



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Professional Development to Promote Online Communication, Collaboration and Learning Among Faculty

A Community of Practice Approach

Coto, Mayela; Dirckinck-Holmfeld, Lone

Published in:

Enriching Collaboration and Communication in Online Learning Communities

DOI (link to publication from Publisher):

[10.4018/978-1-5225-9814-5.ch007](https://doi.org/10.4018/978-1-5225-9814-5.ch007)

Publication date:

2019

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Coto, M., & Dirckinck-Holmfeld, L. (2019). Professional Development to Promote Online Communication, Collaboration and Learning Among Faculty: A Community of Practice Approach. In C. Stevenson, & J. Bauer (Eds.), *Enriching Collaboration and Communication in Online Learning Communities* (pp. 103-136). IGI global. <https://doi.org/10.4018/978-1-5225-9814-5.ch007>

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach

Mayela Coto
Universidad Nacional, Costa Rica
mcoto@una.ac.cr

Lone Dirckinck -Holmfeld
Aalborg University, Denmark
lone@hum.aau.dk

ABSTRACT

Based on a critical re-reading of a study of a community of practice approach to professional development, this chapter uses Engeström's activity theory model to highlight the tensions that arise in a professional development program oriented to change teaching practice through the introduction of ICT and a student-centered pedagogical approach. Despite the community of practice potential, there are many tensions that inhibit this type of professional learning. These tensions can be summarized in four broad categories: institutional structures (division of work), the institutional culture (rules), levels of engagement (differentiations within the community), and faculty' readiness (in the appropriation of tools and new pedagogy). By analyzing, in greater depth, the tensions, our goal is to reflect again in the design principles and to further elaborate on developing a professional development strategy based on a community of practice approach that can be used in broader contexts.

Keywords: community of practice (CoP), professional development (PD), dualities, problem and project-based learning (PBL), online learning, design-based research (DBR), activity theory, tensions, Wenger,

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

INTRODUCTION

To contribute to today's innovation-driven economy, universities must integrate new teaching and learning approaches that allow students to develop skills such as collaboration, problem solving, and critical and creative thinking (Adams et al., 2018). These challenges, together with the principles of long-life learning, online learning and blended learning, imply new demands for faculty, who must be prepared to face the growing expectations of being competent, both in terms of promoting the development of these new skills in the students as in the integration of content, pedagogy and technology (Crawford, 2008; Wall, 2013).

In general, the task of preparing faculty to meet these challenges relies in faculty professional development programs. Literature stresses that these programs must address changes in beliefs, knowledge, and habits of practice, in order to achieve changes in the quality of teaching and learning (Gibbs & Coffey, 2004; Light & Calkins, 2008; Ödalen, Brommesson, Erlingsson, Schaffer, & Fogelgren, 2019). Literature also shows that traditional professional development (event-based, one-hit training workshops) has been shown ineffective in supporting change in teaching practices. These shortcomings have provoked an interest towards community inspired models.

In the last decade, research has shown that communities of practice (Wenger, 1998) can be a catalyst to improving faculty' professional practice (Coto, 2010, 2014; Lantz-Andersson, Lundin, & Selwyn, 2018; Patton & Parker, 2017; Schlager & Fusco, 2004; Sherer, Shea, & Kristensen, 2003). The notion of building learning communities has become a very valuable mean for engaging faculty in meaningful and effective professional learning (Barab, Kling, & Gray, 2004; Macià & García, 2016; MacPhail, Patton, Parker, & Tannehill, 2014; Patton & Parker, 2017; Wing Lai, Pratt, Anderson, & Stigter, 2006). In addition, the technological infrastructure currently available in many higher education institutions has the potential to create online and distributed learning environments that can facilitate and extend the professional development of teachers (Lock, 2006).

Despite its potential, there are many obstacles that inhibit this type of professional learning. Many of the faculty members do not have the knowledge, experience and skills necessary to work as productive members of a community of practice. They are very pressured by time, with the growing demand for teaching and research, and do not always receive incentives or support from the institution to participate in professional development activities (Coto, 2010, 2014; Powell & Bodur, 2019; Tsiotakis & Jimoyiannis, 2016). Further in a resource constraint setting, there may be additional challenges with respect to access to IT, Wi-Fi and Internet, and fewer experiences with the use of IT tools for teaching and learning.

This chapter is based on previous studies (Coto, 2010, 2014) that has its roots in the interlacing of two main theoretical areas: professional development (PD) in higher education and learning in communities of practice (CoP). In this chapter, and responding to a fifth phase of the design-based research methodology - Dissemination and adoption in broader contexts- (Coto, 2010; Reeves, 2006), we will revisit the data but this time we will use activity theory (Engeström, 1987; Engeström, 2001) to analyze the tensions and contradictions that have been identified in the first analysis of the data, in order to broaden the application of the design principles. As such we will be looking into “secondary contradictions emerging between constitutive components of an activity system” (Sannino & Engeström, 2018, p. 49).

THEORETICAL BACKGROUND

The professional development (PD) of teachers is a fundamental mechanism to improve teachers' competences, innovate teaching methods and promote new skills in students (González & Skultety, 2018; Light & Calkins, 2008; Prenger, Poortman, & Handelzalts, 2017; Wake, Dysthe, & Mjelstad, 2007; Zhang & Liu, 2019). The PD must be purposefully conceptualized, carefully implemented and used in a meaningful way to support teacher growth and change (Loughran, 2014). The rapid development of information technology has changed the form, the content, the resources and the environment in which the professional development of teachers is carried out (Unwin, 2015). Online learning has broken the boundaries of time and space, and teachers can access online learning activities anytime and anywhere, which has the potential to effectively resolve the conflict between their workload and their professional development processes (Chen, Chen, & Tsai, 2009; Ching & Hursh, 2014) and at the same time, can encourage them to learn new values and practices through participation in new forms of activity (Coto & Dirckinck-Holmfeld, 2008).

Communities of practice (CoP) are a specialized form of PD (MacPhail et al., 2014). They seek to break the walls of solitary and individualistic professional practice (Byrk, 2016) and create spaces where teachers learn from one another, promoting professional growth (Barab, Baek, Schatz, Scheckler, & Moore, 2008; Hadar & Brody, 2010; Schlager & Fusco, 2004). The CoPs are significant, have a purpose and revolve around authentic tasks (Lock, 2006; Patton & Parker, 2017; Wing Lai et al., 2006).

The CoP framework is based upon social or situated learning theory (Lave & Wenger, 1991). Wenger et al. (2002) define a community of practice along three dimensions: a domain of knowledge that creates a common ground and sense of common identity, a community of people who care about the domain and create the social structure that facilitates learning through interactions and relationships with others, and a shared practice that the community shares, develops, and maintains to be effective in its domain. Other researchers have proposed similar definitions for CoP. Barab et al. (2004) define communities of practice as “a persistent, sustained social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history and experiences focused on a common practice and/or mutual enterprise” (p.55).

When the members of a community do not necessarily share working contexts, nor are they geographically close, the communities of practice are called online or distributed communities (Wenger et al., 2002) which means that they depend on technology to connect the communities members, support work teams, build knowledge repositories, build a sense of community, encourage participation, foster identity and presence and offer online tutoring and instruction. Online and distributed communities are more challenging to keep

alive. In addition, a distributed CoP usually needs a formalized structure to organize activities that would enable doing, becoming, experience and belonging for the members (Schlager & Fusco, 2004).

THE RESEARCH SETTING

The research scenario in the study was the National University (UNA) in Costa Rica, specifically the regional campuses. UNA is the second largest public university with around 20,000 students, 1800 academic staff and 1700 administrative staff. Besides the central campus in Heredia, UNA has several campuses throughout the country. Even though they are an important part of the university, many of the institutional efforts are placed on the central campus where most students and faculty staff are concentrated, thus the institutional initiatives usually take longer to reach the regional campus. The PD programs are not the exception.

At the regional campuses, many teaching staff is hired by short terms and part-time contracts. They carry out a variety of different tasks (academic, outreach, administrative) within the regional center, so time is a scarce resource for them. They usually do not have access to PD processes that take place mostly in the central campus.

The participants in the study were a group of 27 teachers from five geographically distributed campuses who have diverse fields of knowledge and diverse approaches to teaching and learning as results of their own professional experiences and context. Given the geographical distribution of the regional campuses, the study used networked technologies for two purposes: (1) contributing to the reduction of space and time barriers favoring the interaction among faculty; and (2) supporting a more sustainable and scalable teacher PD program within the institution (Schlager, Fusco, & Schank, 2002). The learning environment was designed as a framework for flexible and blended learning, rich in challenges and interactions around ICT and the philosophy and methodologies of problem and project-based learning (PBL), and teachers were considered as the main agents of their PD.

For a comprehensive presentation, design, analysis and results please look into Coto (2010). For this chapter, we use, in a partial way, a set of data from the original study, but we analyze it with a new theoretical lens (activity theory) in order get deeper insights into the dynamics of the findings, and to highlight the tensions that can hinder or act as springboards for a PD process. In our use of tensions, we use this in line with Engeström's use of disturbances and conflicts, but also his use of innovative attempts to change the activity (Engeström, 2001). In the graphic representations of the activity systems, we use a heart to symbolize the dynamics, while tensions such as disturbances and conflicts are symbolized using a kind of lightning or a cross.

THE RESEARCH APPROACH

Design-based research (DBR) is a methodology originated in the pragmatic paradigm. The Design-Based Research Collective (Design-Based Research Collective, 2003, p. 5) defines it as “an emerging paradigm for the study of learning in context through the systematic design and study of instructional strategies and tools”. In achieving its aims of improving educational designs and advancing understanding of learning,

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

DBR draws on the full range of social science research methods, combining a variety of quantitative and qualitative approaches (Barab & Squire, 2004; Sandoval & Bell, 2004).

The main sources of data for the study were online discussions, face-to-face meetings, and reflection workshops. The information was collected through questionnaires, interviews, workshops and participant observation. Given the strong online component of the intervention, over a period of ten months, online observation was carried out almost daily. All recorded sessions (face-to-face meetings, interviews, and workshops) were transcribed for data analysis. Online forum discussions were downloaded into text files. The textual data available for participant observation research include postings in discussion forums, e-mails, chat room interactions and produced artifacts. All the data gathered was analyzed through a recursive process to generate codes. Through the process of coding, collecting, grouping and organizing the data, several codes emerged that were grouped into networks or theme groups (all the details in Coto (2010)).

The DBR approach has a cyclical nature where each phase informs the next phase and, in turn, each phase can result in modifications of all the phases illustrating the iterative refinement nature of the approach. DBR runs through four phases: i. “Analysis of practical problems by researchers and practitioners”; ii. “Development of solutions with a theoretical framework”; iii. “Evaluation and testing of solutions in practice”; and iv. “Documentation and reflection to produce design principles”, where researchers refine, add, and discard principles that comprise their understanding of the experience (Reeves, 2006). For this chapter, the authors expand the DBR model with a fifth phase called v. "Dissemination and adoption in broader contexts" that deals explicitly with analyzing whether the proposed design principles can effectively support teachers, from other contexts, in the process of transforming their teaching practices through the introduction of technology and PBL.

In order to broaden the application of the design principles, we analyze the tensions and contradictions that have been identified in the first analysis of the data, using Engeström activity theory (2001). The tensions and contradictions can be found: (i) within the elements (for example, tools, subjects); (ii) between elements (eg. a subject and a rule); (iii) between a central activity at one point in time and a central activity later on; and (iv) between activities (Engeström, 2014). To perform the analysis, the authors, separately, explored the data and drew the representation of the activity systems for each of the components. Then, they compared their findings and built a common understanding. This method increases the validation of the findings.

DESIGNING A PROFESSIONAL DEVELOPMENT PROCESS WITHIN THE FRAMEWORK OF A COMMUNITY OF PRACTICE

In this study, the design of a professional development environment entails the provision of facilities to enable and support the belonging of faculty staff to a distributed community of practice. The point of departure of the study is the premise that engagement in social practice is the fundamental process by which we learn and become who we are (Wenger, 1998), hence becoming a member of an emerging teaching focused on ICT collaborative pedagogies- community of practice should be both a process of identity construction, and a process of competence acquisition.

Participation in a community of practice involves action and connection, as Wenger stated, it “combines doing, talking, thinking, feeling and belonging” (1998, p. 56). In this regard, the participation of the faculty staff in the PD is seen as not just engagement in a set of activities, but as a process of being participant in a new teaching- learning practice and constructing an identity in relation to this practice.

The literature suggests that we cannot create a CoP for PD goals. However, Wenger (1998) argues that while you cannot design the learning you can *design for learning*. Wenger’s conceptual architecture for learning provides a framework in which we can design a social learning space that affords the evolution of a CoP. This framework is expressed in terms of four basic dimensions that entail issues of meaning, time, space and power. Wenger captures these aspects with four dualities: reification and participation; designed and emergent; local and global; and identification and negotiability. In terms of the design of the PD program, the dualities are analytical tools that can give a better understanding of the process of design for a community.

Reification/participation: This duality creates two kinds of affordances for negotiating meaning as it concerns the need of creating a balance between resources for learning (reification) and the activities that make use of those resources (participation). In the context of the PD learning space, this dimension means bringing together a group of faculty staff through online and physical spaces and providing them with a balance between opportunities of participation and resources they will use in support of this participation. The negotiation of meaning evolves around core concepts, such as the introduction of technology in teaching practices, and student-centered pedagogical approaches (PBL).

Designed/emergent: Wenger (1998) emphasizes that “there is an inherent uncertainty between design and its realization in practice, since practice is not the result of design but rather a response to it” (p.233). Within the study, a conscious effort was put into the design of tasks, spaces and organization that enables university teachers to engage in dialogues, discussions, project work and negotiations (Goodyear, Jones, Asensio, Hodgson, & Steeples, 2001). This duality involves allowing teachers to negotiate how they transform the design in ways that are meaningful to them; thus the ultimate goal of the design will be to create a space for continued negotiability among all the members of the community (Brosnan & Burgess, 2003).

Local/global: This duality refers to how a CoP relates with the rest of the world, through creating continuities across boundaries. The challenge in designing for a community with a focus on change is to create a balance between meeting the teachers’ and immediate needs and a more global institutional change agenda (Barab et al., 2004). The core concepts and practices that must be negotiated need to have local significance to each teacher (and each regional campus) but at the same time be of global relevance to all teachers in the community and to the university community in general.

Identification and negotiability: The identification/negotiability duality refers to the degree to which members identify with the community and the extent to which they are empowered to shape the community, and as such it has an effect on the formation of the identity through the mix of participation and non-participation (Wenger, 1998). For the goals of PD programs this duality is very important. Teachers were

invited to new practices; thus, they were able to decide whether to identify or not with the community practices and consequently whether to participate or not in it.

PRESENTATION OF FINDINGS

There were two types of data sets that contributed to this study. One set was comprised by the interviews and workshops which included spoken face-to-face discussion information, and the second set was drawn from observations, discussion forums and questionnaires, including only written information. This chapter presents the results related with the overall patterns of (A) participation, (B) engagement and identification with the community, and (C) learning.

Participation in the Community

The next sections will further analyze the issue of participation in three manifestations: online participation (including group work), face-to-face participation, and the development of the pedagogical intervention. This analysis will be using activity theory, and especially Engeström's graphical representation of the second generation of activity theory (Leontjew), as the lens.

Online participation

Participation in online activities comprises participation in chats, blog reflection, discussion forums, and group work. This section examines each of them.

Chat conversations: 21 faculty members participated over time in 23 chat sessions. There was an average of five participants in each session, with a maximum number of participants of 14 and a minimum of 2. The synchronous nature of the chat allowed direct interaction with everyone in the virtual room and the social space that was recreated were extremely valuable to the formation of a community identity. Participation in the chats was high at the beginning of the intervention, but then fell almost to a zero. Some of the reasons for the decline were: (1) the messy nature of the talks was overwhelming for some faculty who could not follow the flow of conversation; (2) some faculty, mainly from Coto Campus and the Marine Biological Station frequently experienced connection problems that hindered their participation; and (3) the chat sessions were transformed by some of the participants in a place in which to share all kinds of topics, such as weather, politics and national events. For other participants, those issues were irrelevant; therefore, they were unwilling to invest their time in this activity. These tensions and contradictions are illustrated in Figure 1.

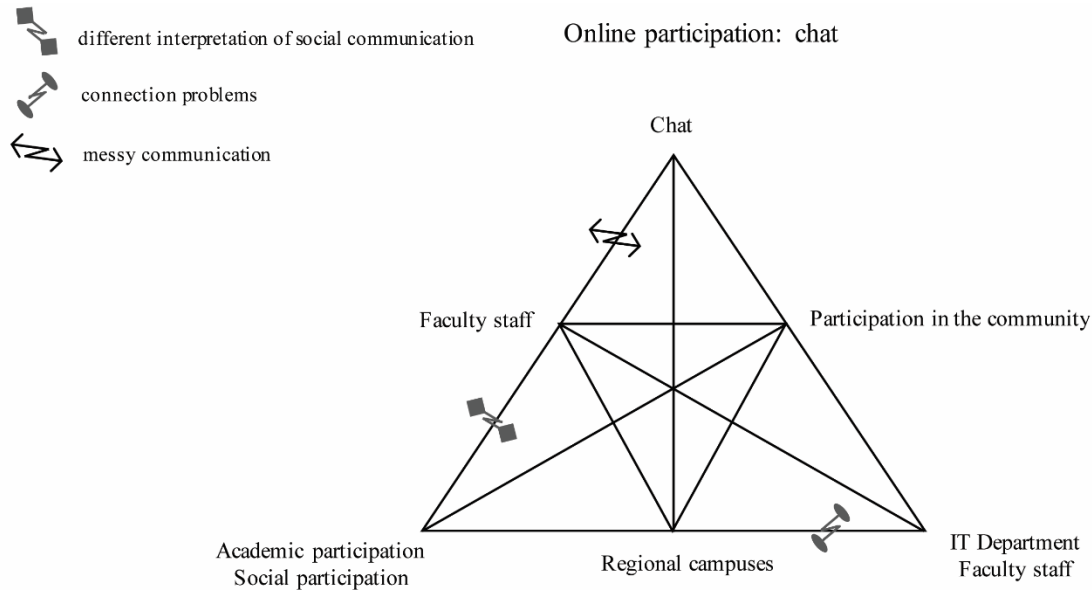


Figure 1. Online participation: chat

Some of these tensions (the messy communication) are related to the tool (chat) or to the appropriation of the tool and the specific design of the chat-function in Moodle. Other tensions were related to the division of work, where especially the lack of a stable ICT infrastructure becomes a problem. This influences the balance and interactions between the participants in the community, making it especially difficult for the faculty staff from some of the regional campuses (Coto Campus and the Marine Biological Station) to participate actively. The third kind of tensions are related to the interpretation of social community. Though there was a shared understanding that core participation in a CoP both concerns social as academic communication as it has to do with identity transformation, it turned out that some of the participants did not engage in the social communication. As these participants withdraw from participating in the chat it influences their participation in the community, and therefore the importance of the chat for community building.

Blog reflection: The blog was conceived as a space of personal reflection on the learning process, as such its value as an activity was considered very high, both from the viewpoint of the learning experience at individual and community level. The personal blog was aimed at providing an ability to trace the individual learning through the entire process. However, the faculty was rarely willing to use the blogs. The entry of the blog with more participants (22) was regarding a personal presentation, and the entry with fewer participants (1) referred to blended learning. It does not mean that the faculty did not reflect on their learning process, just they were not engaged in keeping a personal blog. The process of reflection mainly took place in the co-located meetings and in the discussion forums that were considered meta-reflection spaces. The tensions in the use of blogs is illustrated in Figure 2:

Online participation: personal blog

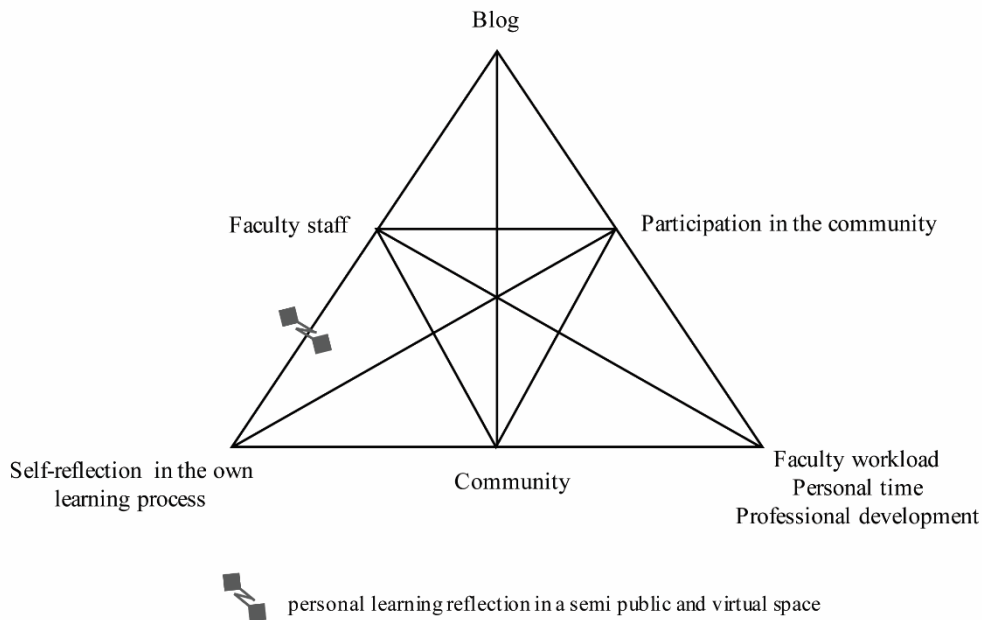


Figure 2. Online participation: blogs

We interpret the lack of use of the blog as primarily a tension between doing personal and community learning reflection in a semipublic and virtual space. Even the blog from a didactical design is expected to support the individual participants and the community to reflect and externalize the learning experience, it seems as this way of communicating was unfamiliar for most of the participants. When it comes to use the blog to present themselves, 22 participants responded to this task. This supports the interpretation that the staff were able to use the blog, however not for the intended external reflection.

Discussion forums: There were a total of twelve discussion forums. By nature, four of them were considered reflection forums, and the remaining eight targeted a specific subject domain, such as Project-based learning; UNA pedagogical model; Modalities of learning: challenges and limitations; and Design of educational materials. Each one of the twelve forums lasted between one and two weeks. It is worth noticing that peripheral participation in the online discussion forums was an activity that requires time. Table 1 shows the individual pattern of participation for each member in the discussion forums. It considers the “core” participation, meaning producing a post, and the “peripheral” participation, meaning reading but not writing. It is possible to deduce that all participants visited the community at some point and were able to see the discussions. There was a high diversity in participation, from almost null participation (P2 and P19) to 100% participation (P8). It is also possible to appreciate that, in general, individual participation (marks with “1”), in online activities is higher than peripheral participation (marks with “0”).

Research suggests that there are typically three distinct levels of participation in communities of practices: (1) The core group who participates intensely in the community and typically takes on leadership roles; (2) the active group who attends and participates regularly, and (3) the peripheral group who, while they are passive participants in the community, still learn from their level of involvement. Typically, this latter group represents most of the community (Lave & Wenger, 1991; Wenger et al., 2002).

Table 1. Individual participation in the discussion forums (Coto, 2014)

Faculty members	Participation over time in the discussion forums *												Total number of postings
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	
P1	1			1	1	1	0	1		0		1	25
P2	0						0		0				0
P3		1	1	1				1	1	0	1		13
P4			1							1		1	4
P5	1	0	0	1									2
P6	0	1	1	0					0		1		5
P7	1	1	0	1	1	1		0			1		16
P8	1	1	1	1	1	1	1	1	1	1	1	1	82
P9	0			1	1	1	0				1	1	24
P10	1	1	1	1			0	0			0		5
P11	1	0	1	1	1	1	1	1	0	1	1		21
P12	1						0		1	1	1	1	15
P13	1	0	0	0	0	1	0				1	1	7
P14	1	1	0	0		1	1	0	0	1	1	1	13
P15	0	0	1	1	1	0	0	1	0		1	1	11
P16	1	1	1	1	1	1		1	1		1	1	48
P17		1	1		1								8
P18	1		1	0	0	1							6
P19	0	0											0
P20	0	1	1	0									12
P21	1	1	1	1									10
P22	1	1	1	1			0				1	1	7

* For participants who were members of the community for more than three months
1 – active participation (writing a contribution)
0 – passive participation (just observing)

Table 1 shows that three participants (P8, P11 and P16), stood out as successful and engaged community members. These faculty members were considered the core participants in this study. The active participation online is considered a good indicator to be considered in determining the category of "core group", because it was in the online environment where most discussion, negotiation of meanings and sharing took place. Regarding the active group who attended and participated regularly, seven faculty members can be considered to belong to this group: P1, P3, P7, P12, P14, P15, and P22. The last one can be considered a good example of an active participant. She began very enthusiastically in the community and took a leading role in her group. However, she felt and declared herself as not akin to online communication, and promptly she stopped her participation in the discussion forums. Despite this, she

found her way within the community and became one of the most active participants in face-to-face meetings (Coto, 2014).

The last group, the peripheral one, is formed by members who even though they were peripheral participants in the community, still might learn from their level of involvement. Twelve participants belong to this group: P2, P4, P5, P6, P9, P10, P13, P17, P18, P19, P20 and P21, and they represent the biggest group within the community. From this group, there were four members who withdrew from the study in the early stages (May to June): P5, P17, P18, and P20, so they did not participate in the pedagogical innovation project. P18 is a case that may illustrate the process of a participant who had a peripheral participation while he was in the community and who finally decided to terminate his participation in it.

In general, the discussion fora worked well, and the participants were able to use them as intended (Figure 3).

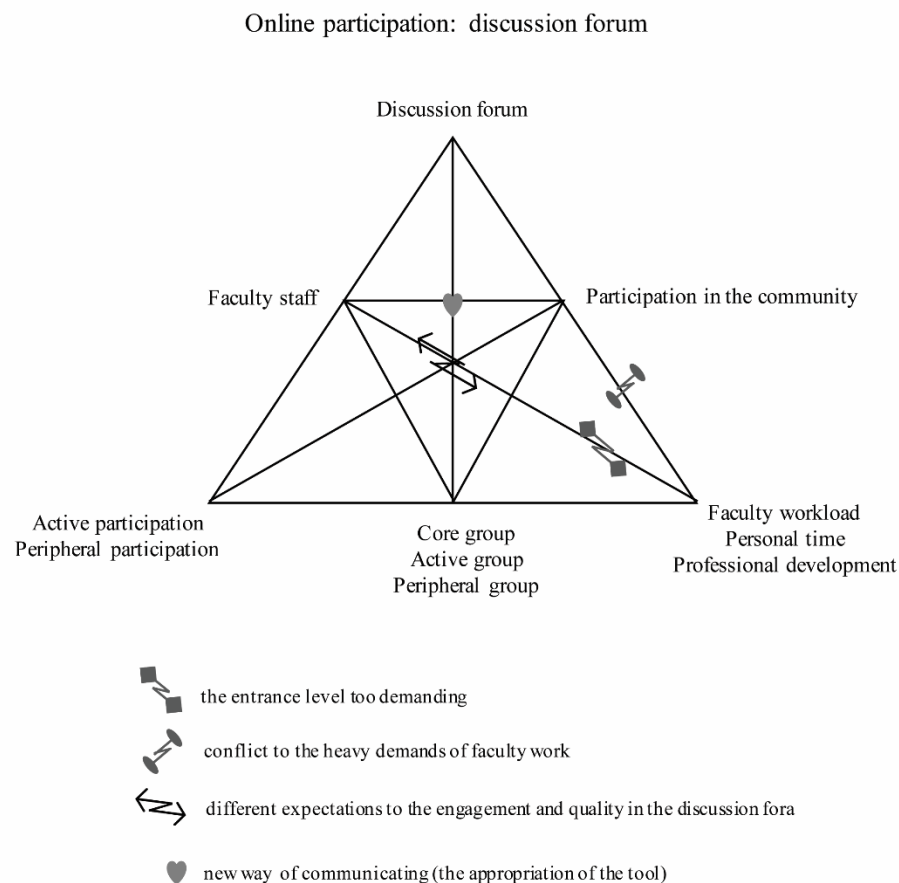


Figure 3. Online participation: discussion forums

Three groups of users evolved and could be identified (core group, active group, and peripheral group), however the analysis also reveals that this different levels of participation in the forum discussions may produce some tensions among the individuals. Some of the core participants, which took up the leadership in the forums expressed disappointment with the other participants not contributing enough. Our

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In *Enriching Collaboration and Communication in Online Learning Communities*. Hershey: IGI Global.

interpretation is, that participating in the online fora is one way of expressing membership and contributing to the building of the community, however the core members are also depending on the active members, and the peripheral members in order to stay “tuned”. At the same time writing and contributing in foras were for the participants a new way of communication, which prerequisite not only the operational skills to use forums as well as a stable ICT infrastructure (which especially was missing in the Coto and Puntarenas campus), but also a readiness and competences to act in the online fora, and to express yourself about academic and social issues in a new mode of communication. The aim of using the communication fora was for the faculty staff to become familiar with and a necessary way of communicating and discussing among the participants, as they were distributed in space and time. Many of the participants were able to use the communication fora as a shared space for academic and social discussions, however it also produced (new) boundaries between the members of the community. One very clear example of these new boundaries was the participant (P22), who in the beginning was actively participating in the forums, but suddenly stopped. With regards to the online communication she became a peripheral participant, however what we shall see later was, that she in the f2f communication took up the leadership, and in the overall CoP belong to the core group.

Four people, who had not participated in the forum discussions withdrew from the PD program. Especially P18 expressed that the entrance level (the ability to use the online communication for academic and social activities) was too demanding, and the overall PD process too demanding and abstract. He expressed that it was conflicting with his heavy demands of work as a faculty member.

Group work

Group work was another activity designed to be carried out mainly in the online environment. The groups were established to create mutual dependencies between the participants and to support the individual construction of meanings through the construction of shared understanding, negotiation, confrontation and commitment (Dirckinck-Holmfeld, Jones, & Lindström, 2009). The groups were also organized inter-campus to enable participants to truly experience by themselves the learning process using networked technologies. This decision was aligned with the principle of constructive activity (Gallant, 2000) which suggests that in order to increase the opportunities for change, faculty should experience the teaching and learning conditions they plan to create for their own students.

In addition, group work was considered fundamental for the design of the pedagogical intervention that the participants would implement with their students. The groups were envisioned as the places where members discuss, analyze and take decisions. However, there were a lot of organization and coordination problems, as well as misunderstandings and difficulties with setting up agreements. The activity in each group was very irregular, and even though the group members were visiting the group online space regularly, they were, in most cases, unable to make decisions, and consequently little progress happened. The tensions emerged in online group work is shown in Figure 4.

Group work: online and distributed participation

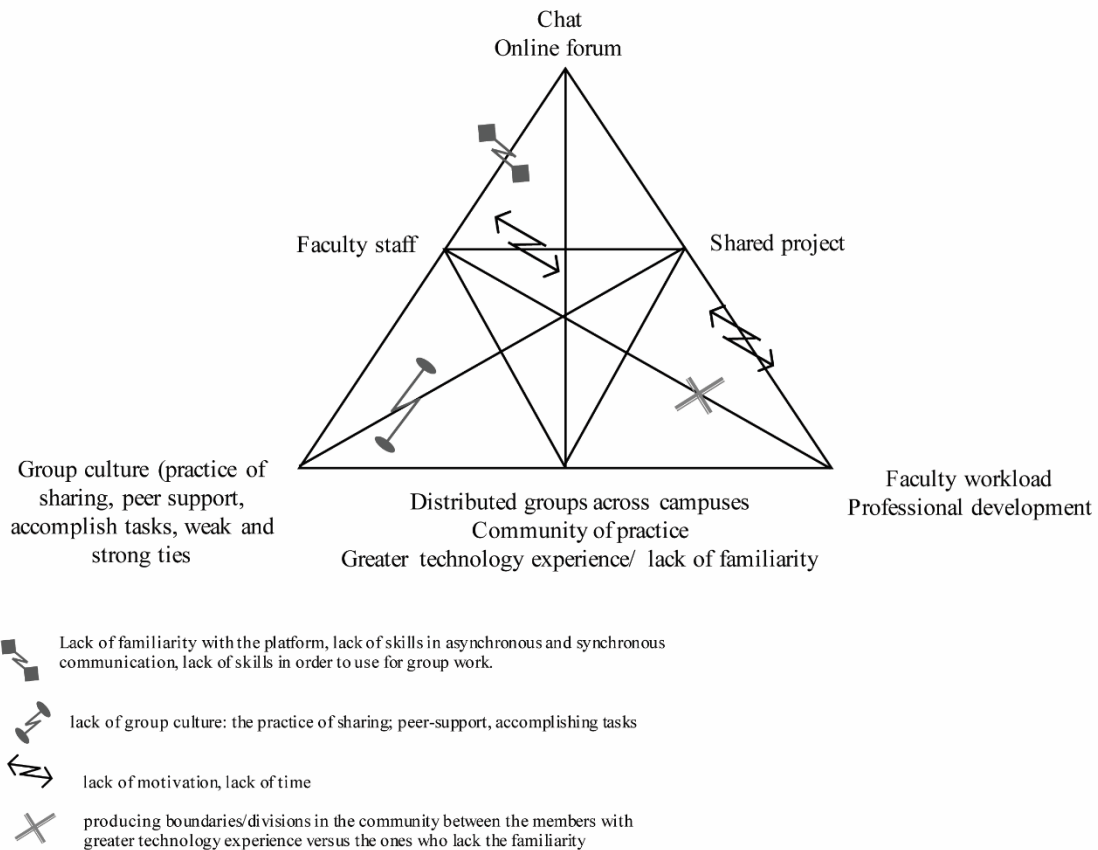


Figure 4. Group work: online and distributed participation

Community members argued lack of familiarity with the technology including lack of skills in asynchronous and synchronous communication and lack of skills in order to use the platform for group work. Moreover, they argued for lack of group culture including the practice of sharing, giving peer-support and lack of commitment to accomplish work. At the individual level, they also explained lack of motivation and time as reasons for why the distributed group work was not as productive as hoped for. Moreover, one argued, that it was a mistake to divide them into groups, when they were just becoming comfortable as a community. It was evident that working in virtual and distributed teams across the regional campuses required skills not inherent in the participants.

In general, the data for online participation suggests a general pattern of higher ability to participate to those members with greater technology experience and background. The inability for the groups to work in an effective way was a factor that negatively influenced academic participation and weakened the cohesion among members of the community and even led some faculty to leave the community.

Face-to-face modality group work

Once discovered that the online group work was not working as intended, the group work was moved to the local campuses in a face-to-face modality (see tensions in Figure 5). The intention of this change was to preserve the practice of sharing and peer-support beyond the online means. The new strategy worked well in three campuses: Nicoya, Liberia and Puntarenas. The participants supported each other in the process of designing and implementing the pedagogical intervention. In the other two campuses, Perez Zeledon and Coto Brus, the support that took place between the members of the group was quite low. Those who made progress in the program were working in rather individual ways.

Taking Nicoya's group as an example, it was clear that while the faculty members were not participating much online, they were gaining value from the community. They worked as a sub-community, where they read the suggested material, discussed it in their group, and used it in their classrooms to extend their teaching repertoire. So, the Nicoya's group work is an example of a practice based on sharing, caring and peer-support, while the groups in the two campuses, Perez Zeledon and Coto Brus not managed to get it to work - even after the groups were organized in a face-to-face modality.

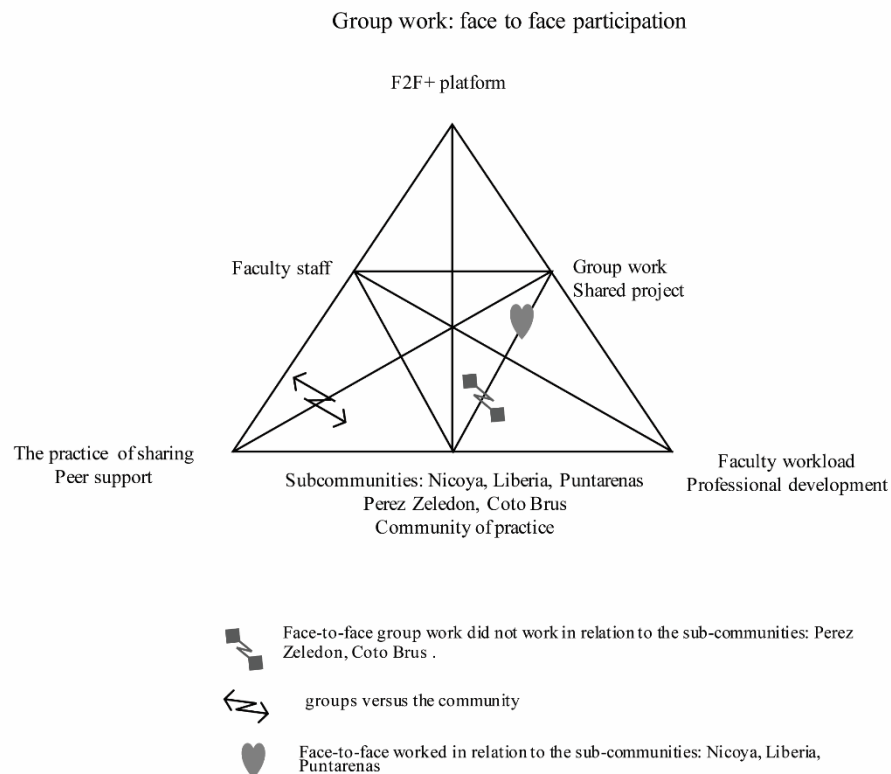


Figure 5. Group work: face to face participation

This contradiction between the groups and the community may be explained by the concepts of weak and strong ties (Granovetter, 1983; Wang, Lu, Ester, Wang, & Chen, 2016). At the CoP level the faculty members are connected in somehow weaker ties than in the group work, where they become very depending on each other. And when it does not work due to the uncertain competences in distributed, online group working or as shared commitment in the f2f group work, the individual learner becomes isolated.

However, there is maybe a didactical design issue in the overall PD approach to consider, which may have reinforced this problem. With references to Dirckinck-Holmfeld, Jones, & Lindström (2009) there may be an ambiguity between the motive for the group work and the dependencies, which the groups may produce. When organizing for collaborative project groups as in PBL, the idea is that the participants share a project and a shared enterprise, however as the pedagogical intervention were not a shared project, it might - as also one of the participant express - be questioned if they really needed the local groups as they felt that they got more support from the community than from their local group. So, it might be worth considering the relations between the individual, the groups and the community and when and why to integrate groups. Especially forced distributed groups across regional campuses demands competences in online group work.

Face-to-face participation

Table 2 shows overall faculty participation in the six face-to-face meetings that took place during the intervention. Two of these meetings were global meetings in Heredia with all participants, and the other four were carried-out in each of the regional campuses.

Table 2. Participation in face-to-face meetings (Coto, 2014)

Face-to-face meeting	Number of participants
February	24
March	27
June	17
August	15
October	14
November	15

The data shows that participation in face-to-face meetings was very regular which confirm the preferences of many community members for face-to-face communication. All in all, face-to-face communication in the seminars were perceived as very important for the academic and social discussions and reflections on the innovation of the teaching practices, and also to motivate the faculty members to engage in the community and to stay motivated. The participants in general like the f2f modalities based on a mix of presentations, design workshops and discussions as they provide a dynamic and “ready-at-hand” environment for discussions and learning, which was within the comfort-zone of the participants. Further, the attendance mirrors engagement, which makes it transparent for the community members to experience the community engagement.

The tensions in the face-to-face participation and modality are illustrated in Figure 6.

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

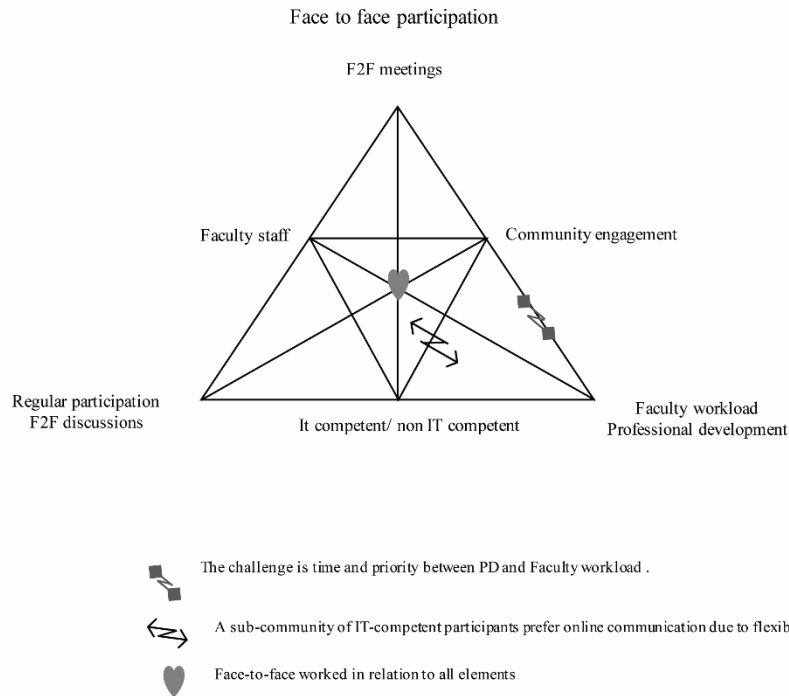


Figure 6. Global face to face participation

In general, the regularity in the face-2-face activities underlines the need for a blended learning approach, However, there were tensions with respect to time and the faculty workload. A sub-group (P11, P14 and P16), always expressed a preference to communicate in an environment that encourages debate beyond the physical limitations. For these members, online communication offers the flexibility not previously available to carry out collaborative learning activities; however, the three of them were competent in using technology as a means of communication. The differences between online participation and face-to-face participation may be illustrated by P2. He participated in all face-to-face meetings but had not written a post in ten months (see Table 1).

In general, time was the most important factor that hinders participation. In most cases, there was always a tension between faculty workload at the university, personal time and time for PD. Daily activities at the university often interfered with the activities proposed in the community. Faculty members were struggling to bring the community into their daily routine. Normally, many of them did not have serious problems with attending face-to-face meetings but found that time for online participation was much more difficult for them.

The development of the pedagogical intervention

The literature points to the importance of providing opportunities to implement what is learned (Gallant, 2000; King, 2003; Lawler & King, 2001) and in DBR interventions are also a mean to create new knowledge and to learn from practice, as an intervention in practice always will reveal some unforeseen stepping stones. As a further strategy for integrating knowing, acting and being, each participant designed, implemented and evaluated a pedagogical intervention in their classrooms in order to enhance some aspect of their educational practice. The activity was highly situated and authentic, and 15 out of the 18 community members who completed the PD program, were able to go through the complete process. They pursued diverse goals in the design of their pedagogical interventions, such as motivating students (P14); making a more participatory course (P2 and P4); promoting reflection and analysis (P12); fostering collaborative work (P22); improving learning through the use of technological tools (P7 and P10); developing fundamental topics through the use of blogs (P1); and using technological tools to develop a project about local tourism (P3 and P6). The innovations were carried-out in courses from areas such as Education, Literature, Environmental studies, Tourism, Administration, Language, and Biology. The tensions emerged during this activity are illustrated in Figure 7.

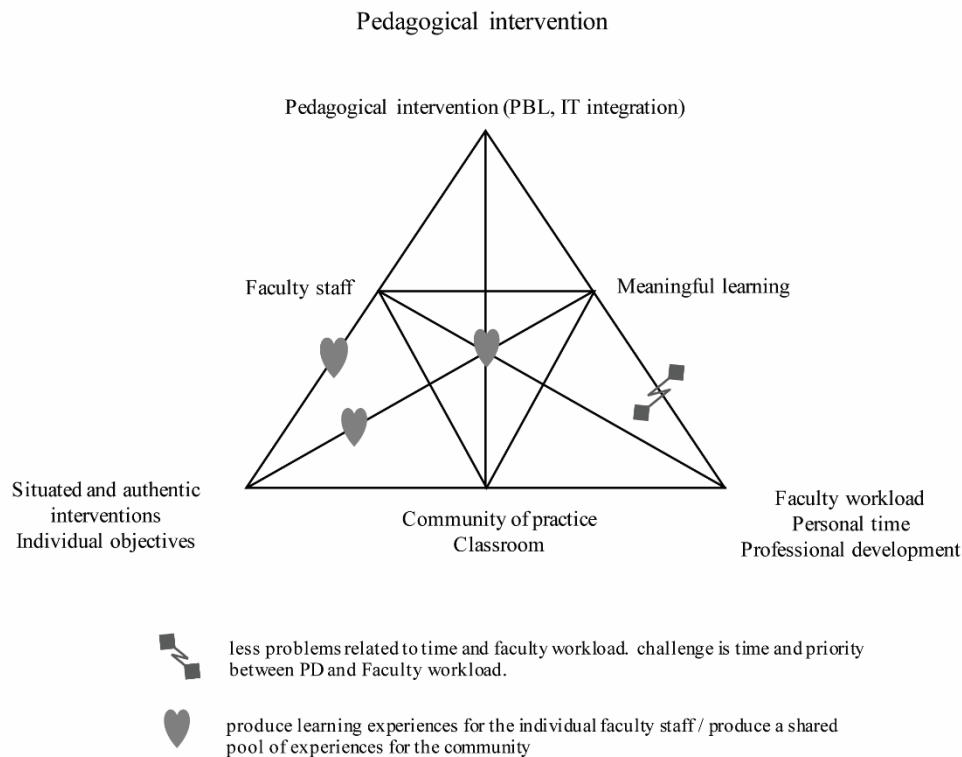


Figure 7. Pedagogical intervention

Findings show that this was the activity as most of the faculty staff participated in. Despite of some problems related to time and perhaps energy constraints of busy professionals, this approach was highly successful in creating practical relevance for their learning. By being capable of making changes [with diverse levels of complexity] in their teaching, the community members felt empowered in their practice, role and future perspectives. Further, for the community, the interventions served as a pool of practical experiences which it was meaningful to engage in and connect to.

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

Engagement and Identification with the Community

Engagement defines who belongs to the CoP (Wenger, 1998). Through the engagement in discussions and collaborative work, faculty members were confronted with the necessity to negotiate their current multiple practices and experiences. The new theoretical knowledge and practical training in ICT and PBL gave them methodological skills which had an impact on their professional practice. However, each participant found a unique place and identity within the community, and it was framed by their engagement and identification with the community. Table 3 indicates the faculty members' perceptions about their engagement with the community.

Table 3. Engagement with the community (Coto, 2014)

	Totally agree	Agree	Disagree	Totally disagree	NR
Interest and positive attitude toward the topics	41.67	33.33	8.33	8.33	8.33
Participation in activities has been constant	8.33	41.67	25.00	16.67	8.33
Sharing of experiences, histories and ways to solve problems with other members	8.33	66.67	8.33	8.33	8.33
Exchanging of resources with the other members	16.67	41.67	16.67	16.67	8.33
Responsibility and commitment with the learning activities	16.67	41.67	25.00	8.33	8.33

The data comes from the final questionnaire and was answered by twelve participants. The community has a defined area of knowledge and practice (ICT+PBL) that shapes the domain and establishes the common ground which gives members the motivation to meet, discuss and share. From the data it can be concluded that 75% of faculty showed interest in the topics that were discussed and thus in the domain of the community. It also can be seen that only 50% of the members stated that they participated regularly in the diverse proposed activities. This is important, because participation in a CoP requires regular interactions to contribute to the development of the domain and the practice.

In connection with the exchange of experiences and sharing of resources, the data show that 75% of the them were willing to share stories, experiences and ways of solving problems, but only 58% of them participated in resource sharing. One possible explanation for this situation is that it in this context it usually requires less time for faculty to share their stories and everyday experiences than to find additional resources. Furthermore, sharing of resources usually requires more technological skills. Maybe the sharing of stories is also more meaningful to the community and more ready-to-hand, than the focus on sharing of additional resources.

The final item in the Table 3 indicates how faculty themselves valued their responsibility and commitment to the learning activities. The data show that only 58% of them said they had assumed responsibility for

participation in learning activities. However, this value is strongly influenced by the feelings of members about their general lack of online participation, since as discussed above, the average rate of participation in the face-to-face activities was high, plus 15 of 18 faculty members were able to design, implement and evaluate an educational intervention in their classrooms. This situation reflects how they created a strong link between participation in the online website and their participation and commitment as members of the community. Because members did not participate online as much as they would have liked, their perception of commitment to the community was weakened.

The tensions that arise in the process of engagement to the community are illustrated in Figure 8.

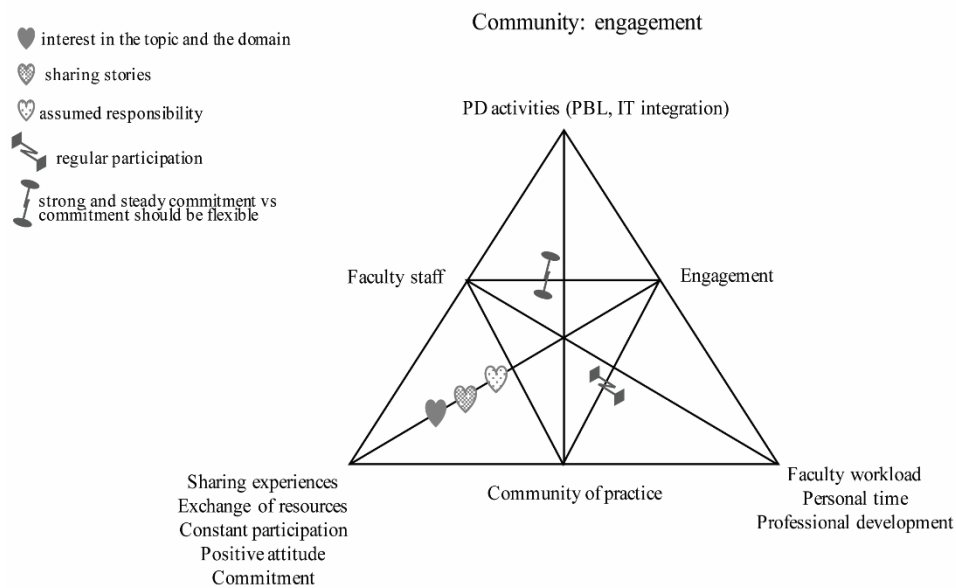


Figure 8. Community engagement

In general, commitment was an issue that generated some controversy. Some members believed that a strong and steady commitment is necessary for PD to be effective and for the community to be productive. Others felt that the way to make a commitment should be flexible, so people need to be able to contribute when they can and as they can. The former was critical of those who did not contribute regularly and thoroughly. These issues of commitment are characteristic of a CoP. If a community is seen as voluntary, which Wenger express in many of his writings, the organic development of the community will show if the strongly committed or the ones, which find commitment to be more flexible will emerge as the core members. However, as a PD strategy, we will recommend making the requirements for commitments even more explicit, for the participants to be confronted with this even before entering the community. Double standards may create confusion and frustration in the community.

Wenger (1998) points out that an important condition to be able to negotiate meaning is identification. As such, identification influences learning and on the formation of the identity through the mix of participation and peripheral-participation. Table 4 indicates the self-perception of participants regarding their

Coto, M., & Dirckinck-Holmfeld, L. (in press). *Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach*. In *Enriching Collaboration and Communication in Online Learning Communities*. Hershey: IGI Global.

identification with the community. The data come from the final questionnaire and was answered by twelve participants.

Table 4. Identification with the community (Coto, 2014)

	Totally agree	Agree	Disagree	Totally disagree	NR
Feel part of the community	58.33	25.00	16.67	0.00	0.00
The community offers a safe and trust space to express freely	50.00	33.33	0.00	8.33	8.33
My contribution is important and valued by other members of the community	58.33	16.67	8.33	8.33	8.33
Positively value shared learning with community members	75.00	8.33	8.33	0.00	8.33
Belonging to the community allows to improve professional practice	66.67	25.00	8.33	0.00	0.00

The tensions regarding the identification to the community are illustrated in Figure 9.

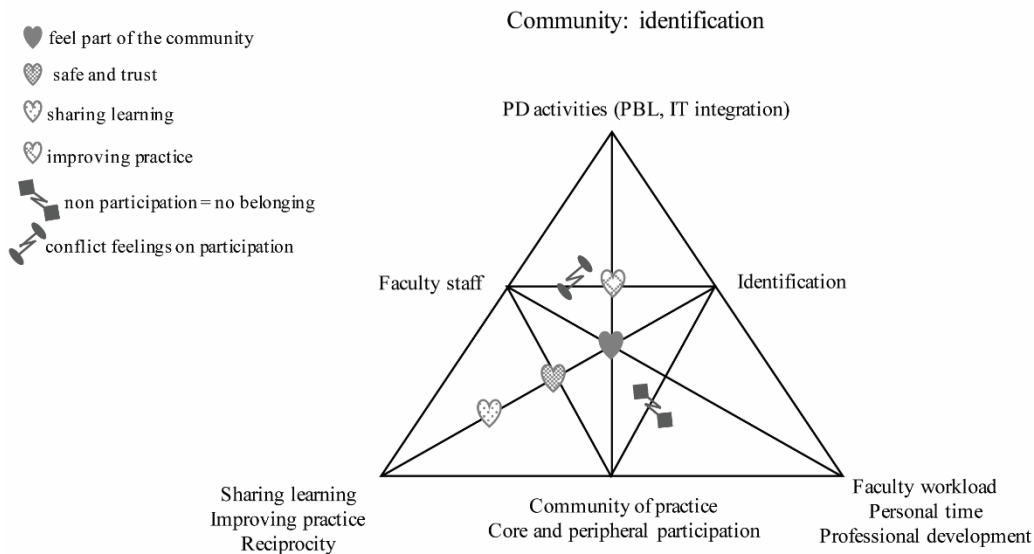


Figure 9. Community Identification

From the data, it appears that 83% of the members felt that they were part of the community. Because it was a distributed community, it is important to consider that the inability to negotiate meanings can create an identity of nonparticipation and marginality, and this may be the case for some participants. Regarding trust and the value of contributions, 83% of faculty believed that the community offered a safe and trusty space to express freely. This *trust* could be seen in the open and free way in which they presented their

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In *Enriching Collaboration and Communication in Online Learning Communities*. Hershey: IGI Global.

thoughts, questions, and doubts in the learning activities. It is important to note that, in some cases, there was an existing degree of trust among the participants of the local campus and participation in the community promoted the consolidation of this trust.

Despite the faculty feeling free to express themselves, only 75% of them reported that their contributions were valued by the other members. This situation can be associated with lack of reciprocity. A community thrives on reciprocity, "on giving back", and in widespread participation in community building efforts (McDonald et al., 2003). When faculty members participated in a discussion and received no response from the other members, they felt that their contributions were not valuable enough for the others to bother to participate. For active participants, fairness dictates that one needs to give back something of comparable value. The lack of reciprocity had a negative effect on motivation and social engagement and, to some degree, devalued the learning process, clearly affecting the cohesion of the community.

As non-participation discouraged some academics to participate, the daily and active participation of other academics also discouraged participation. P8 was the academic with highest participation in the community. He attended all the face-to-face meetings and participated in online discussions almost daily. Furthermore, he made many contributions to the community, such as complementary readings, supporting references, and conceptual maps. This very central participation provoked conflictive feelings in some participants.

Given the geographical distance among campuses, the establishment of relationships among participants was complex. However, despite the difficulties, 83% of the participants appreciated the interaction and the shared learning with colleagues. This could be noticed in some of the answers to the question "What we did well as a community?", where 8 out of 14 academics mentioned aspects such as sharing and support of each other; sharing new experiences; sharing ideas; and sharing practices. About 92% of faculty asserted that belonging to the community allowed them to improve their professional practice. The community favored the development of expertise, which in turn was transferred to the classroom and influenced teaching and learning processes. Through the design, implementation, evaluation and communication of findings about their pedagogical innovations, the participants provided strong evidence of how learning in the community had an impact on their professional practice.

Learning into a community of practice

A central conviction in communities of practice, is that learning is a social process that involves building connections: connections between what is being learned and what is important to the learner, connections between what is being learned and those situations in which it is applied, and connections among the learner and other learners with similar goals (Barab et al., 2004; Hadar & Brody, 2010; Prenger et al., 2017). The community was an opportunity to learn with and from colleagues and there was a growing understanding of the acquisition of new knowledge, skills and competences. The members were engaging in opportunities to learn, share and engage in professional discussions with their colleagues. These opportunities were identified as valuable and, in some cases, as crucial for faculty who work in remote locations and who do not have many opportunities to participate in professional learning activities.

In some sub-communities, especially Liberia and Nicoya, the participants have benefitted from working closer to their colleagues, they learned to work as a community, they engaged in supporting each other and in sharing expectations and experiences.

Literature also suggests (Layne, Froyd, Simpson, Caso, & Merton, 2004; Loughran, 2014; Zhang & Liu, 2019) that providing faculty with opportunities to explore, discuss and reflect about their teaching conceptions and practice, enabled them to become less resistant towards different pedagogical approaches. The participants in this study were required to think and act, in some depth, about their teaching over a 10 months' time frame. This is a much longer period than the regular PD processes, and it is considered, as also identified by Gallant (2000) that this longer period of engagement contributed to creating continuity in their learning through an ongoing, and incremental process. Table 5 shows how participants experienced the PD process, in terms of their learning.

Table 5. Learning in the PD process (Coto, 2014)

	Totally agree	Agree	Disagree	Totally disagree	NR
The PD process allows me to develop skills to integrate technology into my teaching practice	41.7	50.0	8.3	0	0
The PD process allows me to develop skills for incorporating new pedagogical approaches in my teaching practice	75.0	8.3	16.7	0	0
What I have learned is applicable to my academic work	83.3	0	16.7	0	0
The development of the pedagogical innovation allows me to apply what I learn in the PD process	66.7	25.0	8.3	0	0

Learning is a process that changes people. The central issue in learning is becoming a practitioner, not learning about practice (Wenger, 1998). A key outcome of learning, in the context of social learning, is a way of being, of being a type of person in a specific practice context, it is a process of reconstructing identity (Kirkup, 2002; Warhurst, 2006). Through their participation in the community of practice, sharing experiences and negotiating meaning as they were developing new skills to integrate technology into their teaching, and for incorporating new pedagogical approaches, the community members gradually shifted from the periphery of the practice to the establishment of an identity in the core of the community.

Being part of “something bigger” was a strong motivation for most faculty, they feel connected to others and feel that they are contributing to improve teaching practice at institutional level. However, a few of the participants disagree on the learning experience regarding new pedagogical approaches and the application to their academic work. There may be several explanations. However, one explanation may be that the focus on the online tools took up too much attention and the design for community engagement were so demanding related to their other academic obligations, that it was not efficient for them with respect to these dimensions. Figure 10 shows the tensions that emerged in the PD process

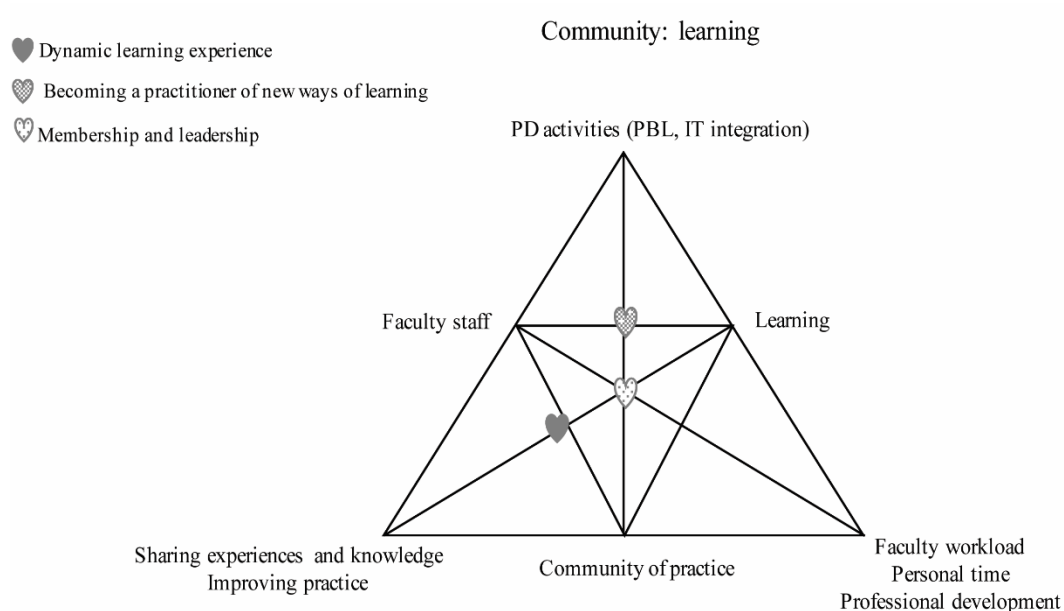


Figure 10. Community Learning

In summary, the community framework provided the participants with the necessary social interaction environment for collegial learning and dialogue. Their interaction allowed different perspectives on topics and issues and they found it interesting and supportive to interact in the group. In most cases, it appeared that their thinking and practice changed. Hence, even though the participants faced obstacles, they learned as a response to participating in the community, what can be considered as significant and meaningful learning for the development of their competence. Further they became capable of setting new pedagogical objectives and integrating PBL and ICT for student learning, and to carry out actions and operations to make it happen (Kaptelinin & A. Nardi, 2006). They succeeded in creating interventions in the classroom engaging the students in new ways of teaching and learning, and mastering ICT to a certain operative level to be able to communicate in online fora, using chat etc. As such the communities of practice approach is not only a productive PD approach, however, may influence the teaching and learning beyond the teachers CoP.

DISCUSSION OF THE FINDINGS: CHALLENGES AND TENSIONS

The PD model proposed in this study represented a multiple challenge for the participants. They were asked to do things that most of them were not used to doing. First, they had to revisit their beliefs and values about teaching; second, they had to engage in student-centered approaches (PBL), third, they had to work collaboratively; and fourth, most of this collaborative work took place via online technology. In navigating

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

through all these challenges, the participants experienced problems. These tensions can be summarized in four broad categories: institutional structures (division of work), the institutional culture (rules), levels of engagement (differentiations within the community), and faculty' readiness (in the appropriation of tools and new pedagogy).

Institutional Structures (division of work)

Within the institutional structures, this study identified the following obstacles: lack of time and access to technology. Most of the participants in this study felt that their workload was so demanding that they could not do what they had to do in the community within reasonable time. Despite the efforts to make the PD program more manageable, the issues of time and workload remained a problem for many participants. The research literature (Chen et al., 2009; Ching & Hursh, 2014; Lock, 2006; Tsiotakis & Jimoyiannis, 2016) and the results of this study suggest that the establishment of extra and necessary time for continuous PD in a CoP approach is very difficult.

In a resource constraint setting, the lack of access to adequate technological resources is also another factor that affected the PD. 96% of the participants had computers at home, but only 65% of them had Internet access at home, so they depended on institutional facilities to participate in online activities. However, while the access to technology and the internet was fairly stable in some campuses, in other campuses, the participants experienced continuous problems with the access to the Internet. This influenced not only the individual faculty staff, but also the dynamic in the community, as access to the internet becomes a new boundary. A distributed learning CoP is deeply depending on stable and strong internet connectivity.

Institutional Culture (rules)

The institutional culture in which the community is embedded can act as an obstacle to community development (Lock, 2006). In this study and despite the participants' motivation, the insular way in which many faculty members used to work affected the transition to a collaborative environment. It became evident that cross-institutional group work was difficult, and, to some extent, it diminished rather than strengthened the community cohesion. Another consequence of this trend towards individualism is that the faculty members do not have references to compare their experiences. They rarely know what happens in the classrooms of other colleagues. This study proposes that references are essential to convert abstract ideas about the quality of teaching in specific actions. To some extent, the community approach proposed by this study contributes to diminishing the problem of lack of references and examples of good practice.

These perspectives add complexity to designing for a community, because in order to be alive, a community needs the development of relationships, active participation and productive interactions among members. In line with Preece et al. (2004) the study found that for faculty to work in a collaborative way, a redefinition of the institutional culture is needed. The project demonstrated that faculty finds it very valuable and meaningful to learn new skills by participating in a community of practice. However, for this to become an institutional strategy, this approach should be backed up and reified in the rules and policies of the institution. How can the institution value and facilitate a community orientation? How to develop policies

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

and incentives to support a community of practice approach. For the transition to occur, it is vital that the faculty receive support and incentives from the institution (MacPhail et al., 2014; Patton & Parker, 2017; Warhurst, 2006).

Levels of engagement

Another tension that was identified by the study as an obstacle for the PD process was the levels of engagement in the learning activities. This study has found that the ways in which the faculty participated and the level of sophistication of their contribution varied considerably from one to another. The core members tended to be the ones who were fully engaged in their PD, despite other work activities. The other participants showed difficulty maintaining a regular participation, so, in some cases they failed to become active members of the community. Those who felt less comfortable with technology also found that the time needed to resolve technical issues was disappointing, which contributed to their peripheral position in the process.

There were also differences in the responses of the members to the learning activities, especially in the discussion forums. The core and most active participants tended to write longer and more complex ideas, while less-active and peripheral members wrote shorter and simpler contributions, although there were exceptions. Although these differences were acceptable within the spirit of communities of practice, findings show that this can be problematic in the context of faculty PD processes. The complex and extensive contributions of some members tended to create feelings of insecurity and inadequacy in some of the less active participants. This contrast in the levels of participation must be handled sensitively in order to avoid serious damage to community cohesion.

Although peripheral participation is considered legitimate (Lave & Wenger, 1991; Palloff & Pratt, 2005; Wenger, 1998), and to some extent, it was agreed among UNA participants that it was valid for them to interact at different levels, depending on particular circumstances, in the dynamics of building a community, the lack of participation did have some effect. In the community, continuously passive participants were viewed as non-contributors and became a source of frustration for the visibly active participants. The community as a unit needed active participants to add value for all members in order to support learning, engagement, and the long-term sustainability of the community. In an online community, engagement as active participation is easier to recognize as the online communication traces the engagement, and this may establish new boundaries in the community. In the institutional strategy for supporting COPs this issue of levels of engagements must be addressed.

Faculty' readiness

The findings show that face-to-face sessions of any sort were found very valuable by the participants in building relationships as well as in working through technical issues. Many of the participants had a lack of confidence in the use of technology, and this situation could even be worst in a resource constraint setting. The study addressed this gap through the initial training and ongoing support of the facilitator.

However, for some faculty, the learning curve was so long and so frustrating that they gave up the community after two or three months of belonging to it.

Several authors (Ching & Hursh, 2014; Eib, 2002; Killion, 2000; Salmon, 2004; Unwin, 2015), argue that in designing distributed communities of practice, it cannot be assumed that the faculty staff are familiar with online participation. From the quality dialogues that took place in the workshops it was evident that it was necessary to foster a culture of online communication and learning among participants. Some of them did not feel fully comfortable with online communication. The behavior of those members in the online part of the PD program was an indicator that additional conditions were necessary before they were able to significantly interact online. In order to participate effectively in an online environment, the faculty need to be self-motivated, self-confident, have the required technological and communicative skills, and not least a supportive and efficient virtual infrastructure. However, we also need to acknowledge, that what it means to be self-confident vary among the participants. The institutions must therefore consider how to support faculty to become self-confident in these new forms of communication and learning.

REFLECTIONS ON THE DESIGN OF THE PROFESSIONAL DEVELOPMENT PROGRAM

In the following, we present and discuss the principles around the four dualities and the tensions that emerged in the findings.

Duality: Participation and Reification

From the analysis it could be seen that the structures of participation chosen in the design were both an incentive and a hindrance to participation. All participants acknowledge the importance of face-to-face activities, even for many of them it was time-consuming to attend, while some of the participants expressed a need for more training especially on how to use the virtual learning environment. Among factors that diminished online participation were time, technical competences and the lack of a culture of online learning and communication, as well as a low bandwidth in some locations. However, what was stressed again and again was the institutional reification and lack of time allocated for really engaging in the TPD and the community building.

The most important and challenging reification made by the participants was to design a pedagogical innovation. This reification was a central facility for supporting engagement, imagination and alignment (Wenger, 1998). It allowed them to create alternative teaching/learning scenarios, envisioning new trajectories and, in many cases, pushing their own boundaries. The reification of the members' learning processes in an educational project seems highly satisfactory. This process required the full commitment of the participants and the integration of their own knowledge and experiences, and in that sense, as has also been identified by Ollila and Simpson (2004) they gained more opportunities for PD than in other less demanding activities - such as readings. However, the first organization of the interventions in groups across the regional campuses was an example of reification, which hinders participation. And for some members it needed a lot of repair work to get them back to the community approach.

Duality: Designed and emergent

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

During the intervention, there was a constant interplay between the theoretical ideas and the practical requirements for designing a situation viable in the UNA context. Furthermore, the chosen method for this investigation –design-based research- supports the recursive movement between the theoretical ideas and the practical requirements. Dealing with institutional resources (mainly the facilitator’s availability of time) as well as with the participants’ schedules, needs, expectations and their competences (technical and cultural) to communicate through technology, drove us to refine the design and revisit our understanding of the underlying theories. So, one learning to draw is the need to plan for a continuous adjustment of the initial design, which naturally comes from the transformation of the learning environment as it was experimented for the faculty within the institutional context.

Duality: Local and global

PD must be aligned with the institutional mission and should promote institution-wide dialogues (Sorcinelli, Austin, Eddy, & Beach, 2006). A CoP relates with the rest of the world, through creating continuities across boundaries. The design in this study encouraged the exchange of knowledge and experiences among participants at two levels: locally in the same campus and globally with faculty from other regional campuses at UNA. It is very distinct that the exchange of knowledgeability among members that came from different local communities promoted learning not only at the individual level but also for the whole community. The pedagogical innovations designed, implemented and evaluated by the participants (in diverse contexts, condition, targets group, and areas of knowledge) were a boundary object that created continuities across boundaries and allowed the expanding of knowledge. They also enforced UNA’s policies about the use of ICT in teaching and about a pedagogical model focused in a student-centered and lifelong learning approach, and therefore in fact not only aligned to the institutional mission (Sorcinelli et al., 2006), but also pushed for a possible direction.

The local and global duality can also be a duality between the ongoing practice and global views on the new methodologies and theories. For sure the pedagogical design based on the principles of CoP, PBL and blended learning “*disturbed*” the local practices, however overall seen, the community approach supported a respectful, trustful and caring environment which supported the individual faculty staff to engage, learn and belong in a situated manner possible for him/her with respect to other obligations, skills and engagement.

Duality: Identification and negotiability

The initial source of participants’ identification with the community was the domain of the community itself. All faculty staff that accepted the invitation to be part of the community was eager to innovate their practice. In this respect, the community offered an opportunity to envision possible futures trajectories within the university. As well, the cultivation of the distributed CoP as part of a model for PD was conceived as a strategic and innovative initiative within the university. For the participants, this was important, the members were proud of belonging to the community; they considered themselves as pioneers and leaders who were contributing to changing institutional teaching practices.

Ollila and Simpson (2004)) state that the connection between PD, identification and negotiability is strong. According to them, the members identify more with the community when they have more opportunities to negotiate its practice. However, not all participants had the same levels of participation in the renegotiation

process. Poor or little participation in the online activities provoked the perception of an inability to contribute to the community, and consequently their feelings of ownership over the community's enterprise were weak. In conclusion, the community members assumed different levels of participation, the participants closer to the core of the community were able to identify with and develop a feeling of belonging to the community to a greater extent than those with a peripheral role. However, maybe an important reflection is, what makes members to core members of the community are not necessarily equivalent with how well they handled the digital tools and the online communication, however a more subtle, dynamic and complex negotiation going on in the community also reflecting the individuals identification, engagement and belonging to the community.

Overall, the design principles behind the four dualities were productive, however a redesign may consider how to design for a greater flexibility and belonging in the "big group", and in the smaller working groups (project groups). Following the principles of community of practice, we should avoid forced working groups, however, develop flexible ways of establishing working groups based on the organic dynamics among the participants. The findings value face-to-face modality groups, however when the it-infrastructure becomes more elaborated in all campuses, it might support new working groups constellations. However, there is no doubt in the findings, that some face-to-face activities are urgent for a community of practice. Further, the findings support that the primary focus should still be on the "big group" in order to provide for an overall alive community (Wenger et al., 2002), where the negotiation of meaning and identity work can take place.

CONCLUSIONS

The central postulate of this study was that a CoP approach offers potential as an option for effective faculty PD. The community created the social context for collegial learning and dialogue in which faculty constructed an identity in relation to a new practice. It contributes to expanding professional and personal networks, fostering a culture of sharing among faculty and reducing isolation. It also provided a safe place to make mistakes, to experiment, and to explore, discuss, reflect and re-conceptualize their conceptions and values about teaching practice. It offered faculty learning opportunities of doing, belonging and becoming, transforming the process of learning in a process of identity formation and not just an accumulation of skills and information.

From the findings, it can be concluded that the impact of community membership on faculty members' learning was complex and provoked many tensions. It was different for each participant depending on their levels of participation, engagement, identification and empowerment to negotiate and shape the practice. However, in general, belonging to the community helped the faculty develop a sense of expertise as they participated in peer-to-peer learning. Learning and change did take place and faculty members became more knowledgeable of their practice and gained an impact on the institutional practices. Overall, the theory of communities of practice and the way Coto (2010) has conceptualized and applied the theories of social and situated learning in a specific context have provided detailed insights and understandings into how professional teacher development and learning is a participatory process that involves more than acquiring skills and detached knowledge. As such the findings support the research which stresses that PD programs must address changes in beliefs, knowledge, and habits of practice, in order to achieve changes in the quality

Coto, M., & Dirckinck-Holmfeld, L. (in press). Professional Development to Promote Online Communication, Collaboration and Learning among Faculty: A Community of Practice Approach. In Enriching Collaboration and Communication in Online Learning Communities. Hershey: IGI Global.

of teaching and learning (Gibbs & Coffey, 2004; Hadar & Brody, 2010; Light & Calkins, 2008; MacPhail et al., 2014; Patton & Parker, 2017; Prenger et al., 2017; Smyth, 2003). And further, that COPs provide a safe and trustworthy base for dealing with the interwoven dimensions of theory and practice through socially mediated reflections and constructions.

Further, the findings support that a community of practice model may help to overcome the shortcomings of the traditional PD strategies of event-based, one-hit training workshops, and transmission from experts (sometimes consultants) to faculty as described by Lock (2006) and Schlager & Fusco (2004). A community model is favoring several principles:

- a long-term engagement and a gradual development and transformation of the learning culture;
- interwoven training, learning, application and not least ownership
- acquiring new skills through a process of identity building
- building on each other member as experts and mutual participation
- developing digital scholarship through identification and negotiability
- learning from outside and linking to the global communities through theories and experts, however reflecting and localizing these inputs in their context;

The study confirms the community of practice as a strong and productive approach to PD, which integrate PD as continuing learning in the everyday practice of a community. To sustain the model, institutions should reflect and develop strategies on how to facilitate for PD as a community of practice. These strategies should reflect on the four dualities as discussed above:

- participation and reification
- designed and emergent
- local and global
- identification and negotiability

The four pairs of dualities are linked and interdependent. In order to apply this approach in other contexts, the designers and initiators must reflect upon the dualities and if they can be deployed and appropriated within the culture of the given institution in a balanced and dynamic manner. Can and will the institution support this dynamic and emerging approach of participation and reification, designed and emerging?, how to balance the design to achieve the professional development goals while it is embedded in the informal and voluntary nature of participation in a community?, should a professional development model let members define the power and direction of the community, or should we design more structured ways of organization and learning for the sake of the professional development goals?. And do the participants agree to contribute to and to engage in the collaborative participation in a community, and are they willing to contribute to and give to the community along with learning from peers based on principles of mutual learning, trust, identification and engagement? And, are they willing (both peers, facilitators and the institution) to allow and support for the different levels of engagement that the participants showed in this study?. Do they allow members to engage in the learning activities in very different levels without diminishing the learning outcomes for the whole community? And, whether it is possible to offer different learning pathways for participants without diminishing the sense of shared community.

On a more tangible level, the designers of the PD program and the institution must reflect upon the conditions for the faculty staff for participating and engaging in the program. How to compensate for them, so they get time to engage with the community? How to ensure that all in the community have a fair access to the use of digital tools and the internet? And finally, how to make it possible to provide extra resources and situated help to the ones who are not used to working in an online and technology rich environment? If these conditions can be met, the CoP approach might be a promising approach to teacher professional learning as it provides for “the experience of doing, becoming, and belonging”.

REFERENCES

- Adams, S., Brown, M., Dahlstrom, E., Davies, A., DePaul, K., Diaz, V., & Pomerantz, J. (2018). *NMC Horizon Report: 2018 Higher Education Edition*. Louisville, CO: EDUCAUSE.
- Barab, S. A., Baek, E., Schatz, S., Scheckler, R., & Moore, J. (2008). Illuminating the Braids of Change in a Web-Supported Community: A Design Experiment by Another Name. In A. Kelly, R. Lesh, & J. Baek (Eds.), *Handbook of Design Research Methods in Education: Innovations in Science, Technology, Engineering, and Mathematics Learning and Teaching*. Routledge.
- Barab, S. A., Kling, R., & Gray, J. H. (2004). *Designing for virtual communities in the service of learning*. New York: Cambridge University Press.
- Barab, Sasha., & Squire, K. (2004). Design-Based Research: Putting a Stake in the Ground. *The Journal of the Learning Sciences, 13*, 1–14.
- Brosnan, K., & Burgess, R. (2003). Web based continuing professional development - a learning architecture approach. *Journal of Workplace Learning, 15*, 24–33.
- Byrk, A. (2016). Accelerating how we learn to improve. *Educational Researcher, 44*(9), 467–477.
- Chen, Y., Chen, N.-S., & Tsai, C.-C. (2009). The use of online synchronous discussion for web-based professional development for teachers. *Learning with ICT: New Perspectives on Help Seeking and Information Searching, 53*(4), 1155–1166. <https://doi.org/10.1016/j.compedu.2009.05.026>
- Ching, C. C., & Hursh, A. W. (2014). Peer modeling and innovation adoption among teachers in online professional development. *Computers & Education, 73*, 72–82. <https://doi.org/10.1016/j.compedu.2013.12.011>
- Coto, M. (2010). *Designing for Change in University Teaching Practices. The case of UNAgora: A community of Practice Approach to Facilitate University Teacher Professional Development in ICT and Project-Oriented Problem Pedagogy*. (Doctoral dissertation). Aalborg Universitet, Institut for Kommunikation, Aalborg.
- Coto, M. (2014). A Distributed Community of Practice to Facilitate Communication, Collaboration, and Learning among Faculty. In C. N. Stevenson & J. C. Bauer (Eds.), *Building Online Communities in Higher Education Institutions: Creating Collaborative Experience* (pp. 327–368). Retrieved from <https://www.igi-global.com/chapter/a-distributed-community-of-practice-to-facilitate-communication-collaboration-and-learning-among-faculty/100598>
- Coto, M., & Dirckinck-Holmfeld, L. (2008). Facilitating Communities of Practice in Teacher Professional Development. In *Proceedings of the 6th International Conference on Networked Learning*. Greece: Lancaster University. <http://www.networkedlearningconference.org.uk/abstracts/Coto.htm>.
- Crawford, K. (2008). Continuing professional development in higher education: the academic perspective. *International Journal for Academic Development, 13*, 141–146.
- Design-Based Research Collective. (2003). Design-Based Research: An Emerging Paradigm for Educational Inquiry. *Educational Researcher, 32*, 5–8.

- Dirckinck-Holmfeld, Jones, C., & Lindström, B. (2009). *Analysing Networked Learning Practices in Higher Education and Continuing Professional Development*. Sense Publishers.
- Eib, B. J. (2002). Online learning and professional development. *Principal Leadership*, 3, 61–64.
- Engeström, Y. (1987). *Learning by Expanding - an activity theoretical approach to developmental research*. <http://communication.ucsd.edu/MCA/Paper/Engestrom/expanding/toc.htm>. Helsinki: Orienta-konsultit.
- Engeström, Yrjö. (2001). Expansive Learning at Work: toward an activity theoretical reconceptualization. *Journal of Education and Work*, 14, 133–156.
- Engeström, Yrjö. (2014). *Learning by expanding*. Cambridge University Press.
- Gallant, G. (2000). Professional development for Web-based teaching: Overcoming innocence and resistance. In E. J. Burge (Ed.), *New directions for adult and continuing education* (pp. 69–78). San Francisco: Jossey-Bass.
- Gibbs, G., & Coffey, M. (2004). The impact of training on university teachers on their teaching skills, their approach to teaching and the approach to learning of their students, , 5 (1) 87-100. *Active Learning in Higher Education*, 5, 87–100.
- González, G., & Skultety, L. (2018). Teacher learning in a combined professional development intervention. *Teaching and Teacher Education*, 71, 341–354.
- Goodyear, Peter., Jones, C., Asensio, M., Hodgson, V., & Steeples, C. (2001). *Effective networked learning in higher education: notes and guidelines*. Lancaster, England.: Centre for Studies in Advanced Learning Technology. Lancaster University.
- Granovetter, M. (1983). *The strength of weak ties: A network theory revisited*.
- Hadar, L., & Brody, D. (2010). From isolation to symphonic harmony: Building a professional development community among teacher educators. *Teaching and Teacher Education*, 26(8), 1641–1651. <https://doi.org/10.1016/j.tate.2010.06.015>
- Kaptelinin, V., & A. Nardi, B. (2006). Acting with Technology: Activity Theory and Interaction Design. In *First Monday* (Vol. 12, p. 345). <https://doi.org/10.5210/fm.v12i4.1772>
- Killion, J. (2000). Logon to learn: to reap benefits of online staff development, ask the right questions. *Journal of Staff Development*, 48–53.
- King, K. P. (2003). Learning the New Technologies: Strategies for Success. *New Directions for Adult and Continuing Education*, 98, 49–57.
- Kirkup, G. (2002). Identity, community and distributed learning. In M. R. Lear & K. Nicholl (Eds.), *Distributed learning: Social and cultural approaches to practice* (pp. 182–195). London: Routledge-Falmer.
- Lantz-Andersson, A., Lundin, M., & Selwyn, N. (2018). Twenty years of online teacher communities: A systematic review of formally-organized and informally-developed professional learning groups. *Teaching and Teacher Education*, 75, 302–315. <https://doi.org/10.1016/j.tate.2018.07.008>
- Lave, J., & Wenger, E. (1991). *Situated learning : legitimate peripheral participation*. Retrieved from <http://www.loc.gov/catdir/description/cam024/91010450.html>
<http://www.loc.gov/catdir/enhancements/fy0702/91010450-t.html>
- Lawler, P. A., & King, K. P. (2001). *Refocusing faculty development: The view from an adult learning perspective*. Presented at the Pennsylvania Adult and Continuing Education Research Conference,.
- Layne, J., Froyd, J., Simpson, N., Caso, R., & Merton, P. (2004). *Understanding and improving faculty professional development in teaching*. Presented at the 34 th ASEE/IEEE Frontiers in Education Conference.
- Light, G., & Calkins, S. (2008). The experience of faculty development: patterns of variation in conceptions of teaching. *International Journal for Academic Development*, 13, 27–40.
- Lock, J. V. (2006). A new image: Online Communities to Facilitate Teacher Professional Development. *Journal of Technology and Teacher Education*, 14, 663–678.

- Loughran, J. (2014). Professionally Developing as a Teacher Educator. *Journal of Teacher Education*, 65(4), 271–283. <https://doi.org/10.1177/0022487114533386>
- Macià, M., & García, I. (2016). Informal online communities and networks as a source of teacher professional development: A review. *Teaching and Teacher Education*, 55, 291–307. <https://doi.org/10.1016/j.tate.2016.01.021>
- MacPhail, A., Patton, K., Parker, M., & Tannehill, D. (2014). Leading by Example: Teacher Educators' Professional Learning Through Communities of Practice. *Quest*, 66(1), 39–56. <https://doi.org/10.1080/00336297.2013.826139>
- McDonald, J., Atkin, W., Daugherty, F., Fox, H., MacGillivray, A., Reeves- Lipscomb, D., & Uthailertaroon, P. (2003). *Let's get more positive about the term "lurker."*
- Ödalen, J., Brommesson, D., Erlingsson, G. Ó., Schaffer, J. K., & Fogelgren, M. (2019). Teaching university teachers to become better teachers: the effects of pedagogical training courses at six Swedish universities. *Higher Education Research & Development*, 38(2), 339–353. <https://doi.org/10.1080/07294360.2018.1512955>
- Ollila, M., & Simpson, A. (2004). Dimensions of Design: A Comparison of Professional Development in Two On-Line Learning Communities. *Proceedings of the IEEE International Conference on Advanced Learning Technologies*, 271–275.
- Palloff, R., & Pratt, K. (2005). *Online learning communities revisited*. Presented at the 21st Annual Conference on Distance Teaching and Learning.
- Patton, K., & Parker, M. (2017). Teacher education communities of practice: More than a culture of collaboration. *Teaching and Teacher Education*, 67, 351–360. <https://doi.org/10.1016/j.tate.2017.06.013>
- Powell, C. G., & Bodur, Y. (2019). Teachers' perceptions of an online professional development experience: Implications for a design and implementation framework. *Teaching and Teacher Education*, 77, 19–30. <https://doi.org/10.1016/j.tate.2018.09.004>
- Preece, J., Nonnecke, B., & Andrews, D. (2004). The top 5 reasons for lurking: Improving community experiences for everyone. *Computers in Human Behavior*, 20, 201–223.
- Prenger, R., Poortman, C. L., & Handelzalts, A. (2017). Factors influencing teachers' professional development in networked professional learning communities. *Teaching and Teacher Education*, 68, 77–90. <https://doi.org/10.1016/j.tate.2017.08.014>
- Reeves, T. C. (2006). Design Research from a Technology Perspective. In J. van den Akker, K. Gravemeijer, S. McKenney, & N. Nieveen (Eds.), *Educational Design Research* (pp. 52–66). London: Routledge.
- Salmon, G. (2004). *E-moderating. The key to teaching and learning online* (2nd ed.). Routledge Falmer.
- Sandoval, W., & Bell, P. (2004). Design-Based Research Methods for Studying Learning in Context: Introduction. *Educational Psychologist*, 39, 199–201.
- Sannino, A., & Engeström, Y. (2018). Cultural-historical activity theory. *Cultural-Historical Psychology*, 14(3), 43–56. <https://doi.org/10.17759/chp.2018140305>
- Schlager, M. S., & Fusco, J. (2004). Teacher professional development, technology, and communities of practice: Are we putting the cart before the horse? In S. Barab, R. Klin, & J. Gray (Eds.), *Designing for Virtual Communities in the Service of Learning*. Cambridge MA: Cambridge University Press.
- Schlager, M. S., Fusco, J., & Schank, P. (2002). Evolution of an On-line Education Community of Practice. In K. A. Renninger & W. Shumar (Eds.), *Building virtual communities: Learning and change in cyberspace*. (pp. 129–158). NY: Cambridge University Press.
- Sherer, P. D., Shea, T. P., & Kristensen, E. (2003). Online Communities of Practice: A Catalyst for Faculty Development. *Innovative Higher Education*, 27, 183–194.
- Smyth, R. (2003). Concepts of Change: Enhancing the Practice of Academic Staff Development in Higher Education. *International Journal for Academic Development*, 8, 51–60.

- Sorcinelli, M. D., Austin, A. E., Eddy, P. L., & Beach, A. L. (2006). *Creating the Future of Faculty Development: Learning From the Past, Understanding the Future*. Anker Publishing Co., Inc.
- Tsiotakis, P., & Jimoyiannis, A. (2016). Critical factors towards analysing teachers' presence in on-line learning communities. *The Internet and Higher Education*, 28, 45–58.
<https://doi.org/10.1016/j.iheduc.2015.09.002>
- Unwin, A. (2015). Developing new teacher inquiry and criticality: The role of online discussions. *British Journal of Educational Technology*, 46(6), 1214–1222.
- Wake, J. D., Dysthe, O., & Mjelstad, S. (2007). New and Changing Teacher Roles in Higher Education in a Digital Age. *Educational Technology & Society*, 10, 40–51.
- Wall, J. (2013). *A Framework for Academic Professional Development in Higher Education*.
- Wang, X., Lu, W., Ester, M., Wang, C., & Chen, C. (2016). Social Recommendation with Strong and Weak Ties. *Proceedings of the 25th ACM International on Conference on Information and Knowledge Management*, 5–14. <https://doi.org/10.1145/2983323.2983701>
- Warhurst, R. P. (2006). “We Really Felt Part of Something”: Participatory learning among peers within a university teaching-development community of practice. *International Journal for Academic Development*, 11, 111–122.
- Wenger, E. (1998). *Communities of practice : learning, meaning, and identity*. Retrieved from <http://www.loc.gov/catdir/description/cam029/98202423.html>
<http://www.loc.gov/catdir/toc/cam026/98202423.html>
- Wenger, E., McDermott, R. A., & Snyder, W. (2002). *Cultivating communities of practice : a guide to managing knowledge*. Retrieved from <http://edrev.asu.edu/reviews/rev405.htm>
- Wing Lai, K., Pratt, K., Anderson, M., & Stigter, J. (2006). *Literature Review and Synthesis: Online Communities of Practice*. Dunedin, New Zealand: Faculty of Education, University of Otago.
- Zhang, S., & Liu, Q. (2019). Investigating the relationships among teachers' motivational beliefs, motivational regulation, and their learning engagement in online professional learning communities. *Computers & Education*, 134, 145–155.
<https://doi.org/10.1016/j.compedu.2019.02.013>

ADDITIONAL READING SECTION

- Britt, V. G., & Paulus, T. (2016). Beyond the four walls of my building: A case study of #edchat as a community of practice. *American Journal of Distance Education*, 30(1), 48-59.
<https://doi.org/10.1080/08923647.2016.1119609>.
- Booth, S. E. (2012). Cultivating knowledge sharing and trust in online communities for educators. *Journal of Educational Computing Research*, 47(1), 1-31.
- Brown, R., & Munger, K. (2010). Learning together in cyberspace: collaborative dialogue in a virtual network of educators. *Journal of Technology and Teacher Education*, 18(4), 541-571.
- Coutinho, C. P., & Lisboa, E. S. (2013). Social networks as spaces for informal teacher professional development: challenges and opportunities. *International Journal of Web Based Communities*, 9(2), 199-211.

- El-Hani, C. N., & Greca, I. M. (2013). ComPratica: a virtual community of practice for promoting biology teachers' professional development in Brazil. *Research in Science Education*, 43(4), 1327-1359.
- Goodyear, V. A., Casey, A., & Kirk, D. (2014). Tweet me, message me, like me: Using social media to facilitate pedagogical change within an emerging community of practice. *Sport, Education and Society*, 19(7), 927e943. <https://doi.org/10.1080/13573322.2013.858624>.
- Mackey, J., & Evans, T. (2011). Interconnecting networks of practice for professional learning. *The International Review of Research in Open and Distributed Learning*, 12(3), 1-18.
- Smith, S. U., Hayes, S., & Shea, P. (2017). A critical review of the use of Wenger's Community of Practice (CoP) theoretical framework in online and blended learning research, 2000-2014. *Online Learning*, 21(1), 209-237. <https://doi.org/10.24059/olj.v21i1.963>.
- Tseng, F.-C., & Kuo, F.-Y. (2014). A study of social participation and knowledge sharing in the teachers' online professional community of practice. *Computers & Education*, 72, 37-47.

KEY TERMS AND DEFINITIONS

Communities of practice: a group of people who share an interest and are willing to invest time and effort to learn and to share experiences and ways to improve their practice.

Distributed community of practice: a community of practice that uses online means and face-to-face meetings for communication.

Faculty professional development: a process through which faculty receive formal and informal training.

Online participation: includes participation in activities that take place through online means, such as chats, blog reflection, discussion forums, and group work.

Identity formation: in the context of a community of practice, identity formation is an integrated component of learning. It is constructed through processes of engagement in practice and negotiation of meaning.

Dualities: a pair of elements that are present in different degrees, it could be understood as a creative tension between the elements. In terms of design for learning, a duality can provide room for innovation and change.