

# Knowledge Management in the Communities of Practice of e-Learning

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**Abstract.** A lot of research has been done to promote and develop good e-learning models, practices, and technological environments. However, fewer efforts were deployed to support e-learning practitioners in performing their job on a day to day basis. There is a need to facilitate communication, collaboration, and coordination amongst e-learning community members. A strategic approach is to solve the problem of capitalization of techno-pedagogic knowledge, tacit and explicit, in the domain of e-learning within the framework of an online community of practice of e-learning (CoPE). The present thesis attempts to solve this problem by creating an individual memory and organizational memory for resources, information, and knowledge that need to be made available to the community members along with an ontology representing a uniform vocabulary for the CoPE. This work will contribute to scientific knowledge support by creating common framework for e-learning practitioners and proposing a new concept of learning theories.

**Keywords:** Knowledge management; e-learning; knowledge capitalization; Communities of Practice of e-learning; ontologies.

## 1 Introduction

The use of new information and communication technologies (ICT) has changed human interactions, their socio-economic structure, and, significantly, their way of learning. Today we live in a knowledge information society where citizens require fast services, better qualities, and improvement in efficiency and cost effectiveness. Companies, schools, universities, and organizations of all sizes are now turning towards e-learning as an efficient tool of training, learning and professional development. The vast movement towards e-learning is clearly seen in the development of large projects being launched all over the world. Organizations of all sizes are now using e-learning as modern, efficient and flexible tool to support learning. It is a significant development in content as well as in services through learning management systems (LMS). Despite this level of interest and the fast gaining momentum however, e-learning faces a number of challenges related to: i) the difficulty in interpretation of domain concepts like the scenarios, learning situations, activities, roles, etc. ii) the multiplicity of approaches, models, methods, techniques and tools used in the development of the online systems, and iii) the heterogeneity of

learning platforms. The need for knowledge capitalization is then necessary in terms of knowledge and know-how related to e-learning, its tools, the exchange resulting from techno-pedagogic practices, and the collaboration between various e-learning actors.

## 2 Research Problem

A promising direction in knowledge management (KM) is the use of a new approach based on communities of practice concept (CoP). Several studies were interested in online learning communities using course management systems such as Blackboard (Develotte *et al.*, 2004; La ferrière, 2005; Rosson, 2007; Tu *et al.* 2002). Nevertheless, to our knowledge, few studies targeted the Communities of Practice of E-learning (CoPE) (Russell *et al.* 2007) and (Hung, 2002). Inspired from organizational contexts, Russell *et al.* (2007) suggested setting up a CoP to define a new way of work between the actors of the community. Hung (2002) suggested that on-line technologies connect schools with real CoPs, and hence complementing the students' knowledge with the social factor of the communities.

Most of the research in knowledge management acknowledges that learning is considered as a fundamental component (Kimble *et al.*, 2004; Wenger, 2004; Daele *et al.*, 2007). Recent research shows that CoPs play an important role in the management of the tacit knowledge that the community members own (Kimble *et al.*, 2004; Wenger, 2004). CoPs have several characteristics that distinguish them from formal organizations and learning situations; such communities are groups of people who share a concern, a set of problems, or a passion about a topic, expand their practical knowledge and expertise in the area under consideration, and interact on an ongoing basis. In an environment of collaborative learning and knowledge sharing, community members learn from each other by making their knowledge and practices explicit, sharing them with their peers, and consequently reflecting on them. The main objective of CoPs is to establish a structure where tacit and explicit knowledge are shared and exchanged among various members within a given domain. The interacting processes of participation and reification are considered as fundamental. Participation forms the key element in the process of negotiation of meaning. It is the process through which people become active participants in the practice of a community. Reification means giving concrete form to something that is abstract. Collaborative learning becomes powerful and exciting when it occurs in the context of a community of practice. Today more CoPs use virtual environments to support their activities. However, an online CoP requires more than simply transferring a community of practice to an online environment. There is a need to establish a technology infrastructure to support the functioning of online CoP to overcome barriers that do not occur in face-to-face CoPs. The main challenge facing online CoPs is how to best enable members to communicate, collaborate, and coordinate so as to facilitate knowledge capture and its utilization. To meet these requirements an individual memory and organizational memory for resources, information, and knowledge need to be made available to the community members along with an ontology representing a uniform vocabulary for the CoPE. This CoPE represents a

virtual space for exchanging, sharing, and resolving problems encountered by the actors of the e-learning during all phases of an online learning system life cycle (Chikh *et al.*, 2007).

### **3 Research Question**

The interest in e-learning presents rich, yet still not fully exploited, opportunities to deliver high quality of learning. A lot of research has been done to promote and develop good e-learning models, practices, and technological environments. However, fewer efforts were deployed to support e-learning practitioners in performing their job on a day to day basis. There is a need to facilitate communication, collaboration, and coordination amongst e-learning community members. A strategic approach is to solve the problem of capitalization of techno-pedagogic knowledge, tacit and explicit, in the domain of e-learning within the framework of an online community of practice of e-learning (CoPE). Capitalization is the process by which members of the community can identify, locate, model, store, access, use/reuse, share, update, and know-how to communicate the knowledge of the community. Consequently, the main research question and sub-questions for this study are as follows:

*How to solve the problem of capitalization of techno-pedagogic knowledge, tacit and explicit, in the domain of e-learning within the framework of an online community of practice of e-learning (CoPE)?*

Sub-questions are:

- How do we represent a CoPE environment?
- How can key stakeholders in a CoPE reach a shared conceptualization and understanding of an e-learning system design for their organization?
- How to define a new specification language for learning scenarios?
- How can CoPEs being supported with technology in order to enhance the process of learning in practice in the field of e-learning?
- How can CoPE help instructional designer, teachers, students maximize the acquisition and reuse of knowledge in the e-learning domain?

### **4 Objectives**

The present research is part of the European project “PALETTE” (2006-2009) where Algeria is a non-European partner. PALETTE project aims at facilitating exchanges and learning in CoPs (Palette, 2006). Our research team at the University of Tlemcen is mainly working on the Communities of Practice of e-learning. The main objectives of the research program are: 1) extend the application of CoPs to the e-learning field and define CoPE and subsequent concepts in the domain of e-learning; 2) Provide

ontology for a uniform CoPEs vocabulary (Onto'CoPE); 3) define a new specification language for learning scenarios in CoPEs (IMS-CLD); 4) provide a set of knowledge management services that will support CoPEs' activities; and finally 5) design an architecture of virtual environment to support the CoPE activities.

The present Ph.D. thesis deals essentially with the relationship between information, knowledge and community members, and how is it managed and capitalized. In this scope CoPE is considered as a virtual space for exchanging, sharing, and resolving problems encountered by the actors of the e-learning during the phases of an online learning system life cycle. Figure 1 shows the environment of a CoPE. Our work focuses on the capitalization of techno-pedagogic knowledge, tacit and explicit, during the engineering phases of the online learning system life cycle within the CoPE. We propose to manage this knowledge by creating individual and organizational memory based on ontology for resources, information, and knowledge that is vital for the community members. This research would shed light on combining two important areas: community of practice and e-learning, and gain deeper understanding of knowledge management in the CoPs of e-learning.

As the author is involved in the research team PALETTE/Algeria, our intention is to contribute to the project and to conduct academic research for our Ph.D. thesis. The work undertaken in this Ph.D. would certainly help in answering some of the questions that the research project aims to resolve.

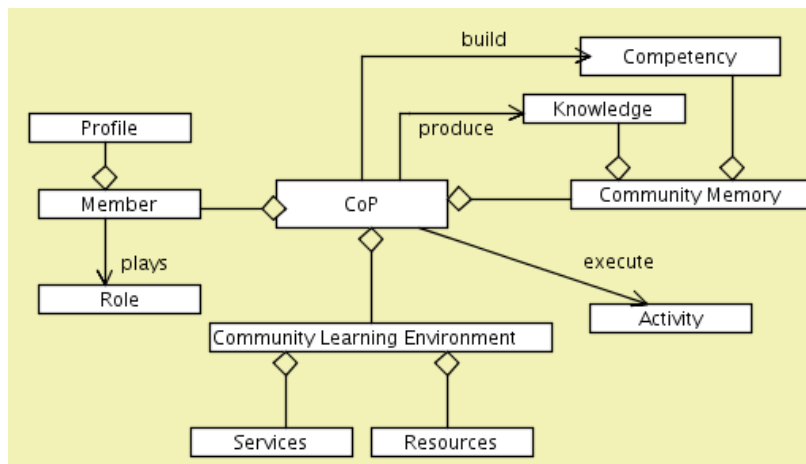


Fig. 1. CoPE concepts.

## 5 Methodology

The methodology adopted in this study is based on action research. Action research is an established research that simultaneously assists in practical problem solving and

expands scientific knowledge (Baskerville, 1999). Action research is performed collaboratively and enhances the competencies of the respective actors in the project. In this action research we participate and act in the community of practice, and simultaneously evaluate the results of this participation. This is a twofold objective: in one hand we aim to understand/participate in the design of a community of practice of e-learning, and on the other hand we aim to contribute to scientific knowledge by creating common framework for e-learning practitioners and proposing a new concept of learning theories. Figure 2 summarizes the phases undertaken for the Ph.D. thesis. The work was done in cycles: the first two cycles show the collaborative work within the research team, while the third cycle highlights the steps undertaken within the Ph.D. thesis along with the main contribution to the project.

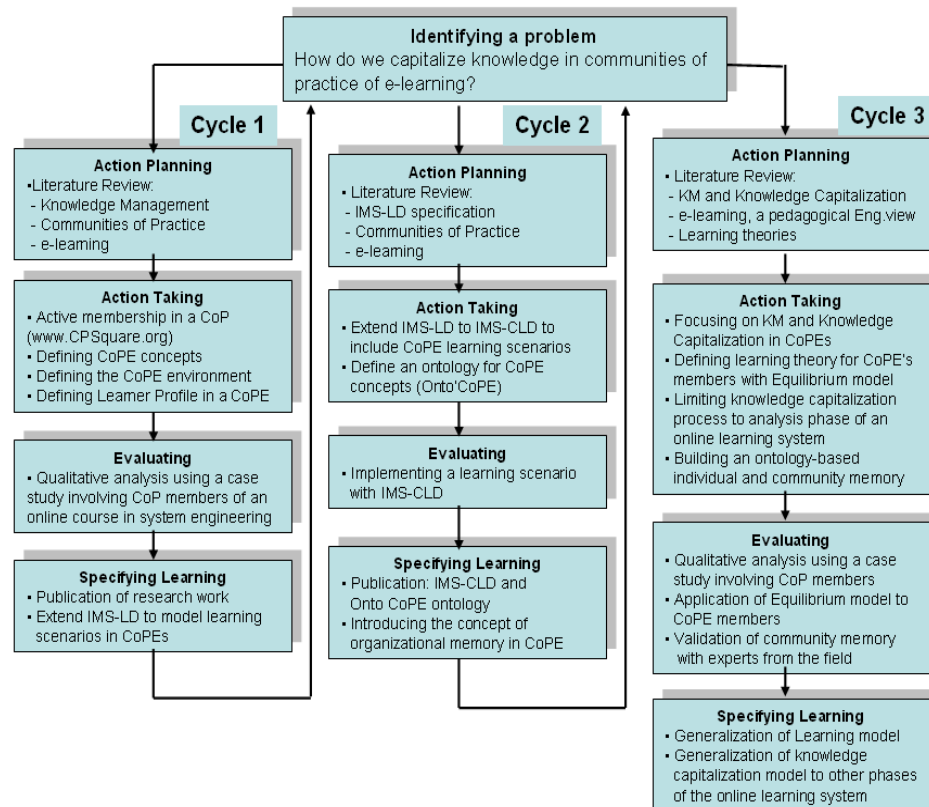


Fig. 2. Action research cycles.

## 6 Results

Four domains are involved and studied in the Palette project: management, engineering, teaching and health. Our work comes under the teaching domain, more specifically in the field of e-learning. We addressed the problem of capitalization of techno-pedagogic knowledge, tacit and explicit within CoPE. Based on the action research plan discussed above, the following elements have been completely or partially completed:

- Literature review: Communities of Practice, KM, e-learning, ontologies, knowledge engineering
- Contribution to the definition of CoPEs and the subsequent concepts in the domain of e-learning.
- Contribution in providing a uniform vocabulary for the CoPEs. This vocabulary constitutes the ontology of the CoPE entitled Onto'CoPE.
- Contribution in defining a new specification for learning scenarios in CoPEs (IMS-CLD) based on IMS-LD.
- Contributed to the definition of a generic structure for CoPEs along with a case study for the project of distance education CoseLearn "Coopération Suisse en matière de eLearning"
- Proposed a semantic model for the modelization of learner profile and group members in the CoPE (Sarirete, 2007). A model for a generic learner profile was developed CoPE taking into account the community factor, the learner participation and knowledge reification.
- Introduced an equilibrium model for learning (Sarirete *et al.*, 2008). The model is based on the constructivist theory. This model has been analyzed and validated using a course in computer networking and will be applied to an e-learning community of practice.
- Published articles/posters in international conferences.

Currently we are focusing on KM and Knowledge capitalization in CoPEs for the engineering phases of an online learning system. We will propose a domain ontology and apply it to the analysis phase of an online learning system, and building an ontology-based community memory.

## 7 Conclusion

The interest in e-learning presents rich, yet still not fully exploited, opportunities to deliver high quality of learning. A lot of research has been done to promote and develop good e-learning models, practices, and technological environments. However, fewer efforts were deployed to support e-learning practitioners in performing their job on a day to day basis. In this thesis we focused on solving the problem of capitalization of techno-pedagogic knowledge, tacit and explicit, in the domain of e-learning within the framework of an online community of practice of e-learning (CoPE) by providing individual memory and organizational memory for

resources, information, and knowledge along with an ontology representing a uniform vocabulary for the CoPE. The aim is to contribute to the learning process of individuals and organizations especially in the educational world. We believe that CoPs and social learning have a huge impact on learning as well on knowledge sharing. We aim at contributing to scientific knowledge by creating common framework for e-learning practitioners and proposing a new concept of learning theories. This work will contribute in proposing technology support for the CoPEs and the management of explicit and tacit techno-pedagogic knowledge in the e-learning field. The work will give an answer to how CoPEs would be supported with technology in order to enhance the process of learning in practice in the e-learning domain and how CoPE would help instructional designer, teachers and students maximize the acquisition and reuse of knowledge.

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