How Can Knowledge Management Support Competence-based Learning? 
Towards a Research Agenda

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Abstract

Competence-based learning (CBL) is an appropriate approach to systematically develop dwindling human resources. The close interrelation between the knowledge and competence concepts suggests the conjoint development of knowledge management (KM) and CBL. We specifically focus on the question of how KM can support CBL processes. This article describes the potential synergies, as well as KM instruments that can facilitate the implementation of CBL. In conclusion, we introduce our current research projects and propose a research agenda that address the raised research question.

1. Introduction

The demographic change in industrialized countries like France and Germany significantly affects the workforce in these countries’ organizations [15]. Not only is the workforce aging, but there are also fewer young professionals available to employ. This mainly affects service-oriented organizations like professional services firms, which are highly dependent on human resources (HR). Knowledge and competence bearers are essential for these organizations’ strategic development. The organizations respond to these growing challenges by increasing their efforts regarding knowledge and competence management.

While the development of knowledge management (KM) and competence management has been advanced in recent decades, there is still no connection between the two disciplines. Given that the competence and knowledge concepts are bound together, this is very surprising indeed.

In the following, KM is understood as a strategic approach that aims at developing the organization [11]. Consequently, human resources, with their existing and developing competences, are spotlighted. Besides the development of knowledge and individual competences, the promotion of the organizational learning is a priority.

Competence-based learning (CBL) is an important trend within competence management research that has been of growing interest within the last decade (see, e.g., [17], [25]). By assessing the learner’s competence positioning, individual trainings and learning paths can be developed to support the learner’s development [8]. This type of learning method is significantly more time and cost consuming than the traditional method, and requires the targeted use of instruments to assess and develop competences [14].

Owing to the interrelations between KM and competence management, we believe it is reasonable to examine the applicability of KM concepts and instruments in supporting CBL processes. In this way, synergies can be created and duplication of work prevented.

By conducting an expert discussion as part of a benchmarking project, we found further support for our research direction. The benchmarking project [35] focuses on a qualitative, longitudinal, and industry-internal comparison of professional service firms (PSFs). One part of the questionnaire-based benchmarking is aimed at the participants’ KM organizations. This includes their staff development activities. We conducted a topic-related KM workshop with the participant companies’ Chief Knowledge Officers, discussing which KM instruments could be deployed to develop the employees’ competences. The first results emphasize that the PSF industry is characterized by a high demand for KM instruments, which are already utilized.

Nevertheless, the current instruments are not specifically utilized for HR development. The experts indicated that they require a target-oriented HR development strategy that also considers KM instruments. This strategy should take employees’ differing learning demands into account, as they vary depending on the learner’s age, as well as on his or
her life-event-specific needs (e.g., parental leave, retraining, and sabbaticals).

The KM experts called for an employee lifecycle model that considers individual competence needs and assigns appropriate KM instruments for specific learning situations, thus supporting employees’ competency-based development better. This call is simultaneously a strong argument in favor of KM instruments and could be an important critical success factor for proving KM success (see [26]).

Our fundamental research objective is to evaluate how the two KM and CBL concepts can be connected to achieve synergies for their organizational implementation. We thus focus on integrating CBL processes into a holistic KM framework. We start by evaluating the concepts on the basis of the existing literature and propose an alignment of the two concepts and their appropriate instruments. Furthermore, we present our research agenda regarding evaluating the integration of the two concepts. The research was based on multiple case studies that we conducted in the context of a KM benchmarking study (see above). We thereafter develop CBL paths with suitable KM instruments in the context of a supply chain management research project.

We develop a concept for competency-based and self-regulated learning in supply chain management as a part of the “EBS-Fraunhofer Supply Chain School” [9]. In this process, we research appropriate KM and e-Learning instruments that could facilitate the two concepts’ realization in the context.

In the following section, we briefly present the required CBL and KM foundations. The integrated KM architecture by Riempp [38] serves as the framework for a holistic KM architecture. Furthermore, we integrate an idealized CBL process into the KM architecture to connect the two research disciplines. This allows the existing KM instruments and methods to be described with regard to their benefits for CBL. In the last section, we describe areas for further research in detail. In conclusion, we discuss the results that have been gained in our research endeavor.

2. Foundations

Knowledge and competences are important factors for organizations’ strategic development. The knowledge-based theory strongly emphasizes the meaning of intangible resources [20], [42]. In addition while Prahalad and Hamel [37] state that competences are the roots of competitiveness.

Furthermore, competences are not the only central resources, as the productive utilization of other resources also requires relevant competences [34]. In times of demographic change, it is especially important to develop the existing human resources strategically [6]. The concept of lifelong learning is therefore both demanded by and supported in the literature (e.g., [39]). Thus, the development of competences is the focus of several management concepts. Within this paper, we specifically focus on the CBL approach.

2.1. Competence-based learning

Competence-based learning (CBL) is an approach to improve the effectiveness of educational processes by improving the personalization and flexibility of learning and by using the opportunities that new technologies offer [24]. CBL focuses on identifying the key competences needed for a job, assessing levels of mastery, and specifying learning to address skill gaps [6]. In contrast to problem-based approaches, competence-based learning is introduced top-down as this allows for planning measures meaningfully and responding systematically to long-term demographic changes. The theoretical assumption that learners become responsible for regulating their own learning approach [36] is an integral part of competence-based learning. Furthermore, these learners are motivated, independent, and meta-cognitively active [14]. Besides developing competences through learning units, the exchange of experience and the internalization of knowledge can also be sources of competences. Nonaka and Takeuchi have already described various ways of transferring knowledge tied to people and their skills [33]. Thus, new technologies offer manifold support functions, such as e-Learning, for competence development.

On the organizational level, CBL is carried out by human resource development activities. Staffing, learning, and performance management are therefore carried out around competence profiles to enhance the human resource potential [8]. Ultimately, CBL reacts to business’ and industries’ need to systematically develop the competences of their dwindling workforce.

Since CBL is obviously a meaningful approach to strategically develop intangible resources, it makes sense to assess whether there are similar approaches and synergies that can be applied. For example, several authors [19], [34], [45] already mention the “the inseparable and mutual supporting relation between knowledge and competence and the significant implications for strategic management” [23, p.130].

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2.2. Knowledge management

Hong and Stahle [23] describe the commonalities in competence and knowledge management’s (KM) development: they both shifted their focus from documentation and identification to leverage and integration, and, finally, the generation of knowledge and competence. De Carvalho et al. identify competence management as a significant antecedent of KM [13]. Specifically, they emphasize the human resources (HR) department’s strategic role in the KM initiative.

“Knowledge is often differentiated from data and information [12], [33] as complemented by truths, beliefs, perspectives and concepts, judgments and expectations, methodologies, and know-how [47]. According to Davenport and Prusak, knowledge can be seen as ‘a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers’ [12, p.5]. Alavi and Leidner describe alternative perspectives on knowledge, for example, as a state of mind, a process, or a capability. [2]. Holsapple distinguishes between a number of knowledge attributes, for example, mode (tacit vs. explicit knowledge) and type (descriptive vs. procedural vs. reasoning knowledge) [22].” [35, p.18].

Nonaka and Takeuchi [33] describe learning and knowledge transfer processes as follows: Implicit knowledge can be externalized or shared by socialization, while explicit knowledge can be combined or internalized to become implicit knowledge. Each of the four processes requires competences.

Over the past 15 years, knowledge and knowledge-based organizational processes’ strategic management has been intensively investigated under the KM umbrella (see, e.g., [12], [38]). Therefore, a KM strategy operationalizes strategic knowledge goals related to corporate strategy and recorded at the organizational level [21]. In addition to the strategy dimension, holistic KM architectures encompass technology, culture, and process dimensions. The integrated knowledge management systems (KMSs)
architecture by Riempp forms this paper’s reference framework (see figure 1) [38]. This architecture was chosen because it addresses the KM dimensions, as well as linking KM and KMSs to business processes. The architecture consists of three layers (strategy, process, and system) and four pillars (content, collaboration, competence, and orientation). Finally, all the above elements are influenced by the organizational culture.

The strategy layer is composed of the business strategy, the KM goals, and strategy, as well as the measurement system. Metrics are defined in the latter to monitor the KM initiatives’ progress. The process layer encompasses business and support processes. KM processes constitute support processes executed by employees in KM roles. KM roles bundle specific KM activities, such as localizing and collecting, exchanging, using, and (further) developing knowledge, undertaken by individuals and/or groups. The system layer describes the KMSs, which are accessed through a portal, and comprise the following functional pillars: Content, which relates to the management of content, its context, and the information objects in which it is contained; competence, which addresses all aspects related to the competences of individuals and groups within the organization; collaboration, which supports individuals and groups who use content and apply their competences to identify, exchange, and create knowledge; and orientation, which provides the search, navigation, and administration functions that the other pillars require.

3. Aligning KM instruments with CBL processes

Alexander [3] proposed an agenda for studying competence-based learning processes very early on. This agenda consists of the fundamental considerations of what needs to be done and the assessment of the individual’s ability (=competence) to carry this out. The gap between the design of learning tasks and the testing and assessment of competences, which requires new learner progress diagnostic approaches, was again addressed by Deiman und Bastiens [14].

Figure 2 illustrates the process of assessing competence and repeatedly conducting trainings on an ever-increasing level. These training measures lead to the competence bearers’ continuous development. The assessments determine the learning progress.

The model, which describes employees’ development at the individual level, is also effective on the organizational level. These individual competences allow the organizational competences to be mapped [10], which in turn allows the needed measures and instruments to be deduced. KM can thus be considered an organizational support process that supports deriving individual measures in terms of CBL.
By using a KM approach, a holistic and integrated concept can be developed on the organizational level that also supports measures on the individual level. Furthermore, this integrated concept promotes the strategic development of knowledge and knowledge bearers, as well as competence bearers.

Figure 3 illustrates the integration of competence-based learning processes into the integrated KMS architecture. Here, the CBL processes are derived using a business strategy. The associated competence goals can be described in the same way that the strategic knowledge goals are determined. The operationalization of business goals into knowledge and competence goals – which can in turn be separated into critical success factors and key performance indicators – can be meaningful. Thus, for example, the business goal development of innovative products can be supported by the knowledge goal development of needed competences. The critical success factor training of identified competence bearer can be linked to this goal. The implementation can be measured by the number of trainings.

On the process level, KM instruments can be used to identify knowledge and competence bearers. Furthermore, instruments are available for knowledge exchange and systematic training.

A knowledge-supporting corporate culture is one of the most important success factors as it enables knowledge exchange and competence development (see, e.g., [5], [18]). Thus, employees’ openness to share and learn and a flat hierarchy are needed to reveal individuals’ knowledge and competences without their having to fear negative consequences.

We conducted an explorative pre-study of KM instruments’ CBL support. Thus, we examined several KM instruments and their applicability in the context of CBL. Table 1 shows the selection of potential KM instruments derived from the literature and discussed with KM experts in respect of KM support for CBL processes.

The process of linking KM instrument to CBL processes highlights the importance of coordination between competence and knowledge development measures. CBL explicitly describes the measures dedicated to competence development. KM offers supporting instruments for this purpose. A specific coordination will be required if the synergies are to be used and duplication of work is to be avoided.

4. Research agenda for further research

The systematic development of human resources will be a dominant competitive factor for knowledge-intensive organizations in the future. KM and CBL are concepts that support the strategic development of such human resources. As shown, the concepts are closely related. Knowledge cannot be acquired and passed on without the appropriate competences. And competences are not practicable without the accompanying knowledge. As presented in the previous section, many KM instruments are also required to implement CBL. The advantage of KM is that it is an integrated and holistic concept whose

<table>
<thead>
<tr>
<th>Level</th>
<th>CBL processes</th>
<th>KM instruments</th>
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<tbody>
<tr>
<td>Strategy</td>
<td>Competence planning</td>
<td>Operationalization of the business strategy into knowledge and competence goals [38]; strategic competence planning via competence portfolios</td>
</tr>
<tr>
<td>Performance Measurement</td>
<td>Learning progress measurement</td>
<td>KM success measurement; competence portfolios [26]; competence maps [41]; e-portfolios [4]</td>
</tr>
<tr>
<td>Processes</td>
<td>Individual learning process</td>
<td>KM trainings [32]; e-learning [48]; KM systems [29]; knowledge and competence maps [28]; wikis and blogs [30]; communities of practice [46]; debriefing processes and results, lessons learned sessions [40]; creativity tools (mind mapping, brainstorming tools)</td>
</tr>
<tr>
<td>Systems</td>
<td>Distance Learning</td>
<td>E-learning environments [49]; integration of competence management systems into KMS; screen/video sharing; workflow management</td>
</tr>
<tr>
<td>Culture:</td>
<td>Openness for personal development; openness for competence assessment; trust</td>
<td>Flat hierarchies [1]; job rotation [27], mentoring and partner programs [43]</td>
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</table>

Table 1. KM instruments linked to CBL
implementation can be purposeful in practice. Thus, technical, organizational, and cultural prerequisites can be determined to support the workforce’s systematic development. Finally, benefits can be gained from utilizing the synergies between CBL and KM.

Future research should focus on the strategic importance of the relationship between competence and knowledge to allow the systematic development of the two concepts from a theoretical and organizational perspective. As a relatively young discipline, CBL can benefit from KM’s experiences. This, however, requires an adequate coordination between HR and KM.

We are currently following a research agenda that incorporates two research projects that will be combined in the future. The first research project deals with the benchmarking of KM initiatives in professional services firms. In a longitudinal study, an intra-industry survey is being conducted in terms of a questionnaire, document analyses, and additional expert interviews. The questionnaire is comprised of about 320 questions categorized according to the dimensions of Riempp’s integrated KMS architecture. The results will be compared across the panel and longitudinally. This will allow important KM trends to be identified. Several of the survey questions deal with KM instruments and training.

Furthermore, we study a specific research topic intensively each year. In this year’s panel, KM and demographic change are of interest. The discussion of this topic has revealed that the participant organizations are affected by the downsizing and aging of their workforce. They have identified the systematic development of employees as one of the most important strategies to solve this problem. The experts have identified several KM instruments like communities of practice and competence profiles as important instruments to support employees’ development. The experts regard the strategic alignment of individual development goals and knowledge instruments as one of the main challenges.

Although sufficient instruments are available for individual development, there is as yet no adequate systematic approach that describes which competences should be developed when and with which instruments. If there were such instruments, they could be assigned to a specific learning phases and learning type to derive appropriate learning measures. Our research therefore focuses on describing and operationalizing learning strategies that integrate CBL and KM.

One of the next steps will be more focused research on organizations’ individual prerequisites regarding HR development and KM initiatives.

Our second research project explores the evaluation of CBL processes within the supply chain management discipline. Within a consortia research project focusing on supply-chain-specific education, we develop concepts that help transfer supply chain management knowledge to a learning platform. These concepts are: self-regulated learning, CBL, the transfer of scientific knowledge to education, and return-on-education measurement. These concepts will build the foundation of an educative institution that allows learners to learn on the basis of their competence portfolio and on their organizations’ strategic knowledge and competence needs. A technical platform will help create and maintain self-regulated distance learning modules.

With regard to the CBL concept, we will focus on assessing the individual learners’ position and on developing appropriate learning programs focused on lifelong learning objectives. Consequently, we have identified frameworks that identify various competences (e.g., [7], [16], [31], [44]). Next, we will compare these frameworks with the job offers and job profiles that our research partners provide. Based on the competence gaps, we will evaluate a curriculum of individual learning paths. Instruments that can be used to implement this curriculum, can be KM instruments that support the identification, creation, usage, sharing, and evaluation of knowledge and competences. By creating the education institute, we will be able to evaluate the KM instruments’ relevance in practice. We will therefore conduct multiple case studies with our research partners. Finally, we will modify the instruments’ usage if required.

5. Conclusion

CBL offers great benefits to organizations faced with the challenges triggered by demographic changes. Owing to the interdependences between competence and knowledge, CBL and KM initiatives should be aligned, if not integrated.

By conducting a first explorative study based on a literature study and expert interviews, we have revealed that KM offers various instruments and a knowledge-supporting environment that can help establish learning processes. We presented a first listing of potential KM instruments aligned with individual CBL processes. Furthermore, we presented our research agenda based on two research projects that deal with the connection between KM and CBL.
Thus, we contribute to recent research by combining two closely related concepts and by presenting a research agenda that allows CBL support to be strengthened by KM processes and emphasizes KM’s benefits for HR strategies.

In the future, it will be important to strategically align KM and CBL processes in order to support organizations’ business strategy and to use these two processes’ synergies. Furthermore, it is important to describe appropriate strategies to derive competences and their development from business strategy.

6. References