Pre-service Teachers' Experiences of Dialogical and Reflective Supervision through Digital Technology

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Article Info	Abstract
	In this article, we review teaching practice supervision methods using Microsoft Teams as a digital, dialogic, and reflective tool in the supervision of the pre-service teachers' teaching practicum. We applied qualitative thematic analysis to data from conversations and supervision discussions between 40 pre-service teachers and their supervisor on the Microsoft Teams chat channel to investigate pre-service teachers' experiences of teaching-practice supervision through digital platforms. The dialogical, digital, deep (DDD) pedagogical framework guided the analysis of the data. We found Microsoft Teams enhanced pre-service teachers' written dialogue, increased peer support, and enabled and deepened collective group dialogue, leading to increased understanding of teaching and learning through analyzing, interpreting, evaluating, producing, and creating knowledge.

Introduction

This article presents pre-service teachers' experiences concerning the digitalization of their supervision during practical training at a primary school teacher education program. This development experiment concerned the teaching of history, religion, and social sciences during a teaching practicum and was based on Ruhalahti's (2019) pedagogical framework of dialogical, digital, deep (DDD) learning, which recognizes the significance of dialogue in digital teaching and of learning platforms in pre-service teachers' professional growth. Finnish teacher education aims to educate reflective practitioners, teachers who are able to integrate theoretical knowledge into their practice and critically examine their experiences and actions, simultaneously growing their understanding of their development as teachers (Toom et al., 2010). Studies confirm that, in addition to being a collaborative learning and reflective tool, the use of web-based resources in teacher pre- and in-service training produces promising results (Dieker, Hynes, Hughes, Hardin, & Becht, 2015; Körkkö, 2019).

In this article, we investigate the use of Microsoft Teams as a digital, dialogic, and reflective tool in the supervision of the teaching practicum. Microsoft Teams is a chat-based collaboration platform complete with document sharing, online meetings, and many more useful features for communications. Martin and Tapp (2019) found that using Microsoft Teams developed collaborative learning as a process of peer interaction mediated and structured by the tutor. Buchal and Songsore (2019), in their turn, claim that their investigation showed that students found Microsoft Teams useful and felt comfortable using the platform to receive and

provide feedback and to share their contributions. We investigate the possibilities new digital tools offer for supervising pre-service teachers' practical training in the Finnish teacher education context. The study is a continuum for developmental processes where supervision practices have been modified in the research context to enhance student-centeredness, promote students' and supervisors' reflection skills, and strengthen the theoretical basis of supervision (Körkkö, 2020).

A pre-service teacher can use the Microsoft Teams digital platform to question and converse with not only his/her supervising didactic lecturer and supervising primary classroom teacher, the latter of whom is responsible for the pre-service teacher's practice in their classroom, but also his/her fellow pre-service teachers who are doing their practical training. In this way, pre-service teachers acquire opportunities for three-way dialogues with people with the same interests to discuss their experiences and reflect on their learning. Through utilizing these opportunities, pre-service teachers are able to analyze and interpret their experiences and, thus, achieve deep learning. Moreover, through this study, we want to encourage other teacher educators to apply technology-based approaches in their supervision. To study pre-service teachers' reflection and deep-learning, this study explored the following research questions:

RQ1: How did pre-service teachers experience three-way dialogical interactions in digital, dialogical supervision through Microsoft Teams during the pedagogical practicum of the primary school teacher education program?

RQ2: How did the pre-service teachers perceive reflection through Microsoft Teams?

RQ3: How did dialogical and deep learning occur through Microsoft Teams?

Reflective Practice in Teacher Education

Pre-service Teachers Becoming Self-reflective

Supervision during practice is an interactive process in which a supervisor guides students, at those students' own rate of growth, in the teaching profession (Korthagen & Vasalos, 2005). The supervisor also supports pre-service teachers during their practicum to resolve problems and dilemmas they may face. This guidance and these instructions aim to help pre-service teachers self-reflect, learn and find their own teaching methods (Franke & Dahlgren, 1996). The idea of conducting teaching practice is based on supervision theory, which views developing pre-service teachers' reflection skills as the key to professional growth (Kyrö-Ämmälä, 2019). This process of reflective dialogue among pre-service teachers is based on the constructivist and experiential learning model: feedback from peers and supervisors enables and enhances learning and, in this experiment, extends to professional growth (Frangou & Keskitalo, 2020; Kolb, 1984). Additionally, when using online teaching tools and in the current study of online supervision tools, tasks and instructions must be given clearly. Practical training supervision should give pre-service teachers opportunities to think, reflect, and solve problems collectively (Aparicio Landa, Sosa Moguel, & Cabanas-Sanchez, 2021). Thus, the ultimate objective is to change pre-service teachers' ways of thinking about teaching and to develop new thinking models. In sum, pre-service teachers should be able to reform and modify knowledge, and to think critically and solve problems as teams with the support of their supervisors (McFarlane, 2016; Stenberg, Rajala, & Hilppo, 2016). The purpose of practical training is to deepen the didactical knowledge students gain during their studies.

Enhancing Reflection through Guidance and Collaborative Reflection through Digital Platforms

Reflection is a key element of pre-service teachers' professional development because, through reflection, educational theory can be integrated into teaching practice (Zeichner & Liston, 1987). Reflection on experience and learning involves distancing oneself from a task and reviewing it by seeking answers to questions that arose during the task. The experiential learning cycle presented by Kolb (1984) consists of concrete experience, reflective observation, abstract conceptualization, and active experimentation. Experiential learning implemented alongside reflective activities can result in the most effective learning. In this article, we define "reflective practice" as the process whereby pre-service teachers reflect on their experiences individually as well as collaboratively with peers and supervisors to improve their teaching competency and, ultimately, their professional growth (Schön, 1983; see also Körkkö, 2020).

Pre-service teachers seem to struggle with noticing integral aspects of teaching and learning when reflecting on classroom situations because of their limited knowledge of teaching (Bryan & Recesso, 2006). Reflection can develop this knowledge when guiding frameworks or other people perceived as knowledgeable are involved; without guidance for reflection, pre-service teachers may concentrate on superficial aspects of their teaching practice (Tripp & Rich, 2012). Supervisors play important roles in pre-service teachers' learning experiences by helping them confront challenges and learn from experiences (McFarlane, 2016). Furthermore, feedback is an important tool for supervisors and teachers: supervisors use feedback to help pre-service teachers gain expected competencies and find gaps in their learning processes; feedback also enhances students' reflections, helps them build bridges between theory and practice, and increases their self-awareness (Korthagen & Vasalos, 2005). Feedback can combine both positive and negative elements, noting both areas in need of improvement and areas of competency; students, in turn, start to understand self-critique and practice it while receiving feedback from their supervisors (Kourgiantakis, Sewell, & Bogo, 2019). In addition, feedback from their peers helps individual students to develop their teaching practice (Pence & Macgillivray, 2008; Stenberg et al., 2016).

During their university studies, pre-service teachers improve their communication and teamwork skills through collaborative learning and group assignments. Nowadays, it is equally important for students to have the ability to work in face-to-face and online settings. Thus, the tools that provide such working experiences online are welcomed and integrated in higher-education institutes worldwide (Correia, Liu, & Xu., 2020). Research has shown that self-reflection writing exercises help students create new experiential learning (Thomas & Quinlan, 2014). Writing is a medium to put thoughts into words and thus it supports thinking (Frangou, 2020). Reflective writing promotes pre-service teachers' learning processes and improves the understanding of competency development and the significance of reflectivity (Akbaş & Dikilitaş, 2019).

Previous studies suggest that the use of digital video and other digital innovations, such as simulation and digital tools like Skype and FaceTime, help teachers in communication and that those platforms have the potential to serve as reflective and interactive tools when connected to the process of supervision, both in pre-service and in-service teacher education (see e.g., Dieker et al., 2015; Kopcha & Alger, 2014; Leighton et al., 2015; Tripp & Rich, 2012). According to Martin and Tapp (2019), teaching and learning with the Microsoft Teams application

is located within the social constructivism paradigm of educational theory. Microsoft Teams allows messaging, collaborative authoring, and file sharing, and thus it promotes many kinds of interaction as well as individual and collaborative learning (Buchal & Songsore, 2019; Poston, Apostel, & Richardson, 2019). The study suggests that videoconferencing systems, like Microsoft Teams, need some improvements to fit better to learning-related features and to enhance usability (Correia et al., 2020). In addition, in their studies, pre-service teachers need to develop their digital skills and find their own online teaching voices while being research and theory informed (Hu, Arnesen, Barbour, & Leeary, 2019).

Promoting Pedagogical and Reflective Thinking through Dialogue

The term "dialogue" is defined as openly sharing thoughts from different viewpoints (Phillipson & Wegerif, 2017). When using dialogue as a means to engage students during teaching practice supervision, the aim is to support the professional growth of pre-service teachers. Dialogue can take various forms; one such form is critical-reflective dialogue, which involves both constructive and real communication. Dialogue promotes and enhances pre-service teachers' pedagogical and reflective thinking (Bokeno & Gantt, 2000). In this study, Ruhalahti's (2019) DDD pedagogical model provides a fitting theoretical framework, as it concentrates on pre-service teachers learning in digital environments (see Figure 1).
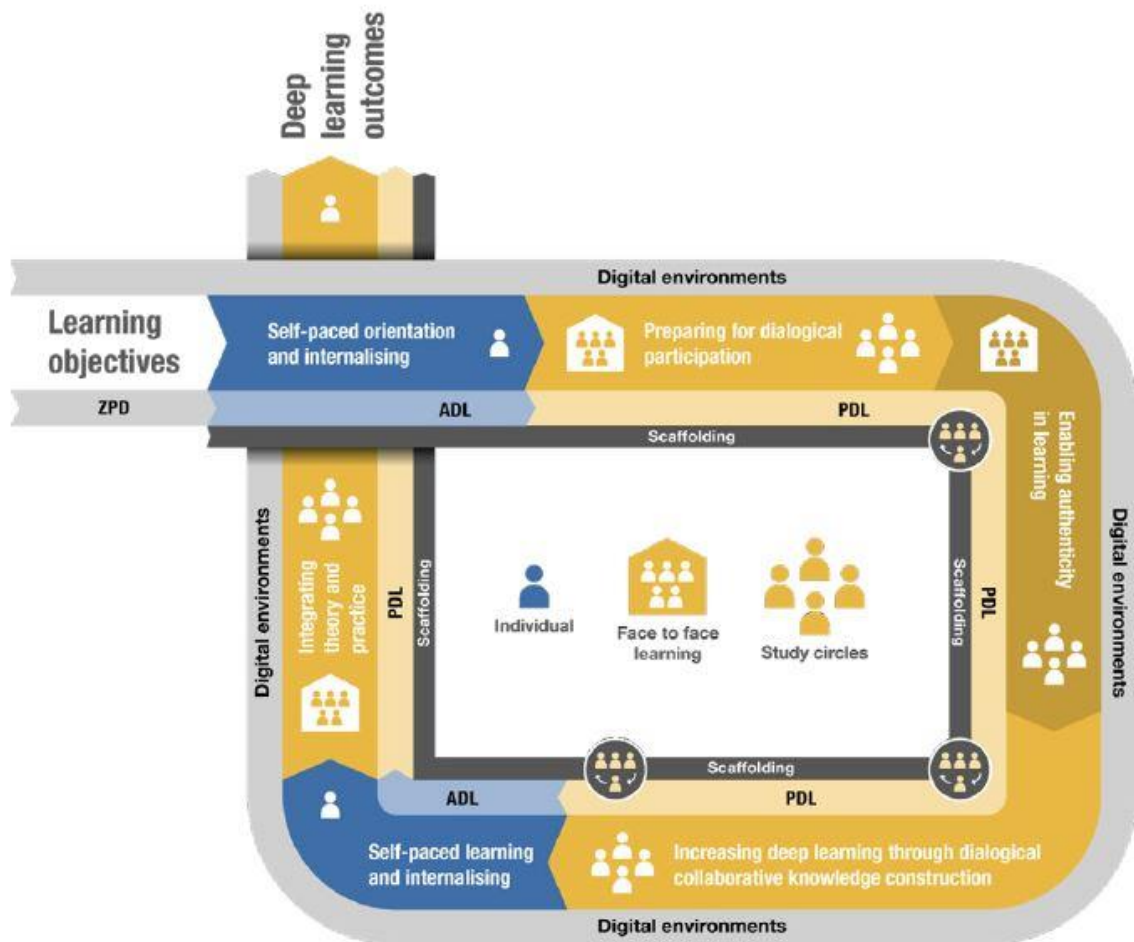

Figure 1. The Dialogical, Digital, Deep (DDD) Pedagogical Model (Ruhalahti, 2019)

The learning process in the DDD pedagogical model is a looped cycle that scaffolds pre-service teachers' learning in digital environments. 1) It begins with students' self-paced orientation on the study module's theme and objectives for the students' actual development level (ADL). 2) This is followed by students' preparation for dialogical participation, which takes place on the potential development level (PDL). 3) The learning process then continues to the phase where learning authenticity is enabled by encouraging students to ask questions, both individually and collaboratively, on the study module's theme. 4) After this phase, deep-oriented learning is intensified through dialogical, collaborative knowledge-construction in digital environments, in which the PDL of the students is high. 5) This is followed by self-paced individual learning and internalization of the theme objectives by completing individual assignments to internalize the constructed knowledge on the students' own ADLs to achieve deep learning.

Deep learning can be defined in contrast to superficial learning, such as memorization; deep learning means achievement of higher-order thinking skills, such as analyzing, interpreting, inquiring, comparing, producing, and creating knowledge (Anderson et al., 2001; Nelson Laird, Seifert, Pascarella, Mayhew, & Blaich, 2014). 6) The last phase integrates theory and practice: each group presents their project, and each student explains how he/she has understood and linked the theory to practice. In the end, the process is dialogically reflected and evaluated within the group to help students develop their competencies further. The project and the process are evaluated by the supervisor by reflecting on the group's starting point and the evaluation framework (Ruhalahti, 2019).

Method

The Primary School Teacher Education Program as a Context

The primary school teacher education program of the University of Lapland follows a research-based approach, entailing study courses integrated with research; pre-service teachers independently complete empirical research. The program lasts five years, and each pre-service teacher completes a master's degree in education studies, which includes both academic studies and practical professional development in a primary school (called the "teaching practicum"). Pedagogical and methodological studies are interconnected with the teaching practicum both chronologically and by content (Kyrö-Ämmälä, 2019; Körkkö, 2020).

The Faculty of Education is connected to the Teacher Training School, which is responsible for organizing the teaching practice. During the first academic year, each student participates in the orientation practice followed by the second-year teaching practice, the "pedagogical practicum". The third teaching practice, the "didactical practicum," aims to deepen students' didactics in different school subjects and their skills to plan and execute longer teaching periods. After the students learn the so-called "basic" work of teachers, they strengthen their competencies in the fourth year "advanced practicum" and the fifth year "field practicum." The latter can be carried out at any school in Finland or abroad. During these two final practicums, the students take more responsibility for teaching and assume more of the overall duties of primary school teachers (Autti 2018; Körkkö, Kyrö-Ämmälä, & Turunen, 2016.)

Pre-service teachers conduct their practice by observing teaching at university training school classes and starting to make their own teaching plans that take into consideration the children's age and the didactical points of the subject. Next, pre-service teachers complete teaching plans and show them to supervising class teachers and didactics (university subject didactic lecturers), the latter of whom are responsible for teaching the various subjects' didactics. After receiving permission to execute their teaching plans in practice settings with primary school pupils, supervising teacher education didactics arrive to observe at least one lesson held by the pre-service teacher with the aim of supervising and giving feedback to the pre-service teacher. Pre-service teachers who are not teaching may observe the lesson and give feedback. The supervision is organized around dialogue and reflection, supporting pre-service teachers to become reflective teaching professionals (Kyrö-Ämmälä, 2019; Körkkö, 2020).

Using Microsoft Teams as a Tool to Supervise Teaching Practice

In this case, individual reflection took place in the form of reflective writing, which was shared with supervisors via Microsoft Teams. In spring 2019, the university didactic of the University of Lapland, who was also the supervisor of the pedagogical practicum in history, religion, and social sciences, looked into the possibilities of digital supervision due to feedback gathered from students (N=40) about earlier practicum periods that indicated a need for a new form of supervision. As the supervising didactic had observed in a lesson, the students' feedback was similar to the supervising class teacher's. The feedback was usually given during recess, which generally lasted 15 minutes. Students felt the need to discuss their learning process. The university didactic struggled to allot sufficient time to provide in-person feedback to the pre-service teachers alongside the demands of his/her teaching schedule at the university and given the 3 km distance between the university and one of the two teacher training schools. The high number of students caused yet another problem. As some students' lessons occurred simultaneously, the university didactic could not always observe a lesson by every student, which introduced inequity in the supervision process. Also, the short lengths of the practices robbed the students of adequate time, adding pressure to the university didactic.

To solve these issues, Microsoft Teams was tested as a collaboration tool in the supervision of religion, history, and social sciences during the pedagogical practicum in the spring of 2019. The tool enables online collaboration and information sharing in common online spaces with chat-based possibilities, including team chat and one-on-one chat, calls, and document collaboration. Another reason for selecting Microsoft Teams was that it was the new recommended collaboration tool by the University of Lapland and that is why the students' were to get familiar with the program as well as the university didactic responsible for data collection in this experiment. In the Microsoft Teams application one can create a team and invite participants to it. Doing this creates a general channel on which the participants can chat. The team's creator can add channels with different topics within the team, and in the channels the participants can also share and co-author different types of documents. Microsoft Teams is provided as a mobile and desktop application (Microsoft, 2020). Figure 2 is a screenshot of the Microsoft Teams application's discussion channel.
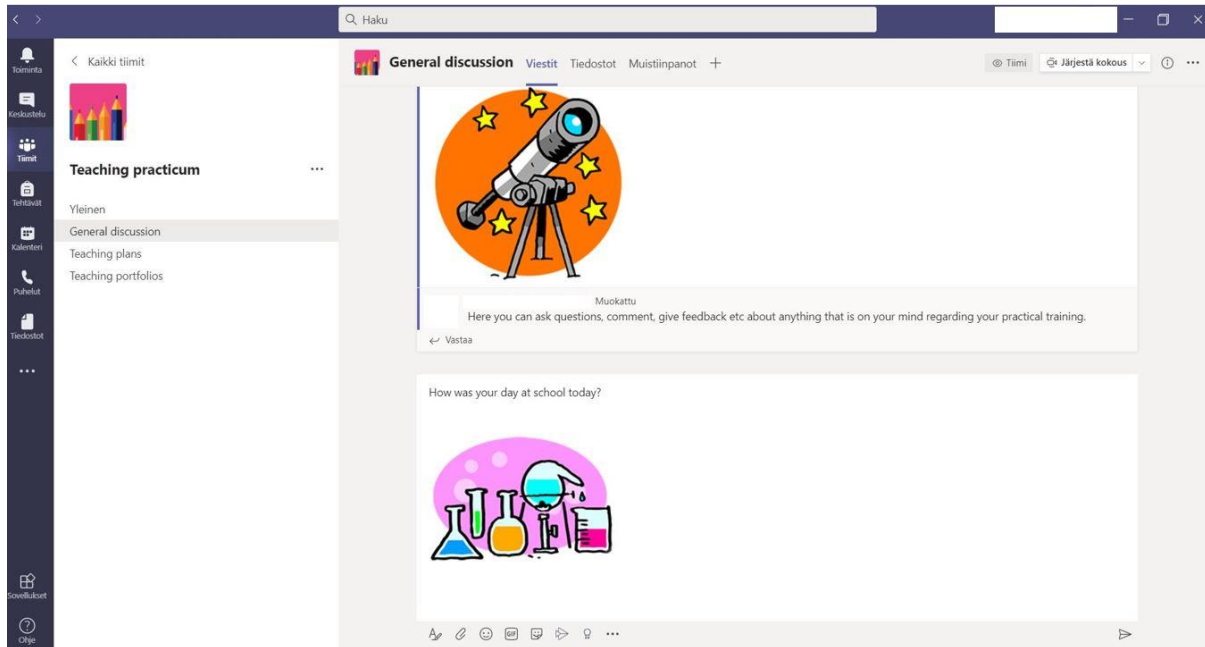
Figure 2. Screenshot of an Example of a Microsoft Teams Discussion Channel

Before the practicum began, the pre-service teachers received topics to teach in each school subject and the amount of teaching time, as normal. After that, the pre-service teachers met the supervising university didactic of the specific subject at the university, who also acted as a supervisor of the practicum. The pre-guidance was timetabled in groups by school subject and school grade, and lasted between 1.5 and 2 hours, during which time the pre-service teachers planned their lessons under the guidance of the university didactic. Pre-service teachers also had opportunities for pre-guidance peer support, since all pre-service teachers teaching the same school subject in the same class grade were planning simultaneously. In this study, the pre-service teachers were informed about the Microsoft Teams experimental supervision and that the data collected would be used for research purposes. Students signed a consent form during the pre-guidance, granting us permission to use material collected as well as their demographic information. At the same time, detailed instructions for using Microsoft Teams were given. During pre-guidance, the pre-service teachers had nearly finished their teaching plans.

The supervision and discussion of the Microsoft Teams platform began with some encouraging words from the supervisor during pre-guidance meetings. It was important at the beginning of the practicum to ensure pre-service teachers understood the significance of supervision and reflection. The next step was to ensure that the online collaboration was going to work. The pre-service teachers were encouraged to read each other's plans and give feedback on them. The pre-service teachers were also reminded to request peer feedback and write in Microsoft Teams about their feelings on and reactions to the feedback.

Right before the teaching practice began, the pre-service teachers showed their teaching plans to the training schools' supervising class teachers. After receiving feedback from them, the pre-service teachers discussed and reflected on this feedback in Microsoft Teams by chatting as a group. Some teaching plans did not require any changes, while others did. If the pre-service teachers were guided to make changes to their plans, they had

opportunities to solicit the opinions of their peers and the university didactic at the same time in Microsoft Teams. The changes requested by the supervising class teachers were mainly due to pre-service teachers' plans not suiting particular pupils. During the pedagogical practicum, after meetings with the university didactic and supervising class teachers, pre-service teachers added their lesson plans to the Microsoft Teams chat. The pre-service teachers usually put the final touches on their lesson plans in co-operation with their peers in the chat group. The university didactic mostly assumed the main role of commenting on the plans, while the other students joined the conversation to varying degrees. After giving a lesson, each pre-service teacher was expected to write a reflective portfolio. Additionally, those pre-service teachers who observed the lesson each wrote a minimum of 250 words of feedback to the pre-service teacher who gave the lesson. This feedback was sent by email, but it was also discussed in Microsoft Teams, as the pre-service teacher had to write a reflective analysis on the comments received in Microsoft Teams.

Participants, Data Collection, and Data Analysis

Since our aim was to interpret pre-service teachers' conversations on the Microsoft Teams chat channel, we adopted qualitative methods, enabling us to find the deep meanings of pre-service teachers' perceptions of their academic and professional growth by analyzing their self-reflections within the theoretical framework of pre-service supervision through dialogical learning. We conducted the study with second-year primary school pre-service teachers (N=40) at the University of Lapland, Faculty of Education. The data consist of conversations and supervision on the Microsoft Teams chat channel between the supervising university didactic and pre-service teachers, both individually and collectively, and between the pre-service teachers on the subjects of history, religion, and social sciences. Students doing their teaching practice in the same classrooms observed each other's lessons and gave written feedback on those lessons.

All data were analyzed by the first, second, third, and fourth authors of this article using qualitative thematic analysis (Erlingsson & Brysiewicz, 2017) by carefully monitoring the interaction and dialogues between the supervisor and pre-service teachers. The dialogical aspects and dialogue participants were also noted. The group dimension was one dimension, and the quality and extent of the dialogues was another dimension of analysis. The transcribed data, 12-point Arial font with 1.15 spacing, was first read line-by-line. The data consisted of 31 pages of dialogue on religion, eight pages of dialogue on social sciences, 10 pages of dialogue on history, and two pages of feedback on Microsoft Teams: 70 pages altogether. The analysis then progressed from the setting of research questions to thematizing, coding, paraphrasing, seeking connections, and categorizing the data, which all led to a summary of the main themes.

Ethical Considerations

This research followed the guidelines of the Finnish Advisory Board on Research Integrity (2012). All students' discussions were anonymized. Each student could choose whether or not to provide written consent to the researchers to use their Microsoft Teams material for this study, and all students were supervised the same way whether they gave the permission or not.

Results

Microsoft Teams as a Digital, Dialogical, and Reflective Tool in the Supervision of the Teaching Practicum

This paper aimed to investigate how Microsoft Teams functioned as a digital, dialogical, and reflective tool in the supervision of the primary school teacher education practicum. The first two research questions – how did pre-service teachers experience three-way dialogical interactions in digital, dialogical supervision through Microsoft Teams during the pedagogical practicum of the primary school teacher education program, and how did the pre-service teachers perceive reflection through Microsoft Teams – are formed in terms of Ruhalahti's (2019) model of DDD learning. The results of these two questions are considered the background of the findings of research question three about deep learning, which gives a holistic picture of how pre-service teachers' reflective thinking can be supported through supervision through digital devices. At the end of this section, pre-service teachers' experiences are reflected in the six stages of the DDD pedagogical model that aims to scaffold pre-service teachers' learning in digital environments.

The Pre-service Teachers' Interactions in Digital Dialogical Supervision during the Pedagogical Practicum

The first research question asked how did pre-service teachers experience three-way dialogical interactions in digital, dialogical supervision through Microsoft Teams during the pedagogical practicum of the primary school teacher education program. Thus, this study investigated the interaction collaboratively and individually between supervisor and student, between individual peers, within groups of students and between student groups and the supervisor via the discussions on Microsoft Teams during the practice.

Dialogue between Pre-service Teachers and the Supervisor

In the experiment, the supervisor promoted interaction and collaboration by posing questions to start the pre-service teachers' reflection processes in the Microsoft Teams chat concerning the teaching plans. In line with Ruhalahti's (2019) DDD model's first stage, this was also an opportunity to encourage the students to self-paced orientation on the practicum themes and objectives. Later on, the supervisor urged the students to describe their practical training, what they learned from it, and how they would use the knowledge later. This corroborates with Ruhalahti's (2019) DDD model's second and third stages, in which the students are prepared for dialogical participation and encouraged to ask questions.

At the beginning of the supervision process, the supervisor guided pre-service teachers to refine their teaching plans or focus their attention on the appropriate areas. At the same time, deep oriented learning is enabled and intensified as per stage four of Ruhalahti's (2019) DDD model. The following excerpt shows the supervisor giving a student feedback about a teaching plan the student added to Microsoft Teams:

I think there are many different points that can be explored with the students with no hurry … if you

want the pupils to look at the pictures independently, you can, for example, take iPads in the classroom, and they can choose one of several pictures, for example in pairs, to start working on. (Supervisor)

The student replied:

Thank you very much, this is absolutely perfect! :) (Pre-service teacher 3)

The supervisor and pre-service teacher discussions mostly concerned the contents of the teaching plan, lesson methods, and after-lesson reflections on ways to improve teaching, as shown in the following student chat excerpt:

I got positive feedback on student orientation and engagement [from the practice school teacher and pre-service teacher peers]. The atmosphere was calm and the pupils were interested in the subject. The plan was changed a bit in the end …. The whiteboard exercise and songs inspired the pupils and provided a good contrast to the discussions. Personally, I began to think that more pictures could have been used to support the teaching. (Pre-service teacher 20)

The pre-service teachers' reflective processes and self-evaluation are evident in these dialogues. One pre-service teacher reflected on the atmosphere of the learning environment and, based on that, drew conclusions on how teaching should be developed. The pre-service teacher observed that the different kinds of classroom tasks helped motivate the pupils to engage with the lesson contents:

There was some kind of restlessness during the lesson which disturbed a little, and I had to spend some time to calm them. Especially during the activity game, the pupils got excited and the questions didn't quite stay in the theme :). We proceeded [well, however,] and went through everything I had planned. Good feedback/positive notes came for example for these: clear instructions, concepts on the board [being] good and altogether opening the concept, how we studied the pictures and discussed them and the questions for the pupils :) (Pre-service teacher 36)

The supervisor answered the student, encouraging her to reflect and also pointing out parts of the lesson that were successful and parts that the pre-service teacher may have needed to consider more:

Really good feedback, congratulations :) …. It was so well planned that I believed that it would go well, and now you were able to do reflection about the lesson. So, now start planning the next lesson, do as punctual [a] plan as the former one and structured guiding, [and] you will do great :) (Supervisor)

Following stage five of Ruhalahti's (2019) DDD model, pre-service teachers' thinking included aspects of interpreting and comparing teaching experiences. Ruhalahti's (2019) DDD model focuses on teaching design skills and designing learning support structures to deepen learning and prepare for dialogic, collaborative knowledge-building. The starting point for learning must be authenticity, both individually and in a group

context, and support for an exploratory approach in dialogical, communal knowledge-building. The extracts presented above illustrate one application of the DDD model: the university didactic did not offer the students ready-made solutions to teaching situations but encouraged them to ponder alternatives and make choices they considered the most relevant in certain contexts. Hence, the supervisor applied reflective approach methods, aiming to support pre-service teachers' learning from practice (cf. Franke & Dahlgren, 1996) and succeeding in combining theory and practice, as per stage six of Ruhalahti's (2019) DDD model. The digital tool promoted dialogue between the supervisor and the pre-service teachers, as well as among the pre-service teachers, independent of place and time (cf. Buchal & Songsore, 2019; Leighton et al., 2018).

Peer-to-peer Interaction

Peer-to-peer interaction and collaborative, reflective dialogue seemed beneficial in the communication between pre-service teachers (see also Körkkö 2020). This corroborates Ruhalahti's (2019) fourth stage of the DDD model, in which deep-oriented learning is intensified collaboratively and dialogically. For example, in the excerpt below, a pre-service teacher gives feedback on the motivating approach of a peer's lesson plan and how the lesson's final exercise helped to take each pupil into account. Giving feedback in this way both motivates its recipient and helps the giver practice offering feedback to their peers:

> Hey! A versatile and clear lesson. You have a fun approach to teach the pupils about the topic, and you also take advantage of pair work during the class. Relaxation at the end of the lesson is good and you get to give attention to each student personally! (Pre-service teacher 35)

Students find peer support motivating and helpful. One student, for instance, said that peer feedback was enjoyable and left a good feeling afterwards:

> Other students encouraged and supported me to try different kinds of ways and gave feedback so that I was feeling happy afterwards. (Pre-service teacher 39)

One pre-service teacher found it nice to hear that their peers might later use tasks that the pre-service teacher had created. The peer support thus functioned as two-way learning. Comments from students indicated that they found positive peer feedback very supportive and encouraging:

> I got good feedback from the other peers[,] and they said that my lesson [was] really good. We talked about how to motivate the pupils [with] content that might not motivate them in [the] first place. I was pleased that I still manage[d] to motivate pupils [with] such tricky content. I loved to hear that my peers might do similar things with their pupils in the future. (Pre-service teacher 2)

Peer feedback was also helpful in identifying successful aspects of the lesson that the pre-service teacher giving the lesson had overlooked. Obviously, pre-service teachers were sometimes stuck on problems they had during lessons and lost sight of what went perfectly.

> When I got the feedback, I understood that there were many successful things in my lesson that I [had] not noticed by myself. Namely, I concentrated on thinking about my own doing and to work, for example, [on] time spent copying and computers. I received positive feedback e.g. from my slideshow and the end of the "quiz." (Pre-service teacher 8)

Peers might also think together about how to do things differently. The excerpt below shows how pre-service teachers sought alternative solutions to a peer's challenges. The pre-service teacher's response to peer feedback indicates they found it helpful and enjoyed receiving new ideas about how to proceed with practice lessons. Students discussed the kinds of challenges diverse pupils bring to practical teaching:

> The other students commented that the lesson was nicely implemented, as it was not any basic lesson, so it brought a nice variability. It was considered whether it would be worthwhile to carry out the task together, as there are many students in the classroom who are not self-directed but need quite a bit of support to progress. (Pre-service teacher 12)

Like the excerpt below shows, peer support was important because it helped put the pre-service teacher's own ideas and experiences in order, supporting the fifth stage of Ruhalahti's (2019) DDD model: that deep-learning means the ability to analyze, interpret, inquire, and compare in the process of knowledge construction.

> At first … there was such a confused feeling[,] and it felt a bit like I couldn't really say, yeah, and not share how it went. All in all, the work went pretty well, but writing took more time than I had planned and the drawing instructions should have been slightly different. I received feedback from both the teacher and peers that the start was a good one because I drew the students' own thoughts on what the topic included on the board. (Pre-service teacher 13)

One pre-service student also commented on the quality and content of the feedback:

> Feedback mainly focused on giving directions where there was little room for improvement, but overall the lesson went well[,] and based on the feedback[,] I succeeded at least at meeting the students, managing the class and actively participating and helping in the group work situation. (Pre-service teacher 20)

The results indicate that Microsoft Teams served as a practical platform for pre-service teachers to share experiences, ask questions, give comments, and generally provide and receive constructive feedback that helped them develop their teaching further (cf. Buchal & Songsore, 2019). Because all the text was saved on the chat forum, the pre-service teachers were able to go back to it and engage or re-engage with comments and feedback at any time (cf. Correia et al., 2020; Smith & Israel, 2010). That kind of feedback included both positive comments and developmental suggestions. Students appreciated the feedback because it had the potential to promote the construction of their professional identities and teaching practice (Martin & Tapp, 2019; Ruhalahti, 2019). At the same time, the students had the opportunity to dialogically reflect on how they had managed to

integrate theory and practice in the practicum, as well as to reflect on the feedback and their learning in the group, as per the sixth stage of Ruhalahti's (2019) DDD model.

The Pre-service Teachers' Perception of the Digital, Dialogical, Collaborative Reflection

The second research question focused on examining how Microsoft Teams performed as a digital, dialogical, reflective tool according to the pre-service teachers' views of their collaboration. The pre-service teachers were asked how they had experienced supervision via Microsoft Teams after they finished their practicum. The students that had taught the same subject in the same grades engaged in a collaborative dialogue via a Microsoft Teams group call. The calls were stored on the chat platform. If a student could not attend the call, he/she could give feedback during one-on-one calls with the supervisor or write feedback in the Microsoft Teams chat. The supervising university didactic led the discussion, which aimed to solicit feedback from the students to improve supervision of future practicums. At the end of the feedback session on Microsoft Teams, the students could discuss anything that came to mind about the practicum. The supervisor asked the following questions during the call and on the chat platform:

> Now at the end of the practicum, I want to ask how … you [felt] about your practicum: How did you experience the peer feedback and the feedback you got from the supervising primary school teacher at the practice school? How do you perceive the supervision through Microsoft Teams? How do you perceive the feedback I gave you? What else do you want to [say]? (Supervisor)

The students were positive in their responses. They were pleased about the supervision. They explained that the supervision through Microsoft Teams helped them plan their practicum lessons.

> I have a very good feeling about my lessons. I feel that your supervision helped me a lot and that I got good ideas for my lesson during my supervision. Those lessons were designed rather easily, as they were a continuation of each other. I would have liked to continue teaching! I got really good feedback from the supervising primary school teacher that my lessons were motivating, timely and concrete. (Pre-service teacher 1)

In another chat, the same student indicated that the reflection and learning process had started:

> The Microsoft Teams was, in my opinion, a well-functioning and good platform. I don't feel that I would have gotten more or less if you had been there to observe my lessons. The supervising in-service teacher and the other students encouraged me to try different ways and gave feedback so that I felt very good at the end! (Pre-service teacher 1)

The pre-service teachers described the quick, direct responses via Microsoft Teams as important, as they received timely responses to their issues. More than half the students felt that this kind of support was significant because they felt they needed instant support after the lesson. Flores and Gago´s (2020) study also found a need for instant response. Also, according to their results, the students who were in their first or second

academic year, needed to receive feedback quite quickly and had more questions for the supervisor during their practicum than the students, who had already spent a longer time in teacher education.

Furthermore, the written notes and feedback given by fellow students who had observed the pre-service teachers' lessons were described as really important for these students' professional growth. However, although the students found the feedback valuable in helping their professional growth, they reported that piloting the Microsoft Teams experiment caused them extra work, just as they might see using technical applications in general (cf. Körkkö, 2020). Based on that, there is a need to explain that providing and receiving this kind of feedback is part of their studies and part of constructing their experiences, not something extra or voluntary. The students expressed how valuable they found the peers were who observed their lessons and brought up issues that they or the supervising in-service teacher could not see. Alternatively, the students' feedback strengthened their own opinions and/or those of the supervising in-service teachers. This helped the pre-service teachers to be more secure and certain about their teaching skills and planning.

> I got positive and constructive feedback from the lecturer of the training school and fellow students. They liked my lessons and teaching methods. Pre-guidance at the university gave me a lot of good ideas on how to execute my lessons. I got help from you (supervisor) and also from the other students who taught the same subject. I felt supervision through Teams [was] quite nice and functional. (Pre-service teacher 36)

Students' comments suggested they were happy with the supervising tool and the way the supervision functioned.

> At first, I was hesitant about Microsoft Teams and the guidance it provides, but in hindsight[,] this was really convenient. … [T]his is not a completely negative thing. Overall[,] a positive experience. (Pre-service teacher 2)

This feedback is very constructive and beneficial for the further development of digital supervision, as the pre-service teachers indicated both their positive and negative experiences using it (cf. Buchal & Songsore, 2019). The fact that the supervisor in the Microsoft Teams could not see the overall situation, nor the pupils the whole picture of each lesson, was pointed out. Some students suggested that they would have liked to meet the university didactic at the training school during the teaching practice; they had a feeling of "being alone" and wished for face-to-face meetings as well (see also Nelson, Nichter, & Henriksen, 2010).

However, using Microsoft Teams brought students from two different training schools together, and those in the second training school had the opportunity to receive support from others who taught the same subject. Notably, if the supervising didactic could not respond to questions regarding lesson plans on short notice, other students would write a few comments and would not leave their peer alone without any response. The Microsoft Teams group chatted about the supervision discussions visible to all so that everyone could see what kinds of issues students faced, and they commented on and learned from each other's experiences. This kind of communication helped pre-service teachers' professional growth and opened their understanding to different forms of planning

and conducting teaching. Naturally, they also learned that there are different processes behind the different choices (see also Buchal & Songsore, 2019). As the student experiences suggest, the Microsoft Teams platform encouraged and enhanced reflections that, in turn, enabled and deepened collective group dialogue and reflection, facilitating the addressing of problems and providing an opportunity for dialogical, digital, and deep learning (Ruhalahti, 2019).

Dialogical and Deep Learning through Microsoft Teams

The teaching practice experiences can be reflected upon the different stages of Ruhalahti's (2019) DDD pedagogical model (Figure 1) in order to evaluate Microsoft Teams as a dialogical and deep-learning tool. For this evaluation, the third research question brings together the findings from the first and second research questions regarding pre-service teachers' three-way dialogical interactions in digital, dialogical supervision through Microsoft Teams during the pedagogical practicum of the primary school teacher education program, and how they perceived reflection through Microsoft Teams.

In the first stage of the DDD model (Ruhalahti, 2019), the pre-service teachers familiarized themselves with the topic, materials, and objectives of their respective subjects and lessons. This was followed in the second stage of the DDD model (Ruhalahti, 2019) by the pre-service teachers' preparation for dialogical participation, which in this case occurred in the pre-guidance, in which the significance of active participation in the Microsoft Teams communication was stressed. In the third stage of the DDD model (Ruhalahti, 2019), the supervisor encouraged learning authenticity with questioning and dialogue, both individually and collaboratively, taking teaching subjects into consideration. These questions supported the pre-service teachers' engagement in their learning processes. During the DDD model's (Ruhalahti, 2019) fourth stage, dialogical collaboration among the pre-service teachers as well as with their supervisor enabled deep-oriented learning. In these discussions, they could link their earlier questions, theoretical knowledge, and practice. The fifth stage of the DDD model (Ruhalahti, 2019) involved self-paced individual work to reach deep understanding and learning; this work consisted of the pre-service teachers' reflective portfolios. The sixth and final stage of the DDD model (Ruhalahti, 2019) integrated theory and practice, and, in the end, the process was dialogically and collaboratively reflected upon and evaluated to support the students to further develop their competencies. The classroom teachers also evaluated the process by reflecting on the pre-service teachers' subject groups' starting points using the evaluation framework.

Reflecting on the six stages of Ruhalahti's (2019) DDD pedagogical model and the process and findings of this experiment, we conclude that Microsoft Teams brought three distinct dimensions into the practicum. First, it enhanced the written dialogues between the supervisor and pre-service teachers, as the pre-service teachers wrote about their plans and then, after the lessons, the students wrote about their teaching experiences in the Microsoft Teams chat group (cf. Correia et al., 2020; Poston et al., 2019). Some reported positive teaching experiences, others negative. Some also wrote in neutrally informative ways. In all cases, the university didactic responded and targeted the supervision individually in a supportive, encouraging, and challenging way to direct the growth of the pre-service teachers and promote individual learning, as Ruhalahti (2019) states in DDD

model. Second, communication in Microsoft Teams increased peer support, since it promoted dialogue between pre-service teachers (cf. Correia et al., 2020). After each lesson, the observing pre-service teachers wrote feedback to the pre-service teacher who had given the lesson. After reading the feedback, the pre-service teacher who had given the lesson wrote a reflective analysis about the feedback to the Microsoft Teams chat group, and this analysis was then discussed in the group. Third, communication in Microsoft Teams enabled and deepened collective dialogue and reflection between the supervisor and pre-service teachers as a group, resulting in deep understanding of pedagogical approaches. As a result of the feedback and notes given via Microsoft Teams (by peers and the university didactic), each pre-service teacher could reshape their teaching and lesson plans before the actual teaching practice and discuss their feelings right after the teaching experience, thereby truly connecting theory and practice.

Furthermore, in this research, deep learning was enabled and supported through interaction and collective group dialogue, as well as through reflection by the supervisor and pre-service teachers as a group. Communication between all parties was enhanced, resulting in a deep understanding of pedagogical approaches and connecting theory and practice. According to Ruhalahti's (2019) model, part of the scaffolding of deep learning is peer feedback. One student, for instance, commented on another student's lesson plan:

> I think that you have approached this sensitive topic really [well]. You deal with the topic with the group[,] but you give them an opportunity to think by themselves, which surely benefits different kinds of learners. (Pre-service teacher 35)

> One student gave motivational feedback to another, which the receiver enjoyed:

> A many-sided and clear lesson. You go through the topic in a nice way[,] and you utilize also the possibility for peer work during the lesson. (Pre-service teacher 35)

Based on the research data and according to Ruhalahti's DDD model (2019), deep learning is achieved through interaction and communication enhancement. The supervisor is proactive and supports interaction to initiate pre-service teachers' reflective processes. The supervisor comments on the lesson plans and encourages interaction between peers. The supervisor also helps concretely and asks questions of the pre-service teachers. Based on the research data, students seem to realize new perspectives suggested by their peers and supervisor due to these interactions (see also Körkkö, 2019).

Discussion

The aim of this research was to describe the experiences of pre-service teachers using Microsoft Teams as a digital, dialogical, and reflective tool during the pedagogical practicum in the primary school teacher education program in the Finnish pre-service teacher education context. Microsoft Teams brought several new dimensions to the practice as it introduced systemized interaction and reflection throughout the practice period. According to students, first, it enhanced dialogue between the supervisor and each student teacher; second, it increased peer

support, since it encouraged and supported the dialogue between pre-service teachers; third, it enabled cooperative group dialogue between the supervisor and pre-service teachers as a group; fourth, it deepened reflections; and fifth, it helped the students mature as professionals. The experiment revealed that the dialogical nature of the group supported the construction of a network and team atmosphere that lasted the entire teaching practice. The results are consistent with previous studies that identified how the use of web-based platforms together with a reflective supervision enhanced pre-service teachers' communication and learning from their practice (Buchal & Songsore, 2020; Kopcha & Alger, 2014; Martin & Tapp, 2019; Smith & Israel, 2010). Resonating with the findings of Buchal and Songsore (2020) and Poston et al. (2019), pre-service teachers found Microsoft Teams to be a functional tool for peer-to-peer and student-to-supervisor interaction. In line with previous studies, our findings highlight the importance of the supervisor's and pre-service teachers' active participation in the learning process regardless of the actual digital tool used (see also Pal & Vania, 2020). Figure 3 illustrates this new kind of supervision.

Figure 3. Continuous Digital Dialogue during the Teaching Practice as an Aid to Support Professional Growth

A digital and communicative method and platform visualizes the pre-service teachers and their individual

growth supported by interaction in Microsoft Teams. The supervisor helps students by interacting to develop reflective thinking, and the student group works as a supportive reference frame. Actual future development is then group-based, socio-constructive dialogue, and the supervisor's pedagogically supportive questioning and reasoning helps students achieve their learning outcomes more easily. According to the discussions, the students were pleased with the instant support provided by Microsoft Teams. Most felt that the feedback from their fellow students on Microsoft Teams was valuable, albeit not as meaningful as the university lecturer's guidance. Students described the feedback given in written notes as being valuable in their professional growth. However, when they subsequently observed and wrote feedback about other students' lessons, they felt it would have been better to give the feedback face-to-face. The written feedback from fellow students therefore needs more planning and deep rethinking of its import.

We acknowledge some limitations of this research when evaluating its results. First, team chat notes were quite short and included emojis; second, the students might not have had the courage to tell the supervisor what they truly thought; third, not all the students used Microsoft Teams regularly. The small sample size of pre-service teachers also might have skewed the results as merely examples of digital supervision, not a whole branch problem. After reading supervising online discussions carefully, we realize that content, pupil behavior, and methods are at the core of the discussion. If we would like to develop pre-service teachers' abilities to reflect, we could put effort into refining students' abilities to debate the options, evaluate them, and invent new ways to do things. To sum up, pre-service teachers often do not reflect their emotions despite receiving feedback from their peers. We obviously need to put effort into questioning and developing pre-service teachers' abilities to reflect on their emotions. Furthermore, supervisors and pre-service teachers could benefit from using theoretically justified and empirically tested reflection frameworks that focus on enhancing reflection on many levels of learning, including the emotional and motivational sides (see Korthagen & Vasalos, 2005; Körkkö, 2019).

Conclusion

The aim of this paper was to describe and develop a new kind of supervision for teaching practicum using digital dialogical guidance. At the beginning of the research process, supervision through Microsoft Teams was not a permanent practice in the primary school teacher education program, but, following the first trial, it has gained a firm ground as part of the curriculum. According to the results, using Microsoft Teams changed the traditional supervising model into a three-way dialogue between lecturer and student, lecturer and students, and student and students. This result brought a new dimension to the teacher education practicum and simultaneously changed the decades-old norm of the university didactic observing single lessons given by pre-service teachers, by offering a place to discuss practicum-related issues throughout the practicum. At the same time, the students were offered an opportunity and place for professional growth and deep learning in which they could connect theory to practice. Dialogue throughout the teaching practicum ensured that the pre-service teachers had support from the university didactic as well as other students who taught the same subjects at the same level. Communication via the online platform occurred daily, so students' reflection became regular and dialogue-based, and, thus, pre-service teachers' learning achieved deep levels. This created possibilities for pre-

service teachers to reshape their teaching and develop their competencies with a wider base of support from the university didactic and their fellow pre-service teachers. Moreover, the pre-service teachers had a chance to organize their thoughts by writing comments on the chat channel.

The pre-service teachers evidently saw supervision through Microsoft Teams as either neutral or positive. One reason for this might be that they had no other kind of supervision experience from the university didactic because this was the first practicum where the pre-service teachers gained supervision from the university didactics from different school subjects. The pre-service teachers had no experience of the "old" type of guidance based on lesson observation and the supervisor's feedback. Another reason might be that most students are familiar with using Microsoft Teams. Although young students are generally used to using digital tools, they can still present challenges, so some students will need support in digital tool use and practical ways to learn (e.g. Flores & Gago, 2020).

Resonating with the findings of previous studies, this study suggests that the chosen digital platform formed a place which fostered communications between the supervisor and the students and among the pre-service teachers; flexible access to all text material and the possibility to react any time were critical features in this interaction (e.g. Leighton et al., 2018; Martin & Tapp, 2019). The results of this study suggest that Microsoft Teams is a successful digital, dialogical, collaborative reflection tool that works well in the teacher training practicum. However, the university didactic must plan ahead and be willing to communicate on the platform daily. Online supervision is different from supervising face-to-face because a supervisor has not observed a lesson and thus has not the same context knowledge as the pre-service teacher. In online supervision, pre-service teachers bring their experiences into the supervising discussion and the focus is on promoting pre-service teachers' reflection process (cf. Körkkö, Morales Rios, & Kyrö-Ämmälä, 2019). Therefore, a supervisor must have adequate skills to guide pre-service teachers to notice integral aspects in their teaching to support their learning from experiences. Pre-guidance is significant, since the structures of the lessons are included and the students gather as a group that teaches the same subject for the first time. This "ice-breaking" meeting gives the students opportunities to meet each other, easing future conversations in the Microsoft Teams chat. Even though the students in this study were from the same class (of approximately 80 students), they did not necessarily know each other well, and the ice-breaking pre-guidance meeting only enhanced the group dynamics.

Recommendations

Finally, this experiment brings new ideas to the field of teacher education. According to our experiment and experiences, the Microsoft Teams platform makes it possible to create a trusting, comfortable learning atmosphere for teacher education, as it brings asynchronous reflective tools that can be used to construct and share ideas around teacher education practice. Microsoft Teams makes reflection and learning visible. One can reflect without being bound by time; you can do so immediately or when it fits your schedule. One also receives supervision whenever needed. The supervisor needs to be available to respond quite soon, however, so that students are helped in a timely manner.

The multiple dimensions of this digitized teacher education practice enabled deep learning for pre-service teachers through dialogue and collaborative reflection. The experiment revealed that its dialogical nature supported the construction of a network and team atmosphere that lasted the entire teaching practice. Dialogue during the teaching practice expedited the professional growth of the pre-service teachers since support and guidance were constantly available. Other teacher education programs are encouraged to adopt new digital methods to supervise students to capitalize on the benefits of deep learning. Digital devices also support pre-service teachers' abilities to use them in their own learning and in their future teaching professions.

Future research should focus on finding out how the use of Microsoft Teams can support its users learning during teaching practice. To enhance development of pre-service teachers' critical reflection skills and strengthen supervisors' competence, it is important to study in detail pre-service teachers' and supervisors' actions and experiences. Through this, it is possible to offer both theoretical and practical support and define guidelines for digital, dialogical, and collaborative reflection through different technological devices. Moreover, it would be interesting to compare the experiences of those pre-service teachers who are supervised through Microsoft Teams with those who experience the "old" type of supervision. This kind of study would reveal the benefits of both supervision styles and find ways of connecting these two approaches.

Notes

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