A COMMUNITY OF PRACTICE APPROACH TO TEACHER PROFESSIONAL DEVELOPMENT—INNOVATION AND GOOD PRACTICES

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ABSTRACT

This paper presents and discusses a community of practice approach (CoP) to teacher professional development (TPD) as a mean to support pedagogical innovation and the development of good practices. The research case is a design-based research experiment based on a community of practice approach to teacher professional development with focus on ICT and problem and project-based learning. The research provides detailed insights into the dynamics of a community of practice model in a distributed community of university teacher professionals. The research identifies tensions in the CoP-model, which future designs for TPD might try to balance. The research case confirms that teacher professionals are eager to learn and to share, and to engage in pedagogical innovation, and that a designed CoP approach all in all works well for them. Based on the results, the paper suggests a set of recommendations for people who are engaged in designing TPD.

Keywords: Community of Practice (CoP); Professional Development (PD); Problem and Project-Based Learning (PBL); Blended Learning

INTRODUCTION

Teaching and learning in schools and universities need to change in order to cope with the dramatic societal changes going on. No question, that education has to respond to the ongoing social and economic transformation which is caused by digitalization and global networks [1], and on the emerging and scaling of the 4th revolution in technologies such as robotics, big data, Internet of Things, and so on. Parents, employers, teachers and students expect to use information and communication technology (ICT) and digital media in all processes. Sørensen and Levinsen [2] describe it as the “hybrid school” where technologies are ubiquitous. The physical school and the analogue culture are not any more superior to the digital, opposite the pupils and students live in worlds with no boundaries between the digital and the physical. The digital and physical intermingle with each other. The digitalization affords radical changes in access to information, in multimodal knowledge construction, reception and not least consumption, in collaboration, in
networking, in flexibility, however it also feeds new possibilities of surveillance and new digital insulting behaviours. All in all, digitalization is ubiquitous, radically changing the foundation for schools and universities, and numerous schools and universities are not yet ready to meet these new opportunities and challenges.

As teachers have a fundamental role in academic development, they have to be the core stakeholders for the digitalization in schools and universities, and the development of the hybrid school. However, many teachers lack digital competences and a repertoire of didactical design competences. For schools and universities to cope in a productive way with the digitalization, it is a prerequisite to find methods for teacher professional development (TPD), which are effective, not too expensive, can be scaled up, and can be deal with a busy work practice.

On this background the research question for this paper is: How to design for productive teacher professional development, which prepares the teachers as agents for digital transformation and promoters of expanding pedagogical practices?

The paper is based on one research case – namely, the UNA case carried out by Coto in Universidad Nacional in Costa Rica [3, 4, 5]. Moreover, the paper also draws on research in relation to the Master in ICT and Learning (MIL) in a Danish context, as background for the paper [6, 7]. The UNA research case is a design-based research experiment based on a community of practice (CoP) approach to teacher professional development (TPD). The shared domain for the teachers was to appropriate ICT as a mean of communication and collaboration in the CoP, and as a tool for transforming teaching and learning towards problem and project based learning (PBL) [3], while MIL is an ongoing master program for professionals (teachers at all levels, designers, HR-people). The pedagogical design for MIL is based on an integration of a distributed CoP and PBL. MIL has been very successful. More than 450 masters have graduated since the start in 2000. The MIL masters are contributing to the transformation of teaching and learning in a Danish setting.

Approaches to Teacher Professional Development

This research builds on two well-established approaches to TPD – namely, CoP [8, 9] and PBL [7, 10].

Communities of Practice

Communities of practice (CoP) represent a promising approach in TPD [11, 12, 13, 14, 15, 16]. The CoP framework is based on the theory of situated and social learning [8, 17]. Following [8], a community of practice is determined by three central dimensions that reflect its nature, what the community is about and how it works: (1) a mutual engagement that binds members as a social entity; (2) a joint enterprise that members continually negotiate, and (3) a shared repertoire that includes shared practices, common resources and beliefs that members develop over
time. Therefore, a CoP revolves around a very specific professional goal and provides a collaborative and safe space for professional growth [18, 19, 20].

In online or distributed communities of practice, members depend on technology to connect with each other, create a sense of community, encourage participation, create knowledge repositories and offer tutoring and instruction [9]. An online or distributed CoP needs a formalized structure to organize activities that would enable doing, becoming, experience and belonging for the members [20].

The research carried out by [3] investigates how to design a CoP of teacher professionals for TPD. The point of departure of Coto’s research is the premise that engagement in social practice comprises the fundamental process in which we learn and become who we are [8] and further, that we learn through participating in CoPs. This involves a process of personal and shared identity-building and competence. Participation in a CoP involves action and connection and “combines doing, talking, thinking, feeling and belonging” [8, p. 56]. In this regard, participation in a CoP is seen not merely as engagement in a set of activities but as a process of being a participant in a new teaching–learning practice and constructing an identity in relation to this.

**Problem and Project-Based Learning**

The development of problem and project-based learning dates back to the 1960ies and 1970ies. Some of the pioneering institutions were the reform universities, Roskilde University (1972) and Aalborg University (1974) in Denmark. The development of the Danish ‘Reform Universities’ related to broader international social and cultural changes (e.g. the 1968 student rebellions), and a break with the ivory tower university. Part of this development was changing power relations between students and teachers/professors (participant control) and a strong focus on ‘solving’ / addressing real life problems (e.g. social inequality, class or gender difference) – and raising political consciousness and paradigmatic critiques of knowledge construction. PBL has proven to be productive in creating ownership to knowledge production and to develop situated solutions. The PBL principles give an opportunity for teacher professionals to inquire and design solutions to exemplary problems of importance to educational practice. There is no fixed recipe for PBL, however in the Danish version the following didactical principles are guiding the practice: problem-based, inquiry of exemplary problems, participant control and ownership, interdisciplinary knowledge construction in collaborative projects [7, 10].
Research Design

The UNA research case explores the design of TPD in the regional campuses of UNA, which is the second-largest public university in Costa Rica, with around 20,000 students, 1,800 academic staff and 1,700 administrative staff. The regional campuses are distributed throughout the country and have the particularity that many of the teaching staff is hired on short-term and part time contracts, so they generally do not have time to move to the central campus where most of the TPD processes take place.

The UNA case involved designing a TPD, based on a CoP approach, for teachers from five geographically distributed campuses. The goal was exploring ICT as a mean of communication and collaboration in the CoP, and as a tool to promote innovative pedagogical methods, such as PBL [3]. The UNA case has been selected as a case as it represents a real challenge. In many countries teachers in the rural area don’t have the same opportunities to participate in professional development activities and to keep up with highest quality level, therefor it’s very important to investigate models, which will give these teachers opportunities to participate equally in professional development activities.

Twenty-seven teachers participated in the research case and in the CoP in total. The teachers had an interest in innovating teaching and learning at UNA, and they were all engaged in developing these new opportunities at the regional campuses. Given the geographical distribution of the regional campuses, the study used networked technologies for three purposes: (1) to reduce space and time barriers, thus favouring interaction and a CoP approach; (2) to support a sustainable and scalable teacher TPD programme within the institution; and (3) to establish a shared space for teachers to explore and test out ICT for learning [5]. The TPD learning environment was designed to represent a framework for flexible and blended learning based on the following principles:

- be rich in challenges and interactions in relation to ICT;
- embrace the philosophy and methodologies of PBL; and
- consider teachers as the main agents of their TPD.

For comprehensive information regarding the presentation, design, analysis and results, please consult [3].
Research Methodologies

The research case has applied the approach of design-based research (DBR) as a pragmatic approach “for the study of learning in context through the systematic design and study of instructional strategies and tools” [21, p. 5]. The main sources of data for the UNA research case comprised online discussions, face-to-face meetings and reflection workshops. The data were collected through questionnaires, interviews, workshops and participant observation over a period of ten months, and online observation was carried out almost daily. All the gathered data were analysed through a recursive process to generate codes, which were later grouped into networks or themes (see [3] for details).

This paper builds on a meta-analysis of these data that has been published in [5]. In this paper, we will continue the analysis focusing on a few selected parameters. The analysis is based on activity theory [22]. This theory has been selected as basis for the analysis as it situates human actions and activities in a societal context (the activity system). It understands humans as driven by purposive and intentional activities and focus on human development and higher ordered forms of human cognition and practices. Further, learning is understood as an object-oriented dialectical process of internationalization and externalization through activities and actions mediated by tools (language or artefacts). Moreover, tensions and contradictions in the activity system (and among activity systems) are viewed as productive springboards of change and development. We are using the second-generation activity theory model [22] as base for our analysis. We have however, contributed with a small adjustment to Engeström’s focus on tensions and contradictions, namely instances of appreciation. In the analysis model, tensions and contradictions are marked with the sign of a lightening, while the appreciation is marked with the heart.

Analysis

The CoP framework is expressed in terms of four basic dimensions that entail issues of practice, community, identity, meaning and with the adjacent concepts of learning as doing, learning as belonging, learning as becoming, and learning as experience [8]. We have captured these aspects with three foci in the analysis (see Table I):
- online and face-to-face modalities and participation in the community
- engagement and identification with the community, and
- learning and the apprehension of digital competences and PBL
### Online Participation: Chat

Participation in the chats was high at the beginning of the intervention, but then fell almost to a zero. Tensions:
- The messy nature of the talks was overwhelming for some teachers who could not follow the flow of conversation;
- Some teachers experienced connection problems that hindered their participation
- Messy communication: all kinds of topics were shared: politics, weather, academic issues

### Online Participation: Discussion Forum

Three groups of users evolved and could be identified (core group, active group, and peripheral group). They all appreciate the new tool and their new competences. Tensions:
- The entrance level too demanding (skills and connection)
- Conflict to the teacher’s workload
- Different expectations to engagement (core participants disappointed with the other’s engagement)
**Group Work: Online and Distributed Participation**

Group work in distributed groups were expected to support the individual construction of meaning through the construction of shared understanding, negotiation, confrontation and commitment.

**Tensions:**

- Lack of familiarity (technical and communicative skills)
- Lack of culture of sharing (practice of sharing, peer-support, commitment)
- Individuals: time and motivation against productive outcome
- Producing boundaries to the vision of the (big) community of practice

![Diagram of Group Work: Online and Distributed Participation]

**Blended Learning: F2F-Participation**

Participation in face-to-face meetings was very regular, preferences of many community members for face-to-face communication ("ready-to-hand" environment for discussions, reflections and to stay motivated).

**Tensions:**

- A few teachers preferred online communication beyond f2f (flexibility & continuity)
- Tensions with regards to time and responsibilities (planning)

![Diagram of Blended Learning: F2F-Participation]
Pedagogical Intervention (PBL)
PBL was the activity most of the teachers participated in and found very useful for their learning outcome. They found it:
- Of practical relevance for the individual learner
- Situated and authentic learning for the individual learner
- Pool of experiences and peer-support at the community level

Tensions:
Teachers workload

Community Engagement
Most engaged in the community: identified with the community, engaged in the domain, sharing stories and assumed responsibility against the community.

Tensions:
- Irregular participation for some (workload, connection problems, priority).

Compulsory and steady vs. voluntary and irregular participation.

*Coto & Dirckinck-Holmfeld* [5, pp. 109–123]
A Community of Practice Approach - Lessons Learned

CoP is a Productive Framework

The analysis document, that a CoP approach provides a productive framework for competence development and the strengthening of the identity of professionals. This is due to

- the relatively free and flexible way of participation in a CoP.
- collaborative, horizontal and situated learning and exchange.
- teachers are eager to learn, to develop their professional identity and to engage with students. They like to share.

However, the quality of the CoP depends on the access to, engagement, commitment and identity within the community of the learners and the facilitators and the evolving dynamics among the participants, as well as the institutional support.

Tensions and Contradictions in a CoP

In the following, we will dig a step deeper into the tensions and contradictions found in the analysis.

Time, Workload and Culture

Despite the efforts to make the TPD program more manageable, the issues of time and workload remained a problem for many participants. Moreover, the consequences of lack of connectivity at home (only 65% had Internet connection at home) made it more difficult and less flexible for some teachers to participate in the community and influenced the dynamics of the community. However, another and often overlooked issue was the insular way in which many teachers are used to work, which affected the transition to a collaborative environment. Very often are these insular way of working build into the policies and incentives of the organizations and institution. Therefore, if organizations want to design for CoP as a mean for TPD, they have to address these issues of digital access, workload and culture in its policies and incentives.

Levels of Engagement

The ways in which the teachers participated and the level of sophistication of their contribution varied considerably from one to another. In order to feel confident in participating in the distributed CoP, the teachers need to appropriate digital skills – both technical and communicative – as a prerequisite for doing digital based actions. As an example, it’s not enough to get technical advice on how to establish a chat, the teachers also need to develop their competences to communicate in a chat and to develop a repertoire for how to apply it didactically for teaching and learning.
The instructions from the facilitator were appreciated and further the participants helped each other in a situated manner to appropriate these tools, however there is no doubt that the different digital skills influenced the dynamics of the CoP between core and peripheral participation and provided some new boundaries between the teacher professionals. Finally, a CoP of teacher professionals need active participants to sustain the community, so a relevant question to ask is how to stimulate for active participation? The CoP idea builds on the participants intrinsic motivation, however in a busy everyday life with competing challenges and obligations it is also important to further explore what kind of extrinsic motivation, which would support and sustain a CoP.

**Blended Learning**

Face-to-face sessions of any sort were found very valuable. This was also reinforced by the participants who had a lack of confidence in the use of technology. Even face-to-face is time-consuming and costly due to travelling (sometimes rather tiring in the rural areas) participants recognize, that face-to-face offers other modalities for exchange of experiences, gives an opportunity for all participants (also other participants than the tech smart) to show engagement and belonging to the community. Further, the face-to-face activities provided a rhythm for the activities in the community. So, for this UNA community a blended learning approach made a lot of sense and supported the belonging to and sustaining the community.

**PBL and Action Learning**

The intervention in the classroom and in the teachers’ own teaching practices was highly valued by all participants. PBL as a method for doing action learning worked very well. In PBL it’s the learners who are formulating the problem of inquiry. This creates ownership to the intervention and gives the teacher professionals an opportunity to investigate the problem, they find most interesting and challenging. The problems and interventions, which the teacher professionals worked on were of diverse nature and from areas such as Education, Literature, Environmental Studies, Tourism, Administration, Language, Biology, Administrative Law, Humanities, History and Informatics.

The PBL method worked well as a method for interventions in own teaching practices. It placed the teachers in the centre, as they are the learners who are formulating the problem for inquiry. The intervention was done individually, however, experiences were shared and reflected on in the community. With respect to digital competences, the intervention enabled the teachers to try out digital applications in the support of their teaching practice, and to gain a repertoire of digital action strategies.
Learning and the Apprehension of Digital Competences and PBL

A central conviction in communities of practice is, that learning is a social process that involve learning as doing in a practice, learning as belonging in a community, learning as becoming and developing identity, and learning as meaningful experience [8, 9] as such the CoP approach promote a holistic and integrated approach to learning. In a CoP approach, it’s not adequate only to focus on competence development, but competence development has to be understood as embedded in the four principles of doing, belonging, becoming, and experiencing.

With respect to the UNA case it succeeded overall to build a community along these principles. The community was an opportunity to learn with and from colleagues, and there was a growing understanding of the need for appropriating new knowledge, skills and competences with ICT and beyond – for being able to participate in distributed communities in the classroom and developing a repertoire of teaching activities with ICT. The members were engaging in opportunities to learn, to share and engage in professional discussions with their colleagues and to negotiate their identity. These opportunities were identified as valuable and, in some cases, as crucial for teachers who work in remote locations and who do not have many opportunities to participate in professional learning activities.

In some sub-communities, especially the university centers located in Liberia and Nicoya (which had rather poor Internet connections), the participants have benefitted from working closer to their colleagues, they learned to work as a co-located community, engaged in supporting each other and in sharing expectations and experiences.

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 [23] that this longer period of engagement contributed to creating continuity in their learning through an ongoing, and incremental process. Table II shows how participants experienced the TPD process, in terms of their learning.

|                                                                 | Totally agree | Agree | Disagree | Totally disagree |
|-----------------------------------------------------------------|---------------|-------|----------|------------------|
| The PD process allows me to develop skills to integrate technology into my teaching practice | 41.7          | 50.0  | 8.3      | 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                |
| What I have learned is applicable to my academic work            | 83.3          | 0     | 16.7     | 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                |

*Coto [4, p. 349]*
Learning is a process that changes people. The central issue in learning is becoming a practitioner, not learning about practice [8]. 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 [6, 24, 25]. Through their participation in CoP and sharing experiences and negotiating meaning as they were developing new skills to integrate technology into their teaching, and to incorporate new pedagogical approaches, the community members gradually shifted from the periphery of the practice to the establishment of an identity as core members of the community. Being part of “something bigger” was a strong motivation for most teachers, they felt connected to others and felt that they were contributing to improve teaching practice at institutional level.

Digging a little deeper into Table II open some issues for reflection. The highest score is given to the phrase: “What I have learned is applicable to my academic work”. This may be a sign, that the CoP approach has been very successfully in relating to the academic practice of the teachers and in a way, which has been meaningful to them. Further, they expressed, that they have “developed skills for incorporating new pedagogical approaches in their teaching”, which is also a very successful result. Also, the pedagogical innovation seems to play an important role in situating teaching and learning in a way, which gives meaning to the participants.

However, it can be discussed if the approach was fully effective with regards to developing the digital skills. 92% agree and totally agree that the TPD process has “developed skills to integrate technology into their teaching practice”. This is very solid, however if we break the numbers only 41.7 % totally agree. Moreover, from this table it’s not fully clear what kind of skills-level the teachers have acquired. Sørensen and Levinsen [2] have suggested the following hierarchy of three levels of didactical design competences for teacher professionals:

- Digital competences (technical and communicative [5]), which are a prerequisite for doing digital based actions.
- Repertoire of digital applications, which is a combination of basic digital competences and different action strategies, which makes it possible to change practice.
- Digital transformation is the competence to creatively integrate digital tools for creating new teaching and learning practices.

One interpretation, which is also supported in the interviews with participants, is, that the majority of participants found that they got some skills for doing digital based actions, and also that they have begun to develop a repertoire of different didactical digital action strategies on how to apply technologies in the classroom, however that there is still a need for further development.

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. 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 TPD approach, however, may influence the teaching and learning beyond the teachers CoP.

CONCLUSIONS

The learning from the UNA case shows that the community of practice approach offers a promising approach to TPD in the context of Costa Rica and at university level, and that the idea of a distributed community of practice offers potentials for expanding TPD in effective ways. The CoP examined in this study seems to mediate in the isolationist culture of the university, fostering a culture of shared learning. Data has shown that working together is effective; that the community is a place where ideas belong to the group and where learning is promoted and valued. The CoP also influences the work of teachers, which in turn influences students. This forces us to rethink the organization and structure of the TPD in higher education, questioning its impact on a true transformation in teaching practice. The community context supports the need for teachers to engage in reflective dialogue and action-oriented activities that challenge and shape their identities, beliefs and practices. It acknowledges the importance of the teachers’ dialogue within a supportive environment. CoPs have the potential to develop more than a culture of collaboration and provide a vehicle for people to expand their teaching abilities that result in educational change [26].

The UNA case provides us with a detailed understanding of how a community of practice approach works, and also the challenges to address. Not surprisingly, does the study document how difficulties in access and unstable connections influence the dynamics of the community. On the other hand, it also shows, that most of the participants find ways to overcome these difficulties and prioritize to continue to engage in the community.

A community of practice model for professional development builds on the professional engagement of the participants and facilitates a dynamic environment for shared exploration and collaborative learning within a digital and analogue ecosystem of tools, social relations and institutional policies and regulations.

We began this article asking the overall research question on how to design for productive teacher professional development, which prepares the teachers as agents for digital transformation and promoters of expanding pedagogical practices?
From our study, we answer this question suggesting the following recommendations to people who are engaged in designing TPD. These recommendations or principles are grounded on our data and on the literature on TPD, CoP and PBL. The TPD should:

- enables the negotiation of meaning and the mutual construction of new understandings and solutions through an adequate balance between activities and resources for learning;
- fosters building of social relationships and trust among teachers;
- brings reflective and challenging learning experiences leading to a transformation of identity and practice;
- provides teachers with different ways of identifying themselves as members of the community;
- brings teachers opportunities to negotiate, feel ownership, give meaning to and shape the practice of the community;
- enables teachers to envision possible futures and possible trajectories;
- brings possibilities of connecting local practices with the institutional and global practices;
- encourages active participation in which teachers competently apply their learning in their own teaching environments;
- stimulates and motivates learning through the formulation, analysis and solutions of problems relevant to the teachers’ practice, profession, research, and passion;
- stimulates interaction and a sense of mutual responsibility for individual and group learning through group work and joint projects that create interdependencies among teachers.

In addition, the TDP process should acknowledge and respect the perspectives, experiences and context of teachers, offers them a sustained and ongoing support for learning and allow them to develop a positive attitude towards the learning experience through personal relevance and the connection to real and everyday needs.

REFERENCES

1. M. Castells. 2000. The Rise of the Network Society, 2nd ed. Cambridge, MA, USA: Blackwell Publishers, Inc.
2. B. H. Sørensen and K. T. Levinsen. 2015. “Powerful Practices in Digital Learning Processes,” Electronic Journal of E-learning., 13(4):291–301.
3. M. Coto. 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.
4. M. Coto. 2014. “A Distributed Community of Practice to Facilitate Communication, Collaboration, and Learning among Faculty,” in Building Online Communities in Higher Education Institutions: Creating Collaborative Experience, C. N. Stevenson and J. C. Bauer, Eds. 2014, pp. 327–368.

5. M. Coto and Dirckinck-Holmfeld. “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, C. N. Stevenson and J. C. Bauer, Eds. Hershey, PA: IGI Global, 2020, pp. 103–136.

6. Dirckinck-Holmfeld, C. Jones, and B. Lindström. 2009. Analysing Networked Learning Practices in Higher Education and Continuing Professional Development. Sense Publishers.

7. L. Dirckinck-Holmfeld. 2002. “Designing Virtual Learning Environments Based on Problem Oriented Project Pedagogy,” in Learning in Virtual Environments, L. Dirckinck-Holmfeld and B. Fibiger, Eds. Frederiksberg C: Samfundslitteratur Press, pp. 31–54.

8. E. Wenger. 1998. Communities of Practice: Learning, Meaning and Identity. Cambridge, U.K.; New York, N.Y.: Cambridge University Press.

9. E. Wenger, R. A. McDermott, and W. Snyder. 2002. Cultivating Communities of Practice: A Guide to Managing Knowledge. Boston, Mass.: Harvard Business School Press.

10. A. Kolmos, F. Fink, and L. Krogh. 2004. “The Aalborg Model - Problem-based and Project-Organized Learning,” in The Aalborg PBL Model - Progress, Diversity and Challenges, A. Kolmos, F. Fink, and L. Krogh, Eds. Aalborg: Aalborg University Press, pp. 9–18.

11. A. Byrk. 2016. “Accelerating How We Learn to Improve,” Educational Researcher., 44(9): 467–477.

12. J. V. Lock. 2006. “A New Image: Online Communities to Facilitate Teacher Professional Development,” Journal of Technology and Teacher Education., 14:663–678.

13. A. MacPhail, K. Patton, M. Parker and D. Tannehill. 2014. “Leading by Example: Teacher Educators’ Professional Learning Through Communities of Practice,” Quest., 66(1):39–56.

14. K. Patton and M. Parker. 2017. “Teacher Education Communities of Practice: More Than a Culture of Collaboration,” Teaching and Teacher Education., 67:351–360.

15. A. Swennen and T. Bates. 2010. “The Professional Development of Teacher Educators,” Professional Development in Education., 36(1–2):1–7.

16. K. Wing Lai, K. Pratt, M. Anderson and J. Stigter. 2006. “Literature Review and Synthesis: Online Communities of Practice,” Faculty of Education, University of Otago, Dunedin, New Zealand.

17. J. Lave and E. Wenger. 1991. Situated Learning: Legitimate Peripheral Participation. Cambridge [England]; New York: Cambridge University Press.

18. S. A. Barab, E. Baek, S. Schatz, R. Scheckler and J. Moore. 2008. “Illuminating the Braids of Change in a Web-Supported Community: A Design Experiment by Another Name.,” in Handbook of Design Research Methods in Education: Innovations in Science, Technology, Engineering, and Mathematics Learning and Teaching, A. Kelly, R. Lesh, and J. Baek, Eds. Routledge.

19. L. Hadar and D. Brody. 2010. “From Isolation to Symphonic Harmony: Building a Professional Development Community Among Teacher Educators,” Teaching and Teacher Education., 26(8):1641–1651.

20. M. S. Schlager and J. Fusco. 2004. “Teacher Professional Development, Technology and Communities of Practice: Are We Putting the Cart Before the Horse?,” in Designing for Virtual Communities in the Service of Learning, S. Barab, R. Klin, and J. Gray, Eds. Cambridge MA: Cambridge University Press.

21. Design-Based Research Collective, “Design-Based Research: An Emerging Paradigm for Educational Inquiry,” Educational Researcher., 32:5–8, 2003.

22. Y. Engeström. 2001. “Expansive Learning at Work: Toward An Activity Theoretical Reconceptualization,” Journal of Education and Work., 14:133–156.
23. G. Gallant. 2000. “Professional Development for Web-Based Teaching: Overcoming Innocence and Resistance,” In *New Directions for Adult and Continuing Education*, E. J. Burge, Ed. San Francisco: Jossey-Bass, pp. 69–78.
24. G. Kirkup. 2002. “Identity, Community and Distributed Learning,” in *Distributed learning: Social and Cultural Approaches to Practice*, M. R. Lear and K. Nicholl, Eds. London: Routledge-Falmer, pp. 182–195.
25. R. P. Warhurst. 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.
26. J. Loughran. 2014. “Professionally Developing as a Teacher Educator,” *Journal of Teacher Education*, 65(4):271–283.