



## Learning with their peers: Using a virtual learning community to improve an in-service Biology teacher education program in Brazil



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### H I G H L I G H T S

- VLC enables sharing of knowledge, teaching methods and resources among teachers.
- Teachers use VLC to learn to deal with matters of difficult approach in schools.
- Teachers switch from socialization to collaborative learning when using a VLC.
- VLC enables teachers to share experiences feasible in limited educational contexts.

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### A B S T R A C T

This study investigated the use of a virtual learning community (VLC-Bio) combined to an online teachers' professional development program. VLC-Bio enabled the sharing of biological knowledge, teaching methods and didactic resources. Although they presented a limited initial profile of internet use directed to socialization, the results indicated that participation in the VLC-Bio focused internet use for teaching and learning purposes. The VLC-Bio offered opportunities to develop the ability to learn from their peers about how to deal with matters of difficult approach in everyday school life, as well as of sharing resources for Biology education that are frequently lacking.

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### 1. Introduction

The current understanding of society as a social network of new morphology is becoming increasingly important. The network society is the result of both computerization and the new technological paradigm characterized by the high speed at which information is generated, processed and passed on (Castells & Cardoso, 2005, p. 460). This new trend based on computing resources and the availability of information, as well as means of

communication available to humans who browse and nurture this informational universe, has been developed through the internet (Lévy, 2001, p. 245). According to Glassman and Kang (2012), the internet offers new opportunities for accessing information, presenting possibilities for augmenting human intellect if we can understand it and learn to harness its potential. In this context, the internet has increasingly impacted on how people have engaged in social relations (Boyd & Ellison, 2008) and processed information (Glassman & Kang, 2012).

The use of virtual communities (VC) has enhanced the social relations through the internet. Virtual communities are characterized by joining together people who have a common set of needs and interests that may cover a variety of dimensions (Hagel, 1999). According to the author, a VC may be organized around an area of interest (such as sports or equity investments), or around a specific demographic segment (certain age groups within the population),

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or a geographical region (metropolitan area). Lee, Vogel, and Limayem (2002) identified four main characteristics in defining a virtual community: (1) it is built on a space mediated by the computer, called cyberspace, (2) the activities carried out are made possible by technology information, (3) the content or topics are directed by its participants, (4) relationships occur through communication among members.

Several authors argue that a VC can also be built for learning purposes (Johnson, 2001; Lock, 2002; Palloff & Pratt, 1999). These electronic networks function as virtual learning communities available online when characterized by active interactions between community members involving learning contents and personal communication (Palloff & Pratt, 1999). According to them, the main characteristics of a virtual community with learning purposes are: collaborative learning, as evidenced by comments directed from one learner to another, rather than from a student to the teacher; socially constructed meanings, evidenced by agreement or by questioning, sharing resources among students; expressions of support and encouragement exchanged between students and willingness to critically evaluate the work of others. Furthermore, the intentional use of a virtual learning community (VLC) enables individuals and/or groups of people that are geographically dispersed to achieve their learning goals (Yang, Chen, Kinshuk, & Chen, 2007).

In this context, it is important to help people develop autonomy by taking control of their own learning process, which is constructed through interactions between individuals and their surroundings either natural and social (Bransford, Brown, & Cocking, 2000; Clark & Mayer, 2011, p. 503). Assuming that the interactions between people can trigger socio cognitive development, the use of Computer Supported Collaborative Learning (CSCL) enables the creation of virtual learning communities where knowledge can be shared (Stahl, Koschmann, & Suthers, 2006). In this sense, knowledge itself is not a static object accommodated in an individual mind, but is actively constructed by social exchanges between people (Stahl et al., 2006). In collaborative learning, two or more persons jointly conduct activities in order to learn about a particular subject (Dillenbourg, 1999). Providing means of communication is the basic form of collaboration support that the computer and the internet can offer. CSCL systems offer a combination of various media such as email, chat, discussion forums, video conferencing and instant messaging. Thus, the learning process can occur through dialog and sharing knowledge between people. They learn through their questions, pursuing lines of inquiry together, teaching each other and watching how other people are learning.

The socio-constructivist approach of learning (Vygotsky, 1978, p. 159; Wertsch, 1991) provides the theoretical basis for the understanding of learning through collaboration in virtual learning communities. Research in this area has been based on learning in communities of practice (CoP) (Lave & Wenger, 1991; Wenger, 1998) in which community members develop speech, norms/standards, conventions, and a repertoire that includes shared ideas, stories, useful tools and ways to deal with typical problems of the specific field of expertise (Wenger, 1998), as well as the concept of zone of proximal teacher development (ZPTD) recently presented in the literature by Warford (2011). According to the author, the zone of proximal teacher development (ZPTD) is based on Vygotsky's (1978, p. 159) concept of ZPD (zone of proximal development) and denotes the "distance between the teaching that candidates (pre-service teachers) can develop on their own and a proximal level that can be achieved strategically through mediated assistance from the more capable ones" (Warford, 2011). Although the concept of ZPTD has been stated initially in the context of training programs for prospective teachers, its application could be extended to the context of in-service teachers education programs.

This direct contact among members of a diverse group of teachers can facilitate knowledge exchange among the more experienced and the less experienced professionals as well as among ones who have undergone training in different areas, and depending on participants of every interaction, specific ZPTD can be created. Teacher education programs must be guided by the conviction that teacher knowledge is inherently situated and mediated and the curriculum should center on promoting discussions between prior teaching experiences, the theoretical canon, and local practices (Warford, 2011).

### 1.1. Online professional development for teachers

International institutions, as well as official documents in Brazil (Brasil, 2006; CONAE, 2010, pp. 1–168; OECD, 2010, p. 276; UNESCO, 2005, p. 240; UNESCO, 2008, p. 15) have considered professional development of teachers a critical component for educational improvement. In addition, research groups and teacher education programs (TEP) have indicated that the best opportunities for the development of teachers are related to their participation in professional communities (Bransford et al., 2000; Darling-Hammond & Bransford, 2005; Shulman & Shulman, 2004; Villani, Almeida Pacca, & Freitas, 2009).

Thus, the use of professional development programs can provide online learning opportunities including courses, activities and online interactions with instructors and classmates (Treacy, Kleiman, & Peterson, 2002), as well as support collaboration among teachers (Park, Oliver, Johnson, Graham, & Oppong, 2007). This type of online program offers a sort of flexibility that gives the teachers opportunities to stay updated, to the extent that they can access it at their own convenience of time and space (Dede, Jass Ketelhut, Whitehouse, Breit, & McCloskey, 2008).

Teachers are driven by personal desire to enrich their instructional practice when they participate in professional development programs (Kao, Wu, & Tsai, 2011). Their beliefs about web-based learning is a positive indicator of motivation in relation to professional development via the web (Kao & Tsai, 2009). These authors propose that these types of training programs could gather competent and experienced teachers in learning through the web to share their professional development experiences. In addition, training programs could try to find effective ways to improve the capacity of teachers to use the internet and relevant tools in such environments (Kao & Tsai, 2009).

In the current society based on the large movement of information and knowledge, through information and communication technology, a policy of continuing education for the use of technology in the educational process is necessary in Brazil (CONAE, 2010, pp. 1–168). According to Bransford et al. (2000) finding ways to improve teaching, stimulate research and implement new technologies in the context of school routines should be sought by researchers, teachers and training programs.

The use of social networks to promote learning through the web can be a vehicle for engaging students in a learning process supported by 21st century technologies, becoming an important strategy to be also used in teachers training programs (Ozkan & McKenzie, 2008). One of the most popular tools currently used in the network society are the so-called social software from which many virtual communities have been created. According to Boyd and Ellison (2008), social software are internet-based services that allow individuals to create a public or semi-public profile within a bounded system when they can link lists of users with whom they can share connections, view and traverse their own list of connections and those made by others within the system. The so-called social networks like Facebook, Myspace and Google+ are examples of these social aggregates that are so successful on the internet.

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