer skill” and “transfer motivation” (see Figure 2).

Figure 2: Regression Models (Hypothesis 1)



The predictive power of the explanatory factors is considerably higher in the case of “transfer skill” than in the case of “transfer motivation”. Indeed, “applicability” and “knowledge about transfer barriers” can explain 33% of the variance for in case of “transfer skill” compared to 20% in case of “transfer motivation” (see Tables 2 and 3).

Table 2: Regression Model for “Transfer Motivation” (full-wise regression analysis)

Regression Model (N=79)								
Model	R	R-Square	Corrected R-Square			Standard error of the estimator		
1	.442	.195	.174			.64501		
Model 1: Influencing variables : (Constant), Applicability_t ₃ , Knowledge about transfer barriers_t ₃ Dependent variable: Transfer motivation_t ₃								
Model		Non-standardised coefficients		Standard. coefficient	t-Value		F-Statistics	
		<i>Regression coefficient B</i>	<i>Standard error</i>	<i>Beta</i>	<i>t-Value</i>	<i>Sig.</i>	<i>F-Value</i>	<i>Sig.</i>
1	(Constant)	3.358	.454		7.390	.000	9.228	.000
	Applicability_t ₃	.161	.048	.345	3.346	.001		
	Knowledge barriers_t ₃	.236	.094	.259	2.518	.014		
Model 1: Influencing variables: (Constant), Applicability_t ₃ , Knowledge about transfer barriers_t ₃ Dependent variable: Transfer motivation_t ₃								

Table 3: Regression Model for “Transfer Skill” (full-wise regression analysis)

Regression Model (N=79)								
Model	R	R-Square	Corrected R-Square			Standard error of the estimator		
1	.570	.325	.307			1.00176		
Model 1: Influencing variables : (Constant), Applicability_t ₃ , Knowledge about transfer barriers_t ₃ Dependent variable: Transfer skill_t ₃								
Model		Non-standardised coefficients		Standard. coefficient	t-Value		F-Statistics	
		<i>Regression coefficient B</i>	<i>Standard error</i>	<i>Beta</i>	<i>t-Value</i>	<i>Sig.</i>	<i>F-Value</i>	<i>Sig.</i>
1	(Constant)	.406	.706		.575	.567	18.258	.000
	Applicability_t ₃	.404	.075	.510	5.400	.000		
	Knowledge barriers_t ₃	.354	.146	.229	2.431	.017		
Model 1: Influencing variables : (Constant), Applicability_t ₃ , Knowledge about transfer barriers_t ₃ Dependent variable: Transfer skill_t ₃								

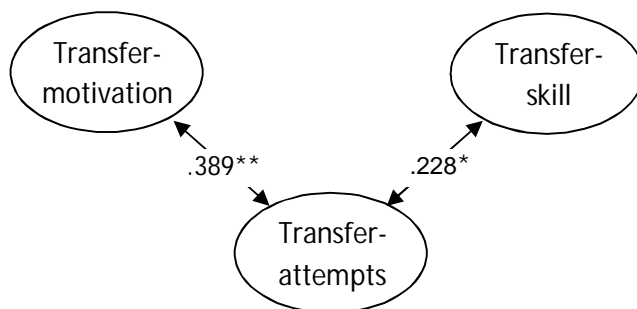
Each of the mentioned explanatory factors has significant predicting power and Fisher's F-test confirms the hypothesis that the proposed regression model fits the data well (Backhaus et al., 2006). Thus, Hypothesis 1 can be accepted: "knowledge about transfer barriers" and, even stronger, "applicability" evidently have significant influence on "transfer motivation" and "transfer skill".

Hypothesis 2: Higher levels of transfer competence cause higher rates of transfer attempts.

Descriptive analysis has shown that the majority of respondents has made attempts to apply their acquired knowledge to their working situation: 87% of participants checked boxes in the upper half of the scale (including "partly", "predominantly" and "frequently"), in fact, 37% chose the highest possible specification "frequently".

Hypothesis 2 has been tested with the help of the correlation analysis and, subsequently, regression analysis (see Figures 3 and 4). Due to the fact that "applicability" does not match normal distribution, the correlations with this scale have been calculated with Spearman-Rho (Backhaus et al., 2006). The correlation coefficient is significant for "transfer skill" and "transfer attempts" ($r=0,228$) and even stronger for "transfer motivation" and "transfer attempts" ($r=0,389$).

Figure 3: Results of the correlation analysis (Hypothesis 2)

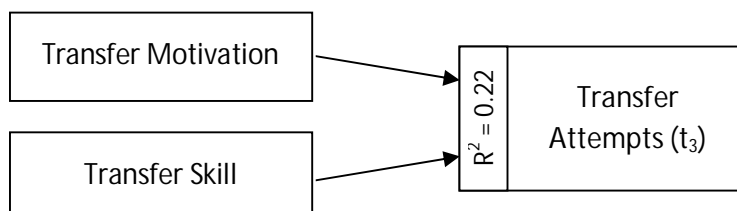


* The correlation is significant on the level of 0.05 (2-sided).

** The correlation is significant on the level of 0.01 (2-sided).

A causal interpretation of the results of regression analysis shows that the determining factors of transfer competence are important predictors of "transfer attempts" (Figure 4). "Transfer motivation" and "transfer skill" provide an explanation for approximately 20% of the transfer attempts' variance.

Figure 4: Regression Model (Hypothesis 2)



Each of the influencing factors has significant predicting power and Fisher's F-test confirms the hypothesis that the proposed regression model fits the data well (see Table 4). Thus, Hypothesis 2 can be accepted, too.

Table 4: Regression Model for "Transfer Attempts" (full-wise regression analysis)

Regression Model (N=79)								
Model	R	R-Square		Corrected R-Square		Standard error of the estimator		
1	.471	.222		.201		.998		
Model 1: Influencing variables: (Constant), Transfer motivation_t ₃ , Transfer skill_t ₃ Dependent variable: Transfer attempts_t ₃								
Model		Non-standardised coefficients		Standard. Coefficient	t-Value		F-Statistics	
		<i>Regression coefficient B</i>	<i>Standard error</i>	<i>Beta</i>	<i>t-Value</i>	<i>Sig.</i>	<i>F-Value</i>	<i>Sig.</i>
1	(Constant)	1.255	.815		1.540	.128	10.836	.000
	Transfer Motivation_t ₃	.453	.091	.388	3.621	.001		
	Transfer Skill_t ₃	.156	.099	.168	1.570	.121		
Model 1: Influencing variables: (Constant), Transfer motivation_t ₃ , Transfer skill_t ₃ Dependent variable: Transfer attempts_t ₃								

Both the results of the correlation analysis and – even more clearly – of the regression show that "transfer motivation" has an influence on "transfer attempts" that is, compared to "transfer skill", considerably stronger. This effect together with further implications of this study are discussed below.

5 Implications

It has become evident that in many cases there is a significant discrepancy between learning success in training and applying acquired knowledge to everyday working situations. Despite excellent learning results, a transfer does not necessarily occur to the extent it is supposed to. There appears to be a gap between knowing and doing. Therefore, knowledge alone has proven insufficient for successful transfer processes.

In order to generate more knowledge about how to bridge the gap between "knowing" and "doing" the purely cognitive focus of traditional transfer research was combined with research on motivation and professional skills and abilities that particularly modern competence research is concerned with. This enabled us to establish the idea that transfer as an intentional action is caused by individual *transfer competence*. Similar to any other type of competence, transfer competence can be seen as a combination of cognitive transfer skills and transfer motivation.

The analysis of development of "transfer skill" and "transfer motivation" in this longitudinal study has shown that these attributes are not time-stable. In order to gain a high level of transfer competence, both characteristics have to be developed and strengthened permanently – in a first step during the training and in a second step on the job.

Furthermore, there are different factors which influence "transfer motivation" and "transfer skill". In this survey, "applicability" as a characteristic of the situation and "knowledge about transfer barriers" as a characteristic of the person have both been examined (Hypothesis 1). The correlation and regression analysis show that "applicability" has significant influence on "transfer skill" as well as on "transfer motivation". The "knowledge about transfer barriers" also crucially influences both characteristics: the more participants believe in their ability to deal with transfer barriers, the more distinctive their "transfer motivation" and "transfer skill" present themselves. Together, both influencing factors can explain 20% of the variance of "transfer motivation" and 33% of the variance of "transfer skill".

In addition, the extent of predictive power of the constituent elements of transfer competence has been examined with respect to the actual "transfer attempts" (Hypothesis 2). The results show, that both "transfer skill" and "transfer motivation" are highly relevant. They can explain 20% of the variance of "transfer attempts". Presumably, this value would have been even higher if "transfer skill" and "transfer motivation" had been modelled with the help of different latent constructs instead of summative constructs. Even "transfer attempts" can be operationalised in a more determined way, ideally, they should be observed by watching the quality of the transfer attempts. Further research will be required to determine more comprehensive operationalisation of these constructs.

Moreover, it can be stated that "transfer motivation" is, compared to "transfer skill", a more important predictor for "transfer attempts". This leads to the assumption, that "transfer motivation" and "transfer skill" determine transfer competence on a different scale. The verification of this hypothesis is left for further research as well.

On the whole, it has become evident that research on transfer competence and its influencing factors can provide for a better understanding and help to bridge the gap between "knowing" and "doing". This seems to be an important prerequisite for the change of behavioral patterns of employees. The results suggest that trainers, to enhance employees' transfer competence, will need to impart to themselves, that the prerequisite for a successful knowledge transfer is not only the development of specific knowledge about the topic trained but also motivation and special skills and tools to deal with upcoming transfer barriers on the job. Furthermore, supervisors should actively support their employees' training efforts through activities such as providing them with opportunities to use the skills they learned and discussing problems that might prevent transfer activities.

References

- Aebli, H. (1993), *Zwölf Grundformen des Lehrens* [Twelve basic forms of teaching] (7th ed.), Stuttgart, Klett-Cotta.
- Aebli, H. (1981), *Denken: Das Ordnen des Tuns. Band II: Denkprozesse* [Thinking: Organizing our activities], Stuttgart, Klett.
- Backhaus, K., Erichson, B., Plinke, W., & Weiber, R. (2006), *Multivariate Analysemethoden: Eine anwendungsorientierte Einführung* [Multivariate Methods of Analysis: An Application-Oriented Introduction] (11th revised ed.), Berlin, Springer.
- Bartholomew, D. J., Steele, F., Moustaki, I., & Galbraith, J. I. (2002), *The Analysis and Interpretation of Multivariate Data for Social Scientists*, Boca Raton, Chapman & Hall.
- Colquitt, J. A., LePine, J. A., & Noe, R. A. (2000), Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research, *Journal of Applied Psychology*, 5, 678–707.
- Deci, E. L., & Ryan, R. M. (1985), *Intrinsic Motivation and Self-Determination in Human Behavior*, New York, Plenum Press.
- Erpenbeck, J., & Heyse, V. (1999), *Kompetenzbiographie - Kompetenzmilieu - Kompetenztransfer (Heft 62)* [Competence Biography – Competence Milieu – Competence Transfer], Berlin, ESM Satz und Grafik GmbH.
- Erpenbeck, J., & Rosenstiel, L. von (2007), Einführung [Introduction], in Erpenbeck, J. & von Rosenstiel, L. (Eds.), *Handbuch Kompetenzmessung. Erkennen, verstehen und bewerten von Kompetenzen in der betrieblichen, pädagogischen und psychologischen Praxis* (2nd ed.) [Manual competence measurement. Recognizing, understanding and evaluating competences in operational, pedagogical and psychological practice], Stuttgart, Schäffer-Poeschel, pp. IX-XXXVII.
- Facteau, J. D., Dobbins, G. H., Russell Joyce E.A., Ladd, R. T., & Kudisch, J. D. (1995), The influence of general perceptions of the training environment on pretraining motivation and perceived training transfer, *Journal of Management*, 21(1), 1–25.
- Ford, J. K., Quionones, M. A., Sego, D. J., & Sorra, J. S. (1992), Factors affecting the opportunity to perform trained tasks on the job, *Personnel Psychology*, 45, 511–527.
- Frei, F., Duell, W., & Baitsch, C. (1984), *Arbeit und Kompetenzentwicklung: Theoretische Konzepte zur Psychologie arbeitsimmanenter Qualifizierung* [Development of Professional Competence: Theoretical Concepts of the Psychology of Job-Immanent Qualification], Bern, Huber.
- Gebert, D., & Rosenstiel, L. von (2002), *Organisationspsychologie: Person und Organisation* [Organizational Psychology: Person and Organization] (5th Updated and Expanded ed.), Stuttgart, Kohlhammer.
- Geldermann, B., Günther, D., Hofmann, H., & Wolf, D. (2005), *Lernkulturen und strategische Kompetenzentwicklungsprogramme in Unternehmen* [Learning Cultures and Strategic Competence Development Programs in Companies], Available from: <http://www.abwf.de/content/main/publik/materialien/materialien62.pdf>. [Accessed 02 October 2008].
- Gerstenmaier, J., & Mandl, H. (1999), *Konstruktivistische Ansätze in der Erwachsenenbildung und Weiterbildung* [Constructivist Approaches in Adult Education and Further Professional Training], München, Ludwig-Maximilians-Universität, Lehrstuhl für Empirische Pädagogik und Pädagogische Psychologie.

- Hacker, W., & Skell, W. (1993), Lernen in der Arbeit [Learning on the Job], Berlin, Bundesinstitut für Berufsbildung.
- Hacker, W., Fritsche, B., Richter, P., & Iwanowa, A. (1995), Tätigkeitsbewertungssystem (TBS): Verfahren zur Analyse, Bewertung und Gestaltung von Arbeitstätigkeiten [System for evaluation of work processes: Analysis, evaluation and organization of work], Zürich, vdf Hochschulverl. [u.a.].
- Hager, W., Patry, J.-L., & Brezing, H. (2000), Einleitung und Überblick [Introduction and Review], in Hager, W., Patry, J.-L., & Brezing, H. (Eds.), Evaluation psychologischer Interventionsmaßnahmen: Standards und Kriterien. Ein Handbuch (1st ed.) [Evaluation of psychological intervention measures: Standards and criteria. A manual], Bern, Huber, pp. 1-7.
- Hasselhorn, M., & Mähler, C. (2000), Transfer: Theorien, Technologien und empirische Erfassung [Transfer: Theories, methods and empirical measurement], in Hager, W., Patry, J.-L., & Brezing, H. (Eds.), Evaluation psychologischer Interventionsmaßnahmen: Standards und Kriterien. Ein Handbuch (1st ed.) [Evaluation of psychological intervention measures: Standards and criteria. A manual], Bern, Huber, pp. 86-101.
- Holton, E. F., Bates, R. A., & Ruona, W. E. A. (2000), Development of a generalized learning transfer system inventory, *Human Resource Development Quarterly*, 11(4), 333–361.
- Igl, W. (2004), Behandlung fehlender Werte [Dealing with missing values], available at http://www.rehawissenschaft.uni-wuerzburg.de/methodenberatung/Igl_040604_Halle_Fehlende_Werte.pdf. [Accessed 25 February 2009].
- Kehr, H. M., Bles, P., & Rosenstiel, L. von (1999), Zur Motivation von Führungskräften: Zielbindung und Flusserleben als transferfördernde Faktoren bei Führungskräfte trainings [The motivation of executives: Commitment to target and flow experiences as transfer assisting factors for executives], *Zeitschrift für Arbeits- und Organisationspsychologie*, 42(2), 83–94.
- Klieme, E., Maag-Merki, K., & Hartig, J. (2007), Kompetenzbegriff und Bedeutung von Kompetenzen im Bildungswesen [The concept and meaning of competence in the educational system], in Hartig, J., & Klieme, E. (Eds.), Möglichkeiten und Voraussetzungen technologiebasierter Kompetenzdiagnostik. Eine Expertise im Auftrag des Bundesministeriums für Bildung und Forschung [Chances and preconditions of technology-based competence diagnostics], Bonn, Berlin, Bundesministerium für Bildung und Forschung (BMBF), pp. 5–15.
- Law, L.-C., & Wong, K.-M. P. (1996), Expertise und Instructional Design [Expertise and Instructional Design], in Gruber, H., & Ziegler, A. (Eds.), Expertiseforschung. Theoretische und methodische Grundlagen [Research on expertise. Basics of theory and method], Opladen, Westdt. Verl., pp. 115-147.
- Mandl, H., Gerstenmaier, J., & Bangerter, A. (Eds.) (2000), Die Kluft zwischen Wissen und Handeln: Empirische und theoretische Lösungsansätze [The gap between knowledge and doing. Empirical and theoretical methods of resolution], Göttingen, Hogrefe Verl. für Psychologie.
- Messner, H. (1978), Wissen und Anwenden. Zur Problematik des Transfers im Unterricht [Knowing and applying knowledge. The problem of transfer in classes], Stuttgart, Klett-Cotta.
- Mutzeck, Wolfgang (1988), Von der Absicht zum Handeln. Rekonstruktion und Analyse subjektiver Theorien zum Transfer von Fortbildungsinhalten in den Berufsalltag [From intention to action. Reconstruction and analysis of subjective theories about transfer of trainings' contents to the working routine], Weinheim, Dt. Studien-Verlag.

- Pawlowsky, P., Menzel, D., & Wilkens, U. (2005), Wissens- und Kompetenzerfassung in Organisationen [Measurement of knowledge and competence in organisations], in Arbeitsgemeinschaft Betriebliche Weiterbildungsforschung e.V. (Ed.), Kompetenzmessung im Unternehmen. Lernkultur- und Kompetenzanalysen im betrieblichen Umfeld [Competence measurement in companies: Learning culture and competence analysis], Münster, Waxmann, pp. 341-451.
- Renkl, A. (1996), Träges Wissen: Wenn Erlerntes nicht genutzt wird [Inert knowledge: When what is learned is not put into practice], *Psychologische Rundschau*, 47, 78–92.
- Seidel, J. (2012), Transferkompetenz und Transfer. Theoretische und empirische Untersuchung zu den Wirksamkeitsbedingungen betrieblicher Weiterbildung [Transfer and transfer competence. Theoretical and empirical analysis of effective training conditions in companies], Landau, Verlag Empirische Pädagogik.
- Sonntag, K. (1996), Lernen im Unternehmen: Effiziente Organisation durch Lernkultur [Learning in companies: Efficient organization by establishing a learning culture], München, Beck.
- Sonntag, K. (2000), Personalentwicklung "on the job" [Human resource development on the job], in Kleinmann, M., & Strauß, B. (Eds.), Potentialfeststellung und Personalentwicklung [Analysis of potential and human resource development] (2nd ed.), Göttingen, Verl. für Angewandte Psychologie, pp. 176-197.
- Sonntag, K., Schaper, N., & Friebe, J. (2005), Erfassung und Bewertung von Merkmalen unternehmensbezogener Lernkulturen [Recording and evaluating attributes of company related learning culture], in Arbeitsgemeinschaft Betriebliche Weiterbildungsforschung e.V. (Ed.), Kompetenzmessung im Unternehmen. Lernkultur- und Kompetenzanalysen im betrieblichen Umfeld [Competence measurement in companies. Learning culture and competence analysis], Münster, Waxmann, , pp. 34-340.
- Sonntag, K., & Schaper, N. (2006), Förderung beruflicher Handlungskompetenzen [Support of development of professional competence], in Sonntag, K. (Ed.), Personalentwicklung in Organisationen [Human resource development in organizations] (3rd ed.), Göttingen, Hogrefe, pp. 270-311.
- Strittmatter-Haubold, V. (1995), Handlungsleitung: Eine empirische Studie zum Transfer von Fortbildungsinhalten [Subjective theories: An empirical study about the transfer of training contents], Weinheim, Dt. Studien-Verl.
- Thorndike, E. L. (1914), *The psychology of learning*, New York, Teachers College.
- Von Cranach, M. & Bangerter, A. (2000), Wissen und Handeln in systemischer Perspektive [Knowledge and doing from systemic perspective], in Mandl, H., Gerstenmaier, J., & Bangerter, A. (Eds.), *Die Kluft zwischen Wissen und Handeln. Empirische und theoretische Lösungsansätze* [The gap between knowledge and doing. Empirical and theoretical approach], Göttingen, Hogrefe Verl. für Psychologie, pp. 221-245.
- Von Rosenstiel, L. (2000), Wissen und Handeln in Organisationen [Knowledge and doing in organisations], in Mandl, H., & Gerstenmaier, J. (Eds.), *Die Kluft zwischen Wissen und Handeln. Empirische und theoretische Lösungsansätze* [The gap between knowledge and doing. Empirical and theoretical methods of resolution], Göttingen, Hogrefe, pp. 95-138.
- Weinert, F. E. (2001), Concept of competence: A conceptual clarification, in Rychen, D. S., & Salganik, L. H. (Eds.), *Defining and selecting key competencies*, Seattler, Hogrefe & Huber, pp. 45-65.
- Wilkesmann, U. (1999), Lernen in Organisationen: Die Inszenierung von kollektiven Lernprozessen [Learning in organizations: Producing collective learning processes], Frankfurt/Main, Campus-Verl.

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