Analysis of Knowledge Management and E-Learning Integration Approaches

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Abstract: The development of knowledge Management (KM) and E-Learning (EL) naturally brings both disciplines closer and encourages integration. Assessment of integration possibilities showed a number of conceptual, technological, organizational and content barriers, which are interfering with integration, and the organization by dealing with them will increase quality, convenience, diversity and effectiveness. Use of KM and EL as equal disciplines is called an integration approach, but using one of them as a support to the other is described as an adoption approach. KM and EL integration may be based on common ground – learning. SWOT analysis was performed to summarize integration possibilities.

1 INTRODUCTION

Traditional competitive advantages of the organization – capital, land, raw materials and technologies start to lose their importance. Instead, employees of the organization with their competency, knowledge, contacts and ideas are becoming the most significant resource.

Knowledge-based organizations may face increasing risks, if they do not pay attention to knowledge of the organization and development of its human resources. The following problems may arise as a result:

- An organization may lose important knowledge, if an employee leaves the organization;
- Significant part of the working time may be spent looking for or recreating the necessary information;
- Employees are not sufficiently trained, they work inefficiently and make mistakes;
- Employee trainings are sporadic, without clear objectives and evaluation of results;
- Knowledge of the organization is not fully utilized for creation of business value.

Aforementioned problems are well identified in the organizations. They may be addressed with knowledge management (KM) and e-learning (EL) approaches and solutions. Each of these approaches, however, has its own advantages and disadvantages.

Furthermore the two disciplines are traditionally seen as unrelated.

Hence, the purpose of the paper is to evaluate KM and e-learning conjoining possibilities and approaches with respect to quality of the use of knowledge in the organization. The following tasks were defined in order to reach the set goal:

- To identify and assess KM and EL integration obstacles and benefits;
- To assess KM and EL integration approaches;
- To perform integration SWOT analysis.

2 DEVELOPMENT OF KNOWLEDGE MANAGEMENT AND E-LEARNING

Both knowledge management and e-learning have been independent disciplines for quite some time. A term "knowledge management" became popular in the 1980s when the conferences and books on KM began appearing, and the term was frequently found in business-oriented journals (Dalkir 2005).

Successful use of knowledge in the organization with a purpose to promote innovations, cultivation of the sense of community, preservation of institutional knowledge and rising of organizational efficiency was important already much earlier. New stage in development of KM is characterized by the use of Web 2.0 and social network technology inside

the organizations, and by the efforts to integrate KM in the employee's daily work processes.

History of e-learning is similar. Term "e-learning" appeared in 1998 (Brooks 2008), but the first attempts to use computers for learning needs were in 1960s (Woolley 1994). The development of Web in 1990s had serious impact on e-learning, when educators started creating text-based training websites (Ellis-Christensen 2015). New communication technology and multimedia development also changed techniques used in e-learning. E-learning currently comprises a significant part of learning both in educational and commercial organizations.

As these two fields continue to develop, synergistic relations will form between KM and EL (Liebowitz and Frank 2011). Some of these relations are quite evident, since both disciplines:

- Deal with capturing, sharing, application and generation of knowledge;
- Have important technological components to enhance learning;
- Contribute to continuous learning culture;
- Can be split into learning objects to facilitate retention and transfer of knowledge;
- Have numerous journals and communities, which have recognized the importance of the synergy between those two disciplines.

Potential barriers, benefits and approaches must be understood to evaluate integration possibilities of KM and EL.

3 PROBLEMS IN KNOWLEDGE MANAGEMENT AND E-LEARNING INTEGRATION

Despite obvious connections between KM and EL, the integration ideas are rarely implemented in practice (Ras et al. 2005). There are several groups of problems, which may be identified as obstacles to closer integration between both disciplines.

3.1 Conceptual Obstacles

Significant conceptual problem is related to human cognition. A typical workplace of a knowledge worker consists of three separate spaces: work, knowledge and learning space (Ley et al. 2005). Work space represents knowledgeable colleagues and information systems, learning space – training classes, laboratories and e-learning systems, but knowledge space – intranet, knowledge bases, etc.

These spaces must be connected for successful and convenient learning, but in cognition domain they are disconnected.

Another problems is to connect already available conceptual KM models with the learning activities and existing learning standards, such as IMS Learning Design (Benmahamed et al. 2005).

3.2 Technological Problems

Each of the three aforementioned spaces (i.e. work, knowledge, learning space) is implemented on different technical platform. For example, work space may consist of learning management system (LMS), intranet portal, knowledge base, wiki, etc. Integration will be even more difficult with dissimilar content structure (Ley et al. 2005).

Real life shows technological disconnection – KM systems and LMS are purchased and implemented separately (Dunn and Iliff 2005). To technically integrate EL and KM, technology needs a single infrastructure and the support of standards.

3.3 Organization of Learning Processes

Knowledge management looks at learning as a part of knowledge sharing process in the organization and focuses on certain forms of informal learning. KM does not focus on learning processes themselves, even though they are vital for successful learning. The language of KM is thus to some degree naive, because it assumes that knowledge is an almost tangible good that can be "produced", "captured" or "transferred" and that can be summed up to a corporate memory (Schmidt 2005).

The incorrect amount of guidance provided for a learner is serious integration problem - while many KM systems provide limited guidance to inexperienced users, many EL courses provide too much guidance and prevent self-directed learning, free navigation and content selection/hiding.

According to constructivist learning perspectives, knowledge cannot be transmitted to learners, but must be individually constructed and socially co-constructed by learners (Jonassen 1999). Learning systems should provide learners with services to assist and facilitate knowledge construction, the amount of guidance should be adapted to learners' needs and context.

3.4 Problems with Learning Content

Schmidt highlights the problem that both KM and EL have a limited and isolated consideration of

context (Schmidt 2005). First, e-learning solutions often do not consider that organizational learning takes place in specific context, and that learning goals are based on real-world needs. Secondly, many KM approaches neglect the fact that the delivery of information chunks does not necessarily mean that the user acquires new knowledge. If the individual's context and characteristics are ignored (i.e., knowledge structures, preferred needs and learning styles) learning might not take place at all.

All organization's knowledge resources (i.e., documents, people, how-to) in event of ideal KM and EL integration may be used as learning materials. This is hindered by the specifics of e-learning materials with their personalized content, internal connections, links and references. Materials for this reason must be converted to small fragments with a possibility to unify them in bigger objects and annotate with metadata about connection to other objects, technical prerequisites, training styles etc. Unfortunately, this may require significant manual work and a lot of time.

The most part of content in a typical e-learning scenario is prepared in advance, and it is not very dynamic. In contrast, KM content is created continuously and often by the employees themselves. Content structuring and annotation as a result is very difficult, and there is simply no time to do this. A midway with an easy authoring on the one hand and interconnectedness and personalization of content on the other hand, is required.

Another obstacle in the use of KM for EL is the fact that information chunks in KM systems often lack interactivity (Yacci 2005). Learning tasks and activities are important for engaging learners and increasing motivation. The information chunks in KM systems must be embedded in the interactive learning activities for successful re-use in learning.

Tailoring of content and teaching strategy to the learner's individual needs can make instruction more effective. Adaptive systems try to monitor students and select next learning steps. Dynamic courseware generation may be able to adapt learning to existing context, and can help reuse knowledge chunks for learning needs. Unfortunately, traditional EL systems are not able to dynamically select and sequence learning materials yet (Brusilovsky and Vassileva 2003).

3.5 Management and Organizational Problems

Top level managers of the organizations probably would not be able to make visionary decisions, as they don't understand enough about emerging trends. This may lead to situations, when KM and EL customers are purchasing products offered in markets, but not the ones they really need (Dunn and Iliff 2005).

Another problem arises when KM and EL are under control of different organizational units, sometimes with conflicting measures (Maier and Schmidt 2007). KM and EL departments for KM and e-learning integration should have common physical proximity, reporting lines, coherent objectives and compatible performance measures. Without that they will compete for resources instead of collaborating to meet business needs.

3.6 Cultural Barriers in Organization

Organization may face different and conflicting learning and information sharing models in different departments (training vs. technology culture; delivery/broadcast vs. collaboration/sharing; etc.) (Dunn and Iliff 2005). Prevention of cultural barriers formed by conflicting values of different departments may be a hard and long task. This will require open thinking, serious investments in human resource development, clear understanding of business needs and outstanding leadership.

KM and EL have several internal problems unrelated to integration of both fields. There are no clear and widely accepted measures to evaluate KM and EL implementation and usage. Many employees are unfamiliar and uncomfortable with sharing knowledge and don't understand their KM systems (Dunn and Iliff 2005). Both disciplines thus need some maturing in addition to understanding and overcoming barriers to integration.

4 KNOWLEDGE MANAGEMENT AND E-LEARNING INTEGRATION BENEFITS

Joint use of KM and EL to achieve organizational goals will require management to find balance between both disciplines (Dunn and Iliff 2005):

- Businesses with good employee training have less need for KM. Those with effective knowledge management need less training;
- Employees searching for a knowledge source might be open to relevant e-learning content. When they look for training, they might use relevant KM content as well;

▪ A business collecting special knowledge should be able to make an even-handed decision between putting it in the KM system and creating an e-learning (or both).

Closer use of KM and EL approaches will provide a more flexible set of options for organization's learning needs. Each discipline might be able to address some of the weaknesses of the other, and their integration should reduce wasted investment in learning.

Islam and Kunifuji suggest adoption of KM approaches in EL systems to encourage conversion of tacit knowledge, facilitation of knowledge organization, retrieval and sharing, and proper management of knowledge resources (Islam and Kunifuji 2011).

The interaction of both disciplines may be summarized like this: KM facilitates e-learning by increasing the effectiveness of knowledge dissemination; e-learning and its enhanced technologies stimulate important changes in KM processes (Yordanova 2007).

Joint studies of both domains point out the opportunity for increased quality, convenience, diversity and effectiveness within an organization. Jointly applied, they are a catalyst for organizational learning, which improves the performance of team members, and is a basis for better results (Sammour and Schreurs 2008).

KM and e-learning both serve the same purpose: facilitating learning and competence development in organizations, but they are using two different perspectives. KM is related to an organizational perspective to addresses the lack of sharing knowledge among employees. In turn, e-learning emphasizes an individual perspective, as it focuses on the individual acquisition of new knowledge (Ras et al. 2005).

5 KNOWLEDGE MANAGEMENT AND E-LEARNING INTEGRATION APPROACHES AND DIRECTIONS

Ras et al. in their paper mention several ways to connect knowledge management and e-learning disciplines. One way is to encourage or improve learning with the help of KM systems, other – extend EL with opportunities from KM technologies (Ras et al. 2005).

While describing connection of KM and EL domains, terms "integration" and "adoption" are used with close meaning. There are following situations (see Figure 1):

▪ Knowledge management is the basis. E-learning provides technologies and tools for KM needs. This situation may be described as adoption e-learning for KM;

▪ E-learning and e-learning systems are the basis. KM techniques and approaches are tailored and used to increase e-learning efficiency. This may be described as knowledge management adoption for e-learning (Islam and Kunifuji 2011), (Sivakumar 2006);

▪ Knowledge management and e-learning are seen as two equal, parallel operating disciplines. Their common, consistent implementation and use is integration of KM and e-learning (Maier and Schmidt 2007), (Schmidt 2005), (Ungaretti and Tillberg-Webb 2011).
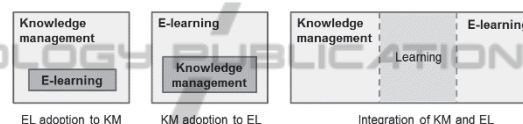

Figure 1: KM and EL adoption and integration approaches.

Learning objects are the common topicality of both KM and EL. According to Web-Based Training Information Centre the radical changes are expected in learning object design to provide following functionality (Kilby 2009):

▪ Reusability: learning content modularized into small units of instruction suitable for assembly and reassembly into a variety of courses;

▪ Interoperability: instructional units that interoperate with each other regardless of developer or learning management system;

▪ Durability: units of instruction that withstand ever evolving delivery and presentation technologies without becoming unusable;

▪ Accessibility: learning content that is available anywhere, any time - learning content that can be discovered and reused across networks.

E-learning with such learning objects will be made stronger and more mature. Some of these learning objects may be also knowledge objects.

Another direction for connecting KM and EL is the incorporation of dynamic knowledge features into the LMS. The main goal will be to ensure "just-in-time" approach, where an employee receives the required information. This solution may utilize intelligent agents to assess user learning or work

progress, build a dynamic, extensive user profile, perform text summarization and collect needed information from different sources.

Both learning object development and "just-in-time" information approach are related to learning which may be used as common ground for KM and EL integration.

6 SWOT ANALYSIS

SWOT analysis is performed to summarize KM and e-learning integration possibilities. The following strengths are identified as a result:

- KM and EL have a common goal – to promote learning and competency development. Integration will facilitate continuous learning culture in the organization;
- KM and EL is related to the knowledge capture, sharing, application and generation;
- Technological components to enhance learning are important both in KM and EL;
- KM and EL use different perspectives, so integration gives a better opportunity to adapt to different situations;
  Experts recognize KM and EL as practice disciplines and look for their integration;
- KM and EL use both types (tacit and explicit) of knowledge;
- KM and EL can be split into learning objects to facilitate knowledge retention and transfer;
- KM facilitates EL by increasing the effectiveness of knowledge dissemination;
- EL and its enhanced technologies stimulate important changes in KM processes.

The weaknesses of KM and EL integration are as follows:

- Workplace of a knowledge worker is fragmented: separated work, knowledge and learning space;
- KM and EL use separate ICT systems and different technologies;
- KM models are not related to EL standards;
- Amount of guidance that KM and EL provide for learner is not appropriate;
- KM and EL have limited and isolated consideration of context;
- KM materials are missing interactivity.

The KM and EL integration will provide following opportunities:

- More effective use of organizations infrastructure and resources;
- Dynamically adaptive systems may use materials from KM systems for learning;

- EL and KM can use shared learning objects;
- Common measures will allow assessing the results of integration;
- Smaller organizations may use simpler or free systems for integration.

The following threats to KM and EL integration are identified:

- Management of the organization doesn't understand potential of KM and EL;
- Culture of the organization doesn't accept KM and EL approaches and integration;
- KM and EL are managed by competing departments with different outcome measurements;
- KM does not pay needed attention to learning processes;
- Since KM and EL have different perspectives, they may be seen as non-related disciplines.

7 CONCLUSIONS

The development of KM and EL naturally brings both disciplines closer and encourage integration. SWOT analysis shows that there are number of conceptual, technological, organizational and content barriers interfering with integration, but the organization by dealing with them will increase quality, convenience, diversity and effectiveness.

A situation, when approaches and techniques of one discipline are used to improve another discipline, is described as adoption. KM and EL implementation and use as two equal, parallel disciplines is integration. Learning is a common part of both disciplines and may be used as base for integration.

The future research will be dedicated to exploration of theoretical approaches to KM and EL integration as well as evaluation of ways to implement these approaches in practice. This would allow developing the theoretical approach, which will be the basis for building practical KM and EL integration framework and solution.

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