

IMPACT OF WEB-BASED TRAINING ON KNOWLEDGE MANAGEMENT IN COMPANIES

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ABSTRACT

Companies need to improve their knowledge environments and bases, their ways of acquiring and creating new knowledge and their learning abilities. They also need to make efficient use of new technologies in relation to knowledge management (KM) in order to survive and be competitive. Training facilitated by eLearning 2.0 (which is based on Web 2.0: Web-based training) is an important tool which enables KM to become a revolutionary method of workforce empowerment equipping users with the skills and knowledge needed to turn change into advantage. In this paper we discuss how to organize Web-based training to support KM in small and medium-sized companies (SMEs) which particularly need help. Some SMEs have focused on KM using it as an innovation capability enabler, but many of the practiced KM approaches have failed. Life long learning (LLL) strategies were missing. We give as an example a European eLearning project coordinated by the author. Strategies were developed to enable SMEs to take full advantage of eLearning in their Web-based training. We involved SMEs and eLearning experts in a European community of practice (CoP) to share their learning and knowledge and to develop a collaboration of learning and KM resources.

KEY WORDS

Web-based training, knowledge management, small and medium-sized companies, community of practice

1. Introduction

In order to survive and be competitive, companies' objectives need to be: a deployment of their knowledge environments/bases and the acquisition and creation of new knowledge and learning abilities.

There must also be an efficient use of new technologies for managing internal and external knowledge flows. [1]. Knowledge management (KM) is "a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that will improve organisational performance" (O'Dell et al., 1998) [2]. KM involves a mix of initiatives referring to culture, organization, management, processes and applied technology. It is very

complex and is dependent on actors, tools and tasks. Much of the knowledge is tacit or hard to articulate [3].

Wild et al. (2002) [4] show that eLearning is an important tool that can support KM in being "a revolutionary way to empower a workforce with the skills and knowledge it needs to turn change to an advantage".

The most frequently used learning theories in the development of educational environments are behaviourism, cognitivism and constructivism. Each has subsets e.g. social cognitivism, social constructivism. All these theories are built on epistemological traditions and attempt to address the meaning of what a person learns.

Siemens (2005) [5] proposes a further learning theory: connectivism, which integrates principles of chaos, network, complexity and self-organisation and moves learning theories into a digital age. Connectivism also addresses the challenges which many companies face in knowledge management activities. We consider connectivism as an important approach for exploring ICT and Web 2.0 in a learning context. Training by using eLearning 2.0 (which is based on Web 2.0 [6]: Web-based training) focuses on community and social interactions and has the potential to support knowledge sharing, creation and transfer of individual and organisational knowledge. It does this through interactive methods of on-line delivery of information, collaborative procedures (eCollaboration), targeted training and through a blending of eLearning with other education methods [7]. The traditional eLearning "teach and learn" model can not ensure the transfer of valuable tacit knowledge [8].

In this paper we discuss how to organize Web-based training to support KM in small and medium-sized companies (SME) which particularly need help. Many of them are not ready for significant international, social and economic change. [9, 10, 11, 12]. Some SMEs have focused on KM and used it as an enabler for innovation capability, but many of the practiced KM approaches failed. Life long learning (LLL) strategies are missing [11], [13]. The priority of SMEs is survival, leading to an implementation of just-in-time activities. The benefits of KM in SMEs to business have to be crystal clear and measurable. To be effective and acceptable to staff, knowledge management environments and training approaches must have a direct relation to competencies and activities of the staff on the job [14].

2. Web-based Training

In comparison to conventional training, the time and place flexibility of eLearning methods offers SMEs many advantages in relation to suitable learning methods for their staff.

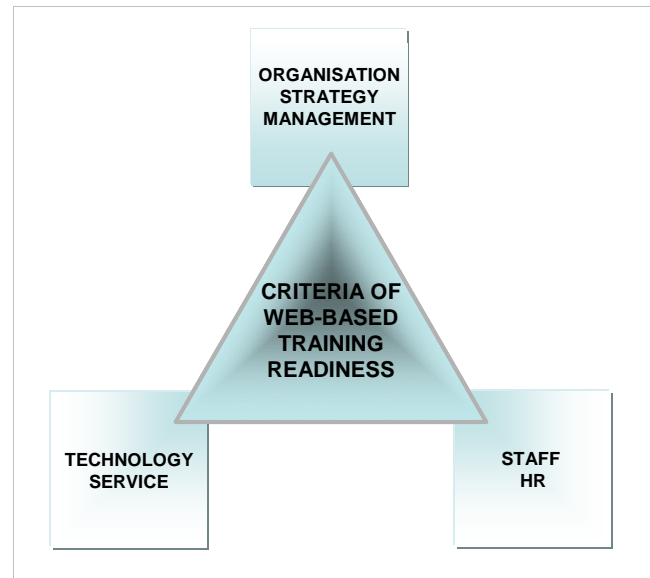
Properly developed eLearning creates a growing repository of knowledge able to provide employees with exactly what they need at a determined time and in a way that offers more efficiency through individualization.

The concept of Web 2.0 facilitates a new level of interaction making it easier to collaborate and to share information. Web-based training is based on tools that combine easy creation of content with Web delivery and collaboration. It simplifies the tasks involved in working and learning in groups and is therefore ideal for SMEs which support natural and informal learning (features enjoyed by SME staff). In communities, individuals receive help from peer-networks thereby reducing unnecessary searching activities and consequently saving time. Best practice and the experience of other practitioners in the community can help individuals learn how to solve problems.

Studies [9] and the EU ARIEL project (Analysing and Reporting on the Implementation of Electronic Learning in Europe www.ariel-eu.net/), [11, 14], show that Web-based training in SMEs often faces a series of problems. Factors which may cause these problems include knowledge gaps and training offered to staff which requires them to attain the necessary competencies in the shortest time. Instead of the competencies being systematically identified, they are drawn predominantly from practical experience. Also, many SMEs do not have the necessary infrastructure for enabling knowledge [15] and life long learning.

The aspects we present below have been considered within the European project SIMPEL [16] by building Web-based training strategies for SMEs.

The first step to be considered before implementation of Web-based training is an assessment of Web-based training readiness. In our model a list of questions for its evaluation is provided in a reference catalogue which takes into consideration the criteria Organization/Strategy/Management, Technology/Services, Staff/Human Resources (Figure 1). Experience shows that a suitable assessment of readiness for Web-based training in SMEs (having limited resources) can be realized in the form of a simple questionnaire survey for managers and individual employees. After data collection, the results should be evaluated by a company consultant and completed/detailed in direct discussion with the company staff and management. The next step is the building of a training strategy to support KM.



Source: IAT

Figure 1: Criteria for Web-based training readiness

3. Questions for the Questionnaire

Organisation/Strategy/Management

- Which are the strategic objectives and reasons for implementing/using Web-based training? Are KM and innovations included?
- Is there adequate understanding that learning to support KM means much more than implementing an ICT tool or solution?
- Is there a well-structured knowledge base of the enterprise that can be used by the staff whenever they would like to use it?
- Does the company have a vision of how KM can support company business?
- Is the knowledge to be transferred and used between different units available in understandable formats?
- Are financial resources available to the company management to support Web-based training?
- Are staff Web-based trained?
- Is the learning culture of the organisation supportive of sharing knowledge?
- Are interactions between staff favourable towards knowledge sharing?

Technology/Services

- Are the ICT equipment and workplace connections Internet compatible?
- When new ICT acquisitions are discussed, is the availability of technology suitable for knowledge sharing a main point?
- Does the existing ICT equipment support effective communication across boundaries or time zones?

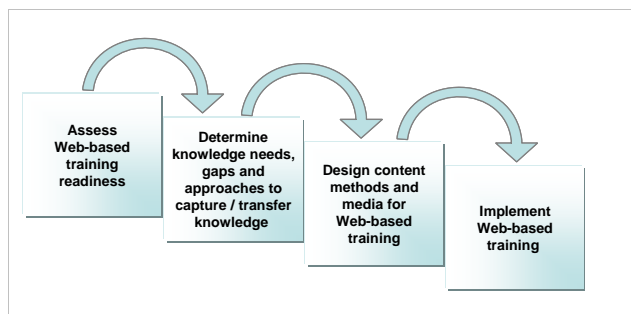
- Are ICT and Web used for learning and communication by staff?
- Do virtual learning communities exist in the organization?
- Is the content to be learned suitable for Web-based training to support KM?
- Is there a strategy to protect key information and shared knowledge in the enterprise and/or is there a complete ICT security procedure for information?

Staff/HR

- Does the staff understand the term KM and how to use existing knowledge for business and work?
- What are the ICT skills of the target groups for Web-based training?
- Is the staff motivated and ready to learn?
- Are trainers and tutors educated for Web-based training?
- Which are the most used vocational training forms in the company?
- Do training strategies based on eLearning exist in the company?

A knowledge audit [17] which identifies gaps between existing knowledge and knowledge requirements should be undertaken. The audit results, including knowledge flows, should be analyzed by examining how knowledge moves around the company, which ICT supports the flows and how knowledge should be transferred by Web-based training

One of the first steps after determination of knowledge gaps, is to determine the nature of the gaps as a result of training deficiency or inefficient ICT tools for KM. Once the nature of the gap has been understood, an optimal approach to addressing the gap should be developed i.e. by using new interactive Web-based tools and resources such as knowledge repositories or by providing additional opportunities for Web-based training.



Source: IAT

Figure 2: Web-based training value chain supporting KM

Formal methods to capture knowledge within the company and to transfer it during learning processes should be defined. It is known that much knowledge in organisations is likely to be informal, ad-hoc and undocumented. This type of knowledge is often distributed informally via

staff interactions. Design of the appropriate Web-based training content should be guided by the SME's knowledge requirements and innovation plans. Content can involve knowledge required by staff to perform tasks and to help in improving customer services. Knowledge required by staff related to new markets and customers and suppliers can also be included in training.

It is important that SME staff skills and knowledge are kept up-to-date. Training seminars with this objective should use a combination of conventional methods and eLearning to address knowledge needs in the most suitable way, i.e. declarative knowledge by using Web sites or other references. Classrooms should be used more for exploring issues interactively, for simulations and for role-play.

A wide range of media should be used to develop interactions with learning environments and to communicate messages.

Mentors need to be well-prepared and equipped to train small groups of individuals on specific topics related to their tasks. Such training sessions can be accomplished in the workplace by synchronous cooperative learning sessions in small groups using Inter/Intranet communication. This type of training is also suitable for knowledge transfer within the company.

4. Example

We applied the above ideas within the activities of the EU project SIMPEL [16] and developed strategies to enable SMEs to take full advantage of the eLearning in their Web-based training.

The strategies developed within SIMPEL based on the fact that a suitable learning concept for SMEs should be based on delivery of content interactively in small pieces over time. Delivery should be part of a larger process which corresponds to staff needs and facilitates faster learning within a work context [18] and implies a personalisation of learning thereby making it useful and attractive to learners. This form of personalisation is lacking in existing learning Management Systems (LMS) and Virtual Learning Environments (VLE). There is a need for them to fuse with Web 2.0 to form Personal Learning Environments (PLE) and to shift from institutionalized vocational learning to a more personal engagement with learners. Approaches which promote a support of knowledge development and creativity through the engagement of individuals within social networks should be used to help individuals develop their full potential.

We involved SMEs and eLearning experts in a European community of practice CoP [19], [20] to share learning and knowledge and to develop learning resources together. An "innovative and optimal vocational training model" for SMEs based on eLearning 2.0 was developed. Best practice models for the capture and sharing of knowledge and for eLearning utilisation were collected and guidelines written.

Within this European CoP, a continuous knowledge transfer was realized particularly between three members, i.e., two universities and one research centre all of which had accumulated much KM practical experience over the years and also with SMEs which had participated in the CoP as either permanent or temporary members. The knowledge transfer was also realized through on-line forums and cooperative, interactive Web-based training sequences including Web conferences [18] and virtual sessions on the Moodle [21] platform which supports the CoP.

Wikis have been deployed on varying required subjects and used for working on common resources such as guidelines in order to share ideas and improve members' collective communication skills. Using wikis in this way provided an opportunity for community members to reflect and comment on their own work and that of others. This CoP attracted sectors engaged in support, training, design and development as well as in consulting and policy formulation related to eLearning in SMEs in the European Union. However, the participation of SMEs was less. We evaluated the CoP activities and products internally and externally and established that many SMEs did not possess adequate ICT skills to participate in the CoP virtual activities and that the advantages of CoPs and Web-based Training are not well understood by managers. To train SMEs in maximizing their use of Web 2.0 for sharing and acquiring knowledge and for improving interactions with their customers, it is intended to enhance the activities of this CoP with attractive eLearning based tutorials including Web usability guidelines for SMEs.

5. Conclusion

We consider that Web-based training can improve not only SME staff competencies but also the KM processes within and across companies.

Social networks such as My Space and Facebook have grown to global phenomena and are widely used for business activities, as are Blogs and Wikis. However, the benefits of Web 2.0 for SMEs are not as well-known. Blogs are very popular and some are very influential; setting up a company blog, whilst useful in keeping clients and staff up-to-date, may not achieve the expected level of "authority".

Social networks like virtual CoPs, are useful for keeping experts and clients in touch and for informal learning, but work/business-oriented content and suitable learning platforms are needed for more formal activities. It is recognised however, that technology can never become an absolute substitute for face-to-face activity within SMEs.

Wikis form an important Web presence for many companies but need to be regularly checked and up-dated in order to be useful information sources for staff, customers and the media. Podcasts, Facebook, Widgests, Wikipedia entry, RSS etc., can all be useful depending on the core business and needs of the company.

SMEs need to survive and to integrate into European/national markets and therefore need to develop a higher interest in the KM subjects. But many aspects can complicate the KM process. A large number of companies, particularly those from new member countries and their employees, tend to be hostile to knowledge management and in particular to knowledge sharing and mutual trust. Missing most are motivation issues such as sharing mechanisms and user-friendly methods and tools to facilitate knowledge transfer.

An important aspect of our future work is to help SMEs develop an open and adaptable attitude to Web-based tools and methods. This can be achieved by initiating corresponding and cooperative projects.

In this context and with partners from universities and SMEs in Ireland (coordinators), Portugal, Romania and Hungary, the author started to work within the EU Leonardo project LLL Readiness in SMEs (ReadiSME).

The proposed project is mainly an innovation transfer project of best practice and results of successful eLearning plus Leonardo and national projects from recent years.

The project proposed here will therefore focus on methods to establish degrees of Web-based LLL readiness in SMEs and on impacting knowledge management. The project will adopt a step-by-step approach to implementing LLL according to different levels of readiness whilst simultaneously working towards higher levels of readiness. In combination with the SIMPEL project models and guidelines, best practice experiences in readiness will be disseminated and valorised in regional, national and European workshops and in discussions with experts.

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References

- [1] Amin, A. & Cohendet, P.: Geographies of Knowledge Formation in Firms. *Industry and Innovation*; 12(4), 2006, pp. 465-486.
- [2] O'Dell, C., Essaiades, N. Grayson C.J. Jr.: If only we knew what we know. The transfer of internal knowledge and best practice. New York: Free Press. 1998
- [3] Nonaka, I. & Konno, N.: The concept of 'ba': building a foundation for knowledge creation, *California Management*, 40(3), 1998, pp. 40-54.
- [4] Wild, R.H., Griggs, K.A., Downing, T.: A framework for e-learning as a tool for knowledge management. *Industrial Management & data Systems* 102 (7). 2002.
- [5] Siemens, G.: Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*. 2005.

- [6] O'Reilly, T.: What is Web 2.0. Design patterns and business models for the next generation of software. <http://www.oreillynet.com/lp/a/6228>. 2005. Retrieved 15.01.2010.
- [7] Kerres, M.: Potenziale von Web 2.0 nutzen. In: Hohenstein, A., Wilbers, K. (eds.) *Handbuch eLearning*, München. 2006.
- [8] Argote, L. & Ingram, P.: Knowledge transfer: A basis for competitive advantage in firms. *Organizational Behavior and Human Decision Processes*, 82(1), 2000, pp. 150-169.
- [9] Attwell, G., Dirckinck-Holmfeld, D., Fabian, P., Kárpáti, A. & Littig, P.: 'eLearning in Europe – Results and Recommendations'. Thematic Monitoring under the LEONARDO DA VINCI Programme. Bonn, Germany. Report., Impuls 010. 2003
- [10] Averill, S. & Hall, T.: 'An observatory of eLearning in Small Medium Enterprises (SMEs)'. In: Richards, G. (ed.), *Proceedings of World Conference on ELearning in Corporate, Government, Healthcare and Higher Education* Chesapeake: VA: AACE, 2005, pp. 220-225.
- [11] Beer, D., Busse, T., Hamburg, I., Mill, U. & Paul, H. (eds.): *eLearning in European SMEs: observations, analyses & forecasting*. Münster, Waxmann, 2006.
- [12] European Commission: *Observatory of European SMEs*. 2003.
- [13] BMWt: *E-Learning in KMU – Markt, Trends, Empfehlungen. Ein Leitfaden für Hersteller, Anbieter, Nutzer und Einsteiger. Ergebnisse des BMWi-Technologieprogramms LERNET*. Hrsg.: Bundesministerium für Wirtschaft und Technologie. Berlin, November 2008.
- [14] Hamburg, I., Lindecke, C. & Terstriep, J.: *Analysing interaction with computer of SME staff in eLearning processes*. In: *HCI International 2005: 11th International Conference on Human-Computer-Interaction*, 22.-27.07.2005. Las Vegas, Nevada. MIRA, 2005, p. 10.
- [15] Krogh, G., Ichijo, K. & Nonaka, I.: *Enabling Knowledge Creation. How to Unlock the Mystery of Tacit Knowledge and Release the Power of Innovation*. New York. Oxford University Press, 2000.
- [16] Beer, D., Busse, T., Hamburg, I. & Oehler, C. (eds.): *Improving eLearning practices in SMEs*. Brussels, Proceedings of the SIMPEL final conference. 14.04.2008. Universitas-Győr, 2008.
- [17] Cheung Chi Fai, Ko Kam Chin, Chu Ka Fu, Lee Wing Bun: *Systematic Knowledge Auditing With Applications. Journal of Knowledge Management Practice*, 2005.
- [18] Geibert, R.: *Integrating Web-based instruction into a graduate nursing program taught via videoconferencing. Challenges and solutions*. *Computers in Nursing* 18(1), 2000, pp. 26-34.
- [19] Hamburg, I., Engert, S., Petschenka, A. & Marin, M.: *Improving eLearning 2.0-based training strategies on SMEs through communities of practice*. In: *The International Association of Science and Technology for Development: The Seventh IASTED International Conference on Web-Based Education*, 17.-19.03.2008, Innsbruck, Austria. 2008, pp. 200-205.
- [20] Wenger, E., McDermott, R. & Sydner, W.: *Cultivating communities of practice: a guide to managing knowledge*. Boston: Harvard Business School Press, 2002.
- [21] Dougiamas, M.: *Moodle: Using Learning Communities to Create an Open Source Course Management System*. Perth, Australia, 2004.