Communities of practice of e-learning, an innovative learning space for e-learning actors

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Abstract

Today collaboration and information exchange and sharing are critical in driving both individual and organizational success. Communities of Practice (CoPs) represent an environment in which individuals, experts and novices, learn together to develop and improve their professional practices and skills. They are therefore the best environment for individual and collective learning. The purpose of this article is to show the potential of social learning in the domain of e-learning, through CoPs of e-learning (CoPEs). We present the main concepts and objectives of CoPEs and explain how they can support e-learning actors in their daily activities. An example of a CoPE, whose main objective is to promote e-learning in higher education context applied to the domain of computer science, is also presented.

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1. Introduction

The last decade has seen substantial institutional investments in the development of e-learning. Accordingly modern e-learning systems such as LMS (Learning Management Systems) and courses they offer became more competitive providing further innovative services.

This competitiveness and the increasing requirement of new products in e-learning have involved a continuous need for actors to learn about different methods, techniques and tools. However, a number of challenges have to be dealt with: (1) the multiplicity and the heterogeneity of e-learning models and tools and (2) the variety of teaching domains ranging from arts and literature to science and engineering and then requiring different educational approaches. Furthermore, we observe that despite the large amount of knowledge accumulated in e-learning, the know-how and the feedback from acquired experience are not always capitalized and exchanged in a systematic way between actors. Therefore, we will focus in the present paper on the problem of capitalization of techno-pedagogic knowledge, both tacit and explicit, in e-learning. Indeed we aim to help actors of e-learning to share their experience with each other, in order to solve their daily problems.
Recently, Communities of Practice (CoPs) have proven themselves in several domains including education, engineering, management, health, etc. They are seen as a new organizational structure offering innovative means for creating and sharing knowledge. We extend the application of this technology to the domain of e-learning which can be seen as a subset of the domain of education. So we consider CoPEs (Communities of Practice of E-learning) as subclass, from the object oriented point of view, of CoPs. Accordingly we define a CoPE as a virtual framework for exchanging and sharing techno-pedagogic knowledge and know-how between actors of e-learning (Chikh et al., 2007; 2008a).

In our previous works (Chikh et al., 2007; 2008a; 2008b; 2008c), we have defined a CoPE and its underlying concepts such as: learning situations, actors and their roles, activities, and environment composed of services, tools and resources. In the present paper, we try to review and enrich some of those definitions. We will analyse more deeply the objectives and mission of such communities and show how they can support and help e-learning actors in their daily activities. The main concepts of CoPEs will be illustrated through an example related to a CoPE, whose main objective is to promote e-learning in higher education context applied to the domain of computer science.

2. Problem statement

Nowadays companies, schools, universities, and organizations of all sizes are using e-learning as a tool of training, learning and professional development. An increase in interest is seen through the development of large projects being launched all over the world. However, this development faces a number of challenges related, in particular, to: (1) the multiplicity and the heterogeneity of e-learning models and tools; and (2) the variety of teaching domains, requiring different educational approaches. Therefore there are many problems encountered by actors involved in the development and use of Online Learning Systems (OLS) during the different stages of analysis, design, implementation, utilization and maintenance. Consequently, those actors need to share their experience with each other in order to solve their problems.

One solution to those issues is to favor collaboration and exchanges between e-learning actors. (Hart, 2009) argues that the future of e-learning is to move to social learning. Therefore, today’s learning environments need to be able to support the different learning approaches: formal and informal, personal and social. The ‘social’ aspect of the learning relies upon human interaction. It is defined as a learning act guided by the regular contact and the associations with the peers. Social learning is the process in which individuals observe the behavior of others and its consequences, and modify their own behavior accordingly (Bandura, 1977). According to (Wenger, 2000), the success of organizations depends on their ability to design themselves as social learning systems. The author identifies three constitutive elements of these systems: Communities of Practice (CoPs), boundary processes among these communities, and identities as shaped by participation in these systems.

(Healy, 2009) asks the following question: “But how do CoP support social learning?” and gives the answer as follows: “CoP support social learning through an apprenticeship model...The CoP supports the apprentice by interacting regularly, sharing know how and experiences. Social Learning within a community is ‘learning about a subject’ as well as ‘learning to be a full participant’. The shared passion and the interaction engages the learners and enables them to acquire deep knowledge about a subject and the ability to participate in the community through productive enquiry and social interaction.”

Accordingly, we address in this paper the necessity and utility of social learning in the domain of e-learning, using CoPs of e-learning (CoPEs). We focus on how to solve the techno-pedagogic problems within the framework of a CoPE. We will discuss the importance of such communities to help e-learning actors in their daily activities. We will show their impact in their learning, innovativeness, and effectiveness as well as in capitalizing knowledge and know-how in a systematic way.

3. CoPs in the domain of e-learning : a literature review

A Community of Practice (CoP) is a community whose main goal is learning. CoP is a concept initially derived from the work of Lave and Wenger (1991), showing that learning means to participate in order to gain expertise. According to Wenger (2004), CoPs are groups of people who share a passion for something that they know how to do, and who interact regularly in order to learn how to do it better. CoPs represent an environment in which
individuals, experts and novices, learn together to improve and develop their professional practices. They are therefore the best environment for individual and collective learning.

CoPs are more often virtual (VCoPs). Therefore they require Information Technologies to support, improve, and develop the learning process and practices. Recently, a lot of research works were interested in studying CoPs and proposing innovative approaches and techniques that will facilitate members’ interactions and exchanges. One of the largest projects launched in this field is the European project PALETTE (Palette, 2006), where several knowledge management services were proposed to support CoPs, using ontologies (Tifous et al., 2007).

Several studies (Develotte, 2004) (Dillenbourg et al., 2003) and (La ferrière, 2005) related to CoPs in the teaching domain in general and many online learning communities using course management systems such as Blackboard have also been widely used in online education (Tu, 2002). However, few studies targeted the CoPs of e-learning: Hung (2002) suggests how links between schools and CoPs can be forged through networked on-line learning communities. Kirkwood (2006) exposes the possibility of exploiting the principles and applications of Web2.0 in e-learning, in order to give for students of Melbourne University the opportunity to form E-learning Communities of Practice. These communities support collaborative and negotiated learning by allowing students to form peer networks, initiate peer teaching, share and workshop their projects, and to harness collective data.

Moreover, we are witnessing an emergence of CoPEs, having different specific objectives but the same global mission: facilitate the social learning between members. For example: CoPe-L (CoP of e-learning at Luxembourg), has been created in the framework of Palette project (http://argentera.inria.fr/swikipalette/data/Main/CoPe.jsp). CoPe-L aims essentially the two following objectives: (1) identify, capitalize, exchange and, support practices and knowledge related to e-learning; and (2) develop an expertise and increase the competency level in design, evaluation, and animation of distance training.

4. Contribution

In our previous works (Chikh et al., 2007; 2008a), we have defined a CoPE as a group of professionals in e-learning who gather, collaborate, and organize themselves in order to: (i) share information and experiences related to e-learning development and use; (ii) collaborate in order to solve together e-learning problems and to build techno-pedagogic knowledge and best practices; (iii) learn from each other and develop their skills in instructional engineering; (vi) promote the use of e-learning standards: IMS-LIP, IMS-LD, SCORM, LOM; etc. Therefore, a CoPE can be considered as an excellent environment for exchanging, capturing and sharing techno-pedagogic knowledge and know-how between actors of e-learning. We will present below the main concepts of CoPEs.

4.1. Actors and roles

Actors of CoPEs are working in the e-learning domain like teachers, pedagogues, tutors, administrators, etc., having different levels of skills and knowledge based on their training and experience in the field. They might be involved either as: (1) members; (2) contributors (individuals participating in particular activities or during some specific periods of the CoPE’s life cycle, such as experts invited by certain members); or (3) Partners (Entities supporting the CoPE). Indeed, as in Palette (2006), we consider that the actors of a CoPE are not only its members, but also the entities which interact with it and constitute its external environment. Members’ identities depend in change of participation level: from a peripheral participation, to an active participation, and finishing by a participation in the core of the community (Sato & Barthèse, 2006). However, members can organize themselves in groups on the basis of their objectives and concerns.

We define two categories of roles: (1) the support members’ role, and (2) the learner members’ role;

1. **Support member**: contributes to the continuous and effective function of the CoPE, with different sub-roles:
   - The coordinator: supervises and identifies important issues in e-learning domain and evaluates the CoPE.
   - The moderator: is the guide of the community, and animates the learning process.
   - The manager: helps to improve the management of members and resources.
   - The reporter: is responsible for the elicitation of relevant knowledge of the CoPE and to synthesize the results of discussions.
   - The administrator: maintains technical environment that supports the CoPE and helps members to use it.
1) **Learner member**: contributes to the realization of the current activities of the CoPE. The member might be either: Knowledge Provider, or Knowledge Consumer:

- **The Consumer**: represents the member which triggers the interaction by asking a question, stating a problem, or requiring explanations.
- **The Provider**: participates to find an answer by formulating the problem differently, giving some hints or providing directly the solution.

### 4.2. Activities

We have classified the activities carried out within CoPEs into four categories: Analysis activities; Design activities; Implementation activities; and Utilization activities, corresponding to the stages of the e-learning development life cycle. Table 1 outlines a list of activities for each type.

| Activity type       | Examples                                                                 |
|---------------------|--------------------------------------------------------------------------|
| Analysis activity   | Elaboration of pedagogic objectives in requirements document;            |
|                     | Definition of learning needs in terms of public target, prerequisites,   |
|                     | organizational and financial considerations.                             |
| Design activity     | Design of the learning situations;                                       |
|                     | Definition of roles and allocation of partitions, etc.;                  |
| Implementation activity | Choice of relevant LMS;                                               |
| Utilization activity | Supervision of learning activities;                                     |

As stated before, the main goal of CoPs is learning. When interacting, members aim to learn together, build and share techno-pedagogic knowledge and artefacts.

As shown in figure 1, there are different forms of members’ interactions within CoPEs: starting from a **simple access** to knowledge (e.g. a learning scenario or resource); to **formal or informal exchanges** between members; until participating in **collaborative activities** (e.g. collaborative decision making process or collaborative design). When performing collaborative activities, members exchange knowledge (tacit and explicit) and, in turn, these can lead to the construction of new knowledge (e.g. identify best practices to formulate a requirements document). It can also conduct to the proposition of new approaches, methods and techniques that will improve the quality of online learning (e.g. propose an approach to evaluate learners in collaborative activities or to test their understanding according to their behavior).
Wenger (1998) identifies four areas of social constructivist learning attained in CoPs: Community; Identity; Meaning; and Practice, representing respectively: Learning as belonging; Learning as becoming; Learning as experience and Learning as doing. We have adopted this classification and adapted it to the context of CoPEs.

Therefore, we have classified learning in CoPEs into four categories: Learning by Experience; Learning by Interacting; Learning by Doing and Learning by Innovation and Creativity, responding to the different types of interactions (see Figure 1).

4.3. Learning environment

A CoPE requires a technical environment to support learning activities of its members. We have defined three alternatives of that environment: (i) a specific environment dedicated to CoPEs, which would exactly fit their needs; (ii) a generic environment dedicated to CoPs, such as that proposed in Palette (2006); and (iii) an LMS environment, like Moodle (http://www.moodle.org). We classify the services as in Palette (2006) into three categories: (1) Knowledge Management Services, including: Knowledge Creation and Enrichment, Knowledge Retrieval, Knowledge Dissemination, Knowledge Visualization, Knowledge Evaluation, and Knowledge Evolution services; (2) Mediation Services, supporting argumentative and collaborative design and decision making; and (3) Information Services, for information production and reuse. The CoPE memory is essentially composed of technopedagogic knowledge such as learning resources and learning scenarios. Best practices are capitalized according a Case-based Reasoning and/or pattern approaches.

The figure 2 represents the portal interface of a fictive CoPE, whose main objective is to promote e-learning in higher education context applied to the domain of computer science. The CoPE is made up of principal actors of a university as well as pedagogues and software engineers. The roles played in this CoPE are: (1) support members, represented by some pedagogues and technicians; and (2) learner members, represented by all the teachers (Faculties, Lecturers, Teaching assistants, Lab assistants). The activities carried out cover the four phases of development life cycle: analysis, design, implementation and utilization. A set of services is proposed: asynchronous and synchronous communication (email, chat, forum, visio conference, wiki); information retrieving; reuse based computer aided design for learning scenarios using collaborative information filtering. In addition a list of useful information is presented (mission, objectives, news; agenda).

Figure 2. The portal interface of a fictive CoPE
5. Conclusion

CoPs and social learning may have a huge impact on learning as well as on knowledge creation and sharing. The CoPs of e-learning (CoPEs) are regarded as an innovative learning space for e-learning actors. Accordingly, we addressed in this paper the necessity and utility of social learning in the domain of e-learning, through CoPEs. We focused on how to solve the techno-pedagogic problems within CoPEs. We discussed the importance of such communities to help e-learning actors in their daily activities. We have shown their impact in learning, innovativeness, and effectiveness of their members as well as in capitalizing knowledge and know-how in a systematic way.

We envision now to develop the reuse based computer aided design system of learning scenarios using collaborative information filtering. This system aims to support CoPE’s members in building new learning scenarios, reusing existing scenarios developed by peers having very similar profiles.

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