

# Abstract

At many universities around the world initiatives have been taken to promote the use of student-centered pedagogical approaches, as well as information and communication technologies (ICT), in the educational process. A core issue with these initiatives has been the professional development of teachers. Recent research suggests that professional learning presented to teachers within a community of practice framework is more likely to have an effective outcome than the traditional forms of professional development and learning. Furthermore, recent technological developments have created new means of bringing geographically widespread teachers together.

The overall aim of this research is to enhance the understanding of to what extent a distributed community of practice approach affects the professional development of university teachers and whether this leads the teachers to promote a transformation in teaching practices mainly regarding the introduction of ICT and project-oriented problem pedagogy (POPP).

More specific research questions are concerned with what is the impact of belonging to the community of practice on teachers?; what kind of changes takes place in the teachers' practice?; which factors support or hinder the professional development of teachers who are part of a distributed community of practice?; how does technology contribute (or not) to the formation of the community, and to the professional development process?; and what principles may be used to guide the design of a professional development model- based on communities of practice for fostering change of practice?

In the empirical study of this work, a design-based research approach has been selected, as it can be used to develop a design solution that has been tested and refined in a genuine learning context, thus making the solution more useable and reliable. This approach begins with the identification of an educational problem, and then a proposal of a draft design solution is derived from literature review. This is followed by iterative testing where the continuous adjustments to the initial design derive from the transformation of the learning environment as experienced by participants within a genuine context. The final stage is the production of a set of refined design guidelines.

In this study, existing design principles were identified in the literature. The study has its roots in the interlacing of two main theoretical areas: Professional development in higher education and learning in communities of practice. From the professional development area, literature highlights the importance of considering the values and beliefs of teachers as well as the learning principles of adults. The theory of communities of practice provides the framework for making a shift from more conventional

professional development models - based on formal training - to learning in practice. This theory has a basic premise that learning should be understood as participation in social practice. Two other contributing areas of the research are information and communication technology (ICT) and problem-oriented and project-based learning (POPP). Both have a double role in this research: The learning principles of POPP help to inform the design principles for the educational intervention; ICT provides the main communicational infrastructure for it; and both of them have a core role in the process of transforming teaching practices.

From this theoretical basis, design guidelines were proposed for a specific context that became the initial design solution. A group of 27 teachers from five different regional campuses at the Universidad Nacional (UNA) in Costa Rica participated in the educational intervention for a period of ten months. Data has been collected through participant observation in the online dialogue, interviews, workshops, and questionnaires. The data collected was analyzed through a process of comparing, contrasting and categorizing.

The main findings of the study were that the distributed community of practice approach appears to be a productive form of professional development under certain conditions. It provides an environment for learning and dialogue that can enrich and deepen teachers' knowledge, as well as an understanding of important educational issues and change of values, beliefs and practices. Issues of access to technology, culture of online communication and collaboration, teachers' workload and time have been identified as conditions that need to be carefully studied in order for the approach to be potentially effective.

Following features of the approach are found to be effective including the mix of activities deployed: readings, discussing ideas, sharing experiences, flexible use of time, and over-all reflection and the possibility for teachers to make meaning of their learning process from direct experience through the implementation of what was learned. Some features of the approach are identified as requiring further refinement: improving social presence, promote a culture of online communication, strengthen local networks, achieve a balance between online activities and face-to-face activities, and strengthen the integration of content, pedagogy and ICT.

The overall result of the approach to professional development proposed by this study, offers teachers a scope for learning, negotiation and identity formation within the community. The study also suggests that teachers who are closer to the center of the community are able to identify with, and develop a feeling of belonging to the community to a greater extent than the teachers with a peripheral role. However, it seems that both kinds of teachers are able to transform, to some extent, their teaching practices.