Managing for transfer of training: Directions for the evolution of learning management systems

Completed Research Paper

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ABSTRACT

Due to the still growing relevance of lifelong learning especially in a corporate context it is necessary to ensure that efforts taken in developing competencies of employees are affecting the performance at the workplace. This transfer of training (TOT) is a well-known concept in education research. As this paper shows there is still a lack of methods that are actually utilized in practice. Especially, there is still a lack of knowledge how information technology can help to raise the TOT.

For this reason this paper is grounded on an extensive literature review and identifies how support of the TOT is utilized. After that it analyzes the use of information technology in this context and leads to implications for further research and the development of tools to enhance the TOT.

Keywords

Transfer of training, Literature Review, Learning Management System, corporate education service

INTRODUCTION

According to the ongoing gain of importance in the area of knowledge-based work, the importance of lifelong learning increases. Under this circumstance the European Union targeted a raise of the rate of workforce participating in lifelong learning from currently 9.3% to at least 15 % (Eurostat 2011). The main impulse for current participants in an ongoing learning process is to perform better in their jobs and to improve career opportunities (Eurostat 2011).

Therefore, the sector of corporate education services (CES) gains on importance due to the economic as well as the demographic changes (Eurostat 2011). In 2012 the market had a volume of \$156.2 billion in the United States (ASTD 2012). With the aspired increase in lifelong learning there is still potential to increase this number. Due to this high volume of the market it is necessary for companies to ensure that the investment into CES has a pay off in the daily business. Therefore, the relevance of TOT increases in this context. This is also shown in the relevance of TOT in the scholarly publications in the field of human resources, where it is the most addressed topic (Jeung 2011).

CES can be characterized by a high degree of interactivity and, consequently, individuality (Alavi, Marakas and Yoo 2002). Actors of CES are training managers, trainers, team managers and learners (Semmann, Amrou and Böhmann 2012). CES are designed by companies and providers. The process of initiating CES is divided in pre-, on-, and post-training. During the pre-training trainer and team managers are designing the CES, in the on-training phase the knowledge is delivered through a trainer to the learners. The CES ends with the post-training phase where an evaluation through the company is conducted (Zolnowski, Semmann, Amrou and Böhmann 2011). Whereas TOT until now is not conducted. TOT is defined as the dimension to which learners effectively apply the learned gained in the education service context to the job (Baldwin and Ford 1988). Estimates of the extent of the TOT problem differ, from 10% (Georgenson 1982) to 50% (Saks 2002) in behavioral and organizational change.

Traditional approaches to CES where the knowledge is usually achieved through presence lessons, has shortcomings because learners are not motivated enough to learn actively (Bates 2000). Information technology gives the opportunity to increase the motivation of the learners of corporate educational services (McCormack and Jones 1997). Because of still notable high

retention and dropout rate, e-learning nowadays orientates more on communication, collaboration and interactive face-to-face (Hoic-Bozic, Mornar and Boticki 2009). Blended learning combines the advantages of e-learning and the approach of traditional CES, through different learning methods to promote better learning effects (Bates 2005). Learning management systems (LMS) are the state of the art systems to support any kind of CES but lack of features that address TOT explicitly (Semmann et al. 2012).

Despite this relevance of CES and the issue of learning transfer, there is a dearth of research on IT support for transfer of training. Therefore, the research question addressed in this paper is as follows: *How can IT be utilized to improve the transfer of training?* We seek to answer this research questions in four steps. First, we review the literature to derive determinants of transfer of training. Based on these determinants, we discuss requirements for IT-supported transfer of training. These requirements are mapped against general capabilities of learning management systems to identify gaps. We conclude with a discussion on how these gaps could be closed by future design research on transfer-supporting components for learning management systems.

The remainder of the paper is structured as follows: In the next chapter the literature review is presented and after that requirements for IT support of TOT are derived. Then these requirements are mapped with learning management systems and later on discussed. The paper ends with a conclusion and implications for further research.

TRANSFER OF TRAINING – A LITERATURE REVIEW

Methodology

To answer the research questions it is necessary to identify and analyze relevant literature. Therefore, a rigorous process has to be utilized (Webster and Watson 2002). In the context of this paper different research areas are relevant. As a result, the literature in these areas was reviewed in parallel and later on the results were merged. The disciplines are human resources, pedagogy, management research, and information systems. The search process was based on different databases that include the majority of scientific literature in these domains. For human resources and pedagogy, the German education portal and the database of the Education Resources Information Center were utilized. These sources are standards in these research areas and are widely utilized. In case of management research and information systems research ABI/INFORM complete, EBSCO, IEEE, and Business Source complete were used.

The actual search was based on the terms "transfer of training" and "knowledge transfer" alone as well as in combination with "e-learning". Articles with one of these terms in the title, abstract, or keywords were identified as potentially relevant. We only included peer-reviewed articles in journals or conference proceedings. The time period of results was not limited.

As a result, 51 articles in the research field human resources and pedagogy were identified and 79 articles in management research and information systems were found. In a next step a backward search approach was utilized to ensure that all potentially relevant articles were included. Based on this extensive set of articles the actual literature review was done. After a first screening of the title and abstracts 72 were identified as relevant articles. An article was marked as relevant, if it addressed TOT and determinants of it and was empirically substantiated.

Determinants of Transfer of Training

In the following, empirically supported determinants are briefly described and referenced. According to educational, adult learning, and psychological literature the identified determinants were classified into three categories. These are learner characteristics, intervention design, and work environment (Alvarez, Salas and Garofano 2004; Baldwin et al. 1988; Burke 2007; Ford and Weissbein 2008). Based on the extensive literature review 15 determinants that influence TOT were identified. This was done under the premise that a determinant can be judged as valid, if at least two independent empirical studies document the influence on TOT.

Learner characteristics

In this category six determinants are subsumed. The first one is the cognitive ability of the learner and influences the transfer positively (Blume, Ford, Baldwin and Huang 2010; Ghiselli 1966; Hutchins and Burke 2007). Secondly, self-efficacy as the belief of a learner in his abilities is correlated with TOT (Brown, 2005; Hutchins et al. 2007; Saks, Haccoun and Haccoun 2011; Saks 1995). The next determinant is the pre-training motivation of the learner. With a high motivation the chance to transfer knowledge to the workplace is positively influenced (Burke and Hutchins 2007; Mathieu, Tannenbaum and Salas 1992; Tannenbaum, Mathieu, Salas and Cannon-Bowers 1991). Anxiety or negative affectivity towards the CES negatively influence TOT because learners are not open to the content and therefore are not able to utilize the content after the

intervention (Ackerman, Kanfer and Goff 1995; Barrick, Mount and Strauss 1993; Silver, Mitchell and Gist 1995). Another facet of the aforementioned determinant is openness to experience, which can positively influence TOT if the learner is willing to engage with the intervention (Barrick and Mount 1993; Herold, Davis, Fedor and Parsons 2006). Lastly, the perceived utility of the intervention influences the TOT if the content is related to the job requirements (Chiaburu and Lindsay 2008).

Intervention design

This category subsumes five determinants. Firstly, learning goals have to be clear and especially the link between the content and these goals has to be addressed (Kozlowski and Bell 2006; Phillips and Gully 1997). The second determinant is content relevance, which means that the content of the intervention has to be aligned with the goals and the materials of the training to support TOT (Axtell, Maitlis and Yearta 1997; Holton 2000; Hutchins 2007; Lim 2006; Yamnill and McLean 2005). The next determinant is practice and feedback as a teaching method to support a TOT through the opportunity to utilize what was learned during the intervention (Holladay and Quiñones 2003; Lee and Kahnweiler 2000; Salas, Rozell, Mullen and Driskell 1999; Warr and Allan 1998). Another determinant is behavioral modeling and addresses change in the learner's behavior, which directly leads to TOT (Bandura 1997; Decker 1982). The last determinant in this category is error-based examples which are a instructional strategy and show typical mistakes according to the content and therefore can influence the TOT (Ivancic IV and Hesketh 2000; Smith-Jentsch, Jentsch, Payne and Salas 1996).

Work environment

The last category subsumes four determinants. The first determinant is the transfer climate at the workplace of the learner. This factor deals with the circumstances in which the learner has to utilize what was learned (Burke and Baldwin 1999; Kontoghiorghes 2003; Lim 2006; Mathieu et al. 1992; Tracey, Tannenbaum and Kavanagh 1995). Secondly, the supervisor's support influences the TOT according to the encouragement to utilize what was learned (Brinkerhoff 1995; Broad and Newstrom 2001; Burke et al. 1999; Clarke 2002; Lim and Johnson 2002; McSherry and Taylor 1994). Analogous, peer support can also influence TOT (Chiaburu and Marinova 2005; Facteau, Dobbins, Russell, Ladd and Kudisch 1995). The last determinant is the opportunity to perform, which means that the learner needs the possibility to utilize what was learned in the work environment (Brinkerhoff 1995; Clarke 2002; Lim 2006).

REQUIREMENTS FOR IT-SUPPORTED TRANSFER OF TRAINING

Though none of these determinants of transfer of training can be directly influenced through technology, technology can influence how these determinants become effective in corporate education services. We argue that three functional areas are particularly relevant for supporting transfer of training through IT: profiling and matchmaking of learners, preparation and planning of training transfer, as well as support and feedback for transfer activities. All of these functional areas are inherently socio-technical, i.e. IT supports human actors in performing specific transfer-related tasks.

Profiling & Matchmaking

Assured learners have adequate characteristics to pursue CES successfully and these learners are able to see the utility of CES for their jobs. A team manager or the human resources department can assure adequate characteristics that have the ability to locate CES needs of the company and of learners in their individual job-role. Thus, they must have the ability to estimate the characteristics of learners or get such information from other IT-supported environments like human resource management systems. This characteristic information should be accessible within a learner profile that includes in addition basic information and the already performed trainings. Furthermore, a job profile that shows precisely the tasks and requirements for the current job and possible next job-levels should be accessible. In addition, an education service profile that contains requirements, the content and the objectives of the CES should be given. Lastly, a user profile with capabilities to contact the owner of the profile and a history of completed CES should be established. It can be seen as a target profile. This information should be accessible and referable within a repository of the IT-supported TOT environment. Through the same repository learners should have the possibility to perform self-assessment and self-directed selection by registering for particular CES. Thus, giving the learner a sense of self-confidence and self-determination through self-selected training to increase motivation and decrease anxiety. Through a passive approval team managers can guide the learners by disapproving the CES for the learner or encouraging them to participate in a CES. In general, the actors should be able to communicate with reference to the information and profile objects. The mentioned profiles and the information aggregated in a structured manner should support the team managers and the learners to assure the success, needs and values of CES. Nevertheless, the decisions made and the completed CES of the learners can support the team manager or the learner in choosing the right CES in the future.

Preparation & Planning

Unlike learner characteristics, technology can influence the intervention design directly by supporting the preparation and planning process of intervention elements. Technology can help in preparing the content of the CES to include design elements that support TOT (e.g. error-based examples, practice & feedback). Training managers and trainers should have the ability to create content that fits to given interventions (Table 1) or future interventions that support TOT and can be referenced with above-mentioned education service profiles. Furthermore, training managers and trainers should be able to communicate and collaborate, to create content for the CES. Also, in preparation of the intervention reporting functions should be given to support the creation of content. This could be qualitative or quantitative evaluation of the interventions. If interventions have led to a successful TOT, the interventions can be translated into a template or content objects of the CES can be reused. In addition, technology can support the planning of post-training activities that ensure the application of content of the CES on the job. Hence, training managers and team managers should have the option to schedule the events and set the location of the post-training activities for each CES in corporation. Furthermore, they should be able to set milestones for the post-training activities to ensure sequential reporting of the success of the intervention.

Support & Feedback

When the learner is back at the work environment technology can influence the TOT directly, technology can help to provide support and feedback during the phase of TOT. This phase does not necessarily start after completion of the CES. It can already start during the impartation of knowledge. For instance, the trainer can provide instructor's support or support can be handled by peer-groups to the participant for the application of training content. Hence, the IT-supported TOT environment needs to offer adequate communication and collaboration methods, which are linked to the learner profile and other information objects mentioned above. The artifacts that arise from communication and collaboration should be available for peer-learners, the (re-)design of interventions or for further learners. Thus, the resulting knowledge will not be lost and the artifacts could answer questions of learners in further CES. In addition, the artifacts can be used to improve the interventions for redesign of interventions. Also, the opportunity to provide feedback about the progress in applying training content to the job (e.g. monitoring) should be supported in this phase by the IT-supported TOT environment.

In general, the IT-supported TOT environment should support different roles of actors and have rights to view the profile and information objects that are available.

SUPPORT OF IT-SUPPORTED TRANSFER OF TRAINING REQUIREMENTS BY LEARNING MANAGEMENT SYSTEMS

This section reviews to what extent learning management systems realize the requirements introduced above. LMS have become a default as e-learning and blended learning have been adopted widely (McCormack et al. 1997). LMS have become an indispensible tool for CES. In the 2012 Training Industry Report, LMS were most frequently named as the technology-driven training product that CES providers either use or intent to purchase (Bradstreet 2012). Additionally, CES providers spent the highest portion of their budgets on tools and technology for their services (Bradstreet 2012). While there are many different LMS systems available on the market, Brandon-Hall developed a set of common LMS capabilities that abstract from individual LMS (Brandon-Hall 2005). In the following table, we summarize how these common capabilities provide support for the requirements of IT-supported TOT (Table 1).

Common capabilities of LMS	Description of capability	LMS support for IT-supported transfer of training through …		
		Profiling & Matchmaking	Preparation & Planning	Support & Feedback
Manages e-learning	Managing (creation, structuring, cross-reference, searching, user rights) of e-learning objects and given methods.	Partially, content and object types are rudimentary.	Partially, objects can be designed with rudimentary functions and with barriers.	None
Management of classroom, instructor-led training	Scheduling events, learners and environment of instructor-led.	None	Partially, only scheduling of milestones and events.	None
Performance reporting of training results	Performance reporting through assessments and qualitative evaluation.	Partially, information types are not manageable for reporting view.	Partially, only assessments and qualitative evaluation.	Partially, only assessments and qualitative evaluation.
Learner collaboration	Collaboration and communication by common tools like forum etc.	Partially, trainer and manger could collaborate but with barriers to other objects.	Partially, trainer and manger could collaborate but with barriers to other objects.	Partially, reuse artifacts and just in time support is not supported.
Keeping learner profile data	Data of learner is kept by the LMS for further CES.	Partially, only training and rudimentary performance data.	None	Partially, reuse of artifacts is not supported.
Sharing learner data with an HR or ERP system	Import and export data of learner to resource systems.	Partially, no references to other profiles and information objects.	None	None
Competency mapping - skill gap analysis	Mapping competencies of learners to needed job skills.	Partially, no job profile available and reporting view.	None	None
Creates test questions and test administration	Creation and management (user rights, learners etc.) of offline and online assessments.	None	None	Partially, only assessments as build in feedback.

Table 1: Common capabilities of LMS mapped to requirements for IT-supported TOT

DISCUSSION

Profiling & Matchmaking

While information objects and user profiles, e.g. learner and education service profile within the LMS are supported (creation, structuring, cross-reference, searching, user rights) by the capability *manages e-learning* (Table 1), support for learner characteristics and characteristic requirements through information objects (e.g. text) are rudimentary. Furthermore, job profiles are not supported to show the learner the value of CES for their job and possible next job-levels that could motivate him. Profiles that only support text or other media as information types are not manageable to extract information

for an adequate reporting view (*performance reporting of training results*). To support team managers and learners to assure the success, needs and values of CES, additional information types with defined fields are needed. Moreover, the actors are able to communicate and collaborate by the LMS capability *learner collaboration,* but with barriers to the profiles and information objects. Thus, a direct access to the profiles and information objects without losing the focus on the communication and collaboration within the *profiling & matchmaking* is only hardly possible. The LMS capability *keeping learner profile data* can support the team manager or learner in selecting future CES by completed trainings of the learners but not through decisions made by training managers or learners. In addition, linked performance data is only qualitative from subjective sources or assessment results. Data from increased performance on the job is not available. While team managers or the human resources department can import the learner profile through the LMS capability *sharing learner data with an HR or ERP system*, even in this case they have to deal with above-mentioned barriers. Lastly, the LMS capability *competency mapping - skill gap analysis* does give the team manager and learner the option to perform a skill gap analysis, but important variables for a successful TOT like learner characteristics are not included.

Preparation & Planning

Like mentioned in Table 1 with LMS capability *manages e-learning* intervention design elements can be designed with rudimentary functions and with barriers. Due to limited opportunities for information types (e.g. text and media) an adequate design of objects for interventions is hardly possible. For example, the sequence of interventions can only be designed through rudimentary information types that are structured in a list view and schedule functions by the LMS capability *management of classroom, instructor-led training*. A more advanced approach is needed to design interventions (e.g. error-based examples, practice & feedback), nearly similar to workflow editors. Some could mention why not use those and import them to the LMS, but the barriers that will arise to reference the information (e.g. milestones) and profile objects would influence the preparation process. In addition, barriers to communication and collaboration (*learner collaboration*) would arise while training and team managers (re-)design interventions. While these functions are partly supported, further functions of *preparation & planning* are unsupported. Neither qualitative nor quantitative reporting functions are given within the phase of preparation to support the creation of content of the intervention. Assessment and qualitative evaluation data is available through the LMS capability *performance reporting of training results*. In contrast, quantitative evaluation data is required in order to report the TOT. The quantitative data is measured while the learner uses the knowledge back on the job. Also, intervention cannot be translated into a template or content objects of the CES to reuse interventions that led to a successful TOT.

Support & Feedback

By the LMS capability *performance reporting of training results* in combination with *creates test questions and test administration* the opportunity to provide feedback about and within the progress in applying training content and knowledge to the job is partially supported, only assessments and qualitative evaluation is supported. Like mentioned before, quantitative evaluation data is needed. Support by instructor and peer-group support is available by the LMS capability *learner collaboration* with limitation to linked information objects and just in time support. While the LMS capability *keeping learner profile data* enables to reactivate learner data, an option to reuse communication and collaboration artifacts for (re-)design interventions or for further learners is unsupported. Capabilities in LMS to s*upport & feedback* are only rudimentary implemented for the phase of TOT, due to the core functionalities to support learning and not the TOT.

CONCLUSION AND OUTLOOK

In the course of the paper we identified determinants of TOT. It is striking that the majority of literature on these determinants is older than a decade and does not address the potential influence of IT on these determinants. Therefore, we recommend focusing on these issues as we have done in this paper. Based on these determinants, we derived requirements for IT support for enhancing TOT. These requirements have been mapped to core capabilities of LMS'. This mapping revealed gaps of LMS for the support of transfer of training. In the category profiling & matchmaking interfaces to HR software should be established to enable learners as well as supervisors to easily identify education services that match a specific job profile and thus support personnel development. This also would lead to a fact-based basis for performance measurements of TOT and can help to evaluate the value of trainings. In case of the preparation & planning, a high impact on TOT could be realized through a dynamic editor to plan trainings based on different modules. At this point measurements of the aforementioned profiling & matchmaking can be used to identify modules that have a strong effect on transfer of training and to reengineer those with low impact. Lastly, in the category support & feedback functionalities have to be improved to intensify collaboration between peers as well as supervisors. At the moment this communication is only centered on the

actual training and does not support later phases, where TOT takes place. Therefore, future research should address these gaps to ensure high impact of corporate education services.

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