Strategic E-Learning in the Workplace

R. Pircher¹, E. Mayr², L. Zenk² and H. Risku²

¹ University of Applied Sciences bfi Vienna, Vienna, Austria
² Department for Knowledge and Communication Management, Danube University Krems, Austria

Abstract—Empirical research suggests that there is an impact of organizational characteristics on individual work-related learning processes. In this paper, we propose a model of relevant organizational factors. An assessment methodology based on a literature survey and activity theory is summarized. First results of an empirical validation are presented with an emphasis on prerequisites for e-learning.

I. INDIVIDUAL AND ORGANIZATIONAL LEARNING

Individual and organizational learning in the workplace are interconnected processes [1] [2]. They influence each other substantially and are difficult to differentiate. This paper develops an approach designed to assess the organizational environment with respect to both learning processes. The emphasis lies on prerequisites and success factors for e-learning. On the basis of the assessment results, decision support for instructional designers and managers is provided. This assessment methodology and decision support are empirically evaluated in different organizations, for example from the health care and telecom sector.

A. Research Approaches to Learning in Organizations

A number of different scientific disciplines occupy themselves with the topics of learning and knowledge exchange in organizations. The fields of Human Resource Development (HRD), Training, and Workplace Learning focus primarily on individual learning and aim at improving job performance. In contrast, the fields of Organizational Learning (OL) and Knowledge Management (KM) concentrate not on individual, but on organizational learning. Their main interest lies in the understanding and management of the collective capabilities of organizations enabled by organizational learning and knowledge. However, this is, in turn, also based on the systemic interaction and integration of individual learning and human resource capabilities. Consequently, although these two different (and extensive) areas of applied research are relatively distinct, they both nonetheless deal with topics which are strongly linked.

Placing the focus on the role of the organizational context in both fields raises the following research questions: In HRD [3] [4] [5] [6] [7] [8], organizational factors should be identified which systematically influence the outcomes of individual learning. In OL/KM [9] [10] [11] [12] [13] [14] the question of whether the outcomes of work-related learning and knowledge sharing in organizations can be improved by an assessment and intervention in the organizational context of learning should be addressed. These questions were explored by means of an extensive literature review.

B. The Impact of Organizational Characteristics on Individual Learning

Since the late 80s, literature has become available which recognizes not only the impact of the individual but also the impact of the organization on individual learning processes and/or training success. Several authors in the HRD field highlight the significance of the organizational context for learning outcomes and motivation [4] [15]. Other publications analyze organizational factors affecting work-related learning [3] [4] [5] [6] [7] [8].

To study the transfer of knowledge and capabilities in organizations, one must first clarify the nature of such knowledge and capabilities. From a mechanistic point of view, they can be regarded as easily transferable commodities. However, research findings suggest that the use of data and information in organizations depends on the subjective interpretation of those individuals and groups who transform this input into actions and performance. Particular emphasis is given to this aspect in situated approaches to knowledge and learning [16]. Within the situated approach it has been proposed that companies must seek to influence and support knowledge management capabilities in several different areas (e.g., leadership and company culture) by deploying and integrating available methods, instruments and technologies to provide a beneficial environment for the use and creation of knowledge and competencies. In doing so, organizations must also actively encourage and support participation. Since individuals can be seen as operating both independently and interdependently, their socially-derived personal history, values, and ways of knowing mediate the way they participate and learn in the workplace. They need to find meaning and value in the learning activities offered. Inconsistencies between organizational and individual values may lead to resistance. Different skills, abilities, and ways of motivating employees to participate are required, for example, to attract the interest of and motivate reluctant employees. Opportunities to participate and receive support are essential for rich learning outcomes [15].

Approaches like situated learning emphasize the social context of learning processes and regard knowledge as socially constructed [16]. Working as such is recognized as a source of learning. Informal learning does not occur in the absence of actions like formal training but in the presence of both action and reflection.
Consequently, a shift from training to learning can be observed in the field of HRD [17]: “Learning arrangements closely linked to the workplace are at the center of attention, for example, mentoring, self-study, learning-by-doing, intercollegiate consultation, special work assignments, reflection-in-action, work-related learning projects, coaching, and work experiments” [18] quoted in [17].

An organization’s potential to provide a supportive learning environment depends very much on the way work is organized and on the work processes [19] p. 160. Consequently, the complete working and learning context must be analyzed: “if we are to further our understanding of the process of workplace learning then we must move beyond a narrow focus on the process of interaction in the immediate workplace that has characterized recent research” [19], p. 160.

II. MODEL OF ORGANIZATIONAL DIMENSIONS

On the basis of the literature review, a Model of Organizational Dimensions (MOD) is proposed, which consists of factors that have major impact on process-oriented learning and knowledge transfer. The model aims to integrate three different research approaches to learning within organizations: HRD, OL/KM, and Activity Theory.

The success of instruments and methods aimed at fostering organizational learning and the development of an organizational knowledge base is influenced by both the characteristics of the organization in question and the habits of its employees. Within the OL/KM discourse, a variety of structuring frameworks have been developed and several models and assessment methods proposed which are relevant for the analysis of organizations [20] [21].

Knowledge transfer constitutes a very important objective of OL/KM. For this reason, these two approaches were both regarded relevant for the definition and outcomes of a learning assessment guideline (LAG) based on the proposed MOD. A number of different OL/KM models were also used in the development of the MOD.

Activity theory focuses on the interaction between human activity and consciousness within the relevant environmental context. It provides a framework for analyzing learning needs, tasks and outcomes within organizations. The socio-cultural, socio-historical lens of activity theory helps managers and learning designers to analyze human activity systems. One fundamental assumption in this approach is the notion that conscious learning emerges from, not prior to, activity [22].

As shown in Fig. 1, an activity system can be visualized in the shape of a triangle [23], p. 135. Based on the relevant literature mentioned above, organizational factors relevant for learning and knowledge transfer have been identified and are pictured in the rectangles in Fig. 1 (see also [24]). The dimensions of activity theory (subject, tools, object, etc.) have been related to corresponding organizational factors (characteristics, data, strategy, etc.) in the structure of a human activity system. The relevant characteristics of the target groups and users relate to the subject, i.e. an individual or group engaged in the activity. Data, information, and ICTs have been attached to the tools which mediate between the subject and the object, i.e. the physical or mental product. Organizational culture includes common espoused values and basic underlying assumptions. Leadership has the potential to influence organizational culture to certain extent. The community, on the other hand, shares a common set of rules. For this reason, the organizational culture and leadership factors have been clustered with rules and community. Work design and office architecture are connected to task specialization and division of labor. The organizational functions of strategy definition/implementation and controlling have been added to the outcome of the activity, because they focus on the targets and verification of the results of the activities in line with strategy.

III. LEARNING ASSESSMENT GUIDELINE

Based on the proposed MOD, a questionnaire, the learning assessment guideline (LAG), was developed. The LAG assesses organisational factors relevant for individual and organisational learning. Research findings from the fields of HRD and OL/KM were used to generate an initial item pool. The design and evaluation of the LAG in the test environments consisted of two empirical phases. In the first phase, face-to-face and written interviews with managers provided information relevant for the implementation of process-oriented learning with a focus on a management perspective. Results from these interviews were used in the second
phase to develop an online survey which gathered information on the employee’s perspective on workplace learning.

A pool of 129 items was developed based on both the literature review and the interviews with managers, and an online survey was conducted in January and February 2008 using this item pool. Overall, 191 employees from five different organizations answered the LAG. This data was used to analyze the structure of the questionnaire and select appropriate items with good test statistics.

Orthogonal factor analysis with Varimax rotation revealed seven factors (explaining 50% of the overall variance). To reduce the complexity of the factor structure, items loaded substantially on more than one factor were excluded. Within each factor, a reliability analysis was conducted for the remaining items. Items which correlated with a factor score of less than .30 were successively excluded. The final scales exhibited satisfactory reliabilities (Cronbach’s Alpha) between .66 and .91. Consequently, the final version of the LAG contains 63 items relating to seven factors: organizational learning orientation (OLO, 21 items), appropriateness of didactics in prior training (DFT, 11 items), availability of infrastructure for e-learning (IEL, 9 items), extrinsic motivation for training (EMT, 6 items), workload (WL, 6 items), preference to learn individually (PIL, 5 items), and preference to learn collaboratively (PCL, 6 items).

To further validate the organizational nature of the dimensions assessed by the LAG, intraclass correlations (ICC) were computed for each scale on both an organizational and a team level. High intraclass correlations indicate very similar scale values within an organization and a team. This analysis confirmed that the LAG contains mostly organizational factors: OLO, IEL, and PIL are both significantly correlated within the organization/team. This analysis was conducted for the remaining items. Items which correlated with a factor score of less than .30 were successively excluded. The final scales exhibited satisfactory reliabilities (Cronbach’s Alpha) between .66 and .91. Consequently, the final version of the LAG contains 63 items relating to seven factors: organizational learning orientation (OLO, 21 items), appropriateness of didactics in prior training (DFT, 11 items), availability of infrastructure for e-learning (IEL, 9 items), extrinsic motivation for training (EMT, 6 items), workload (WL, 6 items), preference to learn individually (PIL, 5 items), and preference to learn collaboratively (PCL, 6 items).

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IV. EMPIRICAL RESULTS FROM TWO ORGANIZATIONS

To visualize assessment with the LAG, data from two organizations, one from the telecommunication sector and one from the health care sector, was further analyzed and compared. 20 employees from the telecom company (mean age = 37.42 yrs, mean length of service in company = 5.83 yrs, 11 % management) and 25 employees from the health care company (mean age = 43.25 yrs, mean length of service in company = 17.26 yrs, 27 % management) answered the questionnaire. As the descriptive characteristics of both samples show, these companies differ greatly both in employee age structure and frequency of employee change. However, despite these descriptive differences the two companies are fairly similar in many of the LAG scales (BFT, WMT, WL, and PCL, cp. Fig. 2).

However, this company does have a higher overall learning orientation, which is beneficial for individual and organizational learning at the workplace. As was shown for these two organizations, the results of the LAG provide a basis for improving the organizational factors relevant for workplace learning. Additionally, the results can be used to select appropriate didactic strategies.

V. DECISION SUPPORT

There is still a lack of research on the correlation of organizational characteristics and suitable didactic measures. However, based on the literature survey and analysis, a number of factors have been identified which appear to be linked to this issue. Through the empirical work carried out in the EU project PROLIX (Process oriented learning and knowledge exchange), data will be collected from a series of individual test bed organizations and should serve as the basis for verification of our assumptions.

A. Decision Support for Didactic Strategies

In accordance with the literature analysis, the following organizational aspects can be identified as relevant for the definition of a didactic strategy: ICT skills, peer support, supervisor support, workload, feedback, goal orientation, learning culture, and work processes (ability and authorization to self-organize the work required).
The following have been defined for each of these organizational factors:

- Occurrences which support or do not support learning
- Potential challenges faced by the use of specific didactic models and underlying assumptions
- Potential benefits of using appropriate didactic models and related assumptions.

Based on the assumptions which had to be made, an attribute can be defined for each individual organizational factor as follows: ICT skills are relevant for e-learning and blended learning. Helpful peer support increases motivation for collaborative learning. Supervisory support can increase the willingness of employees to participate in learning processes which require high levels of motivation and personal involvement. A very heavy workload obstructs self-organized learning. Employees should be familiar with providing and receiving feedback if this is required by the didactic models. A mastery goal orientation favors collaborative learning processes. A strong learning culture supports collaborative learning. A high degree of standardization implies less familiarity on the part of the workforce with self-organized learning.

These attributes can be summarized as follows:

- Required usage of ICT (e-learning)
- Collaboration
- Self-organization
- Feedback.

Following the description of didactic models listed in deliverable 4.2 of the PROLIX project (University of Vienna, see also [10]), it is expected to be possible to search for these attributes to establish a connection between the organizational status quo and the selection of didactic models.

It should, however, also be noted that learning design rules in general should be understood in a probabilistic, not a deterministic sense. "Applying a rule does not guarantee that we reach the desired outcome, but it does increase the probability that we will." ([18], p. 5). This also applies to the proposed decision support information.

B. Decision Support for Management Measures

There are close links between individual learning and OL/KM and for this reason it is proposed to provide decision support for management measures based on both HRD and OL/KM and directed by the outcomes of the LAG.

OL/KM literature provides a rich portfolio of instruments and methods for interventions in organizations (e.g. [15]) HRD also provides valuable inputs for appropriate organizational measures (e.g. [4], p. 621). This allows a precise proposal of management measures to be provided based on any specific deficiencies identified by the LAG.

The assessment results enable the provision of decision support for the respective management team. Appropriate measures and instruments can be proposed for a specific organization in line with the most significant areas identified for improvement.

VI. CONCLUSION AND OUTLOOK

This project provided a validated version of an assessment of the organizational factors that influence work-related learning. Further steps in this research will apply this version of the LAG to gather additional data. The significance of this data will be evaluated in relation to individual didactic preferences of training participants. Furthermore, the applicability and usefulness of the resultant decision support for didactic strategy and management measures will be tested.

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AUTHORS

R. Pircher is Director of Studies for Banking and Finance at the University of Applied Sciences bfi Vienna, Austria (e-mail: richard.pircher@fh-vie.ac.at)

E. Mayr is a researcher at the KnowComm Research Center at the Danube University Krems, Austria (e-mail: eva.mayr@donau-uni.ac.at).

L. Zenk, is a researcher at the KnowComm Research Center at the Danube University Krems, Austria (e-mail: lukas.zenk@donau-uni.ac.at).

H. Risku is Head of the Department of Knowledge and Communication Management at the Danube University Krems, Austria (e-mail: hanna.risku@donau-uni.ac.at).

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