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Extending, broadening and rethinking existing research on transfer of training

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Abstract

The aim of this Special Issue was to generate a new integrated agenda for research on transfer of training. It brought together scholars from diverse perspectives and invited them to strive toward synergy. This article examines how this collection of articles, as well as other bodies of literature, can help extend, broaden and rethink current research on transfer of training. The lack of articulation between the concepts of training and learning, and the missed opportunities for capitalizing on the synergies with research on transfer of learning, are examined. The new insights that could be gained by rethinking research on transfer of training from a perspective of transfer as boundary crossing are also discussed. Finally, the significance of both reconceptualizing 'transfer of training' as 'transfer of learning from training' within a perspective of adaptive learning and actively seeking cross-fertilisation with the literatures on transfer of learning and boundary crossing is highlighted.

1. Introduction

Research on transfer of training has a long history, with thousands of empirical studies since the 1950s investigating whether, and under which conditions, knowledge and skills acquired during training are subsequently used in the work environment (see reviews by Baldwin & Ford, 1988; Blume, Ford, Baldwin & Huang, 2010; Burke & Hutchins, 2007). The generation of such an abundance of research can be linked to organisations' fundamental and ongoing concern to ensure that their employees possess the necessary knowledge and skills from their employer to maintain a competitive advantage and thrive economically. Training and development is, however, extremely costly to organisations, which has created the need to determine the effectiveness of training, and the conditions under which transfer of training is optimal. A recent overview of "what really matters" for successful transfer of training (Grossman & Salas, 2011), aimed at a training and development readership, summarized the most influential variables emerging from this vast body of research. Based on the expectation that the list of factors which may contribute to influence transfer could always be extended and that it would be impractical to incorporate every single factor in research designs, the authors recommended a shift in future research towards deeper investigations of the conditions under which selected variables are more or less influential in their relationship with training.

This Special Issue contributes to this important research agenda and extends it further through the inclusion of a diverse collection of conceptual contributions and reviews, from several scientific disciplines, a plurality of theoretical perspectives and a range of methodological approaches. Expanding the theoretical grounding underpinning empirical work on transfer of training and scrutinizing existing conceptualizations of the notion of transfer is timely in light of widespread concerns from organisations about minimal return on investment in training, and repeated evidence in the transfer of training literature of an enduring "transfer problem".

The aim of this article is to explore the value of *extending*, *broadening* and *rethinking* existing research on transfer of training. The benefits of *extending* research on transfer of training is considered first, through examining how the contributions of this Special Issue add to the existing literature on transfer of training, and the implications of the new insights for

addressing the "transfer problem". How transfer of training research could be *broadened*, thus enriched, through incorporating ideas from recent literature on transfer of learning is considered next. Finally, proposals to *rethink* transfer as boundary crossing from an activity theory perspective are scrutinized for their potential to better understand the learning that takes place at the boundaries of training and work environments. The article concludes by elaborating on the conceptual value of a refocus on 'transfer of learning from training' within a perspective of adaptive learning, and a call for cross-fertilisation with the extensive theory grounded literatures on transfer of learning and boundary crossing.

2. Extending research on predictors of transfer of training and the transfer problem

Invariably, researchers in the field of transfer of training, including the contributors to this Special Issue, consider how their research may add to explaining and addressing the "transfer problem". This suggests that the concept of 'transfer' in transfer of training research is implicitly or explicitly conceptualized from a cognitive perspective, which assumes that knowledge and skills acquired in one situation can be transferred to another based on mental representations, by analogy, or through "transfer-in-pieces" (Wagner, 2010). Given organisations are performance-oriented rather than learning-oriented, addressing the problem of transfer of training is important from an economic perspective of expected returns on investment, even though the issue of transfer is recognized as within the realm of educational research (De Grip & Sauerman, in press). From an educational perspective, transfer of training research is important because it can provide the conceptual basis for the development of improved training designs and workplace practices (Gegenfurtner, Veermans & Vauras, in press), more effective staff development programs (De Rijdt, Stes, Van der Vleuten & Dochy, in press), enhanced social support practices in the work environment (Van den Bossche & Segers, in press), and more effective tools to foster transfer in the workplace (Weisweiler, Nikitopoulos, Netzel & Frey, in press).

Across articles, with the exception of Billett's, the underpinning conceptualizations of transfer of training are consistent with those found in previous literature reviews (Baldwin & Ford, 1988; Burke & Hutchins, 2007; Blume et al, 2010), where transfer of training is defined as the application in a work environment of knowledge and skills gained in a training context. These previous reviews converged around the identification of three main categories of predictor variables on transfer of training skills and knowledge to different tasks and situations: trainee characteristics, training design and intervention, and work environment. Moderator effects of the relationship between predictor variables and transfer, and in relation to measurement issues have also been examined (e.g. Blume et al, 2010).

The articles in this Special Issue extend these earlier reviews through suggesting and examining empirically the value of a range of theoretical perspectives, and through offering in-depth analyses of specific aspects of transfer of training. This includes, for example, the development over time in the relationship between self-efficacy and transfer in relation to various conditions of computer supported collaborative learning (Gegenfurtner et al, in press), or the differentiated role on transfer of training, of individuals' social networks within or outside the organisation (Bossche et al, in press).

Overall, the set of articles offer theory-driven, rigorous quantitative or qualitative analyses of empirical studies that were identified through systematic literature searches using strict criteria (e.g. Gegenfurtner et al, in press; De Rijdt et al, in press) or through a selection of articles most representative of a particular applied field (e.g De Grip, in press) or of a new conceptual or methodological perspective (Van den Bossche & Segers; Weisweiler et al). De Rijdt et al's (in press) review of staff development studies in the field of higher education makes an important contribution through extending previous lists of predictor variables influencing transfer and moderators of the relationship between influencing variables and transfer. Gegenfurtner et al's (in press) meta-analytical study of the longitudinal development

of the relationship between performance, self-efficacy and transfer, Van den Bossche et al's (in press) qualitative narrative analysis of the role of social networks for transfer of training, and Weisweiler's et al (in press) examination of studies grounded in a selection of social psychology theories presumed to be relevant to training research, draw attention to a whole range of theoretical perspectives that could be used to further consolidate and extend future research on transfer of training.

One particular strength of these contributions is that the analyses are not limited to conceptual syntheses of the findings but also critically scrutinize the methodological components of the empirical work being reviewed, for example, the operationalizations of transfer, research designs, sampling, data collection, issues of measurement, and data analysis. A number of methodological limitations are identified, leading to suggestions for enhanced designs and methodologies in future research on transfer of training. Recommendations range from: obtaining more direct measures of the outcome of transfer in research from an economic perspective, exploring what actually transfers, when, how and under what conditions, and not only whether transfer occurs; adopting longitudinal designs to explore the evolution of boundary conditions related to the relationship between target variables and transfer; collecting multiple measures combining questionnaires, observations and interviews in order to triangulate research findings and identify possible inconsistencies; eliciting trainees' subjective interpretations of transfer to gain insight from an experiential vantage point; and examining the potential significance of dynamic person-environment interactions.

One striking feature of the literature on transfer of training, though, is on the one hand how much it has in common with the extensive cognitive literature on transfer of learning, and on the other hand how little cross-fertilisation has taken place. For example, there is very little evidence of conceptual links to the extensive transfer of learning literature, and the articulation between the concepts of training and learning is not addressed explicitly. This is despite the fact that the terms 'transfer of training' and 'transfer of learning' are sometimes used interchangeably (e.g. Blume, et al, 2010), and that learning constructs, such as learner characteristics, learning goals and active learning are widely used in analyses of factors impacting transfer of training (e.g. Burke & Hutchins, 2007). It could be argued that the development of a separate body of literature on transfer of training is justified on the ground that the applied setting (workplace rather than learning context) and target groups for this research (researchers and practitioners interested in organizational behaviour and management, human resource development and workplace training rather than researchers and practitioners interested in school or university learning and instruction) are quite distinct.

Although understandable, the parallel development of the transfer of learning and transfer of training research has limited the cross-fertilisation of conceptual ideas, research methodologies and finding. The strengths of these inter-related bodies of literature need to be combined to generate a more comprehensive understanding of the complex nature of transfer.

3. Broadening research on transfer of training within a perspective of actor-oriented, adaptive learning, and by considering expansive framing

In their commentary on a recent Special Issue on transfer of learning published in the *Educational Psychologist*, Perkins and Salomon (2012, p.248) highlight how all the contributors "take an optimistic stance" on the issue of transfer – which is in stark contrast with the overwhelmingly pessimistic approach of mainstream cognitive literature on transfer of learning – and similarly, the transfer of training literature. Perkins and Salomon attribute this positive stance to the contributors "common motif [which] is not *whether* significant transfer of learning can occur but *under what conditions of learning*" (2012, p.248, italics in the original text). The authors also emphasize the importance of considering why individuals may not "elect" to pursue a possible connection, and the conditions under which "alternative entrenched ways of responding and contrary motives hijack potential transfer" (p.255).

Broadening transfer within a perspective of adaptive learning reflects major changes in transfer of learning research. Concerns about the narrowness of traditional transfer of learning research (dominated by experimental studies) are not new (e.g. Bransford & Schwartz, 2003; Hatano & Greeno, 1999). In their commentary on a Special Issue on transfer, published in the *International Journal of Educational Research*, Hatano and Greeno argued "transfer researchers may have stacked the deck against positive results by adopting an inappropriately narrow criterion of successful transfer and by arranging experiments so that productive learning was not encouraged" (p.651). The same year, Bransford and Schwartz (p.92) pitched the typical transfer approach, which calls for "the direct application (DA) of knowledge and measures it in a context of sequestered problem solving (SPS)" against their proposal "to view transfer from the perspective of preparation for future learning (PFL)", a form of tacit, future-oriented and portable knowledge reminiscent of Broudy's (1977) "knowing with" (p.92). Calls for requestioning conceptualizations of transfer that focus on a "narrow and isolated aspect of learning" occurring in a "static" transfer environment and without attention to individual "agency" were also made at that time (Beach, 1999, pp 107-109).

Recent studies documenting the moment-to-moment processes through which transfer occurs, combined with actor-oriented perspectives (Lobato, 2012) have provided support for the value of conceptualizing and researching transfer within a broad perspective of adaptive learning. This position was advocated by other researchers more than a decade ago (e.g. Hatano & Greeno, 1999; Beach, 1999; Saljö, 2003) and has been reaffirmed in recent years (e.g. Billett, in press; Engle, Lam, Meyer & Nix, 2012; Goldstone & Day, 2012; Lobato, 2012; Veillard, 2012).

For example, Lobato's (2012) research has broadened the traditional cognitive perspective on transfer by adding an actor-oriented perspective, since it can "illuminate unexpected ways in which people generalise their learning experiences" (p.236). For the authors, while "both actor-oriented and mainstream cognitive perspectives on transfer share the view that the basis for transfer is psychological similarity rather than similar features of physical or task environments", the actor-oriented perspective "places greater emphasis on the interpretive nature of knowing than is present in many studies conducted from a mainstream cognitive perspective" (p.234). Investigating the interpretive nature of knowing in transfer of training research has the potential to unveil "how learners construe meaning in transfer situations" (p.243), thus accounting for the socially situated nature of trainees' transfer processes and the possibility that decisions are being made in light of subjectively perceived appropriateness of transfer. An interpretive approach also has the potential to uncover the extent to which choices are made to "personalize or customize the training received" (Blume et al, 2010, p.1095).

For transfer of training research, the consideration of an actor-oriented perspective implies that explanations for limited transfer of training may need to be sought beyond predictor variables related to the trainee characteristics, the training design or the work environment. For example, our own research on learning across cultures (Volet, 1999) revealed that difficult, inappropriate or ambivalent transfer could be explained in regard to the "subjective nature of socio-cultural appropriateness" (p.637), an interpretive perspective "according to which 'appropriate transfer' is a concept socioculturally rather than objectively defined" (Pea, 1987, p.38).

The actor-oriented transfer perspective is consistent with the view that transfer could be subsumed within a perspective of adaptive learning. Billett (in press) aptly describes the "socio-personal process" that reconciles "social, cultural and situational norms, practices and discourses that comprises what are encountered all of the time micro-genetically and accrued over a life course of experience, ontogenetically" with relationally mediated "individuals' capacities, sense of self interest and agency, as well as energy" (p.8), to ultimately decide

whether a task is worth energy investment, and the most appropriate response in a new situation.

Important implications for promoting and further researching the most effective ways of fostering transfer and productive training emerge from this research. One particularly promising avenue for intervention is Engle et al's (2012) concept of expansive framing – which the authors contrast with bounded framing, a narrow form of instruction that limits learning to local outcomes. The educational principle underlying the concept of expansive framing is the fostering of meaningful and explicit connections between what is learnt in a particular setting and a range of other settings (or contexts, thus the idea of "framing contexts") that are relevant to participants. Although, according to the authors, expansive framing may not provide resources "for students to judge which prior knowledge is the most *appropriate* for a particular problem or situation" (Engle et al, p.228, italics in the original text), it can be combined with activities in which learners are encouraged to "critically evaluate the knowledge they have transferred-in for its relevance and validity" (p.228). This approach is expected to assist trainees to develop the skills to "detect" opportunities for appropriate transfer and future uses, in addition to those necessary to "connect" initial learning and the transfer environment (Perkins & Salomon, 2012).

The extent to which the adoption of expansive framing contributes to transfer outcomes beyond direct application (DA) and prepares individuals for what Bransford & Schwartz (1999) call preparation for future learning (PFL) will need to be examined in future research. In the context of organizational training, where investment is expected to bring immediate returns, transfer outcomes in the form of preparation for future learning may however be considered beyond imperatives.

Another development in research on transfer of learning is the proposal to pay greater attention to motivation. Perkins & Salomon's (2012) notion of "elect" in their detect-elect-connect model supports their case for a motivational and dispositional view of transfer. The authors claim that "elect takes on special status as a pivotal point where the learner either moves forward or turns aside" (p.255) and therefore needs to be included in transfer research to acknowledge the hot nature of cognitive activity. Unsurprisingly, given much of the empirical work is field based, the transfer of training literature has long recognized motivation as an important predictor of transfer of training (e.g. motivation to learn, motivation to transfer). The significance of motivation as a predictor variable was documented in earlier reviews (e.g. Baldwin & Ford, 1988) and reached centre stage in a recent comprehensive meta-analytic study (Gegenfurtner, 2011). Gegenfurtner's meta-analysis of the relationship between motivation and transfer in professional training, using nine dimensions of motivation, provides crucial insights into the complexity of motivation as an influencing factor, with important practical implications for evaluation of training. This research addresses major motivational issues raised in the transfer of learning literature, and thus illustrates one of the areas where research on transfer of learning could learn from research on transfer of training.

The significance of motivation in transfer within a broader perspective of adaptive learning is consistent with Perkins & Salomon's (2012) argument that individuals can "elect" (or not) to use prior knowledge once they return to 'life as usual' since initially positive intentions may "quickly dissipate in the face of contrary [socio-political] forces". According to the authors, this highlights how "social contexts [can] erode the mind-sets and behaviours that have been acquired" due to "sharp competition from other responses and other motivations" (p.255), leading Perkins and Salomon to suggest reviving and sustaining motivation to transfer through reflection, meaningful learning and fostering productive persistence in the transfer context. These practical considerations converge with the importance given by Weisweiler et al (2012) to socially fostering learners' perceived sense of autonomy and ensuring that a large number of colleagues provide positive feedback, a recommendation also emerging through

social network analysis (van den Bossche and Segers, in press). At the conceptual level, the dynamic push-pull interactions between individuals' personal intentions and contextual forces that play alternatively supportive or inhibiting roles, reflect the concurrent and interdependent nature of self- and co-regulated processes in dynamic social systems (Volet, Vauras & Salonen, 2009). Empirical research examining the conceptual usefulness of these mechanisms in transfer of training research, from a perspective of adaptive learning is yet to be conducted.

From a pragmatic perspective of organizational training, the aspects of motivation that inhibit effective transfer of learning need to be understood and addressed, but interventions should be customized to particular motivational dimensions, and to when and where their inhibiting effects are manifested. For example, Perkins and Salomon point to the importance of anticipating "counter-habits and counter-motivations undermining later opportunities and prepare learners to face them" (p.257). Such issues could be addressed during training, from an actor-oriented perspective, by making individuals metacognitively aware of the types of social hindrance they may be faced with when trying to use newly acquired knowledge or ideas in their work environment. Weisweiler et al (in press, p.10) mention as examples, "transfer-unfriendly norms, the striving for cohesion and related group-processes". Scenarios grounded in social psychology theories or participants' authentic stories, could be used to stimulate discussions on how obstacles emerging in the work environment may affect intentions to change behavioural or social practices, and what could be done to prevent inaction when the change is perceived as socioculturally appropriate and necessary. Design experiments based on these ideas may be a suitable research approach since fully integrated within training and learning practices.

4. Rethinking research on transfer of training by conceptualizing transfer as boundary crossing

Concerns about the limitations of strictly cognitive views of transfer and learning are widespread, but critiques of situated and sociocultural perspectives of transfer have also been heard (e.g. Konkola, Tuomi-Gröhn, Lambert & Ludvigsen, 2007). Konkola et al note that although situated approaches acknowledge the socially embedded nature of knowledge, and thus examine transfer of participatory processes across situations rather than transfer of decontextualized skills, empirical work from this perspective implicitly conceptualizes social situations as stable rather than dynamic. Moreover, using Beach's (1999) seminal theoretical paper as an example of sociocultural perspective on transfer, Konkola et al argue that although the changing and dynamic nature of transfer situations is acknowledged within this perspective, with transfer conceptualized as involving multi-directional and reciprocal movements "across the boundaries of different activity systems" (p.214), how both individuals and activities are changed through these movements is not sufficiently addressed.

Konkola et al's "developmental transfer perspective" posits that individual learning and transfer are "embedded in the collaborative efforts and transitions between activity systems in the creation of new knowledge, activities and practices and their transitions to new activity systems" (p.217). To understand developmental transfer through the activity theory notion of "boundary crossing" (Engeström, Engeström & Kärkkäinen, 1995), the minimal unit of analysis must be "two interacting activity systems", each characterised by multi-voicedness and positioning of subjects and objects, tools, rules, community and division of labour (Engeström, 2001). Interacting activity systems that have the potential to create opportunities for inter-organizational learning are, for example, schools and work organisations, and by extension training environments that individuals participate in sequentially or in parallel. Examples of sequential participation in inter-related (but not necessarily 'interacting') activity systems abound, since this pattern is typical of crossing boundaries from school settings to work environments. But formalized systems of parallel participation in inter-related (and typically minimally 'interacting') activity systems also exist, for example, the well-

established dual system of training in German-speaking countries (found in some other countries as well), where apprentices work in a company and attend a vocational school one or two days a week throughout their apprenticeship. Regardless of whether boundary crossing takes place sequentially or in parallel, opportunities are created for valuable inter-organizational learning (see Tuomi-Gröhn & Engeström, 2003 for examples of studies in the field of vocational education). However, while the process of boundary crossing can be guided, its outcomes cannot be fully predicted given the multi-voiced nature of activity systems, and the dynamic and generative nature of open forms of learning. Boundary crossing may require "integrative and connective pedagogies" to bring the "worlds of education and work … closer to each other" (Tynjälä, 2008).

Focusing on a developmental transfer perspective is therefore firmly on learning practices and boundary crossing from one dynamic activity system to another, where "a detour via the concept of transfer adds little to our understanding" (Saljö, 2003, p.315). For Saljö, an approach more productive than the concept of transfer is, therefore, to consider how "the provision of rich opportunities for boundary-crossing" (p.317) can enhance individual and collective adaptive learning.

A recent study by Veillard (2012) on "transfer of learning as a specific case of transition between learning contexts in a French work-integrated learning programme" provided a revealing illustration of the dynamic processes of individual and collective learning through induced boundary crossing. In this study, university students were required to use and integrate the knowledge they had learnt previously in their academic courses and workplace internships, in a complex problem-solving activity. An experienced teacher with relevant vocational experience was available as "boundary spinner" to remind students to call on their diverse knowledge sources and to suggest conceptual tools as boundary objects if they reached a deadlock. A detailed synopsis of each class session and a synthetic description of the teacher's and students' activity and verbalizations were established based on video data, alongside the categorization of the different types of knowledge used during problem solving. The authors found that students' difficulties or abilities to manage the different types of knowledge could be interpreted by analyzing the collateral transitions between the initial context of use/or learning and the specific problem-solving situation.

Such research highlights the valuable insights that can be gained through micro-level investigations of transfer of learning from and through participation in dynamic activity systems. Applied to the domain of training, the perspective of boundary crossing offers potential to research how trainees appropriate the intellectual and physical tools of their training environment through practice, and how they put them to productive use in their daily workplace environment, simultaneously considering how the two activity systems concurrently and dynamically co-regulate trainees' engagement. When trainees are offered opportunities for multiple boundary crossings, as is the case in the dual system of vocational education mentioned above, there is potential for cross-fertilisation of adaptive learning. This is likely to be further enhanced if "boundary spinners" (Veillard, 2012) are available to foster the "potential learning mechanisms that can take place at boundaries: identification, coordination, reflection and transformation" (Akkerman & Bakker, 2011, p.132). Research from a perspective of boundary crossing is growing (see Akkerman & Bakker, 2011 for a review) and holds great promise for rethinking research on transfer of training.

5. Conclusion

To sum up, the primary aim of the existing body of research on transfer of training is to gain insight into the conditions of training effectiveness from an economic perspective of return on investment. This research has identified a number of predictor and moderator variables that can affect transfer of training, in terms of trainee characteristics, training design and instruction, as well as conditions of transfer linked to other factors.

Calls for strengthening the theoretical grounding of this empirical work were made (e.g. Blume et al, 2010), and the articles presented in this Special Issue responded to this call. The diverse theoretical and methodological perspectives presented in the collection of articles, supported by comprehensive and rigorous reviews of empirical work on specific aspects of transfer, have *extended* existing research substantially and offered suggestions as to how it could be broadened. Some of this research has great potential to address major issues raised in the transfer of learning literature.

Reciprocally, this article also scrutinized how research on transfer of training could be further *broadened* by borrowing ideas from the transfer of learning literature, most importantly by reconceptualizing the notion of transfer within a perspective of adaptive learning. Related ideas with the potential to broaden the transfer of training literature involve, for example, adding an actor-oriented, experiential perspective to mainstream cognitive grounding to better understand the process of transfer and learning in real-life situations, or examining the potential of the concept of expansive framing for enhancing the development and use of connected knowledge and understanding.

Finally this article examined proposals for *rethinking* the concept of transfer as boundary crossing, the value of this conceptualization for exploring the learning mechanisms that take place at the boundaries of the activity systems of training and work, and how learning through boundary crossing could be enhanced with the help of "boundary spinners".

Exploring how existing research on transfer of training could be alternatively extended, broadened and rethought through the adoption of new conceptual perspectives in order to generate new insights into this complex and multifaceted psychosocial phenomenon, is critical to advance this field of research, and responds to the invitation made by the guest editors' (Segers & Gegenfurtner, in press) of this Special Issue "to strive toward synergy".

One issue that would be worth considering is whether the notion of transfer of training could be renamed 'transfer of learning from training'. From a perspective of targeted readership, there is no doubt that the term training is important to signal the applied focus and context of the research. This is reflected in the journals where much of the empirical research on transfer of training has been published, for example, *Human Resource Development Quarterly, Personnel Psychology, Academy of Management Journal* and *International Journal of Training and Development*, in addition to discipline-based journals of applied psychology. Yet, from a broader conceptual and developmental perspective and as discussed in this article, the study of the processes by which skills and knowledge are developed in a training activity context, and how they may be put to use in a work activity context is better framed within a perspective of adaptive learning.

Addressing explicitly the articulation between training and learning is overdue. The benefits that could be obtained from researching 'transfer of learning from training' from a perspective of adaptive learning are potentially considerable, since this would enable a rich cross-fertilisation with the extensive literatures on transfer of learning and boundary crossing.

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