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A community of practice approach to the co-development of digital pedagogy: a case study of primary school teacher education practicum

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ABSTRACT

This case study aims to identify which characteristics that define the concept of Community of Practice (CoP) can be recognised at the primary school teacher education practicum and how stakeholders perceive digital pedagogy in the context of practices for co-development. The case study took place in a primary school teacher education practicum at the University of Lapland in Finland and involved teacher educators ($n = 2$), student teachers ($n = 5$), and in-service primary school teacher mentors ($n = 6$) who are considered the stakeholders of the case study. The results indicate that the practicum included characteristics that, to some extent, supported the CoP model, including the criteria *negotiated goal*, *addressed challenges*, *co-development of the community*, *leveraged individual's expertise*, and *regular and intentional interaction*. The stakeholders perceived digital pedagogy as an approach that, through employing variety of digital technologies in their teaching practices, can enhance the pupils' learning process.

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Primary school teacher education practicum; co-development; community of practice; digital pedagogy

Introduction

This case study aims to identify which characteristics that define the concept of a Community of Practice (CoP) can be recognised at the primary school teacher education practicum and how stakeholders perceive digital pedagogy in the context of practices for co-development. The stakeholders are teacher educators, student teachers, and in-service primary school teachers acting as mentors within the context of a teacher education practicum – a requirement of the Primary School Teacher Education curriculum at the University of Lapland, Finland. It is a timely investigation, as the COVID-19 pandemic has caused a distinct global rise in the need to teach remotely, and has subsequently contributed to an increased interest in the use of digital pedagogy. The collaboration between the university as a place of research and the school as a place of institutionalised learning has been reported to be beneficial for opening up possibilities for mutual learning (Resch, Schrittmesser, and Knapp 2022; Kyllönen 2020). The topical research, however, does not provide practical solutions on how to carry out this partnership

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between universities and schools in the context of teacher education practicums. This case study provides an aspect on how university-school collaboration can be arranged through teaching practicums in a way that all the stakeholders involved have the potential to co-develop digital pedagogy and learn from each other.

The investigation was carried out following a deductive approach that used Wenger's (1998) conceptual model of the Community of Practice (CoP) to theorise the co-development of digital pedagogy by the school community during the practicum period.

Simply defined, a CoP is a group of people who pursue shared goals, which results in collective learning (Wenger 1998). While CoPs are formed with the aim of providing tools for the systematic leverage of knowledge inside organisations, they are not necessarily restricted to a single organisation; a CoP may connect people across organisational and geographical boundaries. (Wenger-Trayner and Wenger-Trayner 2015.) In this case study, such organisational boundaries are crossed, as the co-development practice described herein involves a university and several primary schools. Therefore, social theories of learning, which consider learners as social beings who learn via participation (Bandura 1977), have also been considered when discussing the concept of a CoP.

The pedagogical use of digital technologies (referred to throughout this paper as 'digital pedagogy'), and its potential to enhance prevailing school practices during practicum is an idea that is shared by teacher educators, student teachers, and in-service primary school teachers. Kyllönen (2020) argues that digital pedagogy can be understood as an approach to teaching in which the instructor uses digital technologies in the planning, implementation, and evaluation processes to support student learning. According to the new Finnish National Core Curriculum for Basic Education adopted in 2016, digital pedagogy is central to learning; hence digital technology-related skills are now included in the curriculum as part of the transversal competencies (Finnish National Board of Education 2016). The curriculum also states that in-service teachers need the technological and pedagogical knowledge for making use of various technologies based on their own needs and at the same time need to understand the consequences of their choices (Tanhua-Piironen et al. 2019; Huhtala and Vesalainen 2017). Hence, while staff development may sometimes focus on the technical use of certain technologies, successful implementation in teaching also requires training on how to use them in a pedagogically meaningful way (van der Rijst, Baggen, and Sjoer 2019).

In the following sections, the context of the case study is described. This is followed by a detailed description of the use of the CoP model as a theoretical framework for the case study, along with the precise research questions this paper seeks to answer. The research methodology employed, including how data collection and analysis were carried out, is then described. Subsequently, an analysis of the data in terms of which practices identified in the CoP model support the co-development of digital pedagogy is presented, followed by a discussion and conclusion.

Research context

The case study presented in this paper focuses on a localised group of what will be referred to as 'stakeholders' (Yin 2014) who belong to the aforementioned Primary School Teacher Education Programme in the Faculty of Education at the University of Lapland. Stakeholders are teacher educators, student teachers, and in-service primary school

teacher mentors associated with the fifth and last practicum period that student teachers complete during the final year of their studies (discussed below). The stakeholders discussed together before the start of the practicum a common goal for co-development which in this case came to be digital pedagogy. The negotiated goal reflected on student teachers' master's thesis topics which they were to work with in seminars. The seminars provided a context for support while conducting research during their practicum periods. The student teachers' research during the practicum periods were meant to prepare them in taking part in a research-based development process and documenting it through their master's theses. The student teachers and in-service teachers were expected to work together in the school to make some practical pedagogical changes in the classroom environments. Teacher educators took part in the co-development according to their expertise and supported student teachers' research process related to the co-development. Elvira et al. (2017) recognised three learning processes that foster the development of university students' professional expertise: 1) transforming theoretical knowledge into practical knowledge, 2) explicating practical knowledge into theoretical knowledge, and 3) reflecting on both theoretical and practical knowledge by using self-regulative skills such as evaluation. As such, linking the theoretical process of developing a thesis with the practice of enhancing prevailing school practices may foster the evolution of students' professional expertise.

The first four practicum periods are completed in the Teacher Training School at the University of Lapland. The Teacher Training Schools are part of the universities and one of their main goals is to provide training ground for student teachers and prepare them for their future profession. In this case study however, the interest lies in the practicum where student teachers are permitted to choose the school in which they wish to complete it. This practicum was chosen as a context of the study because student teachers are placed in ordinary school environments supported by in-service school personnel. It is part of the Primary School Teacher Education Curriculum of the University of Lapland and is worth 5 European Credit Transfer and Accumulation System (ECTS) credits. Student teachers are expected to consider their own interests for their future career when choosing the school in which to complete their practicum period. The duration for the practicum is four weeks, during which time the student teachers must assume an appropriate level of responsibility for the planning, teaching, management, and administration of the class to which he or she has been assigned.

Theoretical framework

A community of practice approach to the teacher education practicum

Teacher education programmes in Finland aim to educate teachers with the skills to solve problems independently and using the latest educational research. Therefore, creating a link between practice and research should be emphasised in teacher education (Toom et al. 2010). For student teachers, teacher education practicum (hereinafter referred to simply as 'practicum') offer a context in which to practice their future profession, but a practicum is also a way to generate partnerships among different stakeholders like teacher educators and in-service teachers, and creates a platform for interaction.

According to Tiainen, Korkeamäki, and Dreher (2018), practicums should be arranged to support learning in teams. Working in teams and helping each other to view classroom situations from different perspectives (which can lead to co-development) fulfils a prerequisite for knowing how to reflect your own actions. When student teachers are accustomed to reflecting their working principles in teaching practicums during their education, they are more likely to maintain this approach in their future working life (Tiainen, Korkeamäki, and Dreher 2018).

According to the recent conceptualisation of the CoP, as a tool it will be the most effective when it includes the following three elements: 1) the domain, 2) the community, and 3) the practice (Wenger 1998; Wenger, McDermott, and Snyder 2002; Wenger-Trayner and Wenger-Trayner 2015). These three elements are discussed in detail in the following sections.

The domain

The domain refers to the shared domain of interest among a group of people. The shared domain of interest is valued as collective competence which can be enhanced by learning between group members, but is not necessarily recognised as 'expertise' outside of the community. The group members must *negotiate a common goal* and *address challenges* concerning their domain of interest in order to develop their collective practices (Wenger-Trayner and Wenger-Trayner 2015; Wenger 1998). According to Tuhkala (2019), involving in-service teachers in negotiations can prevent unwanted situations where development is in conflict with teachers' everyday needs. Such reciprocal partnerships between teacher educators, student teachers, and in-service primary school teachers create possibilities for all three to overcome challenges and learn from one another. Teacher educators, for example, may gain topical information from the field to develop their curricula, while in-service teachers may develop their practices based on current research (Helin 2014).

In this study, the shared domain of interest for teacher educators, student teachers, and in-service teachers is digital pedagogy, or the pedagogical use of digital technologies. Digital pedagogy became a shared domain of interest through negotiation because the student teachers were specifically interested in experimenting variety of digital technologies in the actual classrooms and in-service teachers wanted to update their pedagogical practices.

It is possible to integrate technologies in teaching in various ways, and it is for this reason that digital pedagogy is the subject of co-development in this case study. For example, Maslin and Smith (2017) argue that a practicum can provide a context for student teachers to practice and support growth in confidence for the use of digital technologies as pedagogical tools. In another example, according to Montebello (2017), digital pedagogy is considered as a way to embed digital tools in order to enhance the learning process, and that the use of technology in teaching may affect the teacher's pedagogical solutions. Hinojosa et al. (2016) noticed in their research that teachers use digital technologies most frequently in combination with traditional teaching practices, in which technology is used to support classroom management, presenting information, and giving instructions. Yet another example is provided by Wadmany and Kliachko (2014), who state that technology is the main essence of digital pedagogy, but that without appropriate pedagogical solutions, its advantages cannot be achieved. When integrating digital pedagogy, the teacher's role is to facilitate students' collaborative

learning and to encourage them take more responsibility for their own learning processes. (Wadmany and Kliachko 2014). Similarly, Engeness and Edwards (2016) argue that in digital pedagogy, the teacher is a guide who supports students' collaboration and helps them reach the learning potential facilitated by digital tools. Each of these accounts illustrates how the development of digital pedagogy and its integration into prevailing educational methodologies would be of benefit to multiple stakeholders.

The community

The community comprises the relationships and activities that allow members to interact and share information with one another. Therefore, a CoP cannot be created simply by virtue of a shared domain of interest. The members need to engage in *regular and intentional interaction* through activities in which they may learn from one another (Wenger-Trayner and Wenger-Trayner 2015; Wenger 1998). However, Tuhkala (2019) argues that participation in development work does not necessarily require physical presence, but that other forms of influencing, such as commenting or proposing changes, may suffice. In this study, the community was created through the practicum. Teacher educators, student teachers, and in-service primary school teachers interacted with one another in the beginning of the practicum in order to discuss the prevailing practices of the school and to decide on goals for co-development. The in-service teacher mentor therefore needed to work not only as a supervisor, but also as a co-developer with the student teacher. According to Jaspers et al. (2014), teachers may confront challenges when simultaneously fulfilling both the role of teacher and mentor. Student teachers and in-service teacher mentors were therefore in constant interaction during the practicum because they were working together in the school context.

The practice

The practice refers to the shared repertoire of resources such as experiences, stories, or tools that is developed into shared practices by members of the community. The shared repertoire works as a resource for *leveraging individuals' expertise* when *co-developing the community* (Wenger-Trayner and Wenger-Trayner 2015; Wenger 1998). Student teachers, in-service teachers, and teacher educators may have different insights about digital pedagogy, and it is these insights that comprise the shared repertoire of resources in this study.

According to Edmondson and Harvey (2018), knowledge diversity possessed by the individual team members alone does not create performance benefits for the team. Knowledge diversity can only be beneficial when team members face a creative task or challenge that arouses interaction (Edmondson and Harvey 2018). Building on this notion, it is important to acknowledge From's (2017) argument that digital technology-related pedagogical skills and competences can take effect on three levels: the interaction level, the course level, and the organisational level. The interaction level refers to the actual pedagogical solutions implemented in the classroom. The course level involves the course design process and plans for implementing digital technologies. The organisational level refers to the strategies and educational objectives shared by the whole school organisation. (From 2017.) The teacher educators, student teachers, and in-service teachers may develop prevailing school practices at all three levels during the practicum.

Mishra and Koehler (2006) introduce the Technological Pedagogical Content Knowledge (TPCK) framework to illustrate three different knowledge areas required for the successful integration of technology in teaching. The first area is content knowledge, which concerns the information about the subject to be taught. The second area is pedagogical knowledge, which comprises the teacher's overall knowledge on learning processes, teaching methods, and his or her relation to learning objectives. The third area is technology knowledge, which refers to the information needed to operate the technologies to be used (Mishra and Koehler 2006). Therefore, student teachers, teacher educators, and in-service teachers should support one another and discuss their areas of expertise during the practicum.

Research questions

Investigations were carried out for the purposes of answering the following research questions:

- (1) Which characteristics of a CoP can be recognised in the Primary School Teacher Education practicum?
- (2) How do the stakeholders perceive digital pedagogy in the context of practices for co-development?

The findings for the research questions have the potential to provide tools for evaluating and developing the existing structures and practices of the practicum.

Research methodology

In a case study, interests are placed on a certain localised group of actors (Tierney and Dilley 2001; Yin 2014). In this case, the localised group consists of teacher educators ($n = 2$), student teachers ($n = 5$), and in-service primary school teacher mentors ($n = 6$), who took part in the practicums. In this case, the practicums served as a context for the co-development of digital pedagogy. Therefore, the focus of the case study was to obtain an in-depth understanding of the selected case rather than empirical generalisation. In a case study it is also essential to look for preliminary theoretical concepts in order to define the study's outline (Yin 2014). In the present case, Wenger's (1998) Community of Practice (CoP) and topical research related to digital pedagogy provide a framework for conceptualising the co-development of digital pedagogy.

Table 1. Types and lengths of the instructional documents.

Instructional document	Length of the material
Teacher education practicum's course description	217 words
Instructions for in-service teacher mentor	162 words
Total	379 words

Data collection

As is typical for case studies (Yin 2012), the body of data gathered for this study consists of several sets. The first set of data consists of the instructional documents for the practicum, selected because they provide information about the planned aims and content of the practicum. Table 1 represents the names of the instructional documents analysed as part of this study, along with their lengths.

The instructional documents consist of the practicum's course description and instructions for the in-service teacher who is to mentor the student teacher during the practicum. The former document is part of the University of Lapland Teacher Education curriculum and includes learning objectives, content, and teaching and learning methods, while the latter are meant to work as guidelines for the stakeholders involved. Instructions for the in-service teacher mentor focus primarily on the teacher's responsibilities during the practicum.

The second set of data was collected by means of qualitative interviews with teacher educators, student teachers, and in-service primary school teacher mentors who were involved in the selected case. The interview data provided information about the practical events that took place during the practicum. The practicums were completed in three different primary schools where the interviewed in-service teachers worked. Three of the students completed their practicum in the same school, but at different times. The same teacher educators were involved in all of the practicums. All the stakeholders were asked similar questions considering the collaboration among them (e.g. *What was your role in the co-development?*) and their perceptions about the co-development of digital pedagogy (e.g. *What should be the role of digital technologies in the classroom?*). Each of the interviews lasted 20–35 minutes. Table 2 represents the number of participants and the length of interview transcriptions.

The qualitative process of interviewing is often characterised as a guided conversation (Warren 2001), and the use of a semi-structured interview design (Wilson 2016) fostered this conversational nature of data collection. Semi-structured interview design made it possible to make minor modifications to interview questions during each interview and to ask follow-up questions to lessen the chances of leaving valuable information out of the study (Wilson 2016). The interviews consisted of two parts. The first part included questions about the practices supporting co-development during the practicum. Questions in the second part of the interview were related to the co-development of digital pedagogy.

The interviews were conducted in person, apart from those carried out over the phone with two of the student teachers and one in-service teacher mentor. The advantage of in-person interviews is that it is possible for the interviewer to observe the participant's body language and facial expressions (Wilson 2016). Preparation for the interviews included studying the topics on which the interviews

Table 2. Stakeholders and the length of the interview transcriptions.

Interviews	Number of participants	Length of the material
Teacher educators	2	5470 words
Student teachers	5	7756 words
In-service teacher mentors	6	12098 words
Total	13	25324 words

were based and carrying out a practice interview with a colleague to test the questions being asked. According to Dilley (2000), proper preparations help the researcher to focus on the interview and make comparisons between the things that the participant is saying and what the researcher already knows about the topic. The interviews were audio recorded by phone and later transcribed verbatim. Recorded audio files were stored on a personal OneDrive for Business folder which is provided by the University of Lapland to its personnel. The stored data was encrypted to guarantee anonymity of the stakeholders.

Data analysis

The collected data were analysed using a qualitative method and a deductive approach. This examination of both theory and collected data fostered the emergence of categories (Drisko and Maschi 2015). A qualitative content analysis consists of three phases: preparation, organisation, and the reporting of results. The preparation phase focuses on collecting and becoming familiar with the data (Elo et al. 2014). In this study, the preparation included uploading the instructional documents and the interview transcripts ($n=13$) to the NVivo 12 data analysis programme and carefully reviewing them. In a deductive content analysis, the organisation phase consists of a data review for content and coding in correspondence with pre-identified categories (Elo et al. 2014). In this case study, the categories for characterising co-development were based on the three elements of Wenger's CoP model presented in the section on theoretical framework: domain, community, and practice. In addition, five criteria—*negotiated goal*, *addressed challenges*, *regular and intentional interaction*, *co-development of the community*, and *leveraged individual's expertise*—were identified from Wenger's CoP model (cf. Wenger-Trayner and Wenger-Trayner 2015). The data analysis process was continued by coding the five identified criteria in NVivo 12 and looking for examples of each in the collected data. This process of analysis also aimed to reveal which criteria were not fulfilled.

Two criteria for determining whether the element of the domain was present in the co-development practice were identified. The first criterion was the presence of a *negotiated goal*. Its identification required examples related to the area of goal development; the community members must have negotiated a common goal that they are seeking to achieve during the practicum. One negotiated goal was the use of digital technologies in a manner enabling pupils to search and produce information together. The second criterion was whether or not the members had *addressed challenges*, i.e. whether or not the members of the community had negotiated issues together such as the number of usable technologies. A third criterion, *regular and intentional interaction*, which can be measured by how regularly and intentionally the members of the community interacted, must be identified to determine whether the element of the community was present. The last two criteria are used to identify whether the element of practice is present: *co-development of the community* comprises the practices for collaboration and actual outcomes of developing the community such as learning to use digital technologies in pedagogically meaningful way, while *leveraged individual's expertise* concerns how well community members have considered each other's skills and knowledge when developing the community. Examples of such

Table 3. Identified criteria for characterizing the co-development of digital pedagogy.

Element of CoP	Criteria for characteristics	Items from the instructional documents and interviews
DOMAIN	Negotiated goal(s)	<ul style="list-style-type: none"> • Discussed in a meeting among the stakeholders • Based on the student teachers' interests and the schools' needs • Activation and collaboration through digital pedagogy
	Addressed challenges	<ul style="list-style-type: none"> • From the school context • Lack of induction • Amount of usable technologies • Lack of time
COMMUNITY	Regular and intentional interaction	<ul style="list-style-type: none"> • Student teacher/in-service teacher interaction in the school environment • Teacher educator/student teacher interaction in master's thesis seminars
PRACTICE	Co-development of the community	<ul style="list-style-type: none"> • Meaningful digital pedagogy • Student teacher's role emphasised in co-development • In-service teacher as a supervisor • Teacher educator as a prospector
	Leveraged individual's expertise	<ul style="list-style-type: none"> • Student teachers' technological pedagogical knowledge • In-service teachers' subject knowledge and familiarity with the school and classroom practices

expertise are student teachers' technological skills, in-service teachers' familiarity with school practices and teacher educators' understanding of research design process. For the elements of domain, community, and practice to be considered present, all community members should be somehow involved in fulfilling each of the criteria described above.

Characteristics supporting the idea of a CoP and the co-development of digital pedagogy

The stakeholders had mostly concurring views about the practices of the practicum. Table 3 represents the identified criteria for characterising co-development of digital pedagogy.

Each of the identified criteria for characterising co-development was recognised in the interviews, but not necessarily in the instructional documents. The identified five criteria (see Table 3) will be presented individually in correspondence to the collected and reviewed data in the following sections.

Negotiated goals

The practicum course description or the instructions for in-service teacher mentors did not include any guidelines for the stakeholders to negotiate a common goal for the practicum. All of the interviewees, however, mentioned that they had negotiated a common goal for the practicum. *Negotiated goals* were defined in all cases in the beginning of the practicum in a meeting that included the teacher educator, student teacher, and in-service teacher mentor, described by one interviewee as follows:

It was interactive; the trainee first presented his own ideas and then I presented mine, and the principal was present and the university was involved the second time, what was to come and what to do and the goals were specified for the trainee during this discussion (In-service teacher mentor 6).

The goals were negotiated together among the stakeholders. According to Wenger's (1998), the result of the collective negotiation process needs to support all participants' mutual engagement. According to the interviewees, common goals were negotiated because they had to be linked with the topics of the student teachers' master's theses:

Multidisciplinary module from the master's thesis provided the theme and they (in-service teacher mentors) wished for that digital technology and media content (Student teacher 4).

The outcomes of the negotiations were different in each of the practicums because they were based on the school's needs and the interests of the student teacher. The student teachers also needed to consider the content of the practicum from the perspective of a researcher, because the practicum was meant to provide a context in which they were able to collect research data. Therefore, the negotiated goals were not defined by any of the participants alone, but rather together in the beginning of each of the practicums:

The project is research-based by design, so we need to have some suggestion, some more theoretical, conceptual framework, what we think about multiliteracy and digital pedagogy, what they are and how they could be promoted in primary education (Teacher educator 2).

Wenger's (1998) argues that the result of the collective negotiation should not be only a stated goal, but it should also create mutual accountability among the participants. In most cases, the student teacher determined what content was to be taught based on his or her master's thesis, while the need for new pedagogical solutions was expressed by the in-service teacher mentor. Teacher educators also stated that the student teachers' own design-based research projects concerning their master's theses created some framework for the contents of the practicum. One teacher educator declared that the University's role was to provide a conceptual framework for multiliteracy and digital pedagogy and then discuss how these could be promoted in primary education. The mentioned examples are closely related to transforming theoretical knowledge into practical knowledge, which, as it may be recalled, can foster the development of students' professional expertise (cf. Elvira et al. 2017).

The negotiated goals were generally linked to digital pedagogy which is often characterised to require a learner-centred approach to teaching and may this way cause some changes to teachers' pedagogical practices (Wadmany and Kliachko 2014). The interviewees, however, did not report any pedagogical changes while employing new technologies. The reason for this may be that these stakeholders already followed a learner-centred approach to teaching, and therefore did not necessitate any pedagogical changes (cf. Hinojosa et al. 2016).

Addressed challenges

The practicum course description or the instructions for in-service teacher mentors did not include any information about *Addressed challenges*, and this was also the least mentioned characteristic of co-development by the interviewees. Only the in-service teacher mentors mentioned some examples that could be identified as addressed challenges, and they were mostly concerning the school context:

Use of digital tools is becoming more popular and you are learning and developing it, of course, but then it seems that the pace is so slow and all the time something new appears. (In-service teacher mentor 4)

The interviewed in-service teachers also mentioned having addressed challenges in the stakeholder meeting. Such challenges were related to the lack of induction and time allotted to the use of digital technologies in a pedagogically meaningful way:

We are not getting sufficient induction of how to use digital technologies (In-service teacher mentor 1).

McCarthy, Maor, and McConney (2017) divided teachers' needs associated with integrating digital technologies in teaching into three different categories: technology needs, pedagogical needs, and personal support needs. The examples about addressed challenges in this study are comparable to technology needs and pedagogical support needs. One in-service teacher mentor also expressed anxiety towards digital pedagogy by mentioning that sometimes teaching the pupils to use a certain technology might take too much time away from actual studying:

Technologies were not always used in a meaningful way because teaching the kids to use the technology took too much time from the lesson (In-service teacher mentor 6).

To use digital technologies in a pedagogically meaningful way would require a change in classroom practices to support collaboration and allow for pupils to take more responsibility for their own learning (Wadmany and Kliachko 2014). Therefore, in-service teachers should be provided with an induction that is focused on the use of technologies in a pedagogically meaningful way in order to enhance the learning process (cf. Montebello 2017).

Student teachers or teacher educators did not mention having addressed challenges for the co-development project, but they all came from the in-service teacher mentors and were related to school context. However, Midtsundstad and Langfeldt (2020) argue that school development is a constant process between school and place. Teachers' perceptions about what is important for the school shape their roles as members of the community and thus the school culture. Therefore, school development should be interpreted as contextual (cf. Midtsundstad and Langfeldt 2020).

Regular and intentional interaction

The practicum course description did not include any guidelines for the *regular and intentional interaction* among the stakeholders. The instructions for in-service teacher mentors, however, provided them with topics to discuss with the student teacher, such as course planning, and thus furnishing some insight for intentional interactions between the teachers and the student teachers. None of the instructional documents indicated the teacher educator as part of these interactions.

According to the interviewees, *regular and intentional interaction* occurred between the student teachers and in-service teacher mentors throughout the practicum. The student teachers and in-service teacher mentors usually met at least once a week to discuss how the co-development was evolving:

As the time for lessons began to approach, we discussed about the lesson contents and how it was going, and then there were feedback discussions about how they went (In-service teacher mentor 1).

The meetings between the student teachers and in-service teacher mentors were, in most cases, informal and unplanned, and the student teachers' performance during lessons was discussed. One teacher educator was only involved in the seminars, and therefore did not meet the in-service teacher mentors at all:

Yeah, well I haven't met people at school. It was the responsibility of another teacher educator and these students. Then again, I met the students and the other teacher educator when their research was covered in these seminars (Teacher educator 2).

Teacher educators met the students in master's thesis seminars in which they were concentrating more on how to build connections between their research and school co-development projects. While these stakeholders did meet with each other, it was on different occasions. Furthermore, the in-service teachers from different schools did not meet each other at all:

If you think about co-development, then there should be even more time for joint meetings between their school staff and university researchers and other staff. After all, we haven't really had any meetings where the whole network would have been (Teacher educator 2).

One teacher educator raised the point that there should have been a meeting involving the entire network that included all stakeholders. Wenger's (1998) argues that a key prerequisite for mutual engagement is the ability for members to interact while working. This prerequisite is fulfilled by means of a physical presence between the student teacher and in-service teacher mentor. Teacher educators took part in interaction mostly from a distance by commenting or proposing actions (cf. Tuhkala 2019). Therefore, *regular and intentional interaction* was realised in different ways and on different occasions among the stakeholders.

Co-development of the community

The practicum course description and the instructions for in-service teacher mentors only vaguely emphasised *Co-development of the community*, while the same theme was clearly recognised in the interviews. A certain degree of development was achieved, but it was not always a result of planning, executing, and evaluating the project together. The practicum course description emphasises student's responsibility for taking part in school development:

Student gets to know how to plan his/her own work based on school curriculum and taking into account the focal points of the school development activities (Practicum course description, p. 1).

The course description, however, does not reference the characteristic of working in collaboration with other stakeholders involved in the practicum. In the instructions for in-service teacher mentors, the teacher's role was emphasised as that of a supervisor and enabler of student development:

The objective is to provide student with a comprehensive perspective about teacher's work and school development by taking part in the process or planning and executing an own school/class experiment (Instructions for in-service teacher mentor p. 1).

Similarly, the instructions include content for the student involved in the practicum, but this content does not involve the in-service teacher or teacher educator in planning and executing the experiment. Each of the stakeholders, however, mentioned examples of co-development of the community. According to student teachers, they had the freedom to plan their own lessons and experiment:

I was given free hands and they (in-service teacher mentors) encouraged me to try new things in there and I got to think about that stuff (planning of pedagogical activities) by myself (Student teacher 5).

According to the interviewees, the student was in charge of planning and making the changes to classroom practices. The in-service teacher mentors stated that they wanted to learn about the use of technologies in teaching in particular from the student teachers:

We had the expectation that we too would learn it, the classroom teachers would learn it from those students, and then some of this technology would be used that is not normally used here (In-service teacher mentor 5).

The in-service teacher mentors' roles seemed to be to remain less active in the actual planning and development processes when compared to the student teachers' roles. Subsequently, the in-service teacher mentors could reflect on how to incorporate the new methods into their own work. McCarthy, Maor, and McConney (2017) also noticed in their study that several teachers sought simple advice and tips on how to use certain technologies as part of their work. Thus, in some cases the in-service teacher mentors' role in co-development seemed to be closer to that of a supervisor than a co-developer (cf. Jaspers et al. 2014). One teacher educator emphasised the student teachers' possibilities in practicing their skills in practicums, and how as a result the schools could benefit and learn something from the students:

Great thing is that these students can already design something in advance that will benefit them as well as their practice, but it will also benefit the school where they go to practice (Teacher educator 1).

Teacher educators were not closely involved in the actual co-development process. Wenger's (1998) argues that the development process should include renegotiation of the common goal and a discussion on how the stakeholders may engage more efficiently. According to teacher educators, they remained prospectors of the co-development process, which involved mainly student teachers and in-service teacher mentors. Actual co-development lacked in some cases the shared tasks and challenges necessary to the generation of interaction and collaboration among all stakeholders (cf. Edmondson and Harvey 2018). Co-development was also limited to individual lessons, and therefore did not effect any comprehensive changes in the school as an organisation. Among From's (2017) three levels of pedagogical skill and competence occurrence (interaction, course, and organisational) presented previously, co-development incorporates the interaction level in particular, because the pedagogical changes were made in individual lessons. The

course level and organisational level were therefore not affected by co-development in this case (cf. From 2017).

Leveraged individuals' expertise

The practicum course description and the instructions for in-service teacher mentors did not contain any reference to *leveraging individual's expertise*, but it was mentioned by the interviewees. Student teachers mentioned most often the pedagogical use of technologies as one area of expertise they possessed, while in-service teachers were more familiar with the practicalities concerning the teaching profession:

I was there all the time helping everyone especially with ICT devices and all digital platforms. And at the end of the practicum, I held a training for them about the basic stuff like what you could do with a computer or a phone with the pupils (Student teacher 5).

Student teachers mentioned the use of ICT devices and different technologies in teaching as one topic they were paying particular attention to during their practicums. They also noted that the in-service teacher mentor wished to learn more about the use of different technologies in teaching. Therefore, the student teachers' areas of expertise is closely related to technological pedagogical knowledge which comprises the understanding of how to utilise various technologies in different teaching and learning settings (cf. Maslin and Smith 2017).

The in-service teacher mentors mentioned subject knowledge and familiarity with school practices and pupils as their areas of expertise (cf. Mishra and Koehler 2006):

Well maybe all those school practices, what they are, and knowing how to work at this school, and what kinds of practices there are with certain classes (In-service teacher mentor 2).

Subject knowledge and familiarity with school practices and pupils were leveraged in school development. The in-service teachers could, for example, provide the student teachers with information about the pupils' progress in individual subjects. Teacher educators, on the other hand, stated that they were unfamiliar with the schools' practices or with pupils:

I can use technologies quite well and so on, but then again, this student had a really great idea about how to integrate it into primary education which is a very big challenge (refers to selecting context-sensitive pedagogical solutions) (Teacher educator 1).

Teacher educators were aware that school development is contextual and therefore emphasised the student teacher's and in-service teacher's respective roles in co-development (cf. Midtsundstad and Langfeldt 2020). Diversity in the community members' competences creates possibilities for each of the members to contribute in a different way to the common goal (Wenger 1998). In this case, the stakeholders seemed to have clear perceptions about their own and each other's expertise in relation to their negotiated goal.

Discussion and conclusion

Regarding the first research question: 'Which characteristics of a CoP can be recognised in the Primary School Teacher Education practicum?', the results revealed that according to the stakeholders, the practicum included several practices that to some extent support the CoP concept including the five criteria: *negotiated goal*, *addressed challenges*, *co-development of the community*, *leveraged individual's expertise*, and *regular and intentional interaction*. However, there was a clear mismatch between the instructional documents and the interviewed stakeholders' perspectives. The instructional documents consisted of only a few superficial characteristics concerning co-development and lacked directions that would encourage stakeholders to 'do things together'. On the other hand, most of the interviewees perceived that co-development did exist in the practicum. Characteristics supporting the idea of a CoP should be made tangible in such documents because they could provide tools for the individuals involved in the practicum to reflect on their practices and collaborate more efficiently. (cf. Wenger 1998).

There is still a need to think more about the teacher educator's role as part of the community created in the practicum. The two teacher educators took part in the negotiations for the practicum's common goals but were not actively involved in the actual co-development processes in the school context. They were instead involved in co-development from a distance by commenting on or proposing actions (cf. Tuhkala 2019). The in-service teacher mentors' role was described in some cases as more of a prospector than a co-developer. Closer collaboration with the student teachers concerning, for example, lesson planning, could result in deeper learning for the in-service teacher and in more ways to contribute to the common goal (cf. Wenger 1998). The use of technological tools or applications to build a platform for interaction could support all stakeholders' involvement in co-development of the school since their physical presence is not always possible.

The second research question was: 'How do the stakeholders perceive digital pedagogy in the context of practices for co-development?'. The results revealed that the co-development projects were related mostly through their use of various technologies in teaching and through their respective goals being negotiated by the stakeholders. The in-service teacher mentors sought ideas for how to use technologies in different teaching and learning settings, which is closely related to technological pedagogical knowledge. They also expressed that subject or content knowledge was their one area of expertise (cf. Mishra and Koehler 2006). This resulted in areas of expertise being clearly divided among the student teachers and in-service teacher mentors. The student teachers were responsible for planning how to implement technologies in teaching, while the in-service teacher mentors were responsible for the content (cf. Maslin and Smith 2017). Therefore, it was left for the student teachers to determine the effective pedagogical solutions when involving technologies.

The co-development of digital pedagogy mostly occurred at the interaction level and was perceived as making changes in individual lessons for some of the courses. Changes at the course and organisational levels, however, did not take place because the co-development did not impact course planning or lead to any comprehensive changes in school management. Such co-development would require more planning from the in-service teacher mentors in terms of how to involve student teachers and the whole school

community at these levels. Therefore, school administrations should acknowledge such practicums as contexts for co-development (cf. From 2017). The levels on which co-development is meant to have an impact could also be discussed in the negotiations for the practicum's common goal(s). This could help the practicum's co-development projects achieve a more comprehensive impact in the schools.

The study revealed that implementing the idea of a CoP in teacher education practicums may provide useful practices for co-development. In this study, the negotiated goals were related to the co-development of digital pedagogy, but future applications can involve other goals as well. This demonstrates that the strategy for implementing a CoP can be transferred to other Teacher Education programs. While implementing this method, it is beneficial to allow for negotiating the goals among the stakeholders and for discussing each other's' roles at the very beginning of the co-development process. In sum, teacher educators, student teachers, and in-service teacher mentors all have different ways of contributing to their common goals.

This study provides a strategy for implementing the idea of a CoP as part of a teacher education practicum that can connect university personnel, students, and school personnel as they work to achieve common goals. However, it is crucial to consider the fact that teaching practicums are study courses with well-established practices and regulations affecting the behaviour of the actors involved. Thus, further research is needed to formally examine and evaluate the roles of student teachers, in-service teacher mentors, and teacher educators in teaching practicums. Moreover, this case study has identified a need for an examination of the connections between the practices supporting the idea of Wenger's (1998) CoP and the learning of stakeholders involved in the practicum. This examination could yield a better understanding of the benefits of a CoP used in teacher education and school contexts.

Limitations

Construction of validity concerning reliability and replicability is raised as one issue related to case studies and qualitative research methods in general (Yin 2014). This case study sought to address this issue through the adoption of systematic procedures concerning case studies (Yin 2014) and careful reporting practices. One issue of this case study is that the results may not be transferable. The strategy for implementing the idea of CoP in Teacher Education however can be. The CoP was merely used as a perspective from which the practices for co-development among different stakeholders could be examined. Theoretical premises played a focal part in this study, which is a characteristic of deductive content analysis. Mishra

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