Critical factors towards analysing teachers' presence in on-line learning communities

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ABSTRACT

On-line teacher communities constitute a very popular and dynamic field while they foster a new philosophy for professional development which is characterised as associative, constructivist, reflective, situated, collaborative, and connectivist. This paper reports on the design and the implementation of a learning community consisting of computer science teachers teaching in primary and secondary public schools (K–9), in Greece. The conceptual and the operational dimensions of the on-line community design framework are presented in detail. The architecture of an integrated platform, developed to support the teacher community, as well as the tools and the features it incorporates are also outlined. Finally, we present the findings of a pilot study concerning teachers' presence within the community as well as their views and perceptions of community learning. The results provided supportive evidence of the effectiveness of the design framework and revealed important information with regard to critical indicators of teachers' learning presence within the community, i.e. members' participation, engagement, interaction and cohesion.

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1. Introduction

1.1. On-line teacher communities

Over the past decades, Information and Communication Technologies (ICTs) have become more and more embedded in our daily lives while they have fundamentally transformed the way people work, communicate and have access to information, education and entertainment. Increasingly, a social revolution is occurring since a wide range of public services, administration processes and citizenship activities are transferred on-line. On the other hand, on-line technologies transform and filtrate the way information is shared, knowledge is generated and innovation takes place in networks. Certainly, most people in the developed world rely on their ability to employ on-line connections and participate in networking environments that enable them to access content resources, share ideas, discuss with others, and acquire relevant information, skills and knowledge.

In this context, ICTs are considered as a fundamental component of the reform initiatives necessary for 21st century education (Dede, 2010; European Communities, 2007; Voogt et al., 2013). Schools and teachers are internationally confronted with increasing demands because of educational reforms, new educational policies, changes in

curriculum, new learning tools to be integrated in classroom practice, etc. As our understanding of the learning processes is evolving, teachers need to thrive in increasingly demanding educational contexts through adopting new pedagogical approaches and designing authentic learning activities applicable in school practice. In this regard, teachers need continuous support and multiple professional development opportunities to deepen their pedagogical knowledge and improve their instructional design knowledge and skills (Tsai & Chai, 2013). However, traditional and popular approaches to teacher professional development appear to have low impact on teachers' ability to put innovative teaching approaches into practice (Borko, 2004; Cuddapah, & Clayton, 2011; Jimoyiannis, Gravani & Karagiorgi, 2011; Webster-Wright, 2009). Therefore, to respond to the increased demands and the complexity of current instructional work, peer support and collaboration among teachers has become very important.

At the same time, the rapid expansion of the Web, as a course delivery and learning platform, provided a significant incentive for educational institutions to develop e-learning programmes through on-line and blended approaches. Nowadays, e-learning is commonly accepted, not only as a popular alternative to the traditional face-to-face education but, principally, as a lever for transforming formal education, informal education and personal or lifelong learning. With the advances of Web-based environments that enable and promote interaction among people with common interests, a critical shift from individual work to more associative and collaborative approaches is apparent. Web 2.0, in addition, offers participatory

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environments that support communication, active and collaborative learning, self-directed and lifelong learning, peer- and self-assessment (Brown & Adler, 2008; Jimoyiannis, Tsiotakis, & Roussinos, 2013a, Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013b; Ravenscroft et al., 2012). The dynamic growth and diffusion of Web 2.0 has therefore led to a growing interest in distributed and flexible learning environments, without time and distance barriers, that support the creation of on-line professional communities.

Collaboration and community building have been suggested as important theoretical principles for the design of on-line learning programmes due to the increasing research evidence about their impact on participants' learning and personal development (Garrison & Akyol, 2013; McLoughlin & Lee, 2010; Rovai, 2002; Siemens, 2003; Wenger, McDermott, & Snyder, 2002). People of all ages and backgrounds are getting familiar with online networks where they have enhanced opportunities to interact, collaborate and learn with peers. Therefore, community learning is expected to improve individuals' self-regulation and self-directed learning through their ability to share knowledge and experiences, and observe the performance and perspectives of others (Chapman, Ramondt & Smiley, 2005; Lajoie & Lu, 2012). The notion of learning community has been also applied in the development of on-line courses with the aim to enhance interactions among learners and instructors, and promote active and collaborative knowledge construction (Jimoyiannis, Tsiotakis & Roussinos, 2013a; Jimoyiannis, Tsiotakis, Roussinos, & Siorenta, 2013b; Lu & Churchill, 2014; Yuan, & Kim, 2014).

In the past decade, the idea of teacher communities has been promoted among academics, scholars, educational policy makers and educators themselves (Jones & Preece, 2006; Jimoyiannis, Gravani & Karagiorgi, 2011). On-line teacher communities appear dynamically evolving due to their ability to support sustainable environments for communication, interaction, collaboration and sharing of educational content, without temporal or spatial restrictions. Contrary to the traditional isolated manner of work, on-line communities promote teachers' engagement and collaborative work through sharing educational material and instructional, developing meaning and achieving knowledge construction (Levine & Marcus, 2010).

Growing research evidence, particularly during recent years, has supported the positive impact of on-line communities on teachers' professional development as well as on students' achievements (Jackson, 2009; Levine & Marcus, 2010; Tseng & Kuo, 2014; Vescio et al., 2008; Zuidema, 2012). On-line teacher communities constitute a promising idea and a new model for teacher professional development, since they offer enhanced opportunities to their members to achieve a deeper understanding and collaborative knowledge construction through expressing and exchanging ideas, critical and reflective thinking, interaction and group work (Booth, 2012; Hur & Brush, 2009; Luehmann & Tinelli, 2008). Teacher communities are also considered as a new way to embed teacher collaboration into the school culture (Vescio et al., 2008) while networked intelligence can be used in instructional design, e.g. teachers are involved in the collaborative design of educational interventions and scenarios applicable in school practice.

1.2. Rationale and research questions

Teachers are usually working independently and they are isolated from peers that have common interests or the same subject matter. They are expected to face difficulties when working collaboratively and constructing knowledge based on peer ideas, educational experiences and feedback. Therefore, two main objectives were driving this investigation: a) how to design and implement effective on-line teacher communities in practice, and b) how to better support and foster teachers' interaction and collaboration in order to achieve the community goals.

Previous findings have indicated that the design, implementation and evaluation of on-line teacher communities is an open research problem in the wider context of e-learning (Hou et al., 2010; Baran & Cagiltay, 2010; Zydney et al., 2012). Brouwer et al. (2012) suggested that efficient on-line communities of teachers can be developed by being facilitated and properly designed. On the other hand, Matzat (2013) has shown that a mixture of virtual and real-life interaction among members of online communities was beneficial for all teachers with regard to their professional development in the community.

With regard to the technological environments, literature review suggested that asynchronous discussion forums (Baran & Cagiltay, 2010; Chen, Chen & Tsai, 2009; Delfino, Dettori, & Persico, 2008; Hur & Brush, 2009) and Learning Management Systems (Correia & Davis, 2008; Tsai, Laffey & Hanuscin, 2010) have been widely used to support on-line teacher communities. However, these environments offer limited opportunities for self-directed learning actions. For example, traditional LMS are tutor-centred environments, designed to support e-learning programmes in the context of formal education. Therefore, a technological platform which is intended to support an on-line teacher community should incorporate a wide range of features and tools beyond discussion forums and conventional LMS.

In recent years, Web 2.0 tools such as blogs (Hur, Brush & Bonk, 2012; Hou et al., 2010; Tang & Lam, 2014), wikis (Hutchison & Colwell, 2012; Kim et al., 2012), e-portfolios (Gray & Smyth, 2012), etc. were dynamically used to build learning communities by harnessing their participatory, communicative, content sharing and creation, and collaborative features. However, most Web 2.0 tools were not primarily designed for educational purposes; therefore, their features should be carefully examined in order to achieve the expected community learning outcomes in specific initiatives or situations.

In addition, we have identified from the literature review that previous investigations were limited to the examination of the participants' perceived outcomes and experiences within on-line communities. The majority of the surveys, conducted after teachers' participation in the community, were based on interviews (Booth, 2012; Hur & Brush, 2009; Mackey & Evans, 2011), self-reports and specific questionnaires (Duncan-Howell, 2010; Tsai, Laffey, & Hanuscin, 2010; Tseng & Kuo, 2014). Their main objective was to examine issues concerning teachers' motivation and commitment to participate, their attitudes and perceptions of community learning as well as teachers' collaboration, learning outcomes and achievements (e.g. pedagogical and instructional practices, subject content knowledge), etc.

It is quite clear that we need a more thorough and refined picture of teachers' performance within an on-line community, the nature of interactions among participants, the ways and practices that encourage teachers' engagement and collaboration, the overall development of the community over time as well as the processes that take place therein. However, simply by quantifying members' participation in on-line communities (e.g., statistics of active members, posts, member visits on daily or weekly basis, etc.) has been largely related to the static features of an on-line community. In recent years, some empirical studies have been directed to the analysis of the different ways teachers are engaged, contribute, interact and collaborate within learning communities by using new models, like the Community of Inquiry (Fusco et al., 2011; Holmes, 2013) and Social Network Analysis methods (Schlager et al., 2009; Rehm et al., 2014).

Therefore, major themes regarding the design, operation, evolution and the analysis of on-line teacher communities are still open for investigation. Based on the principles of social learning theory (Wenger, 2009), the present study has the ambition to contribute by a) presenting an integrated platform developed to support on-line teacher communities and b) proposing a consistent theoretical, design and analysis framework aiming to promote and investigate teachers' engagement, interaction and collaboration within on-line communities of learning.

This paper reports on the design and the implementation of an on-line teacher community in Greece, which consisted of computer science teachers serving in public primary and secondary schools. The New