

## KNOWLEDGE MANAGEMENT IN E-LEARNING PRACTICES

Yücel Yılmaz

Marmara University, Department of Business Informatics, Istanbul, Turkey  
yucelyilmaz@marmara.edu.tr

### ABSTRACT

Thanks to extension of IT in educational activities, the difficulties based on time and space are disappearing and the management and the execution of these activities can be implemented more effectively and beneficially. Even though there are significant developments about e-learning both in academic and professional platforms, there are some main questions that must be considered like: How can e-learning and knowledge management be integrated? Do these present e-learning systems fulfill the requirements of knowledge management? Are provided facilities from these systems being utilized in knowledge management accurately? In this paper, firstly e-learning, and then knowledge and knowledge management concepts are considered with their major points. In the next section it is considered that how e-learning systems can be integrated with knowledge management; under the subjects of knowledge management models, system features, and requirements of knowledge management.

**Keywords:** E-learning, e-learning systems, knowledge management, integration.

### INTRODUCTION

Today, organizations need to develop fast and accurate responses to changes which increase their scope and speed day by day. In this context, knowledge management and educational activities gain increasingly importance for all kinds of institutions, not just business enterprises. In the knowledge age we are living, an organizational structure which is flexible, can fulfill customer demands through the effective use of resources, and protect and improve competitiveness, can only be created on the basis of an approach, which regard knowledge as the most basic and strategic factor. Further, in knowledge management studies conducted "education" is a subject of special importance, and instead of "organizational learning" now "learning organizations" are discussed.

With the spread of information technologies in educational activities, time and space-based barriers are removed, as well as the management and execution of these activities can be performed more effectively and efficiently. Although there has been significant progress in e-learning studies performed both on academic and vocational platforms, there are still some questions that need to be answered. The main of these are as follows: How can e-learning be integrated with knowledge management? Are the current e-learning systems able to fulfill the requirements of knowledge management? Are the opportunities offered by e-learning systems used in knowledge management properly? In this study, firstly e-learning, and then knowledge and knowledge management concepts are dealt with their major points. In the next section it is discussed how to integrate e-learning and knowledge management on the basis of knowledge management models, system specifications and requirements of knowledge management.

### E-LEARNING

With changing circumstances and technology, economic, social, cultural and social life has significantly changed. In particular, enterprises operating in highly competitive sectors should address "education" like any other strategic agenda item and use it as one of the strongest tools. Training activities that are effectively carried out facilitate to increase employee productivity, to establish stronger and effective relations with business partners, as well as to increase brand awareness and customer preference. The fact that enterprises operate in challenging competitive conditions make education more critical (Rosen, 2000, p. 1).

In the literature there are different definitions of e-learning. However, when these definitions are considered from a wide perspective, it is seen that they emphasize generally the same features. In the European e-Learning Action Plan, the concept is defined as follows: "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration". In this definition, electronic technologies are regarded as vehicles for education services and resources, and as the conduits for cooperation and communication. In an essential context, the concept can be defined as follows: Online access to learning resources, anywhere and anytime (Holmes & Gardner, p. 14). Some of the other definitions of the concept are as follows:

- E-learning is best defined as the category consisting of training and learning over the Web – training that can be delivered over an intranet, extranet or the Internet (Rosen, 2000, p. 20).

- E-learning is learning at a distance that uses computer technology (usually the Internet) (Henderson, 2003, p. 2).
- E-learning is essentially the network-enabled transfer of skills and knowledge. E-learning refers to using electronic applications and processes to learn. E-learning applications and processes include Web-based learning, computer-based learning, virtual classrooms and digital collaboration (Mihalca et al., 2008, p. 2).

In the context of learning and performance issues, the concept of e-learning can be defined from a broader and comprehensive point of view as follows: E-learning is the use of Internet technologies in order to create a rich learning environment which includes a large variety of instruction and information resources and solutions, and also to deliver this environment. And the goal of e-learning is to improve individual and organizational performance. In this definition, both instructional and information solutions took place, so different applications of e-learning in training and non-training environments are emphasized. In educational environments; course contents and applications are employed in relevant systems, even homework and exams can be electronically performed. On the other side, in non-training educational environments, in addition to formal education, informal education which means providing necessary information and collaboration environments is also realized. With informal education activities it is aimed that employees develop and update their knowledge. For example, doctors need a lot of formal training. However, they also learn in other ways, for example, by reading scientific journals, accessing new medical research data etc. Therefore, an instructional solution may not be required in all learning activities (Rosenberg, 2005, p. 72).

As with the concept of e-learning, there are also a large number of definitions in the literature regarding the types of e-learning. One of the main classifications divides e-learning activities into two main groups, synchronous and asynchronous e-learning. In synchronous e-learning, communication between instructors and students is carried out without delay. Synchronous interaction can be realized over chat sessions, collaborative electronic blackboards, etc. (Rosen, 2000, p. 20). In other words, with synchronous learning, all the students and instructors are in the same (virtual) environment at the same time. Although this type of learning seems similar to the traditional classroom learning, here there is no being of physically together. The main features of the synchronous learning can be summarized as follows:

- It is instructor-led,
- It is collaborative. Students can “talk and interact” with each other,
- It is scheduled (synchronous). Everyone is “there” at the same time (Henderson, 2003, p. 132).

With asynchronous learning, instructor can come together and communicate with a student group over the Internet. However, it is not required that all persons are online at the same time. Students are alone by studying learning materials, as well as by interacting with the instructor and other students by leaving messages. It is anticipated that the messages are answered in a specific period of time, for example, within a few hours. In this method, student can work alone, but continues to provide communication with an instructor or student group. The main features of the asynchronous learning are:

- It is student-led,
- It is semi scheduled (asynchronous). Everyone is “there”, but not at the same time.
- It is collaborative. Students can “talk and interact” with each other by living messages (Henderson, 2003, pp. 135-136).

## **KNOWLEDGE AND KNOWLEDGE MANAGEMENT**

The current time frame we are living in is called several different names, such as the digital age, information age, knowledge age etc. In this age, there are a large number of important developments in the nature of economics. One of the main is that economic structure is based no more on tangible products and manufacturing, but on intangible products and assets (knowledge, information, and so on). In this context, the differences between tangible and intangible assets and their reflections on the economic relations come to the question. Tangible assets are finite / limited assets; they can be used by only one person at a time. They decrease in value by using and sharing. On the contrary, knowledge which is an intangible asset is unlimited, can be used by many people at the same time and increases by using and sharing. Besides, the integration of different streams of knowledge may produce new knowledge assets which would be more refined and have more value. On the other hand, today, the benefits offered by knowledge sharing are increasing and this fact leads to widespread initiatives of collaboration. It is seen that knowledge sharing, for example in form of business alliances, is realized wide spread worldwide, even among competitors (Halal, 2006, p. 4).

Although importance of knowledge and its strategic meaning to organizations are widely accepted, there is no knowledge management model which is accepted worldwide, because of the characteristics of knowledge. Firstly, knowledge is a human-based construct which means that knowledge is created in minds of people. In this creation, human-based factors such as intuitions, beliefs, culture, experiences, etc. play a determining role. On the other side, the meaning of knowledge is context-dependent; knowledge has a specific meaning only in a specific context. The context in which knowledge is created, shared and used determines the meaning respectively importance of knowledge. Besides, knowledge management (KM) is a new approach compared to other management approaches such as total quality management, human resources management etc, and has no proven tools and methods yet. In this context, new technologies for example social software should be examined in relation to their contribution potentials to knowledge management practices. In addition, knowledge is an intangible asset and intangible assets can not be directly managed. Management process of intangible assets can be only indirectly formed. Indirect management means that relevant conditions impacting knowledge creation, knowledge development and knowledge sharing are analyzed and improved. In this way, different requirements for an effective knowledge management should be fulfilled (Probst et al., 1998; Kendal & Creen, 2007; Yilmaz, 2010).

In the literature, the objectives of knowledge management are defined from different point of views. The common understanding in these definitions is that KM is closely related to business excellence, competition and innovation capability of the organization, as well as process efficiency / effectiveness. In order to achieve these objectives, KM focuses on productive management of all intangible resources, for example individual knowledge assets, experiences, databases, know-how etc. Another important point related to KM is that relevant studies are conducted within the framework of corporate strategy (Bhatt, 2001; Nerdrum & Erikson, 2001; Beijerse, 1999; Mittelmann, n.d.; Probst et al., 2006; Riempp, 2003; Yilmaz, 2007; Yilmaz & Gürder, 2010). If business excellence is accepted as the main objective of KM, it can be divided into knowledge-based objectives listed below:

- Conversion of individual knowledge into organizational knowledge: It involves the conversion of knowledge, which is only in the minds of employees, into organizational rules, standards, structures and technologies.
- Creation of knowledge transparency: The organization should be able to determine capabilities which it currently has and must have them in the future. In this context, the organization should lead their employees to acquire necessary skills.
- Facilitation of information-based operations: It has an important role regarding the management of data and information that constitute the basic elements of knowledge. The correct processing of real data, and so the conversion of data into accurate information enable to have accurate knowledge and to decide effectively. Hence, knowledge and decisions are created on the basis of existing data and information.
- Preservation of important experiences: It can decrease the dependence on people and substantially prevent repetition of past mistakes
- Development of an organization-specific knowledge assessment system: The characteristics of knowledge mentioned above require considerable effort spent in this field (Reinmann, 2001; Probst et al., 1998; Probst et al., 2006; Röhl & Romhardt, 1997; Yilmaz & Gürder, 2010).

### **INTEGRATION OF E-LEARNING WITH KNOWLEDGE MANAGEMENT**

The question how to integrate e-learning with knowledge management is closely related to the underlying knowledge management model. As mentioned above, there is no knowledge management model, which has proven successful and is widely accepted. In this study, the integration of e-learning with knowledge management is handled on the basis of the knowledge spiral model developed by Nonaka and Takeuchi (1995). In this model, tacit and explicit knowledge represent the two basic types of knowledge. According to this model, organizational knowledge is created with interactions/conversions which take place continuously between tacit and explicit knowledge. Tacit knowledge is based on personal experiences, can not be easily implied and transmitted, and incorporates human-specific factors such as beliefs, perspectives, culture etc, which can not be clearly interpreted. On the contrary, explicit knowledge can be easily implied, formalized and communicated. The person who has this type of knowledge is conscious of having it and can speak about it. The interaction/conversion modes between tacit and explicit knowledge are socialization, externalization, combination, and internalization (Nonaka & Takeuchi, 1995). The relevant modes and contribution potentials of e-learning systems regarding these modes can be explained as follows:

- Socialization: In this mode, tacit knowledge is transferred between individuals through interactions. In other words, tacit knowledge is converted into tacit knowledge again. Competency and skills

measurements facilitate to determine the people who have specific interests, skills and knowledge in the organization.

- Externalization: The tacit knowledge is converted into explicit knowledge in a repository. The e-learning system can capture knowledge to teach to other people. In this way, the knowledge capture process is developed.
- Combination: The explicit knowledge is extended with other explicit knowledge assets. Knowledge about products and processes of the business is structured to enable that learning processes are carried out more effectively and efficiently. In this context, pedagogical techniques are used.
- Internalization: In this mode, the explicit knowledge that is needed by a particular person or group is extracted from the repository and transferred to him/her or the group, where it is translated into tacit knowledge. Competency and skills measurements facilitate to determine the people who lack the knowledge to do their task effectively and to provide them online training. E-learning systems provide assessments and alternative learning methods to ensure that people have learned the knowledge (Woelk & Agarwal, 2002, p. 2).

Nowadays, knowledge management systems mainly focus on knowledge acquisition, storage, retrieval and maintenance (e.g. update), whereas e-learning systems are often monolithic and can not sufficiently support knowledge development and sharing (Mihalca et al., 2008, p. 1). However, as mentioned above, knowledge is a human-based construct and the creation of knowledge requires that relevant information are understood and internalized by people (Kendal & Creen, 2007). Learners acquire information and process experience. In this process, new information and experience are added into the knowledge base of the learner. Besides, in acquiring information and processing experience, the learner perceives, selects and integrates new information and experience into the current knowledge base and so, he/she changes it. In addition, “learner selects and constructs knowledge that is useful and appropriate for him/herself and in turn uses this to drive and determine his/her own continuous learning process”. Besides, “learning process can be seen as process for...learning that becomes an individual process of interaction between the individual and his/her environment, in which the subjective reality of the learner is actively constructed”. Therefore, if the computer technology will be used to support learning activities which should develop and create knowledge, then new pedagogical processes are required. On the other hand, with the tendency for technology-oriented development, information dissemination and acquisition are focused on (Mihalca et al., 2008, pp. 2-3).

The most important difference between e-learning and knowledge management systems is that they have totally different objectives. E-learning systems try to provide structured learning contents and intercommunication possibilities to specific topics so that learners are supported to develop their knowledge. On the other side, knowledge management systems provide knowledge through content management systems which have search and sort facilities, and also collaboration possibilities with experts and other users on various topics (Ausserhofer, 2002; Putzhuber, 2003, p. 10). In recent years, a lot of research which aim at integration of e-learning systems with knowledge management have been carried out. In this context, the common focus of e-learning and knowledge management can be stated as follows: How can human knowledge and its use within an organization be enhanced? (Dongming & Wang, 2005, p. 4).

Putzhuber (2003, p. 10) defines the common points of these systems as follows:

- E-learning and KM systems provide knowledge in different forms to the users. This content can be reused, annotated, modified or whatever else is needed for different approaches.
- The system architecture is almost the same for both concepts. It is a client-server-architecture with high complexity in the server-part whereas the clients are more or less thin ones.
- For both systems it is very important to provide communication and cooperation facilities. These vary from e-mail over chats to forums or other forms of cooperation.
- Also personalization plays an important role for both approaches. Relevant systems for both concepts support some kind of personalization either role-based or person-oriented.
- Last but not least, some kind of access regulation is available, either group or person specific. It is very important to provide only specific information to specific users and groups.

Within the framework of the common points mentioned above, it is seen that a better conjunction between the systems is dependent on design of the content that can be used for both systems. In addition to its teaching function, e-learning content should be designed to provide information in a categorized and structured context. This requirement and objective is also shared by knowledge management systems. Besides, it is possible that content of the KM system can be assessed as a kind of repository for content of the e-learning system. In such a case, only additional and specific metadata would be required. In addition, knowledge gathered by the

knowledge management system could be used as course in the e-learning system. Topics the many knowledge management users are curious and need to develop their knowledge about can be easily determined on basis of statistical evaluations (Putzhuber, 2003, p. 11).

Integration of e-learning with knowledge management processes can create synergies to significantly improve the creation of new knowledge and the performance of learning processes. As mentioned above, the question how to integrate e-learning with knowledge management is closely related to the underlying knowledge management processes respectively modeled. If these processes are stated as knowledge creation, knowledge structuring and knowledge dissemination, it can be seen that knowledge dissemination and creation occur in e-learning. However, the link between knowledge dissemination and creation are rather weak from organizational point of view. On the one side, new (individual) knowledge gained by learning is not sufficiently made explicit. On the other side, there is a lack of structuring mechanisms that enable to retrieve and reuse knowledge assets created by other people. In this context, the conversion of tacit knowledge into explicit knowledge and application of structuring mechanisms on learning resources are of special importance to the integration of e-learning with knowledge management (Angkasaputra et al., 2004, pp. 4-5).

For the integration of e-learning systems and knowledge management, the knowledge management model which is to be based upon should at first be determined. How this integration can be provided should be evaluated within the framework of the related model. This mentioned integration can basically be explained as follows, based upon Nonaka and Takeuchi's Knowledge Spiral Model: The integration of the staff (employees) to the effective procedures is determined with respect to knowledge source maps and knowledge domains. Staff share their expertise and knowledge with each other by means of the interaction and collaboration options provided by the system; these options can be the chat rooms, discussion forums and coordination meetings thru internet calls. New possibilities for interaction and communication provided by knowledge management systems would definitely increase the efficiency at this stage (socialization).

The next step will be the transformation of tacit knowledge into explicit knowledge; where the knowledge and experiences shared by the staff in the previous stage, should be saved in the e-learning system. The saving procedure should be done within the framework of a certain structuring and classification system. Content management systems and knowledge structure maps can be useful at this stage (externalization). As mentioned above, one of the most important functions of knowledge management systems is to provide options for knowledge structuring and classification.

The successful combination of the explicit knowledge obtained through the process, with already existing knowledge that is to be reached, via either intra or inter institutional sources, should be maintained. Knowledge management systems can have important contributions at these stages as well, since knowledge acquisition, retrieval and maintenance are among their main functions. On the other hand, knowledge management systems also support content development through the network within the system. The combination of the established knowledge with pedagogical methods is vital at this stage (combination). In the final stage of the knowledge spiral model, explicit knowledge is transformed into tacit knowledge and this process is called internalization. Before moving onto this stage, such tools of knowledge management as knowledge asset maps and knowledge application maps can be utilized to determine to whom the knowledge or network shall be conveyed. Those who are concerned can easily reach the knowledge saved by others by means of structuring and retrieval mechanisms provided by the knowledge management system and hence evaluate this knowledge together with those provided by the e-learning systems. Thus, significant contributions are provided to the formation of new schemas (internalization).

## REFERENCES

- Angkasaputra, N., Pfahl, D., Ras, E., & Trapp, S. (2004). The Collaborative Learning Methodology CORONET-Train: Implementation and Guidance. In S. Henninger & F. Maurer (Ed.), *Advances in Learning Software Organizations: 4th International Workshop, LSO 2002, Chicago, IL, USA, August 6, 2002, Revised Papers* (pp. 13-24). Berlin, Heidelberg, New York: Springer.
- Ausserhofer, A. (2002). *E-learning and Knowledge Management towards Life-Long Education*. Austria: Graz University of Technology.
- Beijerse, R. (1999). Questions in knowledge management: defining and conceptualising a phenomenon. *Journal of Knowledge Management*, 3(2), 94-109.
- Bhatt, G.D. (2001). Knowledge management in organizations: examining the interaction between technologies, techniques and people. *Journal of Knowledge Management*, 5(1), 68-75.

- Dongming, X., & Wang, H. (2005). Integration of Knowledge Management and E-Learning. In D. Schwartz (Ed.), *Encyclopedia of knowledge management* (pp. 267-273). Hershey PA, London: Idea Group Publishing.
- Halal, W.E. (2006). The Logic of Knowledge: KM Principles Support Agile Systems. In K.C. Desouza (Ed.), *Agile Information Systems: Conceptualization, Construction, and Management* (pp. 31-40). Oxford: Burlington.
- Henderson, A.J. (2003). *The E-Learning Question and Answer Book: A Survival Guide for Trainers and Business Managers*. New York: AMACOM.
- Holmes, B., & Gardner, J.R. (2006). *E-Learning: Concepts and Practice*. London: Sage Publications Ltd.
- Kendal, S.L., & Creen, M. (2007). *An Introduction to Knowledge Engineering*. London: Springer.
- Mihalca, R., Ută, A., Andreescu, A., & Întorsureanu, I. (2008). Knowledge Management in E-Learning Systems. *Revista Informatica Economică*, 2, 46, 60-65.
- Mittelmann, A. (n.d.). *Informations-, Qualitäts-, Wissensmanagement, Gemeinsamkeiten/Unterschiede*. Retrieved from [http://members.inode.at/amann/softwarequalitaet.at/17\\_Tagung/Mittelmann.pdf](http://members.inode.at/amann/softwarequalitaet.at/17_Tagung/Mittelmann.pdf)
- Nerdrum, L., & Erikson, T. (2001). Intellectual capital: a human capital perspective. *Journal of Intellectual Capital*, 2(2), 127-135.
- Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*. New York: Oxford University Press.
- Probst, G., Raub, S., & Romhardt, G. (1998). *Wissen Managen*. 2. Auflage, Frankfurt am Main: Frankfurter Allg., Wiesbaden: Gabler.
- Probst, G., Romhardt, K., & Raub, S. (2006). *Wissen managen. Wie Unternehmen ihre wertvollste Ressource optimal nutzen*. 5. Auflage, Wiesbaden: Gabler.
- Putzhuber, W. (2003). *From eLearning to Knowledge Management - Bridging the Gap*. (Unpublished Master's Thesis). Graz University of Technology, Austria.
- Reinmann-R.G., Mandl, H., Erlach, C., & Neubauer, A. (2001). *Wissensmanagement lernen, Ein Leitfaden zur Gestaltung von Workshops und zum Selbstlernen*. Weinheim, Basel: Beltz.
- Riempp, G. (2003). Von den Grundlagen zu einer Architektur für Customer Knowledge Management. In L.M. Kolbe, H. Österle & W. Brenner (Hrsg.), *Customer Knowledge Management - Kundenwissen erfolgreich einsetzen* (pp. 23-55). Berlin, Heidelberg: Springer.
- Rosen, A. (2003). E-Learning Overview. In L. Mealy & B. Loller (Ed.), *E-Learning: Expanding the Training Classroom Through Technology* (pp. 19-22). Austin, Texas: Rector Duncan & Associates, Inc.
- Rosenberg, M.C. (2005). *Beyond E-Learning: Approaches and Technologies to Enhance Organizational Knowledge, Learning, and Performance*. San Fransisco: Pfeiffer.
- Röhl, H., & Romhardt, K. (1997). Möglichkeiten und Grenzen des Wissensmanagements: Auf der Suche nach einem neuen Umgang mit der Ressource Wissen in der Organisation. *Gablers Magazin*, 6, 7, 42-45.
- Woelk, D., & Agarwal, S. (2002). Integration of e-Learning and Knowledge Management. In M. Driscoll & T. Reeves (Eds.), *E-Learn 2002 World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education. Proceedings* (pp. 1035-1042). Montreal, Canada.
- Yılmaz, Y. (2007). Pre-Analysis Process for Knowledge Management – A Case Study in a Building Materials Company. *VINE: The Journal of Information and Knowledge Management Systems*, 37(1), 74-82.
- Yılmaz, Y. (2010). Social Software in Management of Knowledge Assets. In A. Erkollar (Ed.): *Enterprise & Business Management* (pp. 85-110). Marburg: Tectum Verlag.
- Yılmaz, Y., & Gürder, F. (2010). Wissensbasierte Analyse von Geschäftsprozessen. In H. Akpınar & R. Öztürk (Eds.), *Optimierung von Geschäftsprozessen* (pp. 75-90). Aachen: Shaker.