EXPANSIVE LEARNING IN TEACHER EDUCATION

EDITED BY: Ainat Guberman and Kari Smith

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EXPANSIVE LEARNING IN TEACHER EDUCATION

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Editorial on the Research Topic

Expansive Learning in Teacher Education

The quality of teaching plays a central role in preparing today's children for participation in a rapidly changing world. Subsequently, the quality of teacher education is a pre-requisite in the education of teachers for today and the future (European Commission, 2013). Acknowledging that traditional work methods and knowledge transmission no longer suffice, groundbreaking innovations are sought. "Expansive Learning" is a term coined by Engeström (Engeström and Sannino, 2010) to describe the creation of new professional knowledge, as opposed to learners' acquisition of existing knowledge previously unknown to them. This special issue deals with expansive learning in teacher education.

Engeström and Sannino (2020) describe four generations of cultural-historical activity theory. In its simplest form, activity is a culturally mediated action such as teaching. Second generation activity theory analyzes relatively durable systems such as schools, that are oriented toward a meaningful societal goal. Activity systems have norms, tools and division of labor. Two or more activity systems that have a partially shared object are the unit of analysis for third-generation activity theory. Partnerships between higher education institutions and schools in initial teacher education are an example. Finally, fourth-generation activity theory deals with large numbers of activity systems that jointly attempt to resolve global issues.

Expansive learning involves a three-pronged change: transformed practices, novel theoretical conceptualizations, and an empowered sense of agency. Expansive learning is often a social, and not merely an individual change, and it transforms all aspects of the learning organizations' professional activity: its vision and goals, practices or products. Learning develops gradually in cyclical processes in the learning organizations' `proximal development zone' (Vygotsky, 1978). A new circle opens when existing, stable achievements which were formed in previous cycles are called into question. The outcome is not guaranteed. The process is fraught with misunderstandings, lacunae, conflicts, and unexpected outcomes. It is heavily influenced by the personal characteristics of the participants, their existing knowledge and goals, and their values, emotions and habits. However, failed attempts may become a source of learning and inspiration for others (Engeström and Sannino, 2010; Sannino et al., 2016).

This special issue presents studies of projects in teacher education that attempt to transform accepted practices and conceptualizations at different levels: from individual teacher educators and institutions to international collaborations. Our aim with this issue is that it will contribute to the collective effort to provide teacher educators, teachers and students with new insights and knowledge about expansive learning.

The paper "Teacher Educators and Expansive Learning in the Workplace and Beyond", authored by Jean Murray, Warren Kidd, Andrea McMahon, and Sheeba Viswarajan describes how a professional learning experience of teacher educators generated sustained changes in teaching

and research practices within their institution, as well as in their own sense of agency and professional identity.

Three papers explore the relationships between schools and teacher education institutions and align with third generation activity theory. The paper "Expansive Learning within a Teachers Community of Ongoing Learners (TCOOL)", authored by Frances Rust, Meghan Dunn and Sabrina Silverstein presents the first iteration of a project designed to prepare teachers for high poverty urban schools. As the teacher education institution and the school attempted to collaborate, they had to change their practices and deviate from their original plans. These led to new theoretical insights.

May Britt Postholm's paper "Premises and Promises for Expansive Learning in Teacher Education" describes how teacher educators' involvement in the professional development of schools resulted in changes in both types of institutions. However, teacher educators' learning was largely restricted to those who were actively involved in the project.

The paper "Expansive Learning in Teacher Education's Hybrid Spaces: The Challenges and Possibilities in and Beyond Learning Studios", authored by Jeroen Imants, Paulien C. Meijer and Erik Blankesteijn reports that the expansive learning that had occurred in "learning studios" was barely disseminated to other teachers. Neither was it disseminated beyond the higher education institution directly involved in the studios. Both papers attempt to identify factors that can either impede or enhance teacher educators' learning.

Two papers represent the national level and lie between third- and fourth-generation activity theory: On the one hand, they deal with persistent problems that concern numerous countries. On the other hand, the national scope restricts the stakeholders to identifiable and relatively stable groups. Marit Ulvik's paper

"Promoting Aesthetical Values to Education" asserts that the aesthetic dimension should be incorporated into disciplinary studies in secondary schools, as it can raise students' motivation, engagement and creativity, and it contributes to students' meaning-making and emotional wellbeing.

The paper "Expansive Learning in Inter-Institutional Communities of Practice for Teacher Educators and Policymakers" is authored by Ainat Guberman, Orit Avidov-Ungar, Orit Dahan and Ruth Serlin. It describes how collaboration between teacher educators and policymakers resulted in transformed practices in three areas: providing support to students with special needs, fostering partnerships between teacher educating institutions and schools, and devising "Multi-player Induction Teams" in which teacher educators, mentor teachers, beginning teachers and additional stakeholders collaborate to support beginning teachers' induction.

Finally, Kari Smith's paper "Expansive Learning for Teacher Educators—The Story of the Norwegian National Research School in Teacher Education (NAFOL)" describes a national initiative with an international impact. NAFOL was established to develop research-based teacher education and strengthen teacher educators' research competence by supporting teacher educators engaged in doctoral studies. Internationalization is an important aspect of the research school, and the model as a whole can inspire teacher educators' expansive learning worldwide.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Premises and Promises for Expansive Learning in Teacher Education

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The study presented in the article focused on school-based development in lower secondary schools in Norway. School-based development represents a new practice not only for school leaders and teachers but also for teacher educators, who should assist schools in their development processes. The study was conducted within the framework of cultural historical activity theory (CHAT). The aim of the professional development project was twofold: to develop teaching practice in schools and also to evolve the teaching in the participating teacher education institutions. The problem formulation for the article is the following: *How does teacher educators' collaboration with schools contribute to learning in their own institutions?* The purpose of the study was to find out how the teacher education institutions' participation influenced the activity within the institutions and what factors could impede or support teacher educators' actions and learning, and even expansive learning. Expansive learning means that a new collective practice or activity is developed in the institution. To answer the research question, a collective case study was conducted to understand the premises and promises for expansive learning in teacher education. The study found "Organizing of the work at the institutions," "Teacher educators' experiences and learning," "Teacher educators as researchers," and "Leadership and change" to be central categories that can describe teacher educators' work and its premises and promises. The study concludes that leadership at the institutions is the main factor that can impede or enhance expansive learning and thus institutional development, and that an interplay between content, culture, and structure is necessary for expansive learning in teacher education.

INTRODUCTION

In a national project conducted over the period 2013–2017, the central Norwegian education authority wanted to improve the quality of teaching in lower secondary schools by focusing on school-based development. The Norwegian authorities provide a definition for school-based development:

> School-based development means that the school, including school leaders and the entire staff, undergoes a workplace-development process. The aim is to develop the school's collective knowledge, attitudes, and skills when it comes to learning, teaching, and collaboration.
>
> (Directorate of Education, 2012, p. 5, my translation)

For 4 years, all the 19 teacher education institutions in Norway took part in supporting the schools as development partners for three semesters in each school, in 1114 schools altogether. The authorities said that school leaders should direct the development processes, with assistance from teacher educators, but that local education authorities were responsible for the local projects. The objective was to develop a teaching practice that was varied, practical, relevant, and challenging for students (Directorate of Education, 2012) leaving them with a sense of mastery and a motivation to learn (Ministry of Education, 2011).

School-based development represents a new practice not only for school leaders and teachers, but also for teacher educators, who should assist with the development processes in schools. The aim of the project was not just to develop teaching practice in schools, but the intention was also that the teaching in the participating teacher education institutions should be developed (Directorate of Education, 2012). The teacher educators taking part in the project could meet other teacher educators twice a year to share experiences and to plan their future activity in collaboration with the schools (Normann and Postholm, 2018). The article focuses on how the teacher educators' actions, which supported the schools, were handled in their institutions and on the outcomes, both at the individual and organizational level. The research problem is formulated as the following question: *How does teacher educators' collaboration with schools contribute to expansive learning in their own institutions?* Expansive learning is "to learn something that is not yet there" (Engeström and Sannino, 2010, p. 2) and thus, to creatively develop something collectively new in an organization. The purpose of the study was to understand how the teacher education institutions' participation influenced the collective activity within the institutions and what factors can impede or support teacher educators' actions and learning. The study was conducted within the framework of cultural historical activity theory (CHAT).

First, I will present CHAT and the related research connected to the study. Next, I will describe how the research was conducted to answer the research question, before I present the findings. The findings will be analyzed and discussed within the framework of CHAT and the related research. I will end the article with some concluding remarks.

THEORETICAL FRAMEWORK AND RELATED RESEARCH

Theoretical Framework

Expansive learning is as already mentioned defined as "to learn something that is not yet there" (Engeström and Sannino, 2010, p. 2). According to Virkkunen (2006), transformative agency can be defined as "breaking away from the given frame of action and taking the initiative to transform it" (p. 49). Engeström and Sannino (2016) stated that expansive learning requires and fosters transformative agency. According to Engeström (1987), "expansive learning activity is mastery of expansion

from actions to a new activity" (p. 125). Actions are conducted by individuals through the division of labor to move practice toward an object for collective and societal activities (Engeström, 1987), for instance, actions conducted by teacher educators in their institutions.

CHAT is developed on the basis of Lev Vygotsky's thoughts and ideas and has several features that correspond to Vygotsky's fundamental thoughts. According to Vygotsky (1981), consciousness is not a product of society; it is produced in the interactions between individuals and society. Thus, external and internal activities have a developmental relationship. Vygotsky (1981) wrote: "It goes without saying that internalization transforms the process itself and changes its structure and function" (p. 163). The individual is active in both transforming and changing the structure of the processes, and the use of language has a central function in these processes (Vygotsky, 1978, 1981). In CHAT, the externalization process is also central (Leont'ev, 1981; Engeström, 1999). In human activity, internalization and externalization continuously operate at every level. Internalization is related to the reproduction of the culture in question, and externalization refers to the processes that create new artifacts or new ways to use them. Externalization thus enables development and creative processes (Engeström, 1999) and can be linked to expansive learning.

In CHAT, the overall aim is to develop practice toward a collective object, and thus, individual actions and development are connected to the division of labor when acting on a joint object. Engeström (1987) p. 174 has expanded on Vygotsky (1978) individual definition of the concept zone of proximal development. According to Vygotsky, learning is a process that starts at the social, external level before it is internalized. At the individual level, the person's learning should be supported in his or her zone of proximal development (Vygotsky, 1978). Engeström (1987) writes in his collective definition: "It is the distance between the present everyday actions of the individuals and the historically new form of the societal activity that can be collectively generated [. . .]" (p. 174). Leont'ev (1981) pointed out that "the object is the true motive" (p. 59) for our actions. When people share a motive for acting on a collective object, the object will be "invested with meaning and motivating power" (Sannino et al., 2016, p. 602). In teacher education, teacher educators' motivation should thus be built into the object to create "initiative and commitment" (Sannino et al., 2016 p. 81).

Engeström (1987) has developed CHAT in what he has named three generations. He refers to Vygotsky's work as the first generation of CHAT, Leont'ev's contribution as the second generation of CHAT, and his own contribution as the third generation of CHAT. The first generation of CHAT is represented by Vygotsky (1978) triangle, showing an intermediary step between the stimulus (S) and the response (R) through an auxiliary stimulus (X) (see p. 40). A limitation of this first generation of CHAT is that individuals are the unit of analysis. This individual perspective was expanded on by the second generation of CHAT developed by Leont'ev (1981). He introduced, in his example of a hunt scenario, the division of labor and thus described collective activity. Each person conducts

goal-directed actions that together satisfy their needs, as in the example of hunting directed at the object of obtaining food. One person is chasing, another is preparing for the ambush, and another should fire the rifle. Engeström (1987, 2001) has visualized this second generation of CHAT in the activity system. The upper triangle in the activity system (see **Figure 1** below) corresponds to Vygotsky's fundamental triangle, but it is turned upside down, with the node mediating artifacts at the top.

Engeström (1987, 2001) also developed the third generation of CHAT. The third generation focuses on collaboration between two or more activity systems that form networks of interacting systems. The activity system, which is the basic model of CHAT, is thus expanded to include a minimum of two systems in the graphical development of the third generation of CHAT. The subjects are in their networks acting on an object that is partially shared between the systems. At the same time, subjects, in each of their systems, also act on their own objects. The third generation of CHAT is visualized in the model below.

In CHAT, boundary crossing is an important concept. Engeström et al. (1995) stated that boundary crossing is characterized as "horizontal expertise where practitioners must move across boundaries to seek and give help, to find information and tools wherever they happen to be available" (p. 332).

FIGURE 1 | The activity system, representing the second generation of CHAT.
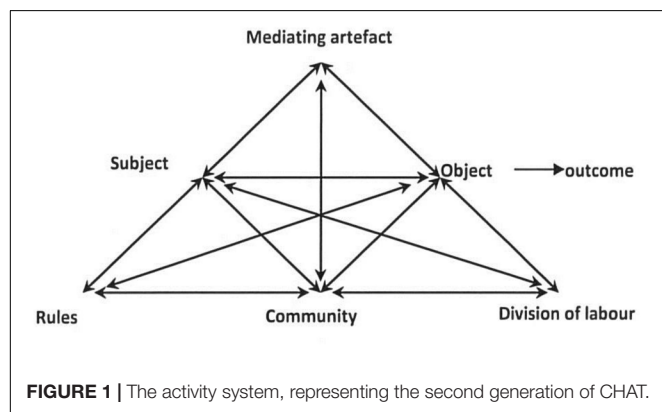
The concept of boundary crossing can thus be useful when focusing on the collaboration between teacher educators, leaders, and teachers in schools. Collaboration within a "shared meeting ground" (Engeström and Toiviainen, 2011 p. 35) can lead to the adoption of ideas from one another and, thus, to developmental transfer between different arenas (Engeström and Sannino, 2010), for instance, from school to teacher education and vice versa. Collaboration between systems can thus lead to learning and development within systems.

Related Research
Teacher Educators' Learning

Lampert and Graziani (2009) state that schools collaborating with universities seem to be places where education might be connected to the improvement of teaching. However, according to Labaree (2006), there can be problems when trying to bring together two institutions, the school and the university, as they are systems that have different cultures, different reward structures, different calendars, and different goals. That various institutions have different objects is visualized in the third generation of CHAT (Engeström, 1987, 2001) and that people from the two different systems can act on a partially shared object at the same time. Loughrang (2014) describes teacher educators' development as professional growth and states that teacher educators have more autonomy and control over their work than teachers have. However, Anthony et al. (2018) observe that professional growth needs to "embrace more than an incidental trajectory occasioned by learning on the job" (p. 7). Meijer et al. (2017) studied teacher educators' transformative learning, and they found that the teacher educators' learning and their development of a shared vision were enhanced by opportunities to learn. Transformative learning and deep learning is embraced in Engeström (2001) concept of expansive learning, and he writes that it means "qualitative shifts in the functioning of the activity system as participants react to growing of contradictions within it, which in turn may lead to a deliberate collective change effort" (p. 137).

In Norway, since 2017, teachers complete a master's degree and are expected to conduct research on their own practices

FIGURE 2 | A network of activity systems, representing the third generation of CHAT.
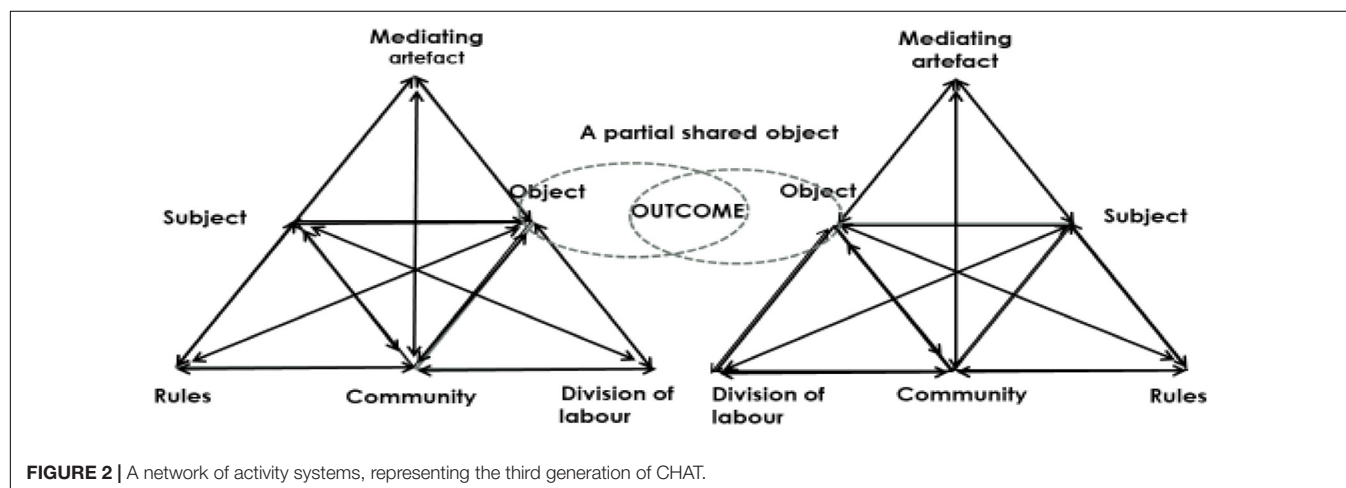
and learn from it (Ministry of Education, 2014; Postholm and Jacobsen, 2018). Teaching and research also described as key factors in teacher educators' professional development (Cochran-Smith and Lytle, 2004; Loughrang, 2014; Lunenberg et al., 2014). This is, according to Lampert and Graziani (2009), a challenge in universities, and they suggest that teacher educators should take advantage of what is known about how teachers learn in schools, but according to Levin and Greenwood (2011) teacher education institutions have a long way to go in developing culture; culture defined by Wolcott (2008) as the different ways groups act and the convictions they connect to these actions. Ping et al. (2018) found in their review study that learning through collaborative activity was important for teacher educators to improve their practices. Windschitl and Stroupe (2017) state that teacher educators have the responsibility to learn and take up new roles that are different from the status quo. Parker et al. (2016) suggest that teacher educators can draw on models of teacher professional learning, such as engagement within communities of practice. Below, the research on teachers' professional development is presented.

Teachers' Professional Development

According to several researchers, school leaders play an important role in creating a positive learning environment in schools. School leaders can help teachers identify their own developmental needs, encourage experimentation, provide resources to support teachers' learning, and support the implementation of new learning (Thoonen et al., 2011; Vanblaere and Devos, 2016). Research findings also show that it is crucial for teachers to contribute to the content of development processes if they are to gain ownership of the processes (Knowles et al., 2005) and emphasize the importance of taking the teachers' needs into account (Ermeling and Yarbo, 2016; Olin and Ingerman, 2016; Tan and Caleon, 2016). Confidence is a word that dates back to research that focuses on the role of leadership in teachers' learning processes in schools. This implies a responsibility that is given to the leaders when it comes to developing a trust relationship both between themselves and teachers and between teachers (Liu et al., 2016; Piyaman et al., 2017). One way of supporting teachers is for leaders to make sure that there is time, for example, observation and reflection in their schedules (King, 2016; King and Stevenson, 2017) but time alone does not lead to development. Research shows that there must be an interaction between structure and school culture for development to take place (Forte and Flores, 2014; Postholm, 2016). Elmore (2000) states that practice is unlikely to develop in a school if the school, as an organization, and its leaders do not focus on this development practice. This means that an organizational capacity must be created for the professional development of teachers (Feeney, 2016).

Based on a study that encompassed an entire school, the researchers conclude that a common goal is essential for developing the practice across a school (Sung et al., 2017). Research on teachers' action research (McNiff, 2013) in which teachers develop research questions based on their own needs, shows that teachers experience gaining control of their own learning situations (Goodnough, 2016). Teachers also feel that they are emotionally rewarded when they collaborate (Chen, 2017) and that collaboration contributes to greater satisfaction in teaching (Postholm and Wæge, 2016; Soini et al., 2016). However, research shows that teachers can find themselves in "the land of nice" (City et al., 2010) supporting each other using cumulative talk, rather than exploratory talk that can lead to competition between ideas (Mercer, 2004).

MATERIALS AND METHODS

Data Collection

To answer the research question: *How does teacher educators' collaboration with schools contribute to expansive learning in their own institutions?*, I conducted a collective case study (Stake, 1995; Creswell, 2013). I gathered data by writing field notes when observing reflection dialogues between teacher educators at network seminars where teacher educators from the 19 the teacher education institutions in Norway were present. The country was divided into four regions, and thus teachers educators in the 19 teacher education institutions met in four groups, three with five institutions and one with four institutions. Two network seminars were arranged in each region each year, and thus the teacher educators from each region met each other eight times throughout the project lasting for 4 years (Normann and Postholm, 2018). Furthermore, reflection notes written by groups of teacher educators at the end of each seminar are included in the data material. Focus group interviews (Fontana and Frey, 2000; Kamberelis and Dimitriadis, 2011) were also conducted in each teacher educator institution throughout the project. These interviews were recorded. During the first 3 years in the project focus group interviews were conducted with five different institutions each year. At the end of the last year in the project, four institutions took part in focus group interviews. The participants in these interviews were teacher educators taking part in the project collaborating with schools. The number of participants in these interviews varied from three to ten, depending on the size of the institution and their opportunity to take part. The intention of the focus group interviews was to produce information about the situation at each institution at the time each focus group interview was conducted, and to get insight into what participation meant for development and learning in the project across institution. The observation- and the reflection notes could also trace learning and development in each institution over time.

The questions for the focus group interviews, focusing on what significance the teacher educators' participation in this project had for the work in their own institutions, were the following:

- In what way has the project affected your own learning?
- In what way do you feel that the work has contributed to your own teaching in teacher education?
- What significance did the project have for the organization of disciplinary and interdisciplinary cooperation in your institution?
- How important has your participation in this project been for the development of your own research expertise?

- How would you describe the leaders' commitment to the project at your own institution?

In addition to these questions, the participants were also asked about how the work was organized at their institutions. At the end of each gathering of teacher educators during the project, they were asked, as mentioned, to write reflection notes. In groups, formed of participants from each institution, they wrote about their experiences connected to their own learning and to the work in their own institutions. Furthermore, they were asked to write about something that had gone well when collaborating with schools and their thoughts on this, about something that had been problematic and their reflections related to this, and about anticipated upcoming challenges and opportunities regarding the project.

Data Analysis

The focus group interviews constitute the primary data material, and they were transcribed verbatim. The transcripts were analyzed using the open coding process, as described in the constant comparative method of analysis (Strauss and Corbin, 1990, 1998). The categories developed from this analysis were the following: "Organizing of the work at the institutions," "Teacher educators' experiences and learning," "Teacher educators as researchers," and "Leadership and change." The developed categories from the analysis of the focus group interviews also gave direction to the analysis of the total data material that supplemented the content of each developed category. The categories structure the presentation of the findings that are narratively constructed (Riessman, 2008) within each category.

Ethics and Quality

The study was approved by the Norwegian national research ethics committee. Before data collection, the study's participants signed a consent form, so the study was based on informed consent. Furthermore, the study kept all the participants anonymous (NESH, 2016) no one is therefore mentioned by name. A collective summary of the focus group interviews conducted was sent to the participating teacher institutions for member check (Lincoln and Guba, 1985) to ensure trustworthiness of the study.

The presented experiences are connected to a specific project, but the findings presented may have transferability and resonance beyond their context if readers of this article can use them to think creatively and imaginatively (Geertz, 1973) thereby using them as a thinking tool (Gudmundsdottir, 2001). This means that the findings could contribute to the development of teacher educators' learning, also connected to other school-based development projects, and to the development of their own institutions as a learning organization.

FINDINGS

Organizing the Work at the Institutions

A big puzzle for the institutions was organizing teacher educators into development groups during the project, both in the context of academic background and personal fitness. These development groups should collaborate with schools to develop the teaching practice toward the objective of the project, that was to develop a varied, practical, relevant, and challenging teaching practice to leave the students with a sense of mastery and a motivation to learn. In general, the teacher educators emphasized that members of the group should have prior experience from the schools, should speak "the right language" so that they were understood in schools, and should be personally suitable for this type of work.

Capacity problems at the institutions created challenges related to the composition of the development groups. In addition to teaching on campus, the teacher educators experienced during the project that parallel work with several national projects could be too much for the individual institutions. It was clear, at an early stage, that teacher educators had organized themselves somewhat differently, and that there was a lack of continuity in the development groups. This lack of continuity was experienced as a challenge throughout the project. The constant changes in teacher educators in the development groups became a challenge when it came to maintaining, transferring, and further developing the experiences of the teacher educators during the project. However, at one institution, the development group was stable, and the participants at this institution had also supported schools in pairs, with one teacher educator in pedagogy and the other in a specific subject.

Teacher Educators' Experiences and Learning

The teacher educators' understanding of what school-based competence development is had evolved, and the willingness to work in teams at the institutions had increased. The collaboration across institutions had also led to a curiosity around and a motivation to participate in the project. Working closely with colleagues at their own institutions had made the teacher educators feel useful, and it had been professionally enriching. That it was professionally enriching was also connected to the inexperienced being given the opportunity to work with experienced teacher educators. This was a strategy at one of the institutions. The emphasis on collective learning in multidisciplinary groups seemed to be one of the most important characteristics of why some groups of teacher educators had learned. However, there is little evidence that the content and learning that had taken place in the context of the work in the schools had spread to teacher educators not members of the development groups at the institutions, and individual learning in the institutions had been the most prominent type.

Teacher educators supported the schools in different ways. Some of them gave lectures, and others observed teaching, believing that these observations helped them to understand how they should meet the needs of the teachers in the whole school and how they should contribute to the collective practice at the school. One of the teacher educators said the following when interpreting the observations of teaching practices as the starting point when communicating with the all the teachers: "The teachers then had something to jointly talk about."

Some of the teacher educators were excited about the opportunity that they had to bring experience from their work in schools into their teaching, as the following statement shows:

> Just being there to stick my head inside all those schools, it does matter to me in terms of learning something more about schools. So, either consciously or unconsciously, I draw those things into the teaching somehow in my own institution, I think.

In this way, the project has echoed within their own institutions, but mainly learning on the individual level, and the teacher educators experienced a connection between what happened in the field of practice and the content of the education program. They also learned that they gained greater credibility in meeting the needs of their own students on campus.

Others, again, did not use their experience of investing in teaching as they were neither responsible for basic education nor had teaching within further education. They nevertheless saw the transfer value of the experience and thus, of the knowledge that they had acquired during the project, for other tasks at their own institution. Some of the teacher educators who were not directly involved in the education of new teachers were, however, working on master's programs in school leadership, on the principal's education, on the supervisor's education, or in the further education sector. In some cases, master's students were also given the opportunity to obtain data from the schools where their supervisors worked as teacher educators supporting the schools. This was a practice that depended on which teacher educators the students had. No institutional practice existed that allowed master's students or undergraduate students who were to write their research and development (R&D) assignments to participate in school-based competence development in schools, but teacher educators want a plan for how students should be involved. There were also some teacher educators who were fully engaged in the project and therefore did not teach on campus.

During the project, many teacher educators experienced that they were able to develop collective knowledge, but there were structures that were lacking in the organization that contributed to the teams' experience and knowledge of being part of the organization. It is clear that many institutions lacked an overview of the various tasks that were performed and how the experiences could be developed and utilized. Teacher educators, during the course of the project, also learned that they lacked competence in college guidance. They experienced that the teachers did not challenge each other, but for the most part supported each other when reflecting on each other's teaching. The teacher educators also felt that they did not know enough about how to express themselves in dialogs with teachers to manage to support them to develop their practice. The teacher educators therefore expressed the desire to develop their own professional competences in this field.

Teacher Educators as Researchers

The teacher educators believed that research should be linked to development work in the schools, but several teacher educators stated that they lacked networks or a leader that could drive research projects. However, several teacher educators also formed their own research groups during the project and stated that they

perceived the project as a "gift package for teacher education." A teacher educator uttered: "The schools as a research field became easily accessible for us."

The teacher educators experienced that the project was important both for research and in terms of having contact with the field of practice. Although there was a unified desire to conduct research in the context of the project, it turned out that it was not so easy for everyone and that such activities depended on the time each individual could allocate to research in his or her position. The activity in these research groups also decreased during the project. At the same time, teacher educators maintained that it was important to develop their knowledge about and a better understanding of how practices and development processes could be researched in R&D work. "We have to develop our methodological competence," was an utterance that was reiterated.

Leadership and Change

Employees at 12 of the 19 institutions experienced the leaders as being absent or peripheral during the project. "When we work on external development projects, we also have to work internally to develop, also when it comes to research, but that requires us having the leadership with us," a teacher educator uttered.

At several institutions, the staff found that there was good leadership support for meetings, with experience sharing between the teacher educators taking part in the project, but that there was little support for investment in the professional staff as a whole and in the education programs. They thought that the work they did needed to be communicated further and even to teacher educators who have not cooperated so much with schools in the past. The teacher educators communicated the need for staff to share experiences of how they work at their own institutions. "What do we do to develop as mentors in schools?" one of them says.

The teacher educators concluded that the lack of leadership reduced the possibility of there being lasting effects of the project. The teacher educators wanted leaders that facilitates knowledge sharing in their institutions. They found that the competences that they acquire in collaboration with the schools are not used in the institutions in a systematic manner. However, a tangible evidence of lasting change is the establishment of a separate professional group of teacher educators working on the development in schools in one of the institutions. The leadership at the institution impelled the organization of this group, and they had a clear rule: it was the teacher educators working at the institution that should constitute the group, not teacher educators working part time and hired from outside their organization. The idea behind this decision was that the teacher education institution should learn, and therefore the teacher educators had to be permanently employed at the institution.

DISCUSSION

The study presented in this article was framed by the following research question: *How does teacher educators' collaboration with schools contribute to learning in their own institutions?* In the

following text, I will discuss the findings within the framework of CHAT and the related research.

First and foremost, it is the teacher educators who have actively participated in the project that have learned. However, due to a lack of collaboration they work differently with the schools, which indicates that they have not developed a common understanding of how to meet the needs of the schools at work. Experience sharing and reflection helps individuals to put into words what they do and thus become aware of their own actions or practices (Vygotsky, 1978, 1981). According to Ping et al. (2018), collaborating activity is important for teacher educators to improve their teaching. It is when individuals as teacher educators become aware of their own practice that they can also develop it on the basis of sharing and reflection with others (Postholm, 2008). There were not formal arenas in place for the sharing of experience and knowledge development for all teacher educators who worked on the project, so time for collaboration was not scheduled at all institutions, as suggested by King (2016) and King and Stevenson (2017). According to Anthony et al. (2018), professional growth needs to embrace more than occasional learning on the job. Despite the lack of formal arenas for knowledge sharing, some teacher educators, nevertheless, felt that they experienced profitable collaboration, both internally and across subjects, at their institutions in connection with their work in the schools. The project may therefore, in some cases, have contributed to a more integrated teacher education, which Nokut (2006) has also pointed out as an aim to act on for teacher education institutions but this still applies especially to some of those who have had an active role in the project. It does not appear that there is a widespread sharing culture at the institutions that allows all the teacher educators to develop together.

Levin and Greenwood (2011) point out that teacher education institutions have a long way to go in developing culture. This study shows that individuals and groups of individuals at the institutions have learned. They have learned that collaboration in teams is useful and professionally enriching. They have, furthermore, learned about practices in schools and that observation of teachers teaching can be the starting point for a dialog between all the teachers in a school, and that the collaboration between them and schools can enrich their teaching in their own institutions. The teacher educators have also learned that teaching including examples from practice can give them greater credibility in meeting the needs of their students. Additionally, the teacher educators have learned that they can develop their methodological competence, and that they can develop collective knowledge, but not a knowledge being part of the whole organization. They have, furthermore, learned about the leaders' importance when it comes to development in teacher education.

Except in one teacher education institution learning can be connected to the individual or group level. In this teacher education institution, they developed a new form of collective societal activity (Engeström, 1987). They expanded to a new activity and thus broke away from the given (Virkkunen, 2006) and created something new that was not yet there (Engeström and Sannino, 2010) in the organization. They worked together and divided the work between them (the division of labor), conducting actions to reach goals. They were also supported by their leaders who created good conditions (operations), within which the individuals conducted goal-directed actions through their joint activity (Wertsch, 1981). They created something new in terms of expansive learning processes (Engeström and Sannino, 2010) and found themselves in an activity system where the context, made up by the factors of rules, community (also comprising the leaders), and the division of labor (Engeström, 1987, 2001) supported the object-oriented goal-directed actions. What the individual teacher educator has learned can be lasting, while organizational learning and lasting collective learning are dependent on good leaders, such as the leadership at this institution. This finding is supported by Elmore (2000) and Feeney (2016) who found that professional development needs to have an organizational focus, with leaders leading the way if practice in the whole organization is to develop.

The teacher educators also wanted to learn more about college guidance in order to support the teachers in their collaborations. They learned that the teachers did not communicate in such a way that they challenged each other when it came to each other's teaching (City et al., 2010) and that they used cumulative talk (Mercer, 2004). Forte and Flores (2014) have found in their research that teachers lack collaborative skills. The fact that teacher educators wanted to gain more knowledge about college guidance can also be a sign that this theme does not have a prominent place in the education of teacher students either. In order for student teachers and teachers to become better at collaboration and guiding each other, demands are also made on teacher educators to develop their own competences and to add this theme to the agendas in their own institutions. The teacher educators also expressed that they should definitely have collaborated more, even when it comes to research.

Teacher educators described the project as a "gift package for teacher education" and linked this to the opportunity to research development processes that they themselves helped to support. In connection with the work during the project, several of the teacher educators wanted, as mentioned, to develop their research method expertise. When conducting research on developmental processes in the schools teachers in the teacher education system can be more systematic in their work when collaborating with leaders and teachers. According to Cochran-Smith and Lytle (2004), teacher educators must both research and teach. Teacher educators' participation in research is described as a key factor in their professional development (Loughrang, 2014; Lunenberg et al., 2014). The material collected and analyzed from the school can further form the basis for teacher educators' teaching in their own institutions. The fact that teacher educators have research expertise can therefore be of importance to both the schools and the students in their own institutions. Teacher educators will also benefit from research expertise when guiding master's students.

Several studies focusing on the meeting of external resources, such as teacher educators, and teachers in the schools emphasize the importance of taking teachers' needs into account (McNiff, 2013; Ermeling and Yarbo, 2016; Goodnough, 2016; Olin and Ingerman, 2016; Tan and Caleon, 2016; Sung et al., 2017).

According to Leont'ev (1981), the overall goal or object of an activity is "the true motive" (p. 59). Teachers may find the work motivating if it is based on challenges or opportunities that they see in their own practice. It will then be "invested with meaning and power" (Sannino et al., 2016 p. 602). In their collaborations, teacher educators and teachers and leaders can develop a shared object, as shown in the third generation of activity theory (Engeström, 1987, 2001). But, was the shared object for the collaboration, focusing on developing teaching practice to be varied, practical, relevant, and challenging for students leaving them with a sense of mastery and a motivation to learn, also the object for the teacher educators in their own activity system? Should their effort be directed only to support development in schools when the aim of the project also was to develop practice in teacher education?

The constructivist view represented by the co-construction (Elden and Levin, 1993) of knowledge can occur, for example, by joint observation and reflection related to teaching. Co-construction involves learning for all parties, both for teacher educators and for leaders and teachers in the schools. A one-way lecture planned and given by teacher educators, as some teacher educators in this project did, does not necessarily facilitate this. However, collaboration framed by dialogs between teacher educators and practitioners can lay the foundation for development transfer (Engeström and Sannino, 2010), from school to teacher education and vice versa. Some teacher educators in the project observed the teachers' teaching and used this observation as a starting point for dialogs. Teacher educators and teachers and leaders can cross each other's boundaries (Engeström et al., 1995) and learn from each other, but according to Labaree (2006), this can create problems when bringing together different activity systems.

Learning for all parties also means that teacher educators need to develop an object or an overall goal that is known for each of them if they are to be able to move their practices toward the object of their activities in their own systems. However, a collective object requires that teacher educators construct the object together, and also collaborate to be able to move their practices toward it. According to Meijer et al. (2017), teacher educators' learning and their development of a shared vision, or a shared object, can be enhanced by opportunities to learn. However, the study shows that collaboration between teacher educators has a potential in their institutions. If teachers educators conduct research with a joint research focus this joint focus can help teacher educators to be more coordinated in their work, but, at the same time they should remember that it is the practitioners' needs that should be the starting point for development and research when collaborating with schools.

Research groups are emphasized as being important for education at teacher education institutions in order to succeed in providing research-based education (Ministry of Education, 2009, 2014). In order to be systematic in their development work in schools, teacher educators need data material to analyze as a starting point for further development in collaboration with practitioners. Collaboration with practitioners means, as already described, that it is also their development needs that should be the starting point for the work. However, research shows that

teacher educators have a way to go when it comes to working with practitioners to promote school development and to conduct research in connection with development. A review study of all the articles published in the *R&D in practice* journal in the period 2007–2017, a total of 92 articles, shows that research was mainly initiated by researchers and their areas of interest (Nilssen and Postholm, 2017). If the teaching is to be research-based, it requires that teacher educators conduct research, but this, according to Lampert and Graziani (2009) is a challenge in teacher education. The findings in this study also show that teacher educators seem to have a way to go when it comes to linking development and research into a fruitful interaction that will have an impact on both developmental processes and on what research-based knowledge can be published and included in the teacher education curriculum.

The teacher educators feel that they need the support of the leaders of their own institutions if they are to succeed in their development work in the schools and, at the same time, conduct research. The school leaders' role is highly documented in terms of development work in schools. Research have found that leaders are paying attention to teachers' developmental needs, they encourage experimentation, they provide resources to support teachers' learning, they support implementation of new learning and they develop trust between leaders and teachers and between teacher (Thoonen et al., 2011; Liu et al., 2016; Vanblaere and Devos, 2016; Piyaman et al., 2017). Research shows, furthermore, that teachers feel emotionally rewarded when collaborating (Chen, 2017) and that collaboration contributes to greater job satisfaction in their teaching work (Postholm and Wæge, 2016; Soini et al., 2016). The teacher educators' work in the schools has helped some teacher educators to feel safer in their teaching on campus through allowing them to use practical examples that enrich the theory, but the teacher educators have the potential to develop their own competences related to research in development processes (R&D work) (Postholm, 2016). If teacher educators manage to emphasize the R in R&D work, working in schools could also help them make the teaching at their own institutions more research-based. This requires a leadership with an overview of competence and capacity so that those who carry out R&D work in schools also have the opportunity to bring this work to their teaching. The leaders should also organize the work in a way that ensures continuity when it comes to teacher educators participating to enhance the maintenance, transfer, and further development of the experiences.

The teacher educators also want a plan for how students should be involved in R&D work in schools. Student participation in research activities at various levels is emphasized in White Paper No. 16 (2016–2017), *Culture for quality in higher education* (Ministry of Education, 2017b) in terms of raising the quality of teacher education. The areas affected above are all discussed *in Teacher Education 2025. National strategy for quality and collaboration in teacher education*. In this strategy, it is pointed out that practice relevance has been a challenge in teacher education, that teacher education institutions need high R&D competence, and that students must be involved in research that should be linked to the field of practice (Ministry of Education, 2017a, p. 11).

Some teacher educators have involved both undergraduate and master's students in their work in the schools, in connection with the students writing their R&D assignments and master's theses. This is also a practice that appears to be dependent on the individual teacher educators as there are no institutional practices in place for this. The study shows that the opportunity to involve students in work in schools is not well utilized and formalized in the teacher education institutions. Those who have taken advantage of this opportunity may have an advantage over other teacher educators when it comes to involving students in their own R&D work. They will thus be better equipped to engage students when writing their master's theses, which should be based on issues related to school practice. From 2017, all student teachers in Norway will take a master's degree (BR40; Postholm and Jacobsen, 2018) and one intention of the master's thesis is that the student teachers should gain greater insight into R&D work that can strengthen knowledge-based professional practice. They can thus research his or her own practice in order to continuously develop this. This means that they also need teacher educators who can provide insights into R&D work. However, teacher educators feel that they need to develop their methodological competence when conducting R&D work, which also involves supporting and challenging teachers in terms of reflections on their completed teaching.

CONCLUSION

The findings show that the participating teacher educators have learned, but several factors need to come into play in establishing premises for expansive learning (Engeström and Sannino, 2010) in the institutions. The leadership at the institutions is found to be a central factor that can impede or enhance expansive learning and thus institutional development. Teacher educators need to have content competences when supporting schools in school-based development. Additionally, they also need to collaborate to develop their competences together and to be

coordinated in their work when collaborating with schools. Wolcott (2008) defines culture as the different ways groups act and the convictions they connect to these actions. This means that the teacher educators together need to find out what their convictions are and develop a joint understanding of the work and how it should be conducted. This means that that there needs to be a structure for teacher educators' collaboration in their own institutions. There also needs to be a structure for how their competences should be transferred to both their colleagues and student teachers. If an interplay is created between content, culture, and structure, there should be promises for expansive learning in teacher education. To make this happen, teacher educators have a responsibility to develop (Windschitl and Stroupe, 2017) but leaders have the main responsibility for making expansive learning happen in their institutions. For teacher educators to be able to learn collectively in their own organizations, the study shows that expansive learning processes need to take place in teacher education, thus forming a new activity.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by NSD. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MP conducted the research, analyzed the data, and wrote the article.

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Expansive Learning for Teacher Educators- The Story of the Norwegian National Research School in Teacher Education (NAFOL)

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Internationally there is an increased focus on developing a research-based teacher education, and Norway is no exception. Teacher educators play a key role in teacher education, and research has become central to their work. Teacher educators are expected to be consumers and producers of research. Today teacher educators are projected to be teaching and research competent (Smith and Flores, 2019). However, many teacher educators become teacher educators with a background as successful teachers, and not all are research competent. Subsequently, they are required to engage in expansive learning to acquire research competence. They are expected to develop a second order expertise in addition to teaching which is for many their first order expertise (Murray and Male, 2005). This paper describes a national initiative in Norway intended to develop a research-based teacher education and strengthen teacher educators' research competence. The Norwegian National Research School in Teacher Education (NAFOL) was established as a network comprising all, but one, teacher education institutions in Norway in 2010. NAFOL is funded by the Norwegian Research Council. In the paper the contextual background to NAFOL, its structure and content are described, followed by reporting on several evaluations of the research school. Conclusions from the evaluations document that the aims of NAFOL are achieved, and the research school has provided a supporting environment for teacher educators' expansive learning related to qualification (Ph.D.), socialization into the academy and subjectification through close individual support (Biesta, 2009). The last part of the paper discusses factors that contribute to success and the challenges NAFOL faced. The main challenge has been handling the increasing number of applicants to the research school, and in the future Norway needs to look for new, inclusive models for teacher educators' expansive learning. Other countries which aim to develop a sustainable research-based teacher education, should look to Norway and learn from the initiatives practiced in NAFOL about how to support teacher educators' expansive learning.

Keywords: expansive learning, teacher educators, research-based teacher education, doctoral education, research-school

INTRODUCTION

In the last decade there is an international political trend which calls for strengthening the research component in teacher education (Menter, 2015; Aspfors and Eklund, 2017). In 2005 OECD claimed that teachers' profile, "clear and concise statements of what teachers are expected to know and be able to do" (OECD, 2005, p. 9), should be evidence based, and 2 years later the European Commission (2007) argued that "... *practitioners and policy-makers should also be direct producers of knowledge, in collaboration with researchers. However, the tradition of such cooperation is not strong*" (p. 6). Subsequently, in 2013, the European Commission repeatedly called for more research in teacher education claiming that "*Both practice-based and theory-focused research can contribute to a deeper understanding of education and of educating teachers*" (pp. 12–13).

There is, however, still an unclear understanding of what research-based teacher education means. Concepts such as evidence based, research-based, research informed, inquiry oriented, all express necessity of research in teacher education (Munthe and Rogne, 2015), and they are implemented in various ways in different national contexts. Nieme (2016) points out that in the Finnish context.

"...*the concepts are used complementarily. Research-based means that teacher education is grounded in continuous research-based inquiry in academic disciplines, including educational sciences, and this provides a basis for the improvement of the curriculum in teacher education. Teacher educators in university departments and teacher-training schools are seen as teachers and researchers*" (Nieme, 2016, p. 24).

Nieme clearly points at the dual responsibility of teacher educators, being teachers and researchers. Finnish teacher education has a long tradition of being research focused, and the position taken in this paper aligns with the four foci Krokfors et al. (2011) claim to be essential for a research-based teacher education:

(1) The study program is structured according to a systematic analysis of education.
(2) All teaching is based on research.
(3) Activities are organized in such a way that candidates can practice argumentation, decision-making and justification when inquiring about and solving pedagogical problems.
(4) The candidates learn formal research skills during their studies.

To be able to practice the four Finnish foci for teacher education, teacher educators are required to be research competent. To teach formal research skills, teacher educators need to know about and be active researchers themselves.

Norwegian teacher education has recently become quite similar to Finnish teacher education, yet with the lack of a long tradition for a strong academic teacher education. The Norwegian policy makers are clear in their demands for a research-based teacher education:

As with any other higher education, teacher education shall be research-based. The content of teacher education shall be based on up-dated knowledge. Research-based teaching also means that the education is characterized by scientific methods and oriented toward new ways of thinking and developing the practice field (Norwegian Ministry of Education, 2014: 44) (author's translation).

The implementation of this policy led to the decision that from 2017 all teacher education beyond pre-school teacher education, is at a graduate level and the teacher education students are required to conduct research for their master dissertations. Additionally, it is expected that all teacher educators are sufficiently research literate to supervise the students' master projects.

However, unlike Finland, per today all Norwegian teacher educators are not research competent, many of them hold a master's degree and have experience from and expertise in school teaching. This situation is now changing, mainly because the institutions will only get accreditation for offering master programs if a certain percentage of the staff hold a doctorate, and secondly, promotion and funding are closely linked to the individual teacher educator's publication list. The dual role of teacher educators as teachers and researchers (Cochran-Smith and Villegas, 2016; Smith and Flores, 2019) forced Norwegian teacher educators to engage in expansive learning, mainly in learning how to become research competent and to actively engage in research.

The demand of teacher educators to be active researchers is not unique for Norway or Finland. Cochran-Smith and Villegas (2016) who conducted an expansive review of US teacher education research, found that teacher educators conducted systematic research to develop new practices and insights into their own teaching at a local level, and they disseminated their findings beyond the local context by conceptualizing their new understandings. Such a practice-oriented approach to teacher educators' research is likely to improve teacher education and the institutional level and beyond. The authors point out, however, that most US teacher educators working in universities would hold a doctorate.

This was not the situation in Norway and to upgrade teacher educators' competence, planning in a long-term perspective, close cooperation between policy makers, teacher education institutions and leading national teacher educators led to the establishment of NAFOL, the Norwegian National Research School in Teacher Education in 2010. This is the story of how teacher educators from all over Norway were offered the opportunity, and grasped it, to engage in expansive learning and develop a new form for expertise, research, in addition to their primary expertise, teaching.

ESTABLISHING NAFOL

To better understand why NAFOL was established, it might be useful to briefly describe the Norwegian context. Norway has experienced various reforms in teacher education in the last decade, and more information about this can be found in the paper by Munthe and Rogne (2016). Shortly, Norway has had two traditions to teacher education, the seminar tradition which is close to the logics of practice, and the discipline tradition

with a focus on research within the disciplines (Afdal, 2012). The seminar tradition was evident in elementary school teacher education mainly taking place in teacher education colleges, whereas the disciplinary tradition characterized secondary school teacher education offered by the universities. This distinction is now disappearing for two reasons. As already mentioned, all teacher education is, from 2017, at a graduate level, and second, recently a merging process of universities and colleges has taken place in Norway. Most institutions offer today elementary as well as secondary school education. The recent strong academization of teacher education puts pressure on teacher educators to supervise candidates' research projects and to publish their own research. Today teacher educators are expected to be research competent.

Another factor playing a central role in the establishment of NAFOL was the rather harsh criticism Norwegian educational research was subject to in a report by the Norwegian Research Council (2004). The research was criticized for being too theoretical and discipline focused, and of little use to the practical aspects of teacher education and teaching. The report recommended Norwegian teacher education institutions to focus on five areas for improvement: (1) research leadership and organization, (2) internationalization, (3) thematic efforts and prioritization, (4) recruitment, and (5) national coordination and cooperation (Østern and Smith, 2013).

As a follow up to the criticism, the Government announced in a White Paper (2009) that research schools in teacher education would be established to strengthen research in the effort to develop a research-based teacher education. The Norwegian Research Council was assigned to send out a call for research schools in 2009 (Østern and Smith, 2013). A remarkable factor in the establishment of NAFOL was that to avoid institutional competition in applying for funding, which might lead to smaller regional research schools, 22 Norwegian teacher education institutions (the following year two more were accepted into the network), agreed to jointly apply for funding for a true national research school in teacher education, which would be built on coordination and cooperation. A committee was appointed to write the application, and there was agreement of the structure and the leadership of the planned research school from the beginning. Full funding for 6 years was granted by the Research Council at the end of 2009, and the first cohort of doctoral candidates was accepted in January 2010.

AIM AND RATIONALE

In the network application submitted to the Research Council of Norway in 2009 the aim of a national research school in teacher education was expressed as follows:

NAFOL will work to strengthen the quality of teacher education for all school levels through a structured, robust, and long-term investment in an organized doctoral education within a national network of cooperating higher education institutions (Norwegian University of Science and Technology [NTNU], 2009, p. 3).

The expression all school levels includes pre-school teacher education, and it has been an important goal in NAFOL

to develop a research-based early childhood education, and to upgrade the research competence of pre-school teacher educators.

Another expressed perspective was that teacher education needs to develop its own knowledge base which emphasizes research-based knowledge and presents the uniqueness of practice and educational sciences in a broader perspective. The idea behind NAFOL was that developing such a knowledge base would take time, and it had to be done by the profession itself, by teacher educators who were active researchers. The national doctoral school would offer practicing teacher educators the opportunity to engage in doctoral studies with additional support and follow up (Norwegian University of Science and Technology [NTNU], 2009). Thus, NAFOL would create a framework for teacher educators' expansive learning.

Expansive Learning

The 'father' of the concept 'expansive learning' claims that any learning theory should seek to answer four questions (Engeström (2001), p. 133):

(1) Who are the subjects of learning, how are they defined and located?

(2) Why do they learn, what makes them make the effort?

(3) What do they learn, what are the contents and outcomes of learning?

(4) How do they learn, what are the key actions or processes of learning?

In NAFOL the subjects of learning are practicing teacher educators who are located in teacher education institutions all over Norway, and their learning is, therefore, not confined to one institution, but takes place within a greater society (Engeström, 2015) of higher education institutions, schools and pre-schools. They learn because they want to expand their knowledge within a specific topic (research theme) and acquire new skills (research skills). The effort they make is huge, taking on a new role and engaging in activities previously unfamiliar to them. The outcomes of learning are likely to be new personal professional knowledge and contributing to a variety of knowledge fields, and, not least, obtaining a Ph.D. degree. NAFOL creates opportunities for individual learning (personal feedback) and learning in groups (small and larger groups), and the learning crosses boundaries as their doctoral projects are within different disciplines, apply different methods, and take place in different contexts. Thus, the learning opportunities offered by NAFOL reflect the metaphor of expansive learning which Sannino et al. (2016) argue "depicts the multidirectional movement of learners constructing and implementing a new, wider, and more complex object for their activity" (p. 603).

The rationale behind the research education in NAFOL is that we have taken an educative (Bildung) perspective in addition to having a strong training perspective in the process of educating new researchers for the academic community. The expansive learning of the NAFOL doctoral candidates is characterized by the fact that they go through a role change process, from being an acknowledged teacher to becoming an acknowledged researcher, however, without reducing their competence in teaching. It is

not merely a question of being trained as a skilled researcher, it includes developing social and ethical standpoints and values related to taking on a professional identity as academics, being able to cooperate with colleagues and support each other. It is a question of developing resilience when things get tough, cope with setbacks, lack of progress and rejections of their academic work. Moreover, NAFOL stresses the importance of being open to presenting work in progress and to receive and provide constructive feedback within peer groups and expert groups. The bildung aspect of NAFOL is strong, as our rational is that the research school should educate a whole person, a scholar, holding social values, a person who is informed about aspects of the world beyond their own context and research projects. Thus, the theoretical foundations of NAFOL are rooted in a strong social-cultural perspective, and the various cohorts become communities of learning, based on trust and support (Wenger et al., 2002). During the 4-year NAFOL period the doctoral candidates have seminars hosted by teacher education institutions all over Norway and abroad. Each seminar includes social, cultural and often outdoor events in addition to an intense academic program.

The educational view on which NAFOL is based can be described by using Biesta's work on the purposes of education; qualification, socialization, and subjectification (Biesta, 2009). NAFOL works toward the qualification for the degree of Ph.D., which is a major goal for the research school. In addition, the aim of NAFOL is to socialize the doctoral candidates into the academic community in a wide perspective, and finally, to focus on the development of the individual person within and beyond the relevant research field and community. A major goal is that every one of the candidates shall find her/his own professional identity as a researching teacher educator and act upon that. Thus, there is a strong emphasis on subjectification in the rational according to which NAFOL works. The learning is expansive, going beyond the respective research projects of the individual candidate. Biesta (2013) uses the term 'becoming educationally wise' which requires more than knowledge and skills, it also requires insights and independent positioning. He

discusses "three reference points for thinking about the future of teacher education: a focus on the formation and transformation of the person toward educational wisdom; a focus on learning through the practicing of educational judgments; and a focus on the study of the educational virtuosity of others" (Biesta, 2013, p. 19). NAFOL has built a doctoral education for teacher educators founded on this view and has developed and continues to develop the program of the research school accordingly.

NETWORK AND ORGANIZATION

Norwegian Research School in Teacher Education was established as a consortium of 24 teacher education institutions (universities and colleges) in 2010 with financial support by the Norwegian Research Council. Today the network consists of 17 institutions. It does not mean, however, that any institutions have withdrawn from NAFOL, but the reduced network is a result of a merging process in Norwegian higher education institutions. NAFOL has an external steering board which meets twice per year, and an advisory board in which all network institutions are represented. They meet once per year. The Head of NAFOL is a full professor employed by the university that administers the research school, and this institution also provides the administrative support. The research school consists of all Norwegian teacher education institutions besides one, and it is this network that 'owns' NAFOL.

The NAFOL program is 4 years, and the original project period was 6 years (till 2016). The aim was to educate 80 doctoral candidates in four yearly cohorts of 20 candidates. However, the project period has been continuously expanded upon the request of the policy makers, and additional funding has been provided. Currently NAFOL is planned to continue out 2021, and in addition to the 181 graduates, there are currently 86 candidates in the program in three cohorts. The last cohort accepted to NAFOL is cohort 10. Each cohort has a designated full professor as the coordinator and who is in close contact with the candidates during and in between the seminars.
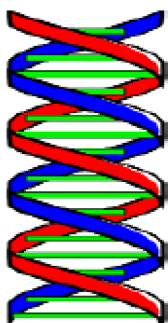
The blue line in this double helix symbolizes the process of training a skilled researcher (qualification), whereas the red line symbolizes the Bildung process of an academic as a whole person, what Biesta (2013) calls 'a wise educator' (socialization and subjectification). The green horizontal lines exemplify the close link between the two interwoven processes. The double helix model illustrates the rationale behind NAFOL's doctoral education.

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FIGURE 1 | NAFOL's rationale. The blue line in this double helix symbolizes the process of training a skilled researcher (qualification), whereas the red line symbolizes the Bildung process of an academic as a whole person, what Biesta (2013) calls 'a wise educator' (socialization and subjectification). The green horizontal lines exemplify the close link between the two interwoven processes. The double helix model illustrates the rationale behind NAFOL's doctoral education. (This Photo by Unknown Author is licensed under CC BY-SA-NC).

THE CANDIDATES

Before providing more information about who the NAFOL candidates are, it is necessary to inform about the context of Norwegian doctoral education in general. The doctoral education in Norway is for a Ph.D. degree, and other degrees, such as Doctor in Education, Ed.D., are not accepted. All doctoral candidates in Norway are employed by a higher education institution, and they seek a position when applying to a Ph.D. program. This means that they are paid a reasonable salary on which they can live, and they enjoy the full rights of academic employees during the project period which is 3 full years or, as most doctoral candidates within education have, a 4-year period of 75% devoted to research and 25% to teaching in teacher education. It is rather difficult to get a Ph.D. position in Norway since the institutions publish a call internationally and in Norway for all openings, and the competition is keen. It is acknowledged that doctoral candidates in Norway enjoy better conditions for doing their Ph.D. than in many other countries.

All NAFOL doctoral candidates are practicing teacher educators or, recently, also practicing teachers from school involved with pre- and inservice teacher education. They work in all kinds of teacher education, from pre-school teacher education to upper secondary school, including leadership education, and within a variety of disciplines; sciences, humanities, social sciences, physical education, art education, domestic science, out door education, etc. NAFOL is proud that 25% of the doctoral candidate/graduates are related to pre-school teacher education. The candidates have practical experience and are in their thirties or beyond, often with family and children. The candidates are enrolled in a doctoral program in their respective institutions, and NAFOL offers additional support for 4 years. It is the respective institution that awards the Ph.D. degree, and NAFOL awards a certificate for participating in the research school. Thus, NAFOL offers an expansive learning process to the doctoral candidates. During the 10 years NAFOL has existed, it has become increasingly competitive to be accepted into the research school as the expansive learning NAFOL offers has become a sought-after support in taking a Ph.D.

THE PROGRAM

In planning NAFOL there were clear aims for each of the 4 years; in the 1st year the focus is on becoming a member of a researcher community, next to becoming an academic writer in the second, moving into developing research skills to examine practice-theory dimensions in teacher education, leading up to the final year where publication and dissemination of research are emphasized. Throughout the 4 years written and oral communication, research skills, and the practice-theory linkage are emphasized alongside the urge to develop a critical and analytic competence.

The Norwegian doctoral education requires a minimum of 30 European Credit Transfer and Accumulation System (ECTS) in addition to the research dissertation. Each institution with doctoral programs offers doctoral courses, where research methodology and scientific theory are compulsory courses in most institutions, in addition to more specific courses related to the discipline or the research field. The NAFOL doctoral candidates engage in expansive learning beyond the common doctoral education as NAFOL offers four additional courses tailor-made for teacher education research, (1) professional theory of teacher education, (2) academic writing, (3) dissemination of research, and (4) teacher education research methodology. These courses are integrated into the 16 seminars the doctoral candidates have during the 4-year NAFOL period. To explain how the courses are integrated, it is necessary to provide more information about the structure of the program and the seminars.

Seminars

Each cohort of approximately 20–25 candidates are accepted into the program in January every year. In the following 4 years NAFOL organizes four 2–3 days seminars for each cohort hosted by the network institutions, all together 16 seminars for each cohort. Two of these seminars will be abroad, in cooperation with a university in one of the Nordic countries and in a European country. The seminars abroad last for 3–4 days. Norway is a long country with big distances, and NAFOL covers travel (usually flights) and hotel accommodation expenses for all candidates for all 16 seminars. The content of the seminars is planned in accordance with the yearly aims presented above, and care is taken that there is a clear progression in the program. The progression follows the various stages in working on a doctoral dissertation, with input from national and international guest speakers, and assignments subject to peer and expert feedback in smaller groups. Each assignment is closely related to the dissertation, e.g., forming research questions, writing a literature review, establishing a theoretical framework, presenting the methodology, findings, and writing the discussion. As most NAFOL candidates choose to have an article-based dissertation, much time in the seminars is spent on writing for publication in peer-reviewed journals. Oral and written dissemination to a variety of stakeholders is an additional component of the seminars. Each seminar offers a module of two or more of the expansive doctoral courses in the NAFOL program.

The seminars usually start with a brief artistic performance, followed by an intense academic program. There is a cultural event in the evening and a joint dinner.

An example of an international NAFOL seminar in cooperation with Ghent University illustrates the above description. In addition to the 2 days with candidates from Ghent, the Norwegian candidates had a 3rd day with master classes and process-seminars which will be explained below (see **Figure 2**).

Master Classes and Process Seminars

Academics are expected to present their research for feedback and criticism from the academic community, and NAFOL's doctoral education aims to prepare the candidates for the tough reality in the academy. In addition to constructive feedback the candidates receive from peers and experienced researchers on short assignments in small groups, NAFOL also offers, to expand

23 AUGUST 2017

09.30 – 10.00	Welcome & musical contribution	4.2
	by Prof. dr. Ruben Vanderlinde (UGent, Belgium) and Prof. dr. Kari	
	Smith (NTNU, Norway)	
	Musical contribution	
	by Delphine Vanholderbeke (UGent student)	
10.00 – 10.20	Phd students introduce their PhD project in one sentence – get to	4.2
	know each others' work	
10.20 – 11.00	Keynote 1 'Practitioner research: A hidden secret for professional	4.2
	development'	
	By Prof. dr. Ruben Vanderlinde (UGent, Belgium)	
11.00 – 11.15	Coffee break	4.4
11.15 – 12.30	Research seminars with mixed groups of 6 students	
	Presentation of research projects in 10 minutes	
12.30 – 13.30	Lunch at 'Kantien'	
	Kanodreef 1, 9000 Ghent	
13.30 – 14.30	Keynote 2 'Professional life (two days) after obtaining a PhD in	4.2
	teacher education'	
	By Hanne Tack (UGent, Belgium)	
14.30 – 14.45	Coffee break	4.4
14.45 – 16.30	Research seminars with mixed groups of 6 students	
	Presentation of research question and methodology in 10 minutes	
17.00 – 18.00	Boat trip in Ghent	
	Bootjes van Gent, Korenlei 4A, 9000 Ghent	
18.30 - …	Dinner in 'Oude Vismijn' in Ghent	
	Rekelingestraat 5, 9000 Ghent	

24 AUGUST 2017

09.00 – 10.00	Keynote 3 'International research in educational leadership'	4.2
	by Prof. Dr. Anne Berit Emstad (NTNU, Norway)	
10.00 – 10.15	Coffee break	4.4
10.15 – 11.00	Research seminars with mixed groups of 6 students	
	Sharing challenges related to writing a PhD in teacher education	
11.00 – 12.00	Keynote 4 'Teacher evaluation as part of strategic human resource	4.2
	management in schools	
	By Dr. Melissa Tuytens (UGent, Belgium)	
12.00 – 13.30	Lunch at 'Kantien'	
	Kanodreef 1, 9000 Ghent	
13.30 – 14.30	Keynote 5 'Functions of assessment in teacher education'	4.2
	By Prof. Dr. Kari Smith (NTNU, Norway)	
14.30 – 14.45	Coffee break	4.4
14.45 – 15.45	Panel debate 'Assessing a dissertation – Questions from students'	4.2
	By Prof. Dr. Anne Berit Emstad, Prof. Dr. Kari Smith, Hanne Tack & Prof.	
	Dr. Ruben Vanderlinde	
15.45 – 16.15	Conclusion	4.2
	By Norwegian student, Ghent student, Prof. Dr. Ruben Vanderlinde, &	
	Prof. Dr. Kari Smith	
19.30 - …	Dinner in Du Progres (only for Norwegian PhD students)	
	Korenmarkt 10, 9000 Ghent	

FIGURE 2 | Example of NAFOL international seminar at University of Ghent, 2017.

the candidates' learning, expert feedback on longer texts, articles, in master classes and on the full dissertation in process-seminars.

When a NAFOL candidate has a complete draft of an article, he/she is given the possibility to engage in a constructive feedback dialog with an invited expert in the field who is not the candidate's supervisor, in a master class. This takes place prior to submitting the article to a peer reviewed journal. The expert reads the article in advance and prepares a formative feedback session of 45 min with the candidate and peers from the cohort in the audience. The feedback is used when finalizing the article for submission to the journal. The doctoral candidates are given the possibility to have a masterclass for all three/four articles of the dissertation.

An article-based dissertation in Norway normally consists of three/four articles and an extended meta-text of up to 100 pages which conceptualizes the project by writing more extensively about the theoretical framework, discussing relevant research in depth, presenting the theory of the selected methodology and synthesizing the findings of the various articles. Subsequently, the Norwegian article-based dissertation should reflect scholarly knowledge at a high level and research competence documented in the published articles. The NAFOL candidates are offered the opportunity to present a full draft of the dissertation to an external reader for formative constructive feedback in a process-seminar before finalizing the dissertation for submission. The external reader will be an acknowledged professor, national or international, from the respective field of the doctoral project. The process-seminar is open to other NAFOL candidates and

lasts for about 90 min. NAFOL covers all expenses for master classes and process-seminars. This is an important factor in the effort to expand the learning of the doctoral candidates beyond the doctoral program of their institution and the supervision team.

Summer Schools and Conferences

Within the cohort the doctoral candidates establish a strong community of learning as they meet four times per year. All the candidates in a cohort will be at more or less the same stage in the doctoral project, thus they support each other in facing similar challenges. However, the whole NAFOL community offers a wider community of learning, and therefore one of the seminars every year is a cross cohort seminar in the form of a summer school or an international conference.

The biannual summer school has become a rather big event as all NAFOL doctoral candidates, their supervisors, and NAFOL alumni are invited to participate. National and international researchers are invited for plenary presentations, debate sessions and feedback sessions in cross cohort groups. The candidates are invited to engage in professional dialogs with each other and with a variety of renowned researchers and scholars. As in the other seminars, social and cultural activities are included.

In the year when NAFOL does not organize a summer school, there is an international conference to which all NAFOL candidates, supervisors, alumni, and two doctoral candidates from each of the Nordic and European universities NAFOL has

worked with. International and national high-profile researchers are invited for keynotes and workshops. All NAFOL candidates must present at this conference, either a poster, paper, roundtable or symposium with discussants. The candidates are given the role of introducing and thanking keynote speakers, chairing sessions and acting as chairs of panel discussions. These are roles they are expected to take on as academics, and at the NAFOL international conferences they are given the opportunity to practice in a low-stake setting. Moreover, the cohort in its fourth year is given the responsibility to organize and lead the social events and conference dinner. The conference becomes an important arena for the NAFOL candidates to expand their learning beyond the cognitive aspects, they are socialized into the academic world.

Keynote speakers and candidates who present papers at the conference are invited to submit their presentations for publication in the NAFOL book. The process of having a paper accepted is rigorous, first an abstract of 1,000 words goes through blind review, and those that are accepted, are invited to submit full papers which again are subject to blind reviews. At the end, only the best papers are accepted for publication in the book which is published by a well-known Norwegian publisher. The fourth book, *Value and Validity in Teacher Education Research,* is expected to be published early 2020.The book offers an additional opportunity for the NAFOL candidates to expand their learning.

Financial Support

The many activities described above are free of cost for all NAFOL candidates which makes it possible for equal participation once they are accepted into the program. The research school also offers financial support for active participation in international conferences and for study leaves at a university outside Norway. NAFOL supports the candidates in finding suitable places where they will have an onsite mentor and opportunities to discuss their work with other doctoral candidates and researchers. Norway is a small country, 51/2 million people, and we depend on international cooperation and networks. One of NAFOL's aim is to strengthen the internationalization of Norwegian teacher education and teacher education research. Learning is expansive beyond Norway, a must in the era of globalization. NAFOL is funded by the Norwegian Research Council which receives earmarked funding from the Government.

RESULTS/EVALUATION

When a nation invests so heavily in developing a research-informed teacher education and strengthening teacher educators' research competence, there is an implied claim that the national research schools must meet the expectations and fulfill the expressed goals. NAFOL has been evaluated in various ways during these 10 years, and in the following some of the results from these evaluations are presented.

Extended Funding

The most common periods for projects funded by the Norwegian Research Council are 3 years for research projects and 6 years for research schools. As mentioned above, when NAFOL received

the first funding in 2010, it was for 6 years, and the aim was to educate 80 teacher educators for a Ph.D. degree in four cohorts, however, the actual number was 100. As NAFOL became known and respected among teacher educators and teacher education institutions, the number of applicants increased, and continuous additional funding was granted without any formal application to the Research Council by the NAFOL network institutions. NAFOL was required to write a yearly report on its activities, the progress of the doctoral candidates and the financial management, and year after year further funding was provided. As for now, the extended project period is 12 years, ending in 2021. By then 10 cohorts will graduate from the research school, three of which are currently in the process. Cohort 9 consists of two groups of 22 candidates each. The reason for having a cohort with two groups was that the number of applicants was so high that despite a considerable rejection rate, the Steering Board found it necessary to accept two groups to cohort 9 to meet the demands of the network institutions.

External Interim Evaluation 2013

It is common in Norway that a research school with rich external funding becomes subject to external evaluation by an international evaluation team. This was also the case with NAFOL, and in 2013 the external evaluation report was submitted. The material used by the external evaluation team were the application submitted by NAFOL to the Research Council, NAFOL's self-evaluation, additional information about the activities, evaluations by 21 network institutions and interviews with NAFOL representatives, management and candidates (Norwegian Research Council, 2013).

The conclusions of the report reads:

NAFOL is well organized with a clear structure, which can be attributed to a well-functioning management consisting of a scientific leader, a consciously structured administration, a board and a council. Both Ph.D. students and supervisors from the partner institutions meet and build networks. Overall, the partner institutions are very satisfied with the cooperation. NAFOL maintains a high profile in terms of internationalization. The strategic importance of the research school is considered very important. There is a clearly set out plan for the school for the whole period until the end in 2016. All in all, NAFOL shows high goal achievement. However, three factors of uncertainty have been identified – collaboration with a kindred research school, NATED[1], vulnerability related to the replacement of people in leading managing positions and concern for what will happen after 2016 (Norwegian Research Council, 2013, p. 11).

National Research School in Teacher Education situates the expansive learning of the candidates in new networks created across the country and across research topics and methods, thus, teacher educators' learning crosses boundaries (Engeström and Sannino, 2010). The three vulnerable factors turned out to be less of a challenge than expected, as the related research school did not continue after 2015, leading people who retired were replaced by others who were engaged in NAFOL in different roles, and the

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[1] NATED, National Graduate School in Educational Research.

project was extended, so the worries about post 2016 have now become the worries of post 2021.

Self-Evaluation 2015

Upon request from the Research Council in August 2015, NAFOL was told to conduct a wide self-evaluation to be submitted to the Research Council by the end of 2015. This was a central document in deciding whether to extend the NAFOL period and expand the funding beyond the original first 6 years. The Academic Head of NAFOL was responsible for the self-evaluation, however, she hired an external researcher to collect data from the network institutions and alumni to reduce the many biases related to self-evaluation. The research question that guided the self-evaluation was: *How do network institutions, represented by deans, graduates, and of NAFOL's founders, perceive the impact of NAFOL's work in its first project period?* (Vattoy and Smith, 2018).

Data were collected by questionnaires to deans of teacher education in the network institutions and NAFOL alumni. In addition, interviews took place with central people in NAFOL, and recordings from a Council and a Steering Board meeting. The extensive report was submitted to the Research Council in November 2015 (Smith, 2015), and a paper, Developing a Platform for a Research-Based Teacher Education (Vattoy and Smith, 2018) summarizing the report, was published in 2018 in the NAFOL book, Where are we? Where do we want to go? What do we want to do next? International and Norwegian Teacher Education Research (Smith, 2018). The main findings of the self-evaluation suggest that

NAFOL's main contribution centers around three areas: establishing networks and cooperation, developing a teacher educator identity, and research linking theory and practice in teacher education, whereas the main criticism relates to attention to early childhood education (Vattoy and Smith, 2016, p. 35).

The findings suggest that NAFOL fulfills its aims to develop a knowledge base in teacher education and to strengthen the research competence of teacher educators. The candidates appreciate the support of relevant networks, and they develop an identity of teacher educators as researchers, they go beyond their comfort zone mediated by peers and experienced researchers (Engeström, 2001).

Even though 25% of the candidates work in pre-school teacher education, the program has not been planned with this specific group in mind. NAFOL candidates work with education of teachers at all school levels and with all school subjects, and the program addresses general aspects of writing a dissertation and developing academic competence in teacher education, and it does not tailor the program to specific thematic domains within teacher education. Hence, the criticism of lack of attention to early childhood education is justified, and similar criticism could also have come from, e.g., secondary school teacher educators, math teacher educators etc.

External Evaluation 2018 (Master Thesis)

In 2017 a master thesis examining the impact of NAFOL on its alumni was submitted to a Norwegian university (not the host university) by a graduate student with no relation to NAFOL whatsoever (Sunde, 2017). The thesis was summarized in an article which will be published in the forthcoming NAFOL book, *Value and Validity in Teacher Education Research* (Smith, 2020). This study was a qualitative study based on in depth interviews with 8 NAFOL alumni exploring the question *How do NAFOL alumni experience the participation and their own learning and development in NAFOL?* (Sunde, 2020). The main findings show that NAFOL provided:

(a) A close supporting network which the candidates' respective institutional doctoral programs did not provide.

(b) Participation in a strong academic community.

(c) Knowledge about how to conduct research.

(d) Professional and social networks.

(e) Shared responsibility for providing mutual support in the peer group.

(f) Additional supervision and feedback throughout the doctoral project.

(g) Learning an academic language.

(h) Low threshold for communication (Sunde, 2017, 2020).

The above findings indicate that NAFOL provides a framework for teacher educators' expansive learning in the process of taking on a dual role as teachers educators, that of teachers and of researchers (Smith and Flores, 2019). Sunde (2020) who has called his paper, *Everybody should have a research school,* concludes that the scientific community of learning in a research school is a good and important arena for professional development.

Numbers

The above evaluations document that NAFOL has been working according to the expressed goals in the application submitted to the Research Council in 2009. The socialization and subjectification processes the candidates experience in NAFOL are emphasized in the different evaluation activities. However, by the end of the day NAFOL has been, and will be, evaluated according to the measurable achievements, the Ph.D. qualification of the candidates. Does the expansive learning framework offered by NAFOL accumulate in an expansive qualification for Norwegian teacher educators? Hence, it is necessary to look at the figures representing the measurable contribution of NAFOL to developing a research-based teacher education and to strengthen the research competence of Norwegian teacher educators.

This section will briefly present figures related to candidates, completed dissertations, attrition, and publication and dissemination of research.

Since 2010, 267 candidates have been accepted to NAFOL. Out of these 12 have left the program, mainly due to severe health problems, and 2 have left their doctoral studies after the NAFOL period. That means that the attrition rate is 5.24%. The national attrition rate from doctoral programs is 22.5% cross disciplines, and 40.6% in education (Statistics Norway, 2019). Currently there are 86 candidates in the program, cohorts 8, 9 (two groups), and 10. The last intake (cohort 10) was January 2019, and these candidates will only have 3 years in NAFOL as the end of the project is the end of December 2021.

TABLE 1 | Attrition and completion rates of Ph.D. degrees.

	National doctoral programs, cross disciplines[1]	National doctoral programs in education[2]	NAFOL
Attrition rate	22, 5%	40,6%	5,24%
Completion rate	35,5%	24,6%	65,56%

The numbers are based on the attrition and completion rates within a 5-year period.

[1]*Statistics Norway, 2019.*
[2]*Statistics Norway, 2019.*

The completion rate of accepted doctoral dissertations in all disciplines in Norway after 5 years is 35.5%. For teacher education and educational dissertations, the completion rate is 24.6% within 5 years (Statistics Norway, 2019). The completion rate in NAFOL is 65.56%, and all dissertations are within the domain of teacher education.

In 2019 NAFOL candidates published 26 peer reviewed papers and presented 61 papers at scientific conferences. This number represents only 1 year, and on average we could multiply this by 8 years (assuming that not much publications took place in the two 1st years of the research school). The NAFOL candidates have contributed with 208 empirical peer reviewed papers to the Norwegian researched based knowledge in teacher education. 61 conference presentations per year adds to the dissemination of Norwegian teacher education research, amounting to 488 conference presentations. For such a small country as Norway and Norwegian teacher education the above numbers are significant. NAFOL has contributed to developing a stronger research-based teacher education.

An additional summative evaluation of NAFOL will be conducted by an external group of evaluators and administered by the Norwegian Research Council in 2021.

DISCUSSION

In the following discussion the reasons for the success of NAFOL as documented in the various evaluations and reported numbers will be addressed before elaborating on the challenges NAFOL has experienced and some worries about the future of expansive learning of teacher educators.

The main task of NAFOL has been to support teacher educators in the process of becoming researchers in addition to their roles as teachers. This is a difficult process, developing a new form of expertise (Murray and Male, 2005; Czerniawski et al., 2017), especially under the explicit pressure from policy makers to make teacher education more research-based. In addition, many teacher educators realize they are obliged to engage in research in order to continue working in teacher education. They are expected to supervise master thesis, and publications are central to their career in the academy (Smith and Flores, 2019). Cochran-Smith (2005) claims that engaging in research is an integrated component of any teacher educator's job responsibility, which aligns with Krokfors et al. (2011) definition of what constitutes a research-based teacher education presented in the introduction of this paper. NAFOL is a research school

in teacher education, and the focus has always been on practice-oriented research relevant to the practice field. Teacher educators must find a balance between teaching and research, and a way to combine both (Vanassche and Kelchtermans, 2016). The NAFOL research profile as stated in the grant application has from the beginning been subject teaching methodology (didactics), teachers' mandate in society, and the teaching profession and professional development. Teacher educators are given the possibility to expand their roles beyond being a teacher to also becoming a researcher within their respective professional interests in their doctoral projects. However, starting a doctoral education is found to be a difficult process, and Jones (2013) concludes in a large review study of doctoral education over 40 years that many doctoral students feel isolated and lonely. In NAFOL the students are, as previously mentioned, accepted into cohorts which become communities of learning and of practice.

Lave and Wenger (1991) define communities of practice as an arena within which participants are given the opportunity to develop special competence through social practices and experts. The cohort serves as a community of practice and learning over 4 years. The candidates are all in the same stage of their doctoral projects, they learn to trust their peers and the cohort coordinator, and the threshold level of communication is low. This leads to the fact that they are open to provide and receive constructive feedback, and to talk about the challenges they face. Friendships are created in addition to very strong professional networks across the country and beyond. The candidates experience they can engage in their expansive learning processes in a safe environment with peer and expert support (Vattoy and Smith, 2018). This might explain the low attrition rate from NAFOL, and the high completion rate compared to the national average.

The cohorts meet four times per year for 4 years outside their own institutions which provides time and space to develop close social relations. In the seminars they meet international and national experts who comment on their work. This creates motivation to attend the seminars and to prepare the assignments (Vattoy and Smith, 2018). Much work is done in small groups, and the candidates are expected to present texts for discussion. Moreover, the assignments are also obligatory for the integrated doctoral courses in NAFOL. There is a kind of social, as well as, structural pressure to produce. They are induced into a continuously evolving process in their doctoral work. It is difficult to be active in NAFOL without experiencing progress. The dissertation is over the 4 years broken into manageable tasks which toward the end take the form of full papers or a complete

dissertation. Continuous formative and constructive feedback throughout the 4 years is the core of NAFOL and essential to completing the projects. The feeling of not having progress, of being stuck, is found to be a major reason for attrition from doctoral programs (Jones, 2013). The candidates are qualified as researchers with a Ph.D. degree, and at the same time they are socialized into the academy, creating strong professional networks within their own subjective professional engagement. NAFOL has become a community which aims to practice Biesta's (2009) goals of education.

Another reason for NAFOL's success can be ascribed to the strong financial support the candidates have available to expand their learning beyond a regular doctoral program. They are given the opportunities to attend conferences and to visit international institutions and create global networks. The candidates do not have to worry about the financial aspects of expanding their learning, which probably is unique in any doctoral education. The Norwegian policy makers have invested heavily in developing a strong research-based teacher education, and NAFOL has been the core of this investment (Norwegian Ministry of Knowledge, 2006–2007, 2008–2009).

The success of NAFOL has, however, also become its main challenge which is elaborated in the next section.

Challenges

When the research school was established, there was a concern that NAFOL would not have enough candidates, and the aim of having cohorts of 20 seemed to be visionary. Therefore, each network institution committed to provide a specific number of candidates in the 1st years. However, already after the 2nd year, when NAFOL became known, the number of applicants per year increased, and an increasing number of applicants were rejected. Keeping in mind that all applicants had already been admitted to a doctoral program based on a detailed project description in one of the network institutions, NAFOL was not in a position, or did not find it ethically correct, to reassess the quality of the project descriptions. Other criteria such as relevance to teacher education and NAFOL's three research domains, and motivation for engaging in expansive learning beyond the institutional doctoral program, were applied. Still, many applicants were found suitable, and as a result two cohorts had 30 candidates and more. However, it became clear that in large cohorts there were a few candidates who were less active, and their participation and progress were not as expected. They were less socialized into the group, and the benefits of the NAFOL activities were not fully exploited. This affected their doctoral work and the completion of the dissertation. Hence, in 2018 the Steering Board decided to have two groups within the cohort (9), each group given a coordinator, to be able to accept more candidates, yet at the same time to maintain the advantages of working within a small community of learning.

NAFOL has become an integrated part of Norwegian teacher education institutions in their efforts to strengthen teacher education research. The institutions are under pressure to employ research competent people with a Ph.D.- degree, and a growing number of positions for doctoral candidates are offered. In the last years the number of applicants to NAFOL has increased, and the rejection rate has been beyond 60%. This means that in many institutions there are two groups of candidates enrolled in their educational doctoral programs, those who are accepted into NAFOL and those who are not. An example is taken from a large university which have nearly 70 doctoral candidates in teacher education, however, only 8 of them are currently accepted to NAFOL. As emphasized in this paper, NAFOL provides expansive learning and individually tailored support to its doctoral candidates which is found to increase the chances for completion. When some candidates in an institution's doctoral education enjoy these benefits and others do not, an A and B team of candidates are created. As some of the NAFOL candidates say, "We are members of the national Olympic team." This is a challenging situation for many network institutions.

NAFOL was established to develop a research-based teacher education by educating teacher educators to become researchers and academics in a time when Norway really needed a courageous and innovative national investment such as a well-structured, high quality and richly funded research school. The success of NAFOL has been described in this article. Today, however, the situation has changed, and the success has created a challenge that requires new bold innovative models for expanding teacher educators' learning as researchers in the future. New models should be inclusive, and not exclusive, as NAFOL due to its huge success, has become. It is therefore timely that the current structure of NAFOL ends in 2021, and different initiatives are tried out and implemented.

Already in 2019 did the NAFOL management, in cooperation with the Steering and Advisory Board, start discussing possible future models which will keep the network intact on one hand, however, include all doctoral students and not only cater for an exclusive group on the other hand. This is still work in progress, in dialog with the Norwegian Research Council and the policy makers. The direction is that the institutional doctoral programs will take over the responsibility for creating strong networks and individual support, whereas the national research school will offer doctoral courses specifically relevant to teacher education research and be responsible for annual seminars/conferences with international speakers and spaces for presenting work in progress for formative feedback from peers and experts.

CONCLUSION

In this paper the unique initiative of creating a national research school in teacher education has been described. NAFOL was right when it was established in 2010 and has contributed to developing a rich research supported knowledge base in, of, and for teacher education (Norwegian Ministry of Knowledge, 2017). It has been a major factor in the quantum leap Norwegian teacher education research has had and is currently experiencing.

The success of NAFOL is due to the national needs, national investment, the structure, pedagogical and social activities, quality of academic and administrative staff, and not least the dedication of the candidates. The teacher educators chose to, and invested in, expansive learning which took place at several levels, first and foremost in acquiring research competence and

a doctoral qualification. Second, they chose to expand their learning beyond a regular doctoral education and participate in NAFOL with its additional requirements and support. Thirdly, the learning expands across Norway, Scandinavia, and Europe.

NAFOL has become well known internationally and acknowledged in European policy documents:

In Norway, the Ministry of Education and Research has started a research program for teacher educators (PRAKUT), engaging them in practice based educational research in close cooperation with schools. This program is supported by a National Graduate School in Teacher Education (NAFOL), where teacher educators can join Ph.D. programs. While supporting the development of teacher educators' research expertise, this initiative also contributes to the development of the knowledge base on teaching, teacher educators, and teachers (European Commission, 2013, pp. 24–25).

Success, however, is context and time dependent, and NAFOL was right when it was established in 2010 and till 2021. However, in the future new models for ensuring teacher educators' expansive learning must be developed, as there is still a long way to go, also according to Norwegian Policy makers (Norwegian Ministry of Knowledge, 2017). The accumulated experiences from NAFOL presented in this paper can expand the learning of policy makers and teacher education institutions in other countries about how to develop national models for expanding teacher educators' learning.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

AUTHOR CONTRIBUTIONS

KS was a professor of Education at the Norwegian University of Science and Technology (NTNU). She was an experienced school teacher and teacher educator, and she was currently the Head of the Norwegian National Research School in Teacher Education (NAFOL). She was, until this year, the Chair of the International Forum for Teacher Educator Development (InFo-TED). Her main research interests are assessment and professional development at all levels of education. She has published widely and is often invited to present her work internationally.

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Promoting Aesthetical Values to Education

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With a pressure on schools to meet the requirements of a knowledge-based global economy, human development, critical thinking and imagination seem to be given lower priority. This article argues for including the aesthetic dimension in teaching as a way to foster human development. While aesthetic subjects are cut, there is a growing interest in aesthetic methods through which students are expected to use their knowledge in new and creative ways. However, there is a tension involved in combining innovative and creative thinking with the objectives model, in which education is broken down into measurable targets. Including more than what is measurable is important to encourage students to not only copy what they are told, but to become creative and able to find their own solutions in the future. The aesthetic dimension might support independent thinking and imagination, crucial qualities in a democracy and for developing a future that we cannot yet see. Aesthetics is here understood in a broad sense and not limited to certain subjects. A main concern in the article is how to include aesthetics in academic subjects. Every subject has elements of emotions, intuition and interpretation and might make use of symbolic forms. The aesthetical involves knowledge that is gained through the senses and that appeals to emotions. An aesthetic approach might contribute to interest and meaning, preconditions for learning that transforms the individual. It might open up unrealized knowledge and unexpected outcomes. Furthermore, the approach might contribute to a good life. The argumentation in the article will build on theory as well as on empirical research from upper secondary school.

Keywords: aesthetics, human development, transformative learning, the art of teaching, comprehensive education

THE STARTING POINT

Once I had a teacher who showed me the way into modern literature. I can still remember the poems we read and the novels we were introduced to in the mother tongue lessons, in this case Norwegian. The teacher's teaching spoke to my heart, not merely to my head. I was not the only one who had this experience. In a natural science programme, but with Norwegian as a compulsory subject, the teacher changed the whole class's somewhat negative attitude toward literature. I for my part had always loved to read and was an uncritical consumer of literature. However, for me the teacher opened a new world within literature and made me much more conscious of quality. I became interested in literature for adults, modern literature, and poetry. Furthermore, I realized that through literature I could get access to knowledge about being a human being and to perspectives very different from my own. Living in the world suddenly became more complex, but also more interesting than before. Through the teacher's commitment and creative teaching, he

showed a group of youngsters something to which we would not have had access without him. The teacher brought something new to the table, and he gave us what Biesta (2014) describes as *the gift of teaching*. This school experience is something I have always brought with me as an example of transformative learning, learning that changes you as a person (Jackson, 1986; Illeris, 2015). You walk out of the classroom a different person than the one who entered – with knowledge, skills, or attitudes you did not have before. Your preconceptions are challenged.

Eventually I became a teacher myself, first in school, then in secondary school teacher education at a university. As a result of my own experiences – with my Norwegian teacher, and with some, but not many, other excellent teachers – I have always sought to pave the way for expressions that make an impression on students. Through expressions that might be characterized as aesthetic, I have wanted to provide students with something meaningful that makes a difference in their lives and that makes going to school worthwhile. The intention has been not only to feed students thinking, but also to reach their hearts and appeal to the whole human being (Biesta, 2017). Sometimes, I think I reached my goal, but many times I did not. Time pressure makes it easy to follow routines. Furthermore, a challenge with transformative learning is that it is difficult to plan for and it is impossible to predetermine students' outcome. What works for some students might not work for others.

The aim of teaching, as I see it, is not only to help students perform well in school; schools are, as Eisner (2002) points out, also places to live together with others and a medium for growth. School occupies a lot of time in young peoples' lives and attention should not only be directed toward the future, but also toward what happens here and now. Furthermore, what is important is not only what people know, but also who they are and how they will use their knowledge. Consequently, teachers need to pay attention both to measurable outcomes as well as to students' human development, something that is difficult to translate into predictable outcomes. Human development is a process, an interaction between the individual and the culture the individual is part of Klafki (2001). It is not about self-realization, but about making the world a better place.

Today there is a pressure on schools to meet the requirements of a knowledge-based global economy (Ball, 2012). International tests like PISA (Programme for International Student Assessment) and TIMMSS (Trends in International Mathematics and Science Study) have had a considerable impact on education. These kinds of tests that measure student outcomes seem to constitute the basis for educational changes. So-called basic skills are emphasized while programmes in arts and humanities are given a lower priority (Nussbaum, 2009). Some researchers claim that human development as well as critical thinking and imagination are neglected (Eisner, 2002; Nussbaum, 2009; Biesta, 2017). However, it is still expected that students are able to use their knowledge in new and creative ways to ensure economic growth (Brekke and Willbergh, 2017). Consequently, even if aesthetic subjects are cut, there is a growing interest in aesthetic methods.

In the following, I will argue for the value of the aesthetic dimension as a way to foster human development in teaching. My reason for this approach is not to promote economic growth, but to support independent thinking and imagination. These are crucial qualities in a democracy (Klafki, 2001; Biesta, 2006). In the argumentation, I will draw on theory as well as some illustrating examples and results from my own empirical studies from upper secondary school.

THE AESTHETIC DIMENSION OF TEACHING

Aesthetics, from Greek *aisthētikos,* is knowledge that pertains to the senses and involves how we experience ourselves and the world. The opposite, an-aesthetikos, is what we have in the concept *anaesthesia*, which is about being unconscious. Aesthetics can thus be connected to being awake and present. Aesthetic expressions can be communicated through symbolic forms like theatre, dance, poetry, and images. These forms represent an interpretation of the world and affect feelings – they express how the world is experienced and invite a response. The aesthetical contains a comprehensive understanding of what it is to be a human being, and might be an alternative and a supplement to what is measurable. It gives access to dimensions outside the domain of logic and expresses what is indescribable through verbal language (Austring and Sørensen, 2006). Østergaard (2013) regards aesthetic impressions as something that speaks directly to the senses. Furthermore, *aesthetics* is defined as a perceptible symbolic form that communicates from, to and about feelings (Austring and Sørensen, 2006, p. 68). To explain: When someone expresses something in a passionate way, they might grip the listener's feelings, and through the way they communicate, they also express their own feelings related to the topic. In that way they both share an experience about feelings.

Austring and Sørensen (2006) present three ways to acquire knowledge: the empirical, the aesthetical and the discursive. *The empirical way of learning* concerns how human beings sense the world through tasting, smelling, listening, seeing and feeling. Knowledge is bodily anchored and often becomes tacit. This way of learning is especially visible among small children. *The aesthetical way of learning* builds on the empirical but involves an interpretation in which people elaborate and communicate their experience of the world. Children, for example, might use play or drawing as a way to interpret and elaborate experiences. Teenagers might express experiences through music, poetic language, images, or even in the way they dress. The aesthetical way of learning can also include an interpretation of other people's expressions. Aesthetical learning has to do with how life is experienced, how it feels and is perceived. The individual tries to understand how it is to be a human being. The understanding is mediated through different symbolic forms that give access to varied interpretations and outcomes that cannot be pre-planned. Who can predict the outcome of reading *Hamlet* (McKernan, 2010)? *The discursive way* of experiencing the world is the intellectual way of learning, characterized by logical thinking, analysis and discursive use of language. It builds on the two other approaches but involves an abstract understanding. In school, problems with meaning will arise if the discursive way

of learning is not connected to the other forms. Students might need to experience a phenomenon or be provided with illustrative examples in order to grasp abstract and generalized knowledge.

If the aesthetic is neglected in schools, society will lose valuable human qualities (Eisner, 2002). As expressed in a UNESCO document, "[c]ulture and the arts are essential components of a comprehensive education leading to the full development of the individual" (UNESCO, 2006, p. 3). The document problematizes a growing divide between cognitive and emotional processing and states that education through and in the arts might stimulate cognitive development. In the U.S., Nussbaum (2009) is critical of a situation in which although the liberal arts are part of college and university curricula, it is the demands of the global market that influence the curricula at lower levels. The humanities and the arts are seen as useless for economic profit. However, here I will underline that the aesthetic does not need to be connected to certain subjects. All subjects can be perceived in a sensitive way and include elements of feelings, intuition and interpretation (Løvlie, 1990). For example, art can be used in academic subjects either to illustrate a content or to offer a qualitative different understanding of a phenomenon. The iconic photo of the napalm girl from the Vietnam War might provide a deeper understanding of war than a textbook description does. Furthermore, education can learn from the arts forms of thinking. One lesson to learn is to formulate aims without clearly defined ends, another that form and content are often inextricable (Eisner, 2004). Finally, teaching in itself can be perceived as art. "Art" is in this article understood in a broad manner. When there are no fixed outcomes, there is space for students' interpretations and for creative approaches. Students form their own understanding, and knowledge becomes internalized. According to Brekke and Willbergh (2017), aesthetic ways of learning, in and through the arts, can contribute to autonomy through the aspects of freedom, imagination and development.

In the following, I will argue why the aesthetic dimension should be included in education through four interconnected and overlapping points:

The aesthetic dimension can:

– contribute to human development and in-depth learning
– create interest and meaning for all students
– present different forms of knowledge
– support teaching as an art

Human Development and In-Depth Learning

Human development is a matter of becoming a wise person and a good citizen. However, what it means to be human today is not prescribed (Biesta, 2006). Based on the situation in the world, with climate challenges, poverty, hunger, and wars, we can ask what young people need in order to manage life in a sustainable way and how education can contribute. In order to overcome these common international challenges, it does not seem adequate only to focus on predetermined outcomes or cultural tools from previous generations. It is impossible to predict what will be useful in the future, and "[i]f we are always aiming at pre-specified ends then we can never grow,"

as McKernan (2010, p. 8) states. Education therefore needs to support creativity and independent thinking.

Furthermore, in order to act, people have to *feel* that the situation in the world concerns them and is part of their responsibility, not only know about it theoretically. For that to happen, one needs to be gripped by a content (Klafki, 2001). Consequently, human development requires in-depth learning and that includes more than the cognitive dimension. This means that teachers have to slow down and take their time (Biesta, 2017) – they cannot introduce too many topics but have to be selective. If someone wants to learn all languages, he or she ends up learning none (Nussbaum, 1997). When selecting what to introduce in schools, Klafki (2001) suggests emphasizing key contemporary issues which are dynamic and not fixed.

Nussbaum (2009) differentiates between education for profit and education for freedom and global citizenship. She states that today's programmes favor cultivation of the technical and claims that: "the humanities and the arts make a world that is worth living in, people who are able to see other human beings as equals, and nations that are able to overcome fear and suspicion in favor of sympathetic and reasoned debate" (Nussbaum, 2009, p. 13). Considering an unsecure future, critical thinking, imagination, and creativity likely will be important attributes to encourage. Including an aesthetic way of learning in schools might support and develop these qualities. Furthermore, aesthetic expressions like music, poetry and images are something that offer people joy and that might enrich their lives, not only their education.

Education in is itself no guarantee for human behavior. The letter below expresses in a strong way that education can be misused[1]:

> Dear Teacher:
> I am a survivor of a concentration camp. My eyes saw what no man should witness:
> Gas chambers built by learned engineers.
> Children poisoned by educated physicians.
> Infants killed by trained nurses.
> Women and babies shot and burned by high school and college graduates.
> So, I am suspicious of education.
> My request is: Help your students become human. Your efforts must never produce learned monsters, skilled psychopaths, educated Eichmanns.
> Reading, writing, arithmetic are important only if they serve to make our children more human.

The letter articulates the point that people can be clever without being wise – or human. How can we avoid what is described in the letter? How can schools contribute to humanity? The German philosopher Adorno (1988) stated in 1966 in a radio programme with the title: "Upbringing after Auschwitz" that empathy and independence are crucial characteristics to encourage and promote in schools. Opening up to empathy implies that there needs to be a space for feelings and for concern for the others. To understand other

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[1]https://www.facinghistory.org/holocaust-human-behavior/education-and-future

people's feelings, one needs access to one's own. Furthermore, if students are only encouraged to do what they are told, their own critical thinking and imagination might not be developed. The discursive way of learning that often takes place in schools needs to be supplemented by aesthetic and empirical approaches (Austring and Sørensen, 2006).

Create Interest and Meaning for All Students

Initially I described, through an example, what I perceived to be transformative learning – learning that supported my human development and changed me as a person. However, transformative learning cannot be taught. What teachers can do is to promote the likelihood that transformative learning takes place (Illeris, 2015). Catching students' interests might be one way to go. Van Manen (1991) emphasizes the importance of *interest* as a precondition for learning, to be intensively present for something or someone. Interest cannot be demanded, but can be caught when something appears *meaningful*, which is different from being entertaining. Content might be conceived as meaningful by students through the teacher's professional "guessing" about how the curriculum and students' life-worlds can be brought together (Willbergh, 2015). This way of encouraging transformative learning demands teachers who know their subject as well as their students.

Furthermore, in order to have an impact on young people, teaching needs to appeal to diverse dimensions. Illeris (2015) mentions three dimensions that exist in all learning: a cognitive, a social, and an emotional dimension. Especially the latter, the one that can be connected to aesthetics, is, in my opinion, neglected in teaching today. What cannot be counted tends not to count (McKernan, 2010). The Norwegian philosopher Naess (2010) claims that in order to make an impression on students, education needs to grip their feelings and be characterized by amazement, creativity, and imagination. Management by objectives might lead to underestimation of the role of feelings. According to McKernan (2010), the objectives model is satisfactory for training or instruction but fails when applied to education. The aesthetic approach – to use artistic expressions as a pedagogical method – offer an empowering impact by opening up alternative understandings and a diversity of forms.

Here I will include an example from when I visited a student during her practice placement (Ulvik, 2018). Åse taught a lesson in a year-eight class (14-year olds) about how different animals were adapted to different biotopes. She presented a very well-structured PowerPoint with few, but important, points and had included in her oral presentation the main concepts the students were supposed to learn. However, after the lesson Åse said that she felt that the students put her on mute. She concluded that she had chosen the wrong channel and had to choose a different one to reach the students. She decided to repeat the lesson, but this time to make use of what she had learned about aesthetics in her teacher education programme. Now she only put spectacular images into her PowerPoint, and told exciting stories about the animals, rather than merely presenting facts. The students were hooked and prepared for learning in a more discursive

way. Åse thought that many students had negative learning experiences in science, her teaching subject. She explained that in a way she tricked them into the idea that learning in science was not that hard.

While verbal utterances provide unambiguous, but thin, information, images – the form Åse chose – are ambiguous and provide rich information (Kjeldsen, 2015). The richness in a picture might provide a fuller and more emotional understanding of something, and it gives students more freedom and space for imagination. Furthermore, images might support students with limited language abilities and utilize their knowledge about the world (Moses, 2015). In that way more students get access to knowledge. In addition to images that provide a different epistemological understanding than words (Kjeldsen, 2015), Åse introduced narratives about the animals. Narratives might awaken emotional involvement more than other forms (Gravett et al., 2017). Using different forms of representation than the discursive one, Åse offered her students an alternative entrance to the topic.

A perception of intelligence as verbally-transmitted knowledge might not recognize students with other talents than those the school usually nurtures (Eisner, 2004). Students can be smart in different ways, as Gardner (2006) points out in his theory about multiple intelligences. Schools should consequently involve different approaches and address the whole human being. Furthermore, in order to be creative, the different parts of the brain need to interact. While the right part can be linked to the aesthetic dimension, the left part can be linked to the discursive way of learning (Austring and Sørensen, 2006). It is easy to forget what Malaguzzi (1993) expresses in his "Poem about hundred languages" (see two excerpts from the poem below):

> The child has
> a hundred languages
> but they steal ninety-nine.
> The school and the culture
> separate the head from the body.
> They tell the child:
> to think without hands
> to do without head
>
> They tell the child:
> that work and play
> reality and fantasy
> science and imagination
> sky and earth
> reason and dream
> are things
> that do not belong together.

Present Different Forms of Knowledge

Like the poem above suggests, there are different forms of knowledge, and therefore different representations – as shown in Åse's example. A famous dancer once said that if she could put something into words, she did not have to dance it (Østergaard, 2013). Eisner (2002) claims that ". . .to use new tools and new forms of representation enables us to look for different things

and to ask new questions" (p. 380). Coherent education should include both head, hand and the heart – the intellectual, practical and emotional (Klafki, 2001). Østergaard (2013) makes a similar point. He states that to be able to describe and explain nature has become the main issue in natural science. In order to support sustainable development, students need to see nature as a value, something that demands alternative representations. He argues that using the arts might lead to a qualitative access to phenomena. In the famous book about the little prince, it is said: "It is only with the heart that one can see rightly; what is essential is invisible to the eye" (de Saint-Exupéry, 2015, p. 67). In order to understand the value of nature, students need to experience and be gripped by it – to see nature with their heart as well as their minds. Østergaard (2013) concludes that the arts might give a different access to phenomena.

A feature of the arts is that its aims are not fixed; attention is directed toward the particular and the ambiguous. There is room for surprises and for using discretion. The opposite is having fixed measurable aims, attention to what is comparable and uniform, toward exact answers, what is predictable and unambiguous and follows rules. Eisner (2004), who has written about what education can learn from the arts, does not suggest that education should not include measurable aims, but that there should be a balance among descriptive, problem-solving and expressive aims (Eisner, 1985). We need them all, but today the measurable aims seem to take precedence.

Teaching as an Art

Teachers' work might itself have an aesthetic quality. According to Eisner (2002): "Good teaching depends upon artistry and aesthetic considerations" (p. 382). He compares teaching with playing jazz. One needs to know when to come in and take the lead, when to bow out, and when to improvise. These aspects follow no rule, they need to be felt. What happens in the classroom is partly informed by theory, but also by improvization in real time on the spot (Bergum, 2003; Eisner, 2004). The form and content depend on who the players are, and improvization therefore depends on each person finding their own voice rather than doing what is "right" (Bergum, 2003). When writing about transformative teaching, Jackson (1986) uses the potter as a metaphor to describe teachers as artists. Even if there are no recipes that tells teachers how to bring on changes, he suggests three ways. One is to be a role model, the second is mild persuasion and the third is to use narratives. The German philosopher Bollnow (1969) problematize whether it is possible to change another human being in a profound way, and he describes upbringing as a risky undertaking. Even if I argue that the aesthetic dimensions should be included in teaching, I will also add that it might lead to unintended outcomes that we should be aware. Human beings are not objects.

Moreover, a lesson might have a dramaturgy (Dale, 1993). It is about the rhythm, the atmosphere, the balance between elements and how the lesson is perceived as a varied whole. Good teaching transmits knowledge in a way the students understand and that encourages their interests. It is an interplay between teacher and students that cannot be replaced by online lectures in which knowledge seems more like a product to be delivered.

EMPIRICAL RESEARCH ON AESTHETIC LEARNING

So far, my arguments are built on theory. In this part I will include examples from my own empirical studies (Ulvik, 2020a,b). With a rather negative impression of the variety of representations used in schools, some colleagues and I investigated how students in upper secondary school perceive school. Through 14 focus group and conversations with 84 students we wanted to learn more about when the school promoted human development and interest in learning, qualities that Norwegian schools are required by law to support (Education Act, 2014, §1). We also arranged three focus groups with four secondary school teachers in each group, asking them to tell us about how they promote interest among students.

The results show that both students and teachers value varied teaching and experiences that appeal not only to the cognitive dimension, but also to the practical and emotional. One of the main categories in the students' answers related to the aesthetic dimension. In the following I will include examples especially from this dimension, examples that illustrate how students learn through the arts (understood in a broad sense) and how that creates interest (Kvam and Ulvik, 2019; Ulvik, 2020b):

> I had a teacher in Norwegian who showed art works and played music when he taught about different periods in literature. The periods came to life and I can therefore still recognise characteristics. I can look at art works and say: oh, that is from that period.
> We saw a film about taking care of the environment and about sustainability. [. . .] I do not eat red meat anymore, so the film actually changed me.
> Sometimes our Spanish teacher plays a song we are supposed to translate or understand the meaning of. Then we learn through music. It's great fun.
> Instead of learning about all the grammatical rules, she *told* us about German culture, how it is, what they eat.

Here students learn through images, music, film, and storytelling. The need for variation is underlined, for instance in the following example: "Once they (the teachers) do something different it becomes much more interesting and engaging."

Students complain about time and assessment pressure and state that in upper secondary school they primarily learn for the test, and that there is often no time to get interested. A student said that: "My ideal school is a school where the teachers in their teaching considering different needs and how students learn in different ways."

The students also described how they appreciate committed teachers that manage to spark a light: "Even if they (the teachers) talk about something boring and heavy, they are so engaged that you look forward to listening to them."

Students value aesthetical impressions, but also being allowed to express themselves in an aesthetic way. One of the focus groups explained that they once were allowed to present some group work as theater. Some students suggested presenting material through a film:

It would have been good fun to make a film! A short film that you can present to the rest of the class. On pollution, for instance. We could walk around, film different places, like the media does! Our creativity would have blossomed!

Examples like the above are rare in upper secondary school. It can be added that in upper secondary school, aesthetic subjects like music, art or drama are not common subjects in the national curriculum. However, what was underlined by the students supports the idea about different ways of acquiring knowledge. "We got a different understanding of a fish when we saw a fish in real life," one student said. Another student mentioned that "in biology we had a field excursion, and everyone became engaged even though it was a heavy topic. But we learned in a practical way."

The teachers, on their side, supported the idea that discursive teaching needs to be supplemented with aesthetic and empirical learning. They suggested among others role-plays and bringing in relevant objects:

I like to include role-plays in my subjects. Then the students get a more visualised understanding of the topic.
In history I like very much to use props. Through the years, I have collected quite a selection. For example, when they learn about the nineteenth century, I might use a caricature drawing from 1897 and ask the students: 'What can it tell us?'

The teachers emphasized appealing to the emotions. One teacher elaborated on this view: "Students should take something home from the lessons, so to appeal to their feelings might be important." He described how his science class arranged a role-play in groups about a young couple who were expecting a baby and were discussing whether or not to take a genetic test. The couple was offered a test because they had a disease in the family. The teacher experienced how the groups became very engaged and continued the discussion after the lesson.

The teachers in our study, mainly from upper secondary school, really wanted to stimulate students' feelings and vary their teaching. However, like the students, they underlined the assessment pressure and how there is often not enough time for students to get interested.

Even if the teachers saw some opportunities for creating interest and meaning, they found that there are sometimes too many topics to cover or a lack of time to plan lessons that make an impression on students. The teachers highlighted that in an ideal school teachers should cooperate, and they would also have liked to do interdisciplinary projects where they could draw on each other as a way to get students interested. Such projects might be more compliant with life outside school, according to the teachers.

Norwegian teachers are expected to promote human development. It might be a challenge, but nevertheless meaningful as expressed by one of the teachers:

It is very demanding to be a teacher and all the time try to provide students with lasting experiences, experiences that contribute to human development. It is a demanding enterprise, but at the same time, it what makes it so great to be a teacher.

The present study shows that through *aesthetic approaches* and *committed teaching*, students are inspired to learn, and to learn more than facts. They also get an emotional involvement with their learning that might transform them as human beings. For that to happen, students need varied representations within their subjects. They also want more creative subjects, like music, dance and fine arts. The aesthetic dimension will add an extra dimension to students' learning. One student explained:

I think society is almost a bit afraid to include subjects like that. They are concerned about the next generation getting enough knowledge, but creative subjects are important! A lot of good thought can come out of it, and you can use your creativity. It's transferrable to other, more fact-based subjects.

For the future, society needs creative people, not only people who can repeat what we already know. Consequently, there should be space for what cannot be measured and that gives student freedom and room for imagination. Freedom is best cultivated by an education that supports critical thinking. Sometimes including different representations does not require big changes, but rather a change of attitude – like in Åse's example.

IMPLICATIONS

A key argument for including the aesthetic dimension in education is to support human development. The previous quoted letter points out that the connection between education and wisdom is not self-evident. Encountering global challenges today, there is a need for global citizenship and for human beings that feel responsible and can imagine a way forward. However, human development through education is not an easy route to stake out. Transformative learning cannot be planned for and be evaluated in terms of measurable outcomes. Furthermore, we do not know what knowledge and skills are needed in the future, and what is needed is therefore creative and independent thinkers. However, while McKernan (2010) states that the objectives model fails when it comes to education, education in Europe has become more standards driven. This is a result of the so-called Bologna Agreement, through which European countries have tried to ensure comparability in the standards and qualities of higher education. It is debatable whether the agreement encourages aesthetic qualities in education.

Moreover, I have argued that the aesthetic dimension is part of all subjects. This means that it is not something that only should be offered in separate courses or at certain levels in the educational system. In higher education, students become included in a special field, and often learn by the discursive way. However, to get a deep understanding

of their topics, they might need examples and experiences. Moreover, education is not only about fitting in to a community, but also involves thinking critically about and even adding to existing knowledge. As such there should be space for students to create their own interpretations and to elaborate on what they have learned in different ways. The aesthetic approach might offer this space for interpretation and processing.

I will point to three consequences for education that includes the aesthetic dimension in addition to the empirical and discursive. An aesthetic approach will have consequences for: (1) the quality of teaching, (2) the resources students are offered, and (3) what students are asked and allowed to do. In the following I will elaborate on these points.

Firstly, aesthetic teaching has a dramaturgy and appears as a meaningful whole (Dale, 1993). There is room for improvizations and for varied expressions. Examples here can be images, films, excursions, narratives and poetic language. These are forms that could also be included in upper secondary school and in higher education. However, I have to add that I find the quality of the different forms important. An artistic image might offer a range of interpretations, and more so than a quick and random choice from the internet. Furthermore, teachers who bring something new to the table have to know their subject but also be willing to take a risk. When stepping out of their comfort zone and putting themselves at risk, there is no guarantee of success. Aesthetic expressions can open up and inspire, but the outcome can never be predetermined. Through professional "guessing," teachers can choose something they think will promote transformative learning (Brekke and Willbergh, 2017).

Secondly, the resources students are offered can also have an aesthetic quality that appeals to more than the cognitive dimension. In some disciplines, students are offered empirical experiences, for example in laboratories, excursions, or practice placements. Sometimes these experiences have an aesthetic value as well. A biology student might appreciate the beauty of a flower. Student teachers might be gripped by experiences from the classroom. However, academic language might often be perceived as boring, and academic texts seldom appear vivid and absorbing. While a good lecture can be engaging, moving, and transformative, textbooks and articles seldom are. The question is whether the traditional academic form only presents part of academic knowledge, and whether the knowledge should be presented in varied ways. For example, do the poetic sections and the narratives in my text add to the understanding of aesthetics in education? That will be up to the reader to judge.

Thirdly, including the aesthetic dimension might also have consequences for students' assignments and exams. Is there room for drawings, role-plays and using their bodies? In the focus groups mentioned previously, many of the groups characterized their schooling as life on a chair. Are students allowed to include aesthetic elements in their presentations, such as making a film? Time pressure will sometimes be an excuse for not including varied presentations. However, speed is not something that encourages deep learning. Furthermore, sometimes students prefer what they are used to and make them feel safe, with fixed answers. In the postgraduate teaching programme of which I am part, students have an assignment in which they have to include an aesthetic element in their presentation. Many students feel insecure and out of their comfort zone, but they enjoy seeing all the different presentations from their peers and in the end often find the assignment useful. When later in the term students have to conduct action research in their practice placement, many choose to try out something related to aesthetics. Could exams include varied forms? In our teacher education, we once tried out a portfolio with five assignments in which students were allowed to use varied forms of representations. However, the external examiners found it difficult to assess, and we decided to give it up out of consideration for the students.

CONCLUSION

The value of aesthetics lies among other things, in the support it provides for critical thinking and creativity, characteristics that are important for encountering an unknown future and for developing democracy. Moreover, aesthetics might contribute to a good life. Aesthetic learning challenges the prevailing concept of knowledge in secondary school and in higher education. Furthermore, it raises the question of the purpose of education, whether it should be for freedom or for profit. Today the economic organization OECD plays a leading role in school development in Europe, and economic growth seems to be a guiding principle for educational change. Policy documents highlight the importance of innovative and creative thinking both when it comes to growth and well-being (OECD, 2019). However, there is a tension between combining innovative and creative thinking with the objectives model in which education is broken down into measurable targets. Aesthetic learning might open up for unrealized knowledge and unexpected outcomes that cannot be predetermined and that can be difficult to measure. In the end, what education should be about boils down to what kind of people we want to educate in what kind of society.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by NSD – Norwegian Centre for Research Data. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Expansive Learning in Teacher Education's Hybrid Spaces: The Challenges and Possibilities in and Beyond Learning Studios

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This article uses the concept of expansive learning from activity theory as a lens to understand learning in and beyond hybrid or third spaces in teacher education. In so-called "Learning Studios," student teachers, experienced teachers and teacher educators learned through exploratory activities, leading to new insights, "familiarized knowledge" and expanded practices. However, while learning in Learning Studios was supposed to affect schools and universities (as activity systems), labeled as "snowballing," this only occurred sporadically. Using expansive learning theory and its prominent role of contradictions, we developed a better understanding of—and explanation for—the lack of snowballing. We developed suggestions for snowballing in schools and universities based on the successful characteristics of learning in Learning Studios.

Keywords: expansive learning, teacher education, hybrid spaces, teacher learning, professional learning communities

INTRODUCTION

Over the last few decades, institutes for teacher education and schools have increasingly collaborated in networks that focus on the internships of student teachers, the introduction of new teachers in schools and professional development of experienced teachers. One of the reasons for the introduction of these networks is the growing problem of teacher shortages. Partly, these shortages are caused by the fact that a relatively high number of beginning teachers leave the profession within the first 5 years of teaching (e.g., Ingersoll, 2001; Borman and Dowling, 2017). Several experiments are initiated with the aim of solving this retention problem. School-university networks are assumed to contribute to that aim.

Most of the time, programs for interns and beginning teachers include elements of mentoring or coaching by experienced teachers and of collaborative reflection with other interns or beginning teachers (Ingersoll and Strong, 2011). These programs depart from the idea that there are still many skills to learn for newcomers. More recent programs have attempted to go beyond this so-called "deficit model" of support for beginning teachers (März and Kelchtermans, 2020). The programs have come to see beginning teachers not only as learners, but also as bearers of new ideas, and as connoisseurs of the younger generations. Viewing them as such creates space for interns and newcomers in quite a new way, as well as space for experienced (mentor) teachers' learning (e.g., Hong and Matsko, 2019). Despite these developments, how student teachers, early-career teachers and experienced teachers learn while interacting in schools as workplaces is still underexamined

and not well-understood. As a result, student teachers see schools as separate from their teacher education program (e.g., McGarr et al., 2017).

On top of the problem of teacher shortages, several developments have changed the situation for experienced teachers as well. In many countries, schools have grown bigger, classes have increasing numbers of pupils with a rising number of cultural and linguistic backgrounds, and societies demand an increasing number of tasks and responsibilities from teachers, sometimes even in relation to worldwide challenges such as a sustainable planet and climate change (cf. Meijer, 2015; United Nations, 2015). This places higher demands on teachers, and the need for their continuing education is growing accordingly. Many schools are struggling with this, and one of the questions is how networks of universities and schools can or should play a part in addressing these demands regarding continuing professional and school development.

The last decade revealed a shift in attention from teacher learning aimed at teachers' further growth toward teacher learning that, in addition, leads to changes in the teachers' professional context, including school improvement (Imants and van der Wal, 2020). However, conditions that apply to teachers' individual learning, described by, for example, Van Veen et al. (2012), do not automatically account for this broader purpose. In fact, new conditions might be needed to be able to address this, but not enough is known about the processes that are involved in initiatives that successfully focus on both types of development (individual teacher growth and school improvement). Studies have shown that initiatives aimed at both individual professional growth and school development often lead to individual growth only (e.g., Imants and Oolbekkink, 2009). "Snowballing" toward development beyond the individual participants, let alone toward school improvement, appears to be notoriously difficult, as initiatives for teacher-researchers in schools show (e.g., Meijer et al., 2013). In such initiatives, teachers are expected to become catalysts in their school to develop an inquiry stance on the part of their colleagues, or to develop a research culture in their schools. Several studies have shown that these projects were often very successful in terms of teachers' personal professional growth, but that any development beyond that was absent or lagged behind (for an overview see Meijer et al., 2013). This might be explained by the fact that in initiatives that aim beyond teachers' individual learning, the conceptualization of learning is not automatically clear. The processes that are aimed for are multilayered in terms of both products and processes.

With this in mind, a network of universities and schools developed hybrid learning environments, or "Learning Studios," in which student teachers from four universities as well as beginning and experienced teachers from related schools participate to learn and develop together. An important difference from the traditional relationship between student teachers and mentor teachers is that the roles of teacher and learner continuously alternate between all the participants. A teacher educator from a university participates as a coach and as a learner as well. Learning Studios are regarded as a specific form of professional learning community. Every week for 1 school year they meet for one morning, during which they depart

from their own questions and concerns in relation to pupil learning. Learning Studios are not only aimed at the professional development of the individual participants, but also at exploring ways to disseminate their learning, thereby affecting the school and university environments and, as a spin-off, contributing to reconsideration of the teacher education curriculum (Koopman et al., 2019).

The hybrid environment of Learning Studios demands a reconsideration of how to conceptualize and understand the processes and outcomes of student teachers' and schoolteachers' learning. This hybrid environment includes many potential contradictions, meant as catalysts for learning. However, without careful attention, learning will be impeded and certainly the type of learning beyond the individual will not take place, as described in earlier studies. Potential contradictions include the types of knowledge that play a role (knowledge at schools and knowledge at universities), conventions (at school and university) and innovations, and individual development vs. the development of schools and universities. In this article, we depart from Engeström's concept of expansive learning (part of his activity theory) to explore the mechanisms that underlie the types of learning in and surrounding the Learning Studio, and the outcomes of this learning. Activity theory might make a suitable framework for the analysis of learning by all participants in this context, for the following reasons:

- Expansion of the unit of analysis of learning beyond the level of the individual; focus on collectives as learners;
- Commitment to pedagogical and interventionist actions to facilitate and change learning;
- Expansion of the unit of analysis from a single activity system to two or more interconnected activity systems; learning in interorganizational networks; growing importance of partnerships between organizations;
- Transformation of conflicts and tensions into a third space as a rich environment for learning.

The aim of this study is to analyze the how and what of learning in Learning Studios, and to explore dissemination and spin-off for schools and universities. In the theoretical framework, insights from the work on professional learning communities (PLCs) and Activity Theory are introduced. PLC insights are used to analyze the dynamics of the internal functioning of Learning Studios; activity theory is used to analyze the how and what of learning within the broader context of the network of universities and schools, in which Learning Studios are positioned as third spaces.

THEORETICAL FRAMEWORK
Characteristics of Professional Learning Communities

Van Meeuwen et al. (2019) reviewed studies on professional learning communities in secondary education from 1990 until 2018 and came to distinguish 11 characteristics and three steering instruments for professional learning communities in secondary schools. Together, these characteristics and instruments make a comprehensive and dynamic conceptual framework for

researching and enacting professional learning communities. The 11 characteristics cluster in three groups: (1) *individual and collective learning*, including collaboration, reflection, giving and receiving feedback, and experimenting; (2) *group dynamic characteristics*, including mutual trust and respect, collegial support and social cohesion; and (3) *professional orientation*, including shared vision, shared responsibility, shared focus on student learning and shared focus on continuous teacher learning. These characteristics are summarized in **Table 1**.

Professional learning communities always function within a broader context of schools and/or universities. Steering instruments are required to create sustainable opportunities for professional learning communities to be productive. Van Meeuwen et al. (2019) identified the following three steering instruments: (1) leadership, (2) autonomy of the community, and (3) facilitation of the community.

Together, the characteristics of professional learning communities and steering instruments as identified by Van Meeuwen et al. (2019) can be assumed to be more or less prominently present in the functioning of Learning Studios (the how question).

Learning Studios and Activity Theory

Learning Studios were set up within a network of several universities and secondary schools (cf. Koopman et al., 2019). It was assumed that this network and the organizational actors within this network would have a serious impact on the functioning and the outcomes of these Learning Studios. Moreover, outcomes of Learning Studios were assumed to contribute to new forms of teaching and learning in universities and schools. Where insights from studies on professional learning communities focus on the *internal* processes in Learning Studios, insights from activity theory are used to study the functioning and the outcomes of these Learning Studios within this complex network environment.

In this section, we build strongly on four articles that focused on activity theory and expansive learning (Engeström, 2001; Engeström and Kerosuo, 2007; Tsui and Law, 2007; Engeström and Sannino, 2010). According to these authors, activity theory expands the unit of analysis of learning beyond the level of the individual; the focus is on *collectives* as learners. Also, activity theory expands the unit of analysis from a single activity system to two or more interconnected activity systems. Activity theory is about learning in interorganizational networks. In this study, the Learning Studio is seen and analyzed as a separate but interconnected activity system within university and secondary school activity systems.

Following activity theory, the interactions between universities and secondary schools as networked activity systems result in the transformation of conflicts and tensions within and between universities and schools into a third space as a rich zone of learning. We regard Learning Studios as third spaces. Activity theory can be helpful in exploring and explaining the expansion of learning within these Learning Studios to learning in the activity systems of universities and secondary schools.

In activity theory, "activity" is the mediating entity between the individual and social dimensions of human development. Individual and group actions are embedded in activity systems that are collective and social in nature. In activity systems, participants engage in common social processes through which meanings are (re-)developed and through which the culture of the activity system is (re-)produced.

In activity theory, the concept of *object* is of crucial importance. There is no activity without object, and object embodies the meaning, the motive and the purpose of a collective activity system. Activities are realized by goal-directed actions. These goal-directed actions can be regarded as specifications of motives that are expressions of the objects of the activity system. The motive of an action is its object. Objects cannot be reduced to short-term acts of specific participants. Objects give direction and meaning to specific outcomes of activities by participants/subjects. One way in which the activity system of a university can enact its objects is by enriching the teacher education program and apprenticeships by transferring positive results and insights from the Learning Studio to the university context. The activity system of the school can enact its objects by enriching the school curriculum and teaching practices through the diffusion of positive results from the Learning Studio through the school context.

TABLE 1 | Professional learning community characteristics (based on Van Meeuwen et al., 2019).

Individual and collective learning	Group dynamic characteristics	Professional orientation
Collaboration: Researching, developing and implementing the shared educational practice together *Reflection:* Individually and jointly questioning daily practice to improve this practice and to evaluate the process of the learning community *Feedback:* Sharing information on teaching practice in relation to the ambitions and goals, to improve teaching practice *Experimenting:* Individually, collectively researching new or altered attitudes, approaches and materials in repeated cycles	*Mutual trust and respect:* Supportive, affective and safe climate where problems and convictions can be voiced *Collegial support:* Teachers devote care and attention to each other; stimulate teachers to share their teaching practice beyond a superficial level *Social cohesion:* Feeling of wanting to belong to the group	*Shared vision:* Shared ambitions and attitudes: a common frame of reference regarding teaching and student learning *Shared responsibility:* Teachers take collective responsibility for learning from and with each other, as well as for student learning, and act accordingly *Shared focus student learning:* Permanent focus on improving student learning *Shared focus teacher learning:* Teachers' ongoing professional development during their career to improve their own learning and the learning of students

In this article, the two interacting activity systems are the secondary schools that participate in the Learning Studio and the teacher education departments of the participating universities. The third activity system is the Learning Studio, positioned as a third zone in between the university and the school. In this third space, more encompassing objects or motives for the activity are constructed, and these are meant to result in transformed activity systems. These activity systems and how they interact are depicted in **Appendix 2** (Supplementary Material). In this appendix the complexity of the interrelationships between the three activity systems is elaborated and visualized, according to activity theory literature.

To reduce the complexity in the figure of **Appendix 2** in Supplementary Material the content of the figure is summarized in **Table 2**. **Table 2** reflects the differences in how the various elements play out for the three activity systems of schools, universities and Learning Studios.

Learning Studio as a Third Space

"Third space" refers to a place where elements of two activity systems are present and interact. Characteristic of the Learning Studio is that within this third space all the participants continuously change between the roles of learner and teacher. School teachers (eventually mentor teachers), student teachers and the coach all take the role of teacher and learner alternately within the Learning Studio. In a "third space," learning takes place when ideas from different cultures meet and form new meanings. The Learning Studio is a third space in which the activity systems of universities and secondary schools are connected and interact dynamically, because in the division of labor the roles of teacher and learner are not rigidly prescribed for diverse subjects from schools and universities. The specific objects of Learning Studios are:

a. Developing student-centered and innovative approaches to teaching and learning in secondary schools; the learning of the secondary school student is central;
b. Professional development of student teachers and secondary school teachers in a shared and rich learning environment.

Aspired outcomes of student teachers in the Learning Studio are:

a. Becoming qualified and well-educated teachers in secondary education;
b. Connecting theory and practice of teaching by participating in the learning studio.

Aspired outcomes of school teachers/mentor teachers in the Learning Studio are:

a. Connecting own practices to theory and research and as a result deepening insights into own practices;
b. Improving own teaching practices by designing and exploring new study tasks and courses/classes for students.

As can be seen, university and school objects are not the first priority in these two Learning Studios. The focus in objects is on the learning and qualification of participants and the development of secondary student-centered teaching practices.

TABLE 2 | Elements of activity systems.

	Activity system		
	Schools	**University/teacher education department**	**Learning Studio (third space)**
Objects	a. Educating secondary students effectively and efficiently, and preparing these students for being successful in final national examinations; b. Contributing to optimal preparation of student teachers as interns in schools	a. Delivering well-qualified teachers for secondary education; b. Contributing to scientific and practical knowledge on teaching and teacher education; c. Developing in-service teachers professionally	a. Developing student-centered and innovative approaches of teaching and learning in secondary schools; b. Shared professional development (qualification, improvement) of student teachers and secondary school teachers
Subjects	School teachers, mentor teachers, student teachers, school management	Student teachers, teacher educators/professors, management of department	Student teachers, school teachers (in some cases also mentor teacher of student teacher) and the coach (teacher educator/professor)
Division of labor	School teachers act as mentors for student teachers; student teachers teach classes as part of their apprenticeship; school management facilitates	Student teachers learn to teach; teacher educators and professors teach them; management of department facilitates	No fixed roles.
Mediating tools	Classes for secondary students, teaching materials that are available within the school, etc.	Classes for student teachers in the regular program, teaching materials, etc.	a. Sessions that consist of a variety of activities, exercises and assignments; b. Learning questions of participants
Rules	School curriculum, grading and examination regulations and requirements, and regulations regarding the apprenticeships of student teachers that are developed under supervision of, and in collaboration with, universities	Teacher education curriculum, examination requirements and regulations, and regulations with professional development schools regarding mentoring of student teachers as interns, including formal supervision of these student teachers	Norms and practices of equality in participation, openness, inquiry and trust are central; uncertainty is regarded as a source for learning
Community	Secondary school and, at a distance, the larger school board	Department itself and the complex entity of the university and the university faculties	All participants or subjects

Contradictions and Tensions

Activity theory views contradictions and tensions as driving forces for learning. The internally contradictory and historically changing character of the activity system plays a central role in this dynamic learning process (as objects of systems and of participants within the systems might contradict, and as the results of continuous discussions in society about education between changing coalitions of participants). The structural sources for potential contradictions and tensions in and around the Learning Studios are:

(1) The tension between conservation and change; expectations in society regarding education always shift between these two poles. Both universities and schools have to deal with this structural educational contradiction. Under ambiguous conditions the pressure to reposition education continues all the time. This tension between tradition and change, or routine and innovation, occurs within the teacher education departments as well as in the secondary schools. This structural tension reoccurs in the Learning Studios as a third space in a specific way, because of the focus on student-centered innovative practices for teaching and learning.

(2) The differences between the educational systems of university and secondary education; a tension that is central in this study regards the difference between codified and tacit knowledge. In the education of student teachers at universities the focus is on the translation of dynamic scientific knowledge into codified knowledge about teaching and learning, and on the transmission of this codified educational knowledge to student teachers. For secondary school teachers, tacit knowledge about secondary education and its students plays a strong role. Transfer of this personal and implicit knowledge is hard to realize within and outside the schools. Transfer implies some kind of articulation and specification, resulting in codification. In common language this tension is often discussed as the gap between theory and practice. We think this label of theory-practice gap misses the point of the second structural contradiction in the Learning Studio. We put the tension central between codified knowledge and tacit knowledge, related to university and school.

(3) The tension between the individual professional development of participants in the Learning Studio and the broader outcome of snowballing that is aspired to by universities and schools in the larger network. In the curricula for students in secondary schools and universities the qualification of these students and student teachers as individual learners is a prominent goal. In this respect, school and university cultures both have a long tradition in representing the image of outcomes of learning and education as assets that are coupled to individual qualifications. The aspired effects of snowballing are organizational gains. In traditional university and secondary school views on learning, organizational gains are not considered to be outcomes of learning. In these educational contexts, learning is not regarded as a collective activity

that, according to activity theory, leads to transformation in activity systems.

The discourses in the activity system of the Learning Studio afford opportunities for transformation of these contradictions and tensions in a rich zone of expansive learning. More encompassing objects or motives for activities can be constructed, eventually resulting in transformations in the activity systems of universities and schools. Expansive learning in the Learning Studio, and in universities and schools, is triggered by existing practices being questioned, rather than by a given learning task. However, the expansion of learning processes and outcomes from the Learning Studio toward universities and schools is not self-evident. Connections and collaboration between universities and schools themselves may be beneficial but they do not guarantee that the object of joint activity is transformed in a productive way. Some opportunities for, and hindrances to, this snowballing form a central theme in this study in relation to the what and how of learning within the two Learning Studios.

Expansive Learning Resulting From the Learning Studio

Expansive learning that results from the Learning Studio relates to the objects of the Learning Studios, as well as to the objects of universities and schools in terms of the snowballing effect. In mainstream learning theory, outcomes of learning are often defined in terms of gains in knowledge and skills and of changed patterns of behavior of individual learners. In activity theory, outcomes are expanded objects and new work practices, including practices of thinking and discourse. The results of expansive learning form a triplet:

1. Expanded pattern of action
2. Corresponding theoretical concept
3. Specific manifestation of agency of participants/subjects.

In Learning Studios, expanded patterns of action concern the innovative classes and study tasks that are developed, tested and evaluated by school teachers and student teachers. Related to these practical exercises, participants discuss theoretical concepts and develop specific meaning for these concepts. These actions occur in Learning Studios as a newly formed community, in which specific manifestations of participants' agency represent their enactment of self-directed learning goals and practices. Expanded patterns of action between the Learning Studios and the universities and schools (snowballing) concern the transmission of the curriculum, teaching and learning in universities and schools that is based on successful practices developed in the Learning Studios. Moreover, reflections in universities and schools on these successful practices can affect codified and tacit knowledge that dominate discourses in universities and schools. This might be accompanied by specific forms of agency for teachers in universities and schools.

Connecting the Professional Learning Community Framework and Activity Theory

In this study, the activity theory framework is used to answer the how and what questions regarding learning in and around

TABLE 3 | Overview of instruments.

Instrument	Overview of topics/starting questions
Observations	• Content of learning (what) • Process of learning (how) • Interaction in the network (who learns from whom) • Giving and asking help • Reframing of questions, topics and findings • Mutual reinforcement
Group interview	• What have you learned? • How have you learned? • Function of the group • Role of the coach • Focus on secondary school student learning

TABLE 4 | Overview of codes used in this study.

Research questions	Codes
Research question 1: Processes	• Learning processes/activities • Patterns in activities during meetings/sessions • Collaboration • Internal network: who learned from whom • Role of coach • Other leading/supportive activities • Satisfaction with learning activities
Research question 2: Outcomes	• What learned • Learned from whom/what • Products delivered • Relationship with own goals.

Learning Studios in a comprehensive way, including the question regarding snowballing from Learning Studios to universities and schools. In addition to activity theory, the professional community framework is used to analyze the social dynamics within Learning Studios. This framework is specifically linked to the how question.

This article deals with the following questions:

1. What does learning look like in Learning Studios?
2. What are the learning results/realized outcomes for participants of Learning Studios?
3. How are the learning processes in, and results of, Learning Studios related?
4. What role do contradictions within the Learning Studio concept and practice play in processes and results?
5. What results from Learning Studios affect the activity systems of universities and schools (snowballing)?

METHOD

Participants

Two Learning Studios were analyzed for this study. Three school teachers, four student teachers and the coach participated in LS 2017–2018. Two school teachers were also mentor teachers for two student teachers. Three teachers, four students teachers and the same coach participated in LS 2018–2019. Again, two school teachers were also mentor teachers for two student teachers. All participants were teaching in history, culture and art history, or social studies. The coach was specialized in Mother Tongue Education and communication theory.

Data Collection

Data were collected each year by means of an observation of an LS session, two group interviews and a questionnaire.

The observation and the first group interview were combined in one session during the first half of the year, after 2 to 3 months of functioning of the LS. **Table 3** presents an overview of observations and interviews.

The questionnaire was administered during the second half of the year and completed by all individual participants. It contained 11 questions regarding motivation for participation, learning aims, themes that were central in the Learning

Studio, how the respondent learned and learning gains for the respondent. Alternatives for answers were offered and more than one alternative could be selected. Moreover, every question asked respondents to clarify the selected alternatives and complete the alternatives with their own answers. The completed questionnaires were the starting point for the second group interview at the end of the year. Compared to the first group interview, this interview had a stronger focus on the learning results and products.

Data Analysis

All observations and group interviews were recorded by video or audio. Transcripts were made of all observations and interviews. Transcripts of the observations were completed with field notes about the group dynamic and other characteristics of the sessions of the Learning Studios.

In the initial data analysis, the transcripts were coded (see **Table 4**) with a focus on the "how" and "what" questions (research questions 1 and 2).

As a next step, relations between processes and outcomes were examined (research question 3). During this step, contradictions became evident (research question 4). During the final step, explicit attention was paid to signs of "snowballing": indications that outcomes or processes in the Learning Studios affected (one of) the activity systems "school" or "university" (research question 5).

Below, results from these steps are described and illustrated with meaningful episodes during the sessions and activities of the two Learning Studios, summarized from the transcribed data.

RESULTS

Learning Processes in the Learning Studios[1]

The results regarding the learning processes are presented according to the characteristics of professional learning communities (PLCs). *First*, we found that the learning processes in the Learning Studios were alternately intense and relaxed, and collective as well as individual. *Second*, the group dynamics

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[1]The Day-to-Day Functioning of the Learning Studios Is Described in **Appendix 1**.

appeared to characterize the Learning Studios as PLCs. *Third*, the results indicate a new perspective on "sharing" in the PLC characteristic of professional orientation. This section ends with a short discussion on how the steering instruments for PLCs [i.e., (1) leadership, (2) autonomy of the community, and (3) facilitation of the community] played out in the Learning Studios.

Intense and Relaxed as Well as Collective and Individual Learning

All participants found that learning in the Learning Studios was alternately intense and more relaxed. Interestingly, individual learning took place in parallel to collective learning. Both were felt to be equally important, and highly interdependent. Two examples of intense and collective learning episodes are presented below: a work session on a mind map and a work session on the development of an observation instrument. Next, an example of a more relaxed activity is also described. Deadlines play a specific role in intense learning. The role of deadlines is described in activities regarding the preparation of Learning Studio presentations and products.

> Episode 1. Mind map construction
> A school teacher in the second Learning Studio (LS) prepared an assignment to construct a mind map of secondary school student learning. During the meeting the assignment started with making individual notes related to the opening question (explicating individual knowledge). The second step was the exchange of notes in small groups (generating shared insights). The third and last step was collecting the results of the small group in the structure of the mind map that was designed by the teacher (developing shared language). During the small group and plenary discussions, concepts and relationships from literature were introduced by individuals who had studied this literature before. One beginning school teacher made specific contributions by referring to her readings of literature. At several moments the coach played a specific role by focusing the discussion and identifying shared or underexplored themes. Time and space were available to discuss some of the complexities of learning, such as the role of emotions, the unpredictability of outcomes and paradoxes in processes. In the mind map structure on the wall, concepts and relationships gradually crystallized toward a model in an organic process of growth. Student motivation and autonomy received special attention. The plan grew to discuss the mind map with an expert from the university in the following week. In the meantime, LS members are reading literature related to the mind map topics. Literature is becoming meaningful for the LS members.

In this episode 1, the shared mind map is a product (a specification of the object) that promotes interdependency in the group as a community. The three-step procedure and the frame for the mind map function as tools. The roles of the leading teacher, the coach and the beginning teacher who did a lot of reading are functional forms of division of labor. Equal opportunities for participation and contribution by all subjects reflect the rules of the community. Collaboration, reflection, and feedback are prominently present in this episode. Collective learning is promoted by the interdependence in the group task, and is expressed in the appreciation of the product, and the

intentions for further steps. Individual learning results from the collective learning and contributes to the collective learning. Codified knowledge from literature, explicated tacit knowledge and related emotions get connected during the three steps of the procedure in the mind map, and in the personal meanings attached to the mind map and the literature.

> Episode 2. Development of observation instrument
> All student teachers in the first Learning Studio (LS) developed classes in which deep learning by students was promoted. They made videos of these classes as data for the research theme of the LS. In this work session an observation scheme for the analysis of the videos was discussed. The observation scheme for deep learning was developed at one of the participating universities. The scheme was introduced by a student teacher from this university, and he also lead the discussion in the LS on this topic. The aim was to develop a shared understanding and application of this scheme. The video of the class of one student teacher was central. At the start the discussion focused on the teaching behavior of the student teacher and on the meanings of deep learning. Gradually the discussion shifted toward the identification and interpretation of the behavior of students in the classroom. The leading student teacher tried several times to focus the attention on this student behavior: "Focus on what you see, what you hear." The special role of the coach was to focus attention on questions regarding validity and reliability (specificity/sensitivity, intersubjectivity, focus on what students do instead of speculating on what students think, scope of instrument related to restricted scope of observed fragments). The additional information on the student teacher in the video, and the interventions of the leading student teacher and the coach were all helpful in constructing a satisfying observation scheme after several attempts. All participants were strongly involved in this assignment, and interactive reflection (critical questions, agreement, feedback) was intense.

In this episode, the object of developing pedagogics for deep learning by students is specified in the shared community goal of constructing an observation instrument for deep learning in classrooms. This goal promotes a strong interdependency within the community. A leading student teacher introduces two tools: an existing instrument and a procedure for testing and adapting this instrument. The roles of this student teacher, the coach, and the student teacher who prepared the video of her class, express a functional division of labor. As in episode 1, equal opportunities for participation and contribution by all subjects reflect the rules of the community. Collaboration, reflection, feedback, and experimenting are prominently present in this episode. Collective learning is promoted by the interdependence in the group task, and is expressed in the enthusiastic emotions accompanying the product and the intentions for further steps. Individual learning results from the collective learning and contributes to the collective learning. The original instrument and the procedure for testing and adaptation represent codified knowledge regarding deep learning in classrooms and its measurement. During the session tacit knowledge regarding deep learning and related emotions are explicated. In the several steps of the procedure both types of knowledge and related emotions get connected (1) in the resulting observation instrument, and

(2) in the personal meanings attached to the knowledge and systematic observation of deep learning.

> Activity 1. A relaxed "in between" activity
> Halfway through the morning program (as a sort of beak) the art history teacher presented one of his assignments for secondary school students. Reproductions of art works from older and recent years were passed to the Learning Studio participants, and each participant selected one reproduction. The task was to have a good look at the art work, and to think about one sentence that represented participants' thoughts and feelings about it. After a while the selected reproductions and the sentences were exchanged among the participants. This exchange was very pleasant, and an enthusiastic discussion followed about how secondary school students might work with this assignment. No shared conclusions or collective follow-up were formulated. But individual learning gains were overtly exchanged.

No shared product was aspired for during this activity. The goal was to participate in a pleasant and informative activity as a community. This resulted in low task interdependence, and strong group cohesion. Division of labor was restricted to the role of the leading teacher, who presented the assignment as a tool and the rules of the assignment. In this activity the main focus is on reflection and feedback. Collective learning resulted from the shared emotion of successful group building and the pleasure of being member of an inspiring community. Individual learning depended on the personal meanings attached to the assignment, and intentions to apply such an assignment with own students.

> Activity 2. Preparation of presentations and products
> Both Learning Studios prepared several presentations and products for the plenary inspiration days (5 Learning Studios from different regions). During the preparation, deadlines played an important role. On the one hand, deadlines created pressure, which conflicts with the experience of room for inquiry, reflections and exchange. On the other hand, the deadlines functioned like high-pressure vessels, and as such they promoted collective result-directed work. This pressure function was positively appreciated by the participants.

The goal was the preparation of joint presentations of products and learning results for other related activity systems (Learning Studios, universities and schools). This activity was directly related to objects of the activity systems of schools and universities. Strong interdependency was promoted by this external expectation, and by the internal drive to show the best of what had been achieved by the community. These expectations and drives combined in the pressure of the deadline for the presentation. Collaboration, reflection, feedback, and experimenting are prominently present in this activity. Collective learning regarded the shared experience of the successful products and developing insights of the community, combined with feelings if pride and excitement about the achievements.

Group Dynamic Characteristics
We found that mutual trust and respect was essential in the learning processes in the Learning Studios. The coach of the Learning Studios stressed the importance of what he called a

"triangle": safety, equality and space/room. The roles of mutual trust and respect, collegial support, and social cohesion are illustrated by the following example of a student teacher whose pedagogical ideas diverged from the dominant ideas in the Learning Studio.

> Episode 3. Discussing tensions
> In the second half of the first Learning Studio (LS) group interview one student teacher started talking about her positioning in the LS. For her, the open-ended start-up of the LS was hard to handle, because she missed personal vision, and expectations and knowledge for herself. There was no program and no clear goal. She preferred working toward a well-defined end product. She conformed to the situation: "I did not want to be the sorehead all the time." This tension regarded the functioning of the LS, as well as the "progressive" pedagogies that were central in many of the LS activities. She positioned herself as more traditional. She felt uncertain at such moments, so she kept her mouth shut. At the same time she appreciated the open climate in the group, and the mutual respect. It was important for her to maintain the safe climate, and she felt at home among nice people. During the interview team members' reactions were respectful, and questions were asked to get a better understanding of her position. This part of the interview was ended with a remark by one of the school teachers. He stressed that the LS should not be focused on progressive pedagogies. The LS is about better education for the students in the schools. The experience is that secondary school students can also show resistance toward new pedagogics. All LS members agreed with this reflection. Afterwards the coach of the LS explained that this tension also played a role in the relationship between this student teacher and her mentor teacher, who also participated in the LS.

This episode shows the essential role of mutual trust and respect, and at the same time it shows that these characteristics are not self-evident. They have to be repeatedly enacted by all members of the community. The student teacher only was open about her position in the group after a while during the group interview. In the reactions of the group members respectful collegial support was prominently present, which made it easier for the student teacher to clarify her position in more detail. This episode shows that for all the members of the community it is important to create and maintain group cohesion. Mutual trust and respect, collegial support, and social cohesion are important aspects of rules and community in the activity system. Moreover, episode 3 shows the role of appreciation for diversity. The word 'sharing' does not imply uniformity in beliefs and practices.

Professional Orientation
In the definition of the PLC characteristic "professional orientation" the word "shared" is often used. However, in the Learning Studios, which functioned as homogeneous teams, the visions and orientations could differ, leading to specific positioning of participants. The participants developed shared responsibility for learning from and with each other, *as well as* for student learning in schools, and they acted accordingly. The shared focus on student learning meant that the participants were permanently focused on improving student learning. However,

participants might differ in their ideas about what could count as an improvement, and how this could be realized in schools.

Steering Instruments

Three steering instruments for PLCs were distinguished: leadership, autonomy, and facilitation. Inside the Learning Studios, the coach played a significant leading role. In addition, there was shared leadership by all participants. Specific leading roles such as session chair were alternated.

As regards autonomy, room was created for self-directed steering within the Learning Studios. This created space for participants' question-directed learning, instead of steering by a program or curriculum. For school teachers in the Learning Studios this autonomy was experienced as protected space and time for inquiry and reflection. This space and time was found to be lacking during daily work in school.

Schools supported teachers by protecting time for participation in the Learning Studios. Universities supported student teachers by creating space within the university programs, but this space varied between universities. Moreover, space was created or already present within the examination regulations. The locations for sessions alternated between schools and universities. Rooms and lunches were made available.

The What of Learning in the Learning Studios

The results of expansive learning form a triplet. The expansive character of learning is in the *combined* occurrence of the three outcomes: (a) expanded pattern of action, (b) corresponding theoretical concept, and (c) new manifestations of participants' agency.

Expanded Pattern of Action

Several "materialized" outcomes of the Learning Studios were realized. Examples that are discussed in this article are the observation instrument, the mind map, and the presentations and products for general inspiration days. In addition, school teachers and student teachers developed new programs, materials and assignments for their students, with tryouts and evaluative discussions in the Learning Studios.

Corresponding Theoretical Concept: Familiarized Knowledge

Outside the Learning Studios, reading literature and listening to experts is tough work, and this is similar within the Learning Studios. However, within the Learning Studios, reading literature and discussions with experts encompass self-formulated questions, and that appeared to make a huge difference with learning in the universities and in the schools. Codified knowledge in literature and tacit knowledge in the schools interact in such a way that for all participants their learning expands into a productive mix. This is illustrated in the episodes 1 and 2 and the interpretations of these episodes.

This mix should not simply be interpreted as a bridge between codified and tacit knowledge. Rather, it is a qualitatively new type of knowledge, which we shall call "familiarized" knowledge. The content of this familiarized knowledge is not too different from

FIGURE 1 | "Familiarized knowledge" as an outcome of the Learning Studios.
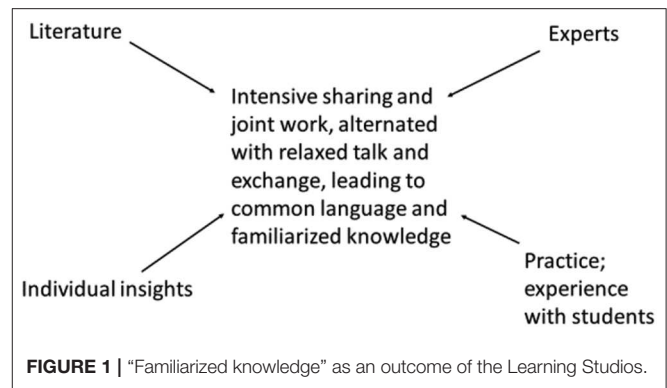
the codified knowledge that is written down in literature. This resemblance is apparent in the content of the constructed mind map and the observation instrument. Also, it contains many insights and experiences that were already present in the school teachers' tacit knowledge. The difference is in the meaningfulness of this familiarized knowledge for the school teachers, the student teachers and the coach. According to the members of the second Learning Studio, the aim of this familiarized knowledge is not "to reinvent the wheel." The aim is to gain deeper insight into the wheel, and to make the wheel fit the own practice. Together this leads to familiarized knowledge owned by the participants of the Learning Studios. This is depicted in **Figure 1**.

The point of proposing familiarized knowledge as a new type of knowledge is that the implicitly present tacit knowledge has been explicated and shared, and that the published but abstract codified knowledge has been discussed from the viewpoint of daily insights and personal and shared experiences. Together this leads to explicit knowledge with a claim of intersubjectivity and validity, which makes it collective knowledge that is personally meaningful for every participant. It is familiarized because cognitive aspects go along with feelings/emotions of shared ownership and agency. Shared ownership can be understood in terms of the experience of practicality, mastery and intersubjectivity. Agency can be understood in terms of self-efficacy in designing inspiring and effective learning contexts for secondary students and for the members of the Learning Studio. The difference with tacit knowledge is that tacit knowledge is private and implicit, and it lacks the claim of validity and intersubjectivity. The difference with codified knowledge is that codified knowledge has a claim of general validity, and it lacks the personal feelings of shared ownership and agency.

The question can be asked as to whether this familiarized knowledge is produced continuously during all the LS sessions. This is not the case. The observations and interviews point in the direction of the most stimulating learning environment for the construction of familiarized knowledge when the participants engage in forms of joint work and intensive sharing. Stated in social psychology terms, these are situations characterized by a relatively high level of interdependency between the participants. Examples are the situations in which participants work on the "material" products that were described in episodes 1 and

2 and activity 2. Parts of all the sessions were devoted to more relaxed forms of exchange of experiences and materials, demonstrations of developed exercises for secondary students and tryouts for student teachers of designed classes. An example is activity 1. In those cases, it depended on what individual participants would take as meaningful information from those sessions for themselves. The resulting knowledge is personal and not systematically explicated.

With regard to the outcomes of learning, a tension occurs between individual and collective outcomes. Although familiarized knowledge can be regarded as a collective outcome, participants in the Learning Studios name their learning gains in terms of individual outcomes. In this respect they follow the image of collaboration as a *collective condition* for learning gains as *individual results*. Regular school culture and university culture both have a long tradition in representing the image of outcomes of learning and education as assets that are coupled with individual competences and qualifications, not as organizational gains. In workplace learning, on the other hand, it is not uncommon to aspire to organizational gains. The image of familiarized knowledge as a collective outcome better fits into the approaches of workplace learning.

New Manifestation of Agency

Learning Studios were constructed as learning environments by participants themselves, as agents of their own learning. The agency is in the enactment by the participants of the opportunities that are offered by the Learning Studios as their own learning environment. Episodes and activities show that this agency is combined with feelings of trust and respect, cohesion, and pride of the results. This is further elaborated in the discussion on the interrelatedness of the how and what of learning.

The Interrelatedness of the How and What of Learning in Learning Studios

We found that the process of learning and the outcomes of learning in the Learning Studios were interrelated in an extreme way. In their early stages in particular, Learning Studios had a double agenda, inventing themselves as learning communities and developing specific goals and a focus for the content of their work. This went together with meaty discussions around diverging opinions and uneasy feelings about the lack of direction and progress.

Interrelatedness was most apparent in the construction of the collective, familiarized knowledge described above. The outcome of familiarized knowledge cannot be separated from how participants learned, that is, the process in which this knowledge is constructed. In other words, learners only construct this type of knowledge when they are actively and collectively engaged in the kind of process that leads to this type of knowledge as a product. This is illustrated by episodes in two group interviews in which the interviewer asks the participants to be more explicit about the role of collaboration in their learning.

Episodes 4 and 5. In both group interviews the interviewer asked the participants to be more explicit about the role of collaboration in their learning. The answers of the participants in both interviews illuminate three interrelated aspects: (1) how their collaboration helped their learning, (2) what they learned about collaboration in learning processes, and (3) how this differs from the learning of students in schools, and the learning of student teachers in universities. In the second group interview participants connect the role of autonomy in student motivation with their own autonomy as learners in the Learning Studio.

The members of the Learning Studios observe a striking difference between learning in the Studios and learning in schools and universities. The how and what of learning in the Learning Studios are related in a specific way, and autonomy plays an important role in this relationship. Besides the roles of intensive sharing and self-directed inquiring, an explanation for this interrelatedness might be the connection that is made in the process between cognitive and emotional aspects of knowledge, which is typical for familiarized knowledge. The interrelatedness between how and what differs from the traditional unilateral view in which the how (condition) and what (result) of learning are strictly separated. The results of this study suggest that the interrelatedness between how and what is a necessary context for the construction of familiarized knowledge. This context is mainly created by the participants themselves, and supported by the larger learning context. In this context emerging opportunities are created by the participants for the connection between cognition and emotion, that was identified in the episodes 1–2 and activity 2.

The Role of Contradictions and Tensions

Several sources of contradictions and tensions are identified in the course of the above presentation of results:

- Focus on tradition/conservation and focus on change/innovation (episode 3)
- Role of codified knowledge and role of tacit knowledge (episodes 1 and 2; activity 1)
- Individual outcomes and collective or organizational outcomes (episodes 1 and 2; activity 2)
- Self-directed learning and teacher-/curriculum-steered learning (episode 4 and 5)
- Images and pedagogies of workplace learning and traditional "school" learning (all episodes and activities).

These contradictions and tensions can be partly understood as resulting from differences between secondary schools and universities as diverging educational institutions. Moreover, these contradictions arise as tensions between the Learning Studios as a third space on the one hand, and the schools and universities as educational institutions with longstanding traditions on the other.

The role of these contradictions and tensions will be further elaborated in the discussion section as this appeared to serve as a source of explanation for the absence of dissemination and spin-off for schools and universities described in the next section.

What Outcomes of Learning Studios Affected the Activity Systems of University and School?

The importance of organizational outcomes for schools and universities of the Learning Studios as a result of snowballing is stressed by these partners in the network. Learning Studio participants visited schools, interviewed students and had conversations with school leaders. Nevertheless, for them, individual outcomes counted the most. Organizational outcomes in universities and schools, as a result of activities in the Learning Studios, were hardly identified during these 2 years. The few changes in schools or universities that were found were due to the efforts of individual participants within their own institutional environment (i.e., school or university).

A tension we discussed earlier might play a role here. This is the tension between individual and organizational outcomes. In the curricula for secondary school students and for university students, the qualification of these students as individual learners is the exclusive goal. In this respect, school and university cultures both have a long tradition in representing the image of outcomes of learning and education as assets that are coupled with individual qualifications and competences, not as organizational gains. This means that participants in the Learning Studios do not automatically take outcomes beyond the individual ones into account.

In addition, participants stressed the important role of question-based self-directed activities. Autonomy and agency played central roles in the Learning Studios. The question can be asked as to how much room for this question-based self-steering of learning was present and experienced by teachers and tutors when they "returned" to their school or university.

An observation, based on insights in discourse analysis, was made by the coach who stressed differences in communication practices between university or school on the one hand, and the Learning Studio on the other. The Learning Studios' communication practices developed into exploratory talk where, for example, roles changed from teacher to learner, and back. Communication in school and university was often characterized as recitation from teacher to student and the initiation (teacher)-response (student)-evaluation (teacher) pattern of teacher-student communication (Mercer, 1995; Nystrand et al., 1997).

DISCUSSION

In this concluding section, we discuss how the expansive learning and activity theory insights into contradictions and tensions contribute to explaining the processes and outcomes in Learning Studios and the school-university network. Firstly, the results are summarized by means of the elements of the activity system. Secondly, the finding that hardly any snowballing occurs from the learning outcomes of Learning Studios to universities and schools is discussed.

Learning Studios as Activity Systems

Results show that a variety of objects of the Learning Studios were realized. Participants succeeded in developing student-centered and innovative approaches to teaching and learning in secondary schools, in which the learning of the secondary school student was central. Moreover, professional development of both student teachers and secondary school teachers was realized. Student teachers in the Learning Studio developed toward becoming qualified and well-educated teachers in secondary education, and they succeeded in connecting the theory and practice of teaching by participation in the Learning Studio. School teachers in the Learning Studio connected their own practices to theory and research, and in doing so, they deepened insights into their own practices. Moreover, they improved their own teaching practices by designing and exploring new study tasks and courses/classes for students.

The Learning Studio communities consisted of an effective mix of subjects: student teachers, school teachers/mentor teachers and a university tutor as coach. The division of labor turned out to be dynamic, which was realized by alternating the roles of teacher and learner in every subject. The rules that focused on practices of equality in participation, openness, space, safety, and trust played central roles here. As a mediating tool, both Learning Studios developed a common program of single sessions, with alternating intense and relaxed forms of inquiry, in which uncertainty on the part of the participants was regarded as a source for learning. The program for a session demonstrated a variety of activities, exercises and assignments (**Appendix 1** in Supplementary Material).

The expansive learning was expressed in a triplet of related outcomes:

1. Several new methods for student learning were developed, tested and discussed;
2. "Familiarized knowledge" was developed, as a synthesis of tacit knowledge (from the school activity system) and codified knowledge (from the university activity system);
3. Agentic actions by the participants themselves resulted in (re)invented and (re)interpreted functioning of the Learning Studios as a new type of learning environment.

The PLC characteristics and steering instruments were helpful in describing the processes of learning in the Learning Studios as activity systems. However, this PLC framework deviates from activity theory regarding the roles of sharing and contradictions. In the PLC framework the focus is on sharing as a source for learning. In activity theory attention is also paid to how the activity system deals with contradictions and tensions in expansive learning.

Moreover, as well as intensive sharing, more relaxed forms of collaboration like exchange also played their roles in the Learning Studios. Interdependence between participants in dealing with contradictions and tensions was essential in the production of what we came to refer to as "familiarized knowledge." This relates to insights from studies about teacher inquiry and creative collectives. The distinction between intense and relaxed episodes of learning in the Learning Studio sessions is related to variants of teacher inquiry in PLCs that were identified by Dana and Yendol-Silva (2003). In "parallel inquiry," Dana and Yendol-Silva claim that every participant works on individual themes, but that connections between participants in the PLC are created, for example, through peer feedback. In "shared inquiry," participants

explore a shared theme together. Finally, in "intersecting inquiry," each participant explores a shared theme in her or his own way. "Shared inquiry" can be associated with the intense collective learning in the Learning Studios, and "parallel inquiry" relates to its relaxed learning episodes. "Intersecting inquiry" was neither observed nor reported in both Learning Studios. "Shared inquiry" was central in the construction of familiarized knowledge by the participants, but alternation with exchange and "parallel inquiry" was essential.

Shared inquiry learning environments offer opportunities for Learning Studios as creative collectives. In creative collectives, participants with diverging knowledge backgrounds, skills and experiences interact to find solutions for "wicked" problems (e.g., Hargadon and Bechky, 2006). These solutions could never be found and practically realized by single participants based on their individual competences and expertise. Typical activities of creative collectives include: asking each other for help, giving each other help, reflectively redefining a problem and potential solutions. These activities, which were observed during intense collaboration, are reinforced by progress made in problem solving, and by the shared experience of this progress.

Schools and Universities as Activity Systems

In a general way, Learning Studios appeared to contribute to 'objects' of universities and schools (delivering well-qualified teachers and educating qualified secondary school teachers). But looking more closely, the Learning Studios did not contribute to objects of schools and universities in the network in a way that added to the objects of both activity systems separately. The Learning Studios were only incidentally helpful in making minor improvements to the school and university programs and education. No structural snowballing was observed or reported.

First, strong connections between the Learning Studios and the communities of schools and universities were not realized. Connections and exchanges only resulted from individual relations between Learning Studio subjects and individual university and school subjects (e.g., other school teachers or other teacher educators). Second, the majority of teachers in schools and universities were not focused on the transmission of LS results. And third, in terms of rules and mediating tools, we identified several contradictions within both activity systems and between both activity systems and the Learning Studios activity system.

Why Did Snowballing From LS to Schools and Universities Only Occur Incidentally?

Learning in the Learning Studios was experienced as being very enriching by the participants themselves. Nevertheless, the outcomes and products of expansive learning within the Learning Studios appeared to be difficult to disseminate to schools and universities that participated in the larger network. This seems to be a paradox: When the results are so promising, why are the results of this learning so hard to disseminate from the activity system of the Learning Studio as a third space to the two larger activity systems that come together in the Learning Studios?

Part of the explanation for this paradox might be found in the familiarized character of the knowledge that was constructed.

This "familiarized knowledge" can be characterized by the connectedness of the cognitive aspects of codified knowledge on the one hand, and the emotional aspects of ownership and agency that are important in daily teaching practice and in teachers' professional identity on the other.

Another part of the explanation might be that this familiarized knowledge is constructed in such a way that the content and the process of learning are always interrelated. In this interrelated process, cognition and emotion are closely connected. This connectedness, so typical for learning the Learning Studios, is not automatically or frequently present in regular learning processes in schools and universities. In learning codified knowledge (in universities), the what and how of learning are often analytically separated. Tacit knowledge (present in schools) is often constructed around assumed practical if-then relationships. For this reason, both codified and tacit knowledge assume an instrumental image of transfer from outcomes. Both assume that outcomes of Learning Studios can be disseminated 1:1 to universities and schools. But in this assumption, the interrelatedness of the what and how is neglected, and the connectedness between cognition and emotion is overlooked. In addition, the emphasis on individual qualifications in the educational culture might be underestimated while aiming for an organizational impact.

If the outcomes of the Learning Studios would be transferred 1:1 to the university learning environment and the secondary school learning environments, the familiarized knowledge of the Learning Studios would at best become a variant of the codified knowledge that is already well-known by teachers in both institutes. In this codified knowledge, the how and the what of learning are analytically separated, and cognitive aspects of knowledge are stressed. No connection is made with teachers' tacit knowledge. Disseminated this way, the recipients in schools and universities would not make the connection with the emotional aspect of familiarized knowledge, related to ownership and agency. As a result, there is no direct snowballing.

Opportunities for Snowballing

Expansive learning toward schools and universities outside the Learning Studios might be promoted by creating *similar learning environments within the schools and universities*, in which similar processes of constructing familiarized knowledge take place. In such learning environments, the specific mix of cognitions and emotions in familiarized knowledge can be constructed by participants in a process in which the what and how of learning are interrelated, and in which all participants are focused on realizing organizational gains in addition to individual outcomes.

Based on the results of this study, we propose the following characteristics of Learning Studio-like learning environments in universities and secondary schools:

- The community of learners includes groups that are both stable and mixed;
- Professional coaching as well as shared leadership;
- Sessions are protected by regular time and space;
- Autonomy because of self-directed learning with question steering instead of curriculum-/teacher-directed learning;
- Space for agency and diverse forms of inquiry;

- Orientation toward student learning in schools and universities;
- Appreciation of diversity and uncertainty among participants;
- Flexible programs and matching examinations in universities and schools;
- Practical and active participation of school and university leadership in efforts and discussions that promote dissemination and spin-off.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics Committee of Radboud Teachers Academy, Radboud University. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

JI collected the data, analyzed and discussed the data in relation to the theory, took the lead in writing parts of the theoretical framework, the analysis and results sections, and provided extensive feedback on the other parts. PM discussed the data in relation to the theory, took the lead in writing the introduction, parts of the theoretical framework, the discussion, and provided extensive feedback on the other parts. EB provided extensive feedback on, in particular, the results section and the episodes included there, on the Appendix about the day-to-day routine of the Learning Studios, and on all other parts of the texts.

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Expansive Learning Within a Teachers Community of Ongoing Learners (TCOOL)

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This paper presents a first iteration of the TCOOL project as a design experiment in the education of teachers for high poverty, urban schools. The TCOOL Project embodies a new vision for the professional education of teachers that engages schools and universities in deep partnership designed to support the preparation and on-going learning of teachers. Expansive learning theory as described by Engeström and his colleagues is used to probe the opportunities for learning about teaching that TCOOL provides to practitioners in schools and universities. We found that the expansive learning theory enabled us to see that, even in its pilot run, the learning processes manifested throughout by participants in the school and university included productive deviations from our original intentions. These have led to both practical and theoretical shifts in our change effort.

Keywords: teacher education, professional development, teacher research, school-university partnership, expansive learning, teacher learning, design research, self-study research

INTRODUCTION

In this self-study of teacher education practice, the theoretical framework of expansive learning is used to examine a design experiment (Brown, 1992; Cobb et al., 2003a) aimed at addressing the problem of redefining and reshaping teacher education so as to answer the question of what it would take to bring the university and school together as partners in the pre- and in-service education of teachers for high-poverty urban schools. The paper begins with a review of literature related to teachers' professional learning and to the design research and expansive learning frameworks that inform the study. It is followed by an overview of the TCOOL (Teachers Community of Ongoing Learners) project whose design serves as the basis for the study. Then, using Smith and Keith (1971) approach of event analysis for the study of project implementations. This is followed by an in-depth review of the 2-year pilot phase of TCOOL during which my partners in the school and university and I were engaged in trying to prepare an environment for the school and university to successfully come together. While still very much the beginning of a design experiment in teachers professional learning (Brown, 1992; Cobb et al., 2003b, 2009), the outcomes of this initial phase of our effort appear to hold promise for scaling TCOOL to other high poverty communities as an "adaptation" (Morel et al., 2019) of traditional processes of teachers' professional education—both pre- and in-service.

TEACHER EDUCATION, EXPANSIVE LEARNING, AND DESIGN EXPERIMENTS IN EDUCATION

Much of American teacher education is stuck in an unproductive and dysfunctional pattern with vast numbers of new teachers feeling unprepared for teaching and shockingly large numbers of these new teachers (roughly 50%) leaving the profession within their first 5 years (Ingersoll, 2001) thus creating a constant influx of inexperienced teachers (Ingersoll et al., 2019). Worse still, many good and experienced teachers report feeling burned out, uninspired, and frustrated by the limited options they have to enhance their teaching and learning capacities within their profession, driving many to leave classroom teaching for administration positions or other careers that offer better pay, more opportunities for professional growth, and greater personal rewards (Ingersoll et al., 2018, 2019). Tinkering at the margins of university-based teacher education has not worked. The time has come for fundamental change in the way we prepare and support the teachers of America's fifty-five million school children. The need is particularly acute for those who work with the poorest children who are often more school dependent for their development and academic learning than are children who come from families where parents are better prepared and have more resources to be co-teachers outside of school (Ladson-Billings, 1994; Delpit, 1995, 2012; Kirkland, 2013).

To prepare and support teachers to optimize the learning and achievement of children of poverty, two significant shifts must happen. The first involves shifting understandings of teacher education from preservice preparation alone to shaping programs that encompass the whole of a teacher's professional life in the context of school-based reform (Rust, 2010). This means bringing the school into the preparation of teachers and the university into the professional life of teachers IN schools (Lieberman, 2011). The second shift involves shifting the current deficit model of low expectations for children and teachers in high-poverty urban schools toward one that positions both students and teachers as partners in knowledge building (see Bereiter and Scardamalia, 1989; Scardamalia and Bereiter, 2006; Engeström and Sannino, 2010; Engeström, 2016; Sannino et al., 2016). Achieving the transformation implicit in these shifts requires committed, dynamic, and enduring collaborations between local schools, professional communities, and colleges/universities to reconceptualize teacher education in ways that encourage professional learning through high levels of practice in schools. Such a process might be described as a *design experiment* (Cobb et al., 2003a) wherein the familiar practices of teacher education are used in new ways with the intent of developing an innovative approach to the preparation and support of teachers for urban schools, an approach whose ultimate parameters are devised in the process of the experiment. It is likely that the outcome of such a design experiment could be construed as an example of what Engeström and Sannino (2010) describe as *expansive learning,* wherein learners learn something that is not yet there. In other words, the learners construct a new object and concept for their collective activity and implement this new object and concept in practice" (2).

The theory of expansive learning as a vehicle for understanding specific processes of change has been used by Engeström and his colleagues to explore a variety of organizational transformations in a number of complex networks including a municipal home care in the city of Helsinki, services of the University of Helsinki libraries, teacher education for vocational schools (Engeström and Sannino, 2010; Engeström, 2016), the work and services of investment managers in a Scandinavian bank, curriculum redesign in a middle school, and a company that manufactures hi-tech security products (Engeström, 2016). These are work settings wherein participants recognize a problem of practice but do not perceive a path toward change. As Engeström and Sannino (2010) write,

> The basic argument for such a focus on work settings is that traditional modes of learning deal with tasks in which the contents to be learned are well-known ahead of time by those who design, manage, and implement various programs of learning. When whole collective activity systems, such as work processes and organizations, need to redefine themselves, traditional modes of learning are not enough. Nobody knows exactly what needs to be learned. The design of the new activity and the acquisition of the knowledge and skills it requires are increasingly intertwined. In expansive learning activity, they merge (3).

As a framework for considering change efforts, "The theory of expansive learning puts the primacy on communities as learners, on transformation and creation of culture, on horizontal movement and hybridization, and on the formation of theoretical concepts" (Engeström and Sannino, 2010, 2).

Engeström et al. identify seven typical components of the process of expansive learning: (1) Questioning (2) Analysis (3) Modeling the new solution (4) Examining and testing the new model (5) Implementing the new model (6) Reflecting on the process (7) Consolidating and generalizing the new practice (Engeström and Sannino, 2010; Sannino et al., 2016). However, the process and its outcomes are never prescribed. Hence, designing for expansive learning, precisely because of uncertainty regarding the outcomes of efforts to move an organization or group toward it, requires attention to design theory and openness to the possibility of design experiments in educational research.

Design theory when applied to education most often refers to learning, and design experiments in educational research have emerged in recent years as an important approach for the study of curricular and pedagogical innovations aimed at improving learning among children and their teachers (Brown, 1992; Cobb et al., 2003a; The Design-Based Research Collective, 2003). Brown (1992), for example, describes her study of "reciprocal teaching" as a design experiment and Bereiter and Scardamalia (1989), Scardamalia and Bereiter (2006) engage in design-based research to describe their efforts at "intentional learning." In these and other experiments such as those by Schoenfeld et al. (1993) in mathematics or Wiggins and McTighe (2005) on "backward design" of curriculum, the design effort focuses on curriculum and the design effort uses known resources in new ways that aim at fostering critical thinking and reflective learning among children and, ultimately, for their exercising autonomy

around their learning. With each of these design experiments, there is a concomitant concern about enabling teachers to engage in and support innovative practices so that their classrooms and their schools evolve as learning communities.

Teachers who work with children in these ways are often themselves engaged in new learning, specifically a form of professional learning that has them adopting what Cochran-Smith and Lytle (1999, 2009) describe as an *inquiry stance* and, in the, process developing "knowledge-*in*-practice" and "knowledge-*of*-practice." This work can be done individually (Hamilton and Pinnegar, 2015), and it can be done collaboratively in communities of practice (Wenger, 1998)—teachers and researchers together. Either way, practice is examined and appropriated with regard to its efficacy for learners. This is teacher education as professional education (Rust, 2010)—preservice and inservice—that can result in a learning organization such as that described by Engeström and Sannino (2010).

At the preservice level, learning to think of teaching as essentially becoming a part of a community of learners is difficult to achieve. In part this is because of what Lortie (1975) describes as "the apprenticeship of observation"—that tacit lens on the work of teaching developed over 12 or more years of schooling which positions teachers at the front of the room, telling education to their students. In part, this is because it is unlikely that either students of teaching or their teacher educators have experienced genuine collaborative, collegial learning that moves the learner to thinking with others, to reflecting, and to working together toward deep understandings. What is needed is a radical shift in teacher education that positions it as the ongoing professional learning of teachers which, like medical education, is situated as a genuine partnership between schools and universities and is aimed at professional learning across the professional lifespan of teachers and teacher educators (Rust, 2010; Rust et al., 2019)—a design experiment.
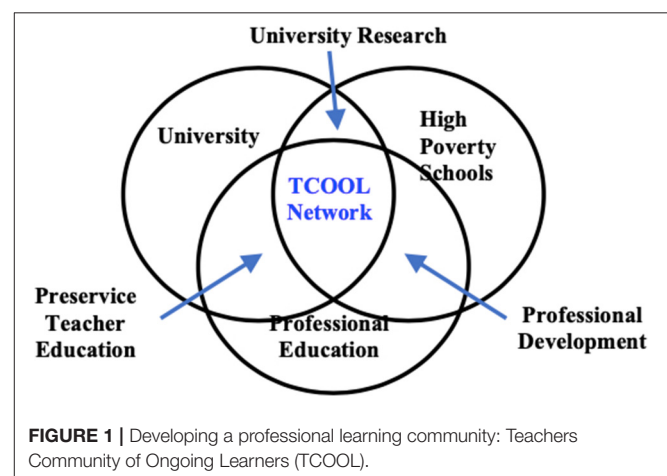
THE TCOOL DESIGN

The design experiment that we have focused in on is TCOOL (Teachers Community of Ongoing Learners). Like all design experiments TCOOL involves connection between the field (practitioners) and the laboratory (researchers) (see Brown, 1992; McCandliss et al., 2003). This explicit and necessary "boundary crossing" (Cobb et al., 2003b) is critical to the desired outcome, the grand goal of creating a seamless path for professional learning among teachers. The grand design of TCOOL situates teacher education at the nexus of theory and practice. It draws community- and college/university-based assets into the local school, thus making the school a center for continuous learning for students and professional growth for teachers. The design situates the TCOOL project within the school in the larger context teacher education, that is, as nested in a university-based system. Our effort of the TCOOL project is to shift that system away from the traditional "use" of the school as a site for field experience toward genuine partnership in the preparation and support of teachers across their professional lives (Rust, 2010). In

this shift, the school acts as a catalyst for change in the process of teacher education. It serves as core to generation of knowledge around teacher learning, as a hub for the study of practice by practitioners as well as researchers, and as a community resource (see **Figure 1**: TCOOL).

TCOOL's focus is on working with high poverty urban schools and the higher ed institutions that work with them. These are schools where the percentage of students living below the poverty line far exceeds the city wide average. In New York City public schools, ∼60% of families live below the poverty line, qualifying them for Title I status. In high poverty schools, this percentage is usually between 95 and 100%. In this design, high poverty urban schools come together with university programs that provide preservice teacher education and other education-related services and organizations that provide professional education related to a variety of school-based needs, for example, support to special education, technology training, arts education, etc. The school is at the center of the design. It is the place wherein preservice education, inservice education, research on practice, and the specific local context come together to inform and enhance the learning of children and their teachers.

The design of TCOOL is premised on the idea of teaching as a "learning profession" (Dewey, 1904, 1977; Lieberman, 1992; Darling-Hammond and Sykes, 1999) so its framework and intended outcomes differ from other teacher education programs in a number of important ways:

- *In-situ* **Learning**. It situates teacher education inside public schools and inside the classroom with current teachers working in collaboration with colleagues in colleges and universities, including faculty and professional staff. Like doctors in hospitals, preservice teachers are in the schools daily over a period of one to two school years working alongside and in concert with experienced teachers—far more time and focus than is normally required. In these ways, it is intended to eliminate the university-school divide that has so many new teachers feeling that their courses do not relate to their school placements. As well, it is intended to help teacher educators shape their programs in ways that resonate with the

FIGURE 1 | Developing a professional learning community: Teachers Community of Ongoing Learners (TCOOL).

needs of the schools so as to support professional learning and inquiry with and among both preservice and experienced teachers (Brown, 1992; Cobb et al., 2009). Hence, new teachers' experience of learning to teach resides in the school as a laboratory for learning and it is hoped that, like new doctors, they will move into their first years of teaching knowing the breadth and depth of life in schools and classrooms and understanding and relying on research-informed practice (Lunenberg and Korthagen, 2009; Tal, 2019).

- **Career-Long Focus**. It changes the focus of teacher education from a narrow preservice activity to encompassing the career-long process of professional learning that is essential to supporting high-quality teaching over time and to preventing teacher burn-out. It recognizes both teacher induction AND teachers' long-term growth and professional satisfaction as an essential part of the work of the school (Little and McLaughlin, 1993; Putnam and Borko, 2000; Borko, 2004; Ulvik et al., 2017). It positions both pre-service and experienced teachers' engagement in research as a core professional value (Lieberman, 1992, 1994; Cochran-Smith and Lytle, 1999, 2009; Cobb et al., 2009) as well, it supports teacher educators' study of and refinement of their practice (Loughran, 2014; LaBoskey and Richert, 2015).
- **Real-time, Continual Feedback**. It is focused on actual day-to-day teaching—the single most important element in student learning (Hawley and Valli, 1999). In most teacher education programs, preservice students spend only a few weeks in classrooms as student teachers and the oversight of their work is generally episodic at best. Here, students are not only immersed in the schools over a period of 2 years, their teacher educators are also there regularly supporting them there and providing a model of collaborative engagement with school faculty (Rust et al., 2019).
- **Iterative Learning Model**. It supports an iterative process in which teachers inside the school study their practice and continually adjust it to meet the needs of their students with research assistance from their university/college-based partners. In this way, it enables both new and experienced teachers to bring theory and research into practice (Fish, 1980; Brown, 1992; Rust and Meyers, 2006; Cobb et al., 2009; Cochran-Smith and Lytle, 2009; Rust, 2009).
- **Sustained Collaboration**. It offers a level of sustained collaboration between urban public schools and their university/college partners, thereby fostering a long-term model of lifelong professional development that is intended to be highly enriching to current classroom teachers as well as to the research and policy communities (Anderson and Herr, 1999; Cobb et al., 2003b, 2009; Rust and Meyers, 2006; Rust, 2009).

And for High Poverty Urban Schools in particular:

- **Teacher Retention**. It will result in the retention of high-quality teachers in schools serving children of poverty.

As a partnership between higher education and public schools, TCOOL is intended to begin within a single school and expand over a 10-year period to include a network of schools (elementary, middle, and secondary) in the same geographic area that will function as research-informed communities of practice (Wenger, 1998; Wenger and Snyder, 2000). Within each school, the same collaborative elements will be in place: Each begins with a strong principal and teachers in a high poverty school choosing to collaborate with university-based preservice teacher education to make the school the educational analog of a teaching hospital. That is, each school will operate simultaneously as a site for coursework and fieldwork for student teachers and as the locus of professional learning for experienced teachers. The process of moving each school to becoming an inquiry-oriented site in which school and university collaborate in support of powerful professional learning is the prime intervention that is TCOOL. Hence, within each school, the project is designed to engage teachers in practitioner research that supports reflection on and refinement of practice.

When the model is expanded beyond a single school to a network of pre-k-12 schools in partnership with higher education and within a specific geographic area, it has the potential to become a dynamic and sustainable professional learning community focused on advancing student learning and achievement in high-needs urban schools. Implicit here is the idea that as the schools that are embraced in the TCOOL project are better aligned with one another and with their higher ed partner around professional learning, the community embraces "its" schools and university as "of the neighborhood" and will view them as assets to the community. Such networks of truly committed and engaged educators, students, and parents can foster a powerful conversation beyond the immediate area about what is being learned locally to support students' academic growth and, at the same time, contribute to the larger conversation about how to advance public education in high poverty communities nationally (DuFour et al., 2005).

STUDYING THE PILOT OF THE TCOOL DESIGN EXPERIMENT

Cobb et al. (2003a) contend that design experiments have "five crosscutting features" (9–11):

1. Their purpose is the development of a class of theories about both the process of learning and the means that are designed to support that learning.
2. The nature of the methodology is highly interventionist.
3. Design experiments always have two faces: prospective and reflective.
4. Design experiments are iterative—featuring cycles of invention and revision.
5. Design experiments tend to emphasize an intermediate theoretical scope (rather than grand theories of learning) that is located between a narrow account of a specific system (e.g., a particular school district a particular classroom) and a broad account that does not orient design to particular contingencies. Thus, they speak directly to the problems that practitioners address in the course of their work.

6. Design experiments are "conducted to develop theories, not merely to empirically tune 'what works'" (Cobb et al., 2003a, 9). They do not produce statistical evidence or hard data about what has worked. Rather, they describe "attempts to support arguments constructed around the results of active innovation and intervention in classrooms" (Kelly, 2003, 3) and schools so, in their very format, or what Kelly (2003) describes as their "grammar," is and is intended as generative and transformative. They get at the complexity of schools and classrooms.

Measuring the outcomes is messy work. As Brown (1992) wrote, "Components are rarely isolatable, the whole really is more than the sum of its parts. The learning effects are not even simple interactions but highly interdependent outcomes of a complex social and cognitive intervention" (166). To get at the overall and longterm impact, Brown (1992), Cobb et al. (2003a), The Design-Based Research Collective (2003), Engeström and Sannino (2010)—all recommend "thick descriptive datasets (and), systematic analysis of data" over time. Research tools include "ongoing records of the design process" (Cobb et al., 2003a)—data "on both learning and the means by which that learning was generated and supported" (12). As described by Brown (1992), Cobb et al. (2003a), and Engeström and Sannino (2010), these can include, for the overall management of the design experiment, agendas, and notes from all meetings of leaders and participants, interviews and surveys. For the conduct of the design experiment in classrooms: observational notes, student work, "patterns of social interaction; inscriptions, notations, and other tools; and responses to interviews, tests, or other forms of assessment" (Cobb et al., 2003a) as well as video and audio records. All are stored electronically for review not only by the research team to describe their learning and dissemination but for the field as a whole for growing knowledge about learning, teaching, and innovation.

The data gathered to guide the daily work of a design experiment are in many ways the same as those suggested for looking at the extent to which the process of invention and innovation brings the effort closer to the goal. The data capture those multiple small shifts that enable researchers, teachers, and administrators to know what seems to be working in the moment as well as to be able to step back, reflect, and, with an eye toward the grand goal, calibrate next steps. Like Wiggins and McTighe (2005) *backward design,* the research process requires a simultaneous embrace of the grand goal –what they describe as "big ideas" and "enduring understandings"—and attention to steps needed to move closer to those ideas and understandings that learners can carry with them and deepen over a lifetime. The backward design process is accomplished with an eye to the big ideas through planning as formative assessment. Each step relates to the question, "how do I know what my students are learning?"—a question of formative assessment that invites multiple forms of assessment so that learner and teacher can move beyond simple rote, short term assessments to high level, thoughtful assessments that engage learners in the pursuit of deep understanding. In this process, teachers themselves become researchers using the everyday tools of classroom assessment

to guide them: observation notes, samples of student work, simple entrance and exit tickets, conversations with students, their own journals, anecdotal notes, running records for reading, photographs, video, and audio recordings. As described by the Design Research Collaborative in the 2003 special issue of *Educational Researcher,* "Such collaboration means that goals and design constraints are drawn from the local context as well as the researcher's agenda" (6) and often results in shifts in the design that can help to "refine the key components of an intervention" (6).

Method

In studying the pilot phase of TCOOL, we have drawn on similar methods using the data as formative to enable in-the-moment modifications of the project—essentially, this was a rapid-prototyping approach (Bossot, 2002; Ihrig and MacMillan, 2015): For the school, the data were drawn from weekly logs of lunchtime conversations kept by the project manager/mentor and shared online with the teachers, principal, and project director; e-mail notes between the project manager/mentor and project director; agendas and notes from monthly meetings run by the project director and project mentor with the teachers as well as from the two summer institutes; notes and videos from the teachers' presentations of their research in December and June each year; the teachers' research presentations; interviews conducted by the mentor; and feedback surveys given at the end of each semester. For the college, data are drawn from notes of meetings between the project director and the dean, department chairs, and college faculty and mentors; email with college mentors; notes from the project mentor's meetings with student teachers, classroom teachers, and the college mentor.

To give a sense of the process of the project, I have used Smith and Keith (1971) framework of event analysis, wherein the analysis of an innovation effort is developed by focusing on key events (and the activities that surround them) that occur sequentially over the span of the project. The material for this narrative is drawn from the data described above. Here, I have used the framework as a timeline documenting summer and semester activities during the 2 years of the TCOOL pilot and begin each phase with a description of what was going on in the school as well as a description of college-related activities. As a design experiment, the attention given here is to the unfolding narrative as a means of understanding what it takes to enable genuine partnership between a school and university. Hence, the narrative is not about proving what works. Rather, it is about tracing key elements of the TCOOL effort to enable theory building. The data enables the telling of the story of developing the design experiment.

Context

Drawing on her experience of having shaped urban-focused teacher education programs in New York, Chicago, and Philadelphia as well as studying international teacher education, specifically programs in Finland (Salberg, 2011) and Norway (Ulvik et al., 2017) where entry to teaching has the same cachet as entry to medicine does in this country, Rust conceptualized

and articulated the general framework of TCOOL. In the Spring of 2016, she approached a major foundation that was shifting its focus toward teacher education. As a result of this initial conversation, she was introduced to the Deputy Chancellor of New York City Schools who felt the TCOOL model held great promise. He urged Rust to reach out to an experienced principal of an early childhood and elementary school serving children aged 3—10 (5th grade) in Brownsville in Brooklyn. The principal immediately saw the potential of the TCOOL collaboration to advance her school's teaching and learning needs. At the same time, Rust recruited and brought together a group of academics from local New York City institutions (NYU, CUNY Early Childhood Professional Development Institute, & Brooklyn College- CUNY) to collaborate with the school administration on a pilot vision and design.

The School

Riverdale Avenue Community School (PreK-Grade 5) is a prime example of a setting where the TCOOL strategy could make a real difference. An analysis of the official student demographics of its 357 students provides evidence of the high levels of poverty in this community: 93% of the students are eligible for free lunch; 28% have been identified with having learning distinctions; 8% are English Language Learners; and a shocking 27% are homeless or living in temporary housing.

Most of the teachers have master's degrees and from 5 to 30 years of teaching experience, making them potentially strong participants in developing a professional learning community. Many come from Brownsville or similar communities. Several had worked with the principal in her prior teaching setting.

Participants

Over the course of the pilot, the key participants remained the same. Throughout, the Project Director, Frances Rust, worked with both the school and the college. In the school, the key participants were the School Principal and the Project Manager/Mentor who entered the project in the Fall of 2017. In the University, the Dean was central.

Other school-based participants were lead teachers (1 each year) who met weekly with the principal and project manager/mentor and those teachers who opted to participate in monthly meetings with the project manager/mentor and me. Though the number changed yearly, the group of participants averaged 12–15. In the monthly meetings, we focused on their developing the skills of teacher action research. These meetings were supplemented and supported by weekly small group meetings with the Project Mentor. Two different university-based mentors worked with student teachers -one at the end of Year 1 the other at the beginning of Year 2. In the Spring of year 1 a group of 4 college students engaged in the initial stages of field work as participant observers came to the school and worked in 2nd, 3rd, and 4th grade classrooms. In the fall of year two, there were 2 student teachers working in 1st and 2nd grade classrooms.

Funding

Funding is always a concern in new project development— likely greater with this project because it did not operate under the aegis of a major university grant and the initial foundation interest did not hold. Hence, funding was a constant concern for the project director over the entire period of the pilot. As the project got underway and progressed, she was raising funds through private donations designated for the project through gifts to NYU-Metro Center. Between January 2017 and January 2019, $200,000 was raised—a sufficient sum to cover the major costs of the project related to personnel: an initial literacy-based enrichment program, salaries for the mentors, stipends of $1000 per semester for each of the 12–15 participating teachers as well as a small stipend each semester for a lead teacher/coordinator and for the principal, *per diem* stipends for teachers participating in the summer institutes, and a one-time only stipend to the student teacher supervisor from Brooklyn College. All other items anticipated in the project budget like additional school-based mentors, fellowships for student teachers that would enable them to be present weekly in the school for all of their field work during the 2 years of their education coursework, travel to conferences, equipment, graduate student engagement with the assessment process, etc. were put on hold pending a major grant. Since January 2019 when funds through donations to NYU for the TCOOL project were exhausted, the principal has enabled in-school participation in the project to continue by garnering resources to pay for the mentor to continue her work with the teachers through bi-weekly visits. As well, she has maintained the schedule that enables the teachers to meet with the mentor and so to continue their research.

PILOTING THE TCOOL DESIGN EXPERIMENT

Getting Started

At the end of August of 2016 just before school opened, the Principal set up a meeting with the teachers at the school during which she introduced me and enabled me to describe the project and to enlist their participation in TCOOL. We were too late in the academic year and did not have enough funds to enable our preservice teacher education partner, Brooklyn College, to shift already determined student teaching placements to the school, so the project began with Rust spending at least a day a week in the school getting to know the school and teachers.

In January 2017, with the first infusion of funds, our first effort at collaboration between school and university began with the launch of a literacy-based enrichment program suggested by NYU Metro Center. The program, designed for middle and high school, supports children's creation and performance of poetry. While the 13 of the school's participating teachers attended TCOOL workshops with Rust and a NYU graduate student mentor during the school day, their regular classes received instruction by teachers from the enrichment program. In weeks where there were no professional learning sessions, two instructional coaches, Rust and the NYU graduate student mentor worked with the fifteen participating teachers to support individual teacher's efforts to engage their students in rich discussion and critical thinking about their learning.

This initial iteration did not work well. It occurred once a month, the participating college faculty shifted unpredictably so teachers did not get to know them, and the substitutes who came from te arts education program were not accustomed to working with elementary school children. The problems encountered led TCOOL's partners to reach a number of critical decisions:

1) First among these was to abandon the idea of "preparing" a school for working collaboratively with student teachers and simply dive right in. It was clear that the group of experienced teachers at the school, all with master's degrees, were eager to move away from the didactic workshop model of professional development toward one that would enable genuine analysis of real teaching in familiar classroom settings.

2) Second, feedback from the school's teachers enabled us to revise our understanding of a mentor's role from instructional support around a specific instructional intervention to instructional support that enables individual inquiry and facilitates collaboration among teachers around critical aspects of their work. We found teachers eager to talk about: teaching specific concepts, how routines are handled in their classrooms, how to develop support for a particular child, etc.

3) Third, we decided that engaging with teacher education writ large, that is, as the preparation and continual learning of teachers as the focus of our work together should always be at the core of our conversation when we enter into a new school. We originally thought to focus instructional interventions on areas such as Literacy and English as a New Language (ENL). We now understood that although literacy and language are critical, these issues can be addressed more fruitfully in the conversations around practice that would likely come with the inclusion of a student teaching program as core to the activity of the school itself.

4) Fourth, we recognized the need for an assessment framework that evaluates the approach of engaging partners at the school and university level in practitioner research to inform practice rather than statistical data (e.g., standardized test scores) which cannot get at the rich complexity of the individual setting. We had learned that in order for a new model of teacher education to be clearly articulated, the assessment framework should include links to classroom practice, accountability among the partners, and evaluation of implementation.

Developing a Plan of Action

With adequate new funding, we began in July of 2017 to develop a plan for TCOOL that was as close to enacting the vision of TCOOL as our thinking could approximate. Drawing on experience the prior Spring and recommendations from one of our higher education partners and with new funding, the principal and I together sought out and hired an experienced mentor who would be in the school 2 days each week to meet with teachers in small groups to support their action research, would liaise with the Brooklyn College student teacher supervisor, and would meet regularly with the principal and me, the project director, to help us gain insight about the daily operations of the program. In essence, she would function as the project manager and school-based mentor.

During the summer, the principal, project mentor, and director developed a general plan of operations:

- Teacher teams of 3–5 teachers would meet weekly with the project mentor around their research. In keeping with Rust's insistence on professional learning being part of the school day (hence understood as part of the teachers' work), these meetings were developed as lunch conversations focused around the teachers' action research. To facilitate, the principal shaped a schedule that enabled teachers to meet weekly at the same times and with the same small group of 3–5 colleagues. We also determined that teachers who opted to participate would receive $1,000 per semester. This acknowledged their participation in the lunch meetings, monthly action-research meetings with the project manager/mentor and me, and their development of an end of year presentation of their work.
- In the spring, these teams would be expanded to include student teachers.
- The project director would reach out to the college to develop a plan for integrating student teachers beginning in the Spring of 2018.
- Regular meetings of all the participating teachers, the project director, the project manager/mentor, and university mentor/supervisors would be held monthly. These meetings were intended to support the development of the teachers' research skills, to support on-going assessment, as well as to facilitate collaboration with the college.
- Day-to-day oversight of the collaboration between the school and the college would be coordinated by the project manager/mentor.

Living Into the Plan

Here, we describe the general conduct of the TCOOL project as it related to the school and the college. Our focus is on the effort to develop a collaborative atmosphere in the school and a genuine partnership between the school and the college—both sites being essential to the preparation of new teachers and professional learning of the 13–15 participating teachers who would be the preservice teachers' colleagues and classroom mentors in the school.

Beginning-Summer Into Fall, 2017

At the start of a 3-day summer institute mid-August of 2017, the project manager/mentor was introduced to the teachers. Together, she and I worked with 20 interested teachers and classroom assistants to introduce practitioner research and mentoring. By the end of August when teachers were back and readying for the year ahead, the principal sent out a request re participation in TCOOL. She provided an incentive by alerting teachers that their action research projects for TCOOL could also count for a district-wide initiative on teacher research. In response, 13 teachers (one of whom was new to teaching) indicated to the principal a willingness participate in the TCOOL project. This meant a commitment to a weekly meeting with the project manager/mentor and a small group

of colleagues, monthly after school workshops with the project manager/mentor and project director, willingness to host a student teacher, the eventual presentation of their work to colleagues, and eventual write up of their research.

With this signal from the teachers, the principal began to shape a schedule that would enable teachers to come together in cohort groups of 3–5 at lunch time. Though it sounds simple on the surface, developing a schedule that will work week after week requires attention to a myriad details: coverage of classes by licensed staff; shifting "specials" such as art, music, computer; freeing space for the meetings; commitments from those not participating to honor the effort of their colleagues to engage in the project. Additionally, the principal had to look ahead on the calendar to position the after-school monthly meetings, and she had to set a regular meeting time with the project manager/mentor. While not an immediate concern in September, the principal and mentor were also aware of the need to make time to prepare within the school and with Brooklyn College for the entrance of student teachers in the spring.

Beginning in mid-September and throughout the Fall, the weekly lunch meetings of teachers and project-mentor got underway as did the monthly after school workshops. Lunch in this early childhood/elementary school began at 10:30 and was complete at 12:20 pm with classes rotating into the cafeteria in half hour slots followed by playground time so the small group meetings were scheduled for 50 min but, taking into account the need for participants to get there and get settled and then for teachers to leave for their classes, they turned out on a good day to be 45 min meetings. The project director and project manager/mentor were in weekly communication regarding these meetings in person, on the phone, and through email. The project manager/mentor developed notes from each lunch conversation that she then shared with the teachers, the principal, and the project director, and she and the project director met weekly to review these looking for trends to inform our planning and also as evidence of what was working. Prior to an end-of semester celebration in December with the TCOOL teachers wherein the teachers made 3-min presentations to one another about what they were doing with and learning from their research, the mentor collated notes from each teacher's lunch conversations so that each had that data at hand as they began to prepare for their presentations at the end of the school year. She also provided each teacher with a set of questions to guide their writing.

Though she could not attend the summer institute held at the school with the teachers, the dean of Brooklyn College was in conversation with the project director regarding plans for the college's participation in the project. The dean and the principal were able to meet at the school at the end of November to solidify plans for student teachers' field experience at the school beginning in January. It was decided that an initial group of student teachers would be 10 students participating in an elementary literacy course. Their college-based mentor would establish their schedules with the school through the principal's office, would visit weekly and would communicate on a regular basis with the project mentor.

Meanwhile, in the school, the principal, project mentor, and lead teachers were developing a "curriculum" for the teachers who would host student teachers in their classrooms. The principal wanted to be sure that she and the teachers who would host student teachers were aware of how to provide a supportive atmosphere for the new teachers. As this planning went forward, there was no one on the college side with whom they were able to communicate until the November meeting with the dean and later with the college-mentor once the Spring semester began.

Winter Into Spring, 2018

While school opened on January 3 and the weekly lunch meetings picked up again, student teachers did not come to the school until the second week of February. This was completely unexpected by the school team but seemed the normal operation of the teacher education program as classes did not commence until late January and field placements were apparently often scrambled over the holidays and required resetting. When four instead of the ten student teachers anticipated did come, each had a different schedule of times and days thus confusing classroom placements and requiring last minute shifts among teachers. Only one was prepared to take the time to participate in grade-level meetings and to join in her classroom teacher's TCOOL group. The college-mentor was unable to arrange her schedule to regularly be in the school on the same days as the project manager/mentor or when the project manager/mentor was not in her small group meetings so her liaison with the school became one of the lead teachers who had planned with the principal and the mentor; that conversation was essentially a check on attendance. Further complicating the issue was the fact that, irrespective of whether the cooperating teachers were participants in the TCOOL project, the coaching for mentoring that the principal, project manager/mentor, and planning team had wanted to provide was set to happen at the end of the school day, and it became too cumbersome for all to have yet another meeting.

As the Spring term progressed, the student teachers completed their field experience hours. By the time of the school's spring break at the end of March, they had stopped coming to the school. After Spring break the pressures of school district assessments would have made their presence difficult since they had not been there long enough to know the curriculum of their respective classrooms. However, the issue of how to work with the college's teacher education programs assumed a major place in our conversations at the school and with the dean who was able to relay to us difficulties that the students and mentors felt they had experienced at the school.

It was time for a reset regarding the student teacher side of TCOOL. With the encouragement of the dean, the project director visited the college in the late Spring, this time focusing on a 2-year graduate program of special education wherein the faculty could countenance placing students in the school for the entire four semesters of their program. As we developed a plan for placing two graduate students in the coming fall, we identified a college faculty member who was willing and able to be in the school a day a week in dialogue with the students, cooperating teachers, and project mentor. The project director carried the plan forward to the school and a conversation focused on the fall semester began.

At the beginning of June, the teachers participating in TCOOL were ready to present their action research projects in a whole school event. As she had done in December, the project manager/mentor created separate records for each of the teachers of their lunch conversations throughout the spring. By then, she had also been invited into many of their classrooms as a participant observer, and she had developed strong relationships with the teacher leaders to the extent that one elected to begin a research project on her own with the project manager/mentor's guidance.

The June event was a morning event attended by all of the teachers in the school and one of the major funders of the project who brought along a guest, a former principal from the Brownsville area. It was remarkable in that the responses to the TCOOL teachers' presentations by colleagues and particularly their questions explored the TCOOL teachers' thinking about their instructional shifts over the year as well as the action research process. Following the event, the project provided lunch for the TCOOL participants and for those who had worked with student teachers. The mentor and project director used this time as an opportunity for a focus group conversation on the project.

As the project manager/mentor and I reviewed the year of weekly meetings among teachers and with the principal, we were able to discern some lessons that would guide our planning for the next year within the school and relative to the college. Initially, the meetings were structured as "quick shares" wherein teachers would talk about what they were doing around their action research question. In November, we had remarked to one another that each of the cohort groups seemed to be developing their own distinct conversation. They seemed to have developed such trust with the project manager/mentor and one another that they were able to bring in issues from their classrooms for which they needed extra support and working these through together became part of their developing relationship. As the year went on teachers often came prepared with questions to ask the group, data to share, videos to watch together and next steps to think about together.

Summer Into Fall, 2018

We began the summer with several major planning sessions focused on (1) development of a website at NYU Metro Center wherein we could describe the project and sketches of the teachers' research projects (2) development of a full-scale assessment of the project thus far; and (3) developing a more robust relationship with Brooklyn College around student teaching. Once again, we planned for a 2-day summer institute early in August and hoped that those who had worked with us over the first year would continue. They did and new participants joined. The summer sessions were less of an introduction than the prior year as many of the participants had either participated in TCOOL or had been at the teachers' presentations.

In the fall, we retained 9 teachers from the prior year and gained 8 new participants. Additionally, the project manager/mentor was now working individually on action research with both the lower and upper elementary team leaders

and requests for her to visit classrooms had come from sixteen teachers—not all participants in TCOOL.

While we retained the weekly lunch meetings and the monthly workshops, there were striking differences. We saw that the TCOOL teachers who had been with us during the first year were now really "into" their action research. They began to request specific foci for the monthly sessions. For example, they wanted to know more about a variety of note-taking strategies and when appropriate to use them. As well, they requested that writing time be planned into the meetings. The project manager/mentor and project director moved to shaping the 90-min monthly workshops; within each there was a short time for presentations and discussions of strategies, real time for writing, and time for a step-back reflection and look ahead.

As in December 2017, the TCOOL teachers came together for a celebration of their work. This time, the project manager/mentor videotaped and posted the videos to each of the participants and the project director made transcripts of the videos and shared these with the teachers to facilitate the their writeups later in the year.

Winter Into Spring, 2019

As the second semester began, we were set to move forward to into the spring when, early in January, we discovered that our funding was exhausted. At that moment when it looked as if the TCOOL project had come to an abrupt end, the principal and teachers opted to continue the lunch-time action research meetings and the principal stepped in with funding to continue the project mentor though not with the full 2-day presence that the mentor had provided.

Additionally, the principal and teachers opted to continuing with their commitment to engaging with student teachers. The school team had developed with the college mentor a framework of expectations for student teaching. Two master's students in special education came early in the new school year and their mentor was available when they were there. Difficulties arose, however, with one of the student teachers disagreeing with her cooperating teacher's instructional process. In part, this had to do with the state's mandated performance assessment that positions the student teacher as an active agent and decision-maker in the classroom. In this case, teaching to the test (the state's performance assessment) may have come too soon for trust and understanding between student teacher and cooperating teacher to have developed. While major efforts were made to ameliorate the situation, working with student teachers still seemed adjunct to the real work of the school.

In June, the TCOOL teachers once again presented to one another and their colleagues though this time their presentations were part of day of small group workshops and planning sessions developed by teachers across the school so the audience was not as robust as it had been the previous year. However, in comparison to the prior year, the teachers seemed more confident in their presentations and much more willing than in the past to bring their presentations into print—something we are about to do!

In their presentations, they made claims about their own growth as professionals:

- One teacher traced changes in her teaching to her initial focus on her writing instruction. She claimed that as she kept deepening of her understanding of how to better support her students, she could transfer her learnings to her math instruction, changing the way she teaches math and increasing student learning. She also began to talk more deeply about her practice with other teachers and to strategize with them. A surprise to us is that she has continued to engage with the project manager/mentor even now as she prepares her action research for publication.
- Two teachers who team teach did their first project separately—each focusing on a different child. In the second year, they chose to do an action research project together to change the way they taught writing. The focused on one strategy—fish bowl- to work on with their children. They began to video tape on their own so as to reflect upon, inform, and improve their instruction.
- Another teacher completely changed her instruction by looking at data from each child to inform her next steps in the teaching of reading. In her second year, she used this isame approach in her new role as an ESL teacher and is continuing with it. She, too, is preparing her study for publication.
- One of the lead teachers came into the project initially as part of a group but arranged for one-on-one meetings with the project manager/mentor. She ascribes her move into a genuine leadership role in the school to having had supportive opportunity to reflect on her interactions with other teachers so to improve her practice. She has gone from being a leader in the school to Assistant Principal and then Principal.

Though improvement in student learning was not an intended outcome of the TCOOL project at this early stage, the claims that each of these teachers made about improvement in their teaching were buttressed by the learning gains that they documented among their students.

Once we are able to secure the appropriate funding, the college is committed to trying again. The issue of funding is critical here because enabling preservice students to spend 2 years in the school as fellows requires funding for fellowships that will enable them to engage full-time with the school and with their coursework instead of having to additionally carry part-time jobs. To have a college-based mentor in the school also requires funding to secure course release.

MAKING SENSE

Implied in the design of TCOOL (see **Figure 1**) is a steady state in schools and universities that suggests, though it does not specify, a set of moves among each of the key participants that will gradually move toward equilibrium. We now see that while this vision of a changed relationship between schools and universities may, in the long run, be apt in that it serves as an image to define our grand goal, it cannot encapsulate the complexities

involved in this change process within and across each of the participating organizations (Brown, 1992; Cobb et al., 2003a). So, the telling of this story of the pilot and the act of reflecting on each step and drawing lessons to shape the next become critical to the effort of learning how to move closer to the goal. In other words, this is not a not a study that promises to define which tools at hand work best, though, traditional tools, such as field experience and inquiry-oriented practices, are definitely essential here. Nor is it aimed at defining specific outcomes. Rather, it is a study of learning about what the process of moving toward the goal of radically reshaping teacher education entails. It is about theory development (Cobb et al., 2003a). Our analysis then focuses on what we have learned that can carry us forward.

Lesson One: Boundary Crossing

Merging radically different systems that have traditionally existed in parallel universes (which describes the traditional school university relationship in teacher education) requires genuine boundary crossing. Cobb et al. (2003a) suggest that, "design experiments ideally result in greater understanding of a *learning ecology*—a complex system involving multiple elements of different types and levels—by designing its elements and by anticipating how these elements function together to support learning" (9). In other words, design experiments get at the complexity of educational settings. With the TCOOL pilot, this showed in a number of ways.

The first had to do with the design of TCOOL wherein we planned for collaboration between the college and the school earmarking the long-term presence of student teachers in the school as the essential "tell." In achieving that collaboration, we planned for including student teachers in the school as new members in a vibrant learning community wherein the conversation of practice was alive and well- among the teachers and was increasingly shared in by the teacher education community. The learning ecology that we sought in those plans implicitly recognized the fact of the borders as systemic organizational differences between the school and the university. It is clear to us now that explicit recognition of boundaries is essential and that it should enable early and ongoing negotiation and planning.

In the TCOOL pilot how time is used and for what— how activity schedules are made—was and is an essential issue of boundary crossing for it is with the use of time and the organization of the calendar that the mores of an organization are often most clear. Whether the TCOOL concept will always work within the cyclical pattern of the school/academic year as it did during the pilot is unclear. It makes sense, for example, to use the summer for reflection-driven planning that positions future activity relative to set patterns regarding time and culture but this should involve discussion among all of the partners. For example, if summer is too late for planning for student teacher entry into the school in the fall, then a critical next step is developing the capacity to negotiate the barriers raised by the different organizational calendars to give time to the

placement process. In TCOOL, this was done by the school and university the following year after the Spring of 2018 experience when the student teachers essentially began their field work at the school almost 5 weeks after school had opened. But the boundary issues around time in each organization are far more complex.

Time issues were obvious in the lack of synchrony between the student teachers' and college-based-mentor's schedules with those of the teachers and project manager/mentor. The efforts made by the dean and college faculty to resolve these initial discrepancies, though they may have seemed minimal or a "little too late" at the time, required substantial accommodation on the part of the college that was most obvious in their effort to plan with the school for the spring of 2019 and the designation of a new set of faculty and a new college-based-mentor.

In the school, the creation of a schedule to accommodate the weekly lunch meetings with the project manager/mentor was significant in that it required adjustments across the school to bring this professional development activity into the daily life of the teachers. As well, there were the often difficult accommodations that teachers who took on student teachers had to make as a novice entered their sphere of influence. And then there were the teachers who participated in the lunch conversation who, though they may have worked in the same building with one another and even on the same grade level or as a team, still had to overcome their tendency toward privatism (Lortie, 1975) in order to be able to develop their small learning communities.

Using the lens of expansive learning, we were also able to expand our own horizon on the time and participation needed to develop the model. As Sannino et al. (2016) note, "rather than aiming at transferable and scalable solutions, formative interventions (like this one) aim at generative solutions developing over lengthy periods of time both in the researched activities and in the research community" (599). In part, the time needed is about developing trust.

Lesson Two: Relational Trust

Unlike so many interventions in schools and experiments within education programs, TCOOL had/has no end point. Rather, it is a constantly negotiated and renegotiated set of activities that pertain at once to the moment of their happening and at the same time serve to shape action(s) beyond that moment; and, while in the moment, the vision of the grand goal may be forgotten, it can be drawn back to awareness in the interactions of the participants as they ask, "Why are we doing this?" Pioneering and staying with TCOOL even as the funds ran out, even as we could not bring in all the elements that the grand design suggests should be there—this requires what Bryk et al. (2010) describe as "relational trust," that is, trust rooted in social respect and deeply influenced by a person's perception of another's integrity. Bryk describes this as the strongest indicator of school reform. Trust is what creates investment in an initiative, what gets stakeholders to buy-in to a change and do the work necessary to support it on the ground and in the moment. We saw such trust exhibited throughout the TCOOL pilot from the principal

in her unwavering support, from the project manager/mentor who was faithful in her commitment of time and willingness to share her skill and knowledge and from the teachers who faithfully shared with one another in the weekly and monthly meetings. We saw it with the Dean who has continued her efforts to support the project and stands ready to help us move forward.

With TCOOL, we have learned, too, that trust is essential to a vibrant, focused learning community and it takes time to develop that trust. In our experience, a year enables beginning well. It gives the time needed to try to learn one another's language and meaning, and it enables building a reservoir of shared experiences as well as shared language and understandings. We saw this particularly in the action research groups where we saw a shift toward increased reflexivity among the teachers. We could not have forecast at the beginning of this work that the teachers would be asking for additional research tools in the Spring of 2018, or that they would willingly present their work to their peers and write about it. While we credit these moves to the conversation cycle initiated by the project mentor and used in the weekly cohort groups and to her development of a research guide that supported the teachers' development of their oral and written presentations, we understand that this happened because trust had been nurtured and developed. Continuing together over time requires trust, too, in order to figure out how to move through the institutional and organizational barriers that are inevitable.

Lesson 3: Resources

While the grand plan of TCOOL is that the partnership is genuinely shared by the school, university, and community, our analysis of the pilot phase makes it very clear that such partnership requires funding—initially to enable the conversation of practice to emerge and become situated and not just in the school. It is needed to enable the circle of participants in the school and the college to widen and for the activities of the project to expand.

At the school, without another school-based mentor or two or making the project manager/mentor's job full-time, we could not grow beyond 16 teachers participating. Because it would have required extra time and the appointment of a someone to liaise with the college supervisor, we could not do the preparation of teachers to serve as mentors to student teachers. We could not afford planning retreats that could bring school and university participants together. Hence, the major activities of the TCOOL pilot resided in the school and pertained to the embrace of practitioner research within small learning communities during the school day.

In the university, funding is needed to support fellowships for students to be able to do the whole of their field work (4 semesters) in the school thereby enabling them, perhaps, to complete their degrees in 4 or 5 years rather than the current average of 7 years because of their need to juggle work with school. It was lack of funding that precluded our effort to develop a committed group of student teachers. Funding is needed to facilitate college faculty engagement with the school. For example, we discussed with the university the possibility of

bringing a course into the school so that student teachers and teachers in the school could participate in it. Similarly, we felt it would have helped student teachers to have their supervisor in the school with them each week.

Summary

It is clear, that the complexity of the school and universities as workplaces situated themselves in complex systems makes it almost impossible for leaders to track change day by day or even month by month. There must be dedicated times when participants come together, perhaps, in summer, wherein we take stock of what has happened and draw from that to shape next steps. This coming together is particularly important in terms of our commitment to radically reshape teacher education so as to prepare and support teachers to optimize the learning and achievement of children of poverty.

Our work together suggests flexibility and fluidity: Flexibility with regard to time; fluidity with regard to having strategic participants who have the time, experience, capacity, and trust to cross boundaries both within and outside of the partner organizations.

Whether the routines that were developed in the pilot, especially those like the lunch meetings that invited collaboration around practice and saw an expansion of teachers' capacities to adapt instruction to meet students' needs (in one way or another, the primary focus of the teachers' research), will hold in the same form as we move forward we cannot know. However, based on the teachers' and principal's embrace of the arrangement, it seems likely that the commitment to situate professional learning as part of the school day has become a key facet of the TCOOL design and will hold as such as others enter the collaboration.

CONCLUSION

In this paper, we have presented a first iteration of the TCOOL project as an example of expansive learning. We have used the lenses of expansive learning theory (Engeström and Sannino, 2010; Engeström, 2016; Sannino et al., 2016) and design theory (Brown, 1992; Cobb et al., 2003a, 2009; The Design-Based Research Collective, 2003) to probe the opportunities for learning about teaching that TCOOL provides to practitioners in schools and universities. Though TCOOL is not *per se* an instructional intervention like those programs studied by Sannino et al. (2016) in their study of Change cases, by Cobb et al. (2003a) in their overview of design experiments, or by Cobb et al. (2009) with regard to design experiments in mathematics, we found that the lenses provided by both theories have given us a glimpse of the meaning of the "qualitative transformation of all components" that Engeström and Sannino (2010) describe. For us, expansive learning was and is manifest in the collective movement of teachers and administrators toward a shared inquiry-oriented practice (Cochran-Smith and Lytle, 2009) in which the conversation of practice grew within the school as more teachers and teacher leaders participated, and it occurred between the school and the university as efforts to integrate these distinct organizations has persisted and deepened. It has

disrupted the notion of stasis in either organization though whether and how the movement toward the equity implied in the participatory teacher education model of TCOOL will resolve is unclear.

In a sense, the TCOOL pilot has given us some "proof of concept" in that, by casting light on problems AND progress over the short time of 2 years, it has helped us to discern paths for future action around shifting the relationship between schools and universities vis-à-vis teacher education. This is a story of trying to figure out what it takes to get a school and a university to work together. Here, design theory (Brown, 1992; Cobb et al., 2003a, 2009; The Design-Based Research Collective, 2003) and expansive learning theories (Engeström and Sannino, 2010; Engeström, 2016; Sannino et al., 2016) have been especially helpful to interpreting the change process implicit in this effort, for, as both theories make clear, the end state, the outcome of a real-life experiment like TCOOL can only be envisioned in terms of the general equilibrium desired. How one gets from here to there, while planned for in general terms, must be open to revision, redirection, and surprise. Otherwise, we end up at the place where we began.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

AUTHOR CONTRIBUTIONS

FR is the author of this manuscript which was informed by data developed through field notes, emails, surveys, interviews, and conversations with participants in the school and college.

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Teacher Educators and Expansive Learning in the Workplace and Beyond

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Research on the professional learning of teacher educators is a relatively young and under-researched area, despite the importance of this occupational group in the fast-changing area of teacher education internationally. Past provision for learning has often focused on either one-off professional development events or workplace learning. Aiming to develop new knowledge and understanding of professional learning for teacher educators, this article attempts firstly, to analyse the impact of a one-off learning event, offered by the European InFo-TED group, on its participants, and secondly, to look at where and how the learning generated there developed further learning back in the workplace. Deploying a conceptual framework emphasizing participatory professional learning and Engestrom's concept of expansive learning, we explore how these two forms of learning might be planned and implemented in order to provide integrated, professionally relevant and enduring forms of learning.

Keywords: teacher educators, professional learning, teacher education, professional development, expansive learning

INTRODUCTION

Professional learning across the career-course is clearly essential for ensuring the on-going relevance of the practice of all professionals and of the organizations in which they work. Yet research on such learning for teacher educators, working in higher education institutions, is a relatively young and under-researched area (Lunenberg et al., 2014; Vanderlinde et al., 2017); this situation is in contrast to the wealth of research on the professional development of school teachers. This deficit still persists, despite some advances in the area of teacher educators' learning over the last decade. Some of these advances have been in Europe, through the work of the InFo-TED project, described in this article, and the work of a Research and Development Community within the Association for Teacher Education in Europe (ATEE). Both of these groups have developed alternative conceptualizations of professional learning and development for teacher educators (see, for example, Kelchtermans et al., 2017), which have been influential increasing understanding of professional growth for this distinctive occupational group, central to the teaching of teachers, as we outline below.

This article attempts firstly, to analyse the impact of a one-off learning event on its participants, and secondly, to look at where and how the learning generated there developed further learning back in the workplace. Our overall aim is to develop new knowledge and understanding of how these two types of learning might be planned and implemented in order to provide integrated,

professionally relevant and enduring forms of learning. We plan to achieve this aim by, firstly making reference to the specific learning opportunities offered by a Summer Academy—a one-off, face-to-face, structured learning event, planned, organized and implemented within the InFo-TED project for teacher educators from across participating European countries. We then look at how such a one-off learning opportunity, in a setting far from the workplace and the daily practices of the attending teacher educators' working lives, has led to further experiential learning in those workplaces.

To explore this learning, the article draws upon two general evaluations of the InFo-TED Summer Academy (Kelchtermans and Deketelaere, 2019; Rust and Berry, 2019), enhanced by further data in the form of auto-ethnographical reflections, vignettes and journals of Summer Academy participants (Kidd et al., 2019). By using these additional date sources, we seek to situate some of the teacher educator's professional learning within the workplace context of England, a country which has undergone very significant "reforms" in its teacher education system in the last decade. This article begins, however, by exploring the occupational group of teacher educators internationally and our conceptual framework for professional learning, influenced by the work of Engeström (2001, 2005) and Engeström and Sannino (2010).

Teacher Educators

In a recent European Commission report, teacher educators were defined as

> "all those who guide teaching staff at all stages in their careers, model good practice, and undertake the key research that develops our understanding of teaching and learning" (European Commission, 2013, p. 2).

This inclusive definition of teacher educators has been particularly influential in recognizing the importance of those who mentor and support student teachers in schools. Nevertheless, internationally, many of those explicitly recognized as teacher educators are still working in higher education, and it is this part of the occupational group which is foregrounded in this article.

Teacher educators, of course, have distinctive roles, identities, pedagogies and practices as "teachers of teachers" (Loughran, 2006) or as "second order practitioners" (Murray, 2002; Murray and Male, 2005). They work with adults who are intending teachers in what may be conceptualized as second order contexts (Murray, 2002), that is in spaces where teacher educators are teaching teachers Because they are a distinctive group teaching those who are intending or serving teachers, it follows that their professional learning needs are necessarily distinct from those of teachers. This is not least because their distinctive attributes often include a fundamental identity shift from the first order context (teaching in schools or colleges) to the second (Murray, 2002; Murray and Male, 2005).

In their second order working context teacher educators need to be able to generate a second level of thought about teaching, one that focuses not (only) on content, but also on

how to teach teaching itself (Loughran, 2014). As Russell (1997, p. 55) identifies, a fundamental aspect of teacher educators' teaching is the need to focus on "the pedagogical turn" in teacher education, or "realising that how we teach teachers may send much more influential messages than what we teach them." To put this in another way, the work of teacher educators as "teachers of teachers" includes a unique body of knowledge that requires them to move beyond seeing teaching as solely "doing" and "transferring" what has been learned in previous work experiences or study (Loughran, 2014).

Certainly, enabling and facilitating learning about teaching is a key task for teacher educators, but in addition to being a "teacher of teachers," they have other professional roles (Lunenberg et al., 2014) or sub-identities (Vanassche et al., 2015)—as researchers, scholars, coaches, mentors, gatekeepers, managers, administrators and curriculum developers, not least. This is not to say that teacher educators fulfil all these roles at any one time; nor do these roles belong to specific career phases, as Kelchtermans et al. (2017) identify. Instead, these roles need to be perceived as inter-related to the different and often varied contexts for work and the different relationships formed during that complex, multi-faceted, changing and changeable work. Ellis et al. (2013) claim that teacher educators are "a troublesome category of academic workers' (p. 267), being both practitioners and academics, with working conditions that often differ from those of other academics, not least in the close contact with the field of schooling they often maintain. Like the teachers they teach, they are often subject to frequent and sometimes radical policy changes. Most teacher educators see themselves as researchers and scholars, although their degrees of actual engagement in research production and their "researcherly dispositions" vary (Tack and Vanderlinde, 2014, 2016). Time to engage in research and the intellectual capital and resources to do such work are often limited, especially where teacher educators come into higher education without doctorates of equivalent experience of sustained research. All of these aspects of work influence the professional learning needs of the occupational group.

PROFESSIONAL LEARNING

In this article, for the most part, we use the phrase "professional learning" rather than "professional development," although both terms are in common usage internationally, and indeed much of the work of InFo-TED uses the latter term. This choice is made is for a number of reasons: professional development can imply a passive act of being "done unto" in terms of receiving knowledge from others; it is now clear that passive learning alone does not reliably create changes in practices (Borko, 2004; Smith, 2010; Stewart, 2014); many professional development practices still focus on delivering content rather than enhancing learning (Webster-Wright, 2017); consequently there has been what Webster-Wright (2017, p. 23) describes as "a shift in discourse and focus from delivering and evaluating professional development programs to understanding and supporting authentic professional learning" (Webster-Wright,

2017) within collaborative practice (Stewart, 2014); and finally, our conceptual framework for this article involves emphases on Engestrom's (Stewart, 2014) concept of expansive learning, as an active and open form of learning. In summary, learning in a professional community is often considered to be more effective than traditional professional development methods now (Stewart, 2014; Webster-Wright, 2017).

Yet for teacher educators, importance may still be placed upon one-off, face-to-face, short term learning events (such as induction or research workshops), despite the fact that such formal learning provision alone is unlikely to exert a major impact on teacher educators' development (Czerniawski et al., 2017). We do, however, acknowledge the importance of some one-off professional learning events for organizational stability and growth and for focused individual development, but we argue that this in itself is not sufficient. This is in part because the very limited number of studies of teacher educators' professional learning indicate how important formal and informal learning in the workplace is (see, for example, Murray and Male, 2005; Boyd et al., 2011; Lunenberg et al., 2014) since it takes place in professionally and personally relevant contexts and often involves experiential learning. This is defined here as being learning which takes place alongside work, but is not the primary goal of that work. Workplace learning for teacher educators, however, is not well-theorized compared to the strength and depth of theorization found in other professional fields (McNamara et al., 2014). This, we argue, is a real omission in knowledge of teacher educators' professional learning since it is vital to consider this occupational group as both workers/employees *and* learners/scholars.

Engeström (2001, 2005), Engeström and Sannino (2010) highly influential definitions of expansive learning may be seen as influencing changing conceptions in three areas of professional learning: the nature of the learning and knowledge itself; the processes of knowledge generation and consequently learning; and the contexts in which such learning can take place. In terms of knowledge itself Engestrom argues that that there is "a new generation of expertise around, not based on supreme and supposedly stable individual knowledge and ability, but on the capacity of working communities to cross boundaries, negotiate, and improvise" (Engeström, 2005, p. 145). Expansive learning is a social and communal act, involving the creation of that new professional knowledge. Here, such learning is opposed to the metaphor of "learning as acquisition" (Sfard, 1998), that is the individual or communal learner's acquisition of stable and pre-existing knowledge which was previously unknown to them.

Engeström's emphasis rather uses the metaphor "learning as participation" and attributes the difference between these two metaphors for learning to the question: Is the learner to be understood primarily as an individual *or* as a community?' This emphasis on learning through participation in activity systems (Engeström, 2001, 2005; Engeström and Sannino, 2010) in some ways mirrors similar emphases within the work of Lave and Wenger (1991) who talk of participation in a community of practice) or Billett (2001, 2004) who explores learning through workplace participatory practices. For Engestrom, heterogeneous groups of learners grow and learn together, influenced by the characteristics of the participating individuals, including their previous work experiences, their professional and personal values and their pre-existing knowledges (sic). Heterogeneity within groups is particularly important as this enables new collaborations through the crossing of pre-existing professional boundaries and the sharing and creating of differing types of knowledges (sic), experiences and points of view. This generation of new knowledge involves new expertise which Engestom terms "knotworking"; his "integrative characterization" for the new type of expertise is "collaborative and transformative expertise" (2005, p. 161). Where solutions are required, engaging in these processes facilitates the discovery of new approaches. Engeström (2005) then sees expansive learning resulting in three types of change: transformed practices; novel theoretical conceptualizations; and a new (or renewed) sense of agency.

THE InFo-TED GROUP

The InFo-TED group was initially established in 2013 by four experienced teacher educators and researchers—Kari Smith from Norway, Mieke Lunenberg from the Netherlands, Ruben Vanderlinde from Belgium and Jean Murray from the UK. This founding group judged it timely to highlight the importance of teacher educators and the complexity of their professional learning internationally. By early 2019 InFo-TED had expanded to become an active group of 20 teacher educator researchers from six European countries (Belgium, the Netherlands, Norway, England, Scotland, Ireland). In addition, the group draws on the expertise of the Mofet Institute in Israel and has other external members from the USA and Australia. From 2016–2019 InFo-TED received grants through the Erasmus + funding stream. In general, Info-TED now disseminates ideas, knowledge and research about teacher educators' professional learning through face-to-face events and a website https://info-ted.eu/.

DESIGN PRINCIPLES FOR THE InFo-TED PROJECT

In 2017 nine members of the InFo-TED group co-wrote an internal document (Vanderlinde et al., 2017) with the goal of describing the underlying general design principles that the Council intended to use for the development of the two main outcomes of its Erasmus+ project. These outcomes were: first, a European Summer Academy for teacher educators; and second, a website and a Virtual Learning Environment (VLE) for the same group. In this article we focus only on the first of these goals but we intend to report on part of the second in a future publication.

The design principles were based on two pieces of research: the first, a conceptual model developed by the group in 2015/16 (see Kelchtermans et al., 2017); and the second, empirical research in the form of a survey (Czerniawski et al., 2017). The design principles were deliberately made general, with the intention of contextualizing them in the next phase of the project, the Summer Academy event which is one of the major focuses of this article.

The conceptual model for teacher educators' professional learning provided a shared language that was essential before colleagues from different national contexts were able to engage in collaborative research, improvement of practice and discussions with policy makers. Like this article, the model foregrounds teacher educators' professional learning in and through their practices (Kelchtermans et al., 2017). This "practice-based approach"—instead of a "blueprint approach" (Vanderlinde et al., 2017)—started from a positive appreciation of the practices through which teacher educators "enact" their professionalism as they undertake their daily work; these practices reveal "who" a teacher educator is, and what they stand for since the professional self or identity is reflected in their actions. As Kelchtermans (2013) states, the teacher educator as such only "emerges" through practice, which in turn is generated within and by the (different) contexts for teacher educators' work.

The empirical research on which the design principles were based was a large survey (1,158 participants) of higher education-based European teacher educators' learning needs (Czerniawski et al., 2017). The participants worked in Belgium (Flanders), Ireland, Israel, the Netherlands, Norway and the UK. In general, the findings suggest that teacher educators had "a strong desire" for further professional learning of two types: first, learning relevant to activities inherently linked to day-to-day work; second, learning relevant to career progression in academia. In the latter, there was a strong focus on addressing research and writing skills. Overall, these teacher educators preferred learning with and from colleagues and viewed professional learning communities as the best form of learning. There was also a strong preference for professional learning opportunities that were continuous and adapted to individual needs and contexts, rather than traditional one-size-fits-all provision such as generic courses and workshops.

Working from these two pieces of research, the core didactical focus of the InFo-TED project became the exchange of practices amongst teacher educators in order to create networks and communities of practice and learning. Nine design principles (Vanderlinde et al., 2017, p. 5) were distinguished: (1) ownership of content and process, (2) work in professional learning communities, (3) knowing each other and sharing, (4) informal and formal learning at the workplace, (5) attention for teacher educators' multi-layered and multiple identities, (6) changing practices takes time, (7) take into account the pressures on teacher educators' time, (8) forming networks, and (9) striving for integration. As the summary below indicates these principles certainly influenced the design and implementation of the Summer Academy.

The Summer Academy Within the InFo-TED Project

The goals of the Summer Academy, partially supported at the time by the Virtual Learning Environment (VLE), were: the dissemination of the conceptual model for teacher educators' professional learning and the evidence-based experiences of InFo-TED; the collaborative professional development of the 42 participating teacher educators; the stimulation of pan-European

networks; and the instigation of collaborative research and practice within these networks.

The Summer Academy aimed to build upon its diverse participants' viewpoints, professional experiences and learning needs in order to create an integrated learning experience. Pedagogic principles central to the design included: giving opportunities for teacher educators to work in professional learning communities (here these were considered to be both the full group of 42 participants and stable, small groups of six or seven individuals meeting at least once daily over the week-long programme). Within these communities, it was seen as important to create open and safe learning climates in which relationships based on professional trust could be built, and where multi-layered and multiple identities were recognized, and honesty, openness and personal values were respected. A further aim was to foster a growing sense of ownership of the resultant professional learning amongst all the attending teacher educators.

The final design aimed for a balance between plenary presentations, lectures and whole group discussions on the one hand and working in smaller groups on the other, with all teaching, facilitating and presenting methods reflecting the "teach-as-you-preach"-principle. There was then a formal "curriculum" for the Academy in which research-based theoretical and pedagogical models were introduced to participants, but there were also many opportunities for individuals to discuss their own experiences and reflections and to debate and contest the curriculum content, including the concepts and research findings. The timetable, for example, balanced time for informal meetings and exchanges among participants with the formal presentations, plenaries and group work. Overall, one further aim was to achieve an integrated form of professional learning which modeled a variety of pedagogies relevant to teacher educators and teacher education.

As indicated above, preparations for the Academy included the design of the VLE in a private part of the wider InFo-TED website. Only Summer Academy attendees could log in to access this VLE, which was intended to support interactions both before and after the Academy. This online tool was designed to be collaborative, interactive and asynchronous, following existing models for online professional development (see, inter alia, Fichtman et al., 2016; Murray and Kidd, 2016).

As with all the other preparations for the Summer Academy, the VLE was also driven by InFo-TED's previous conceptual and empirical work on professional learning. In theory then, through the carefully constructed and inter-active "spaces" within the VLE, participants were able to collaborate and interact across local, national and professional "boundaries."

CONTEXTS FOR THIS STUDY

The Data

As we have stated above, our overall aim in this article is to develop new knowledge and understanding in relation to teacher educators' professional learning, specifically analyzing the effects of a one-off, formal learning opportunity, in a setting far from the workplace and the daily practices of the attending teacher

educators' working lives, and the ways in which this has led to further experiential learning in the workplace.

In terms of data the article draws upon two evaluations of the Summer Academy, firstly Kelchtermans and Deketelaere (2019), an internal evaluation document written for the group's consideration, and secondly, the full, public project evaluation (Rust and Berry, 2019). The data collection strategy for the internal evaluation used various tools to collect perspectives from all groups involved in the Academy (for example, InFo-TED Council members, facilitators, presenters and the participants) throughout the process of preparation, design, implementation and follow-up. Those data collection tools included documentary analysis, field notes from participant observation, informal reflective interviews and 'public video selfies' from each participant. At the end of most days, participants were asked to make private video recordings in English on their phones, addressing questions for structured reflection such as, what has struck me today? What unexpected new insight/thought did I have today? And what is today's main impact on me as a teacher educator (developer)? (Kelchtermans and Deketelaere, 2019, p. 3). These private recordings were not used in the evaluation process, but at the end of the week, all participants were asked to make a "public video selfie," a 5-minute recording drawing on their previous videos to summarize their professional learning experiences. These "public videos" did become part of the data set for the evaluation.

Part of Rust and Berry's report aimed to analyse the impact of the Academy on participants' learning after 3 and 6 months. It drew on all the internal evaluation data cited above, but additionally, it analyzed the evaluative *Letters to Oneself* which participants wrote at the end of the Academy, further communications with eleven participants, and the retrospective interviews held with five interviewees, each representing a different country (for further details see Rust and Berry, 2019). The interview data was collected twice at 3- and 6-month intervals after the Summer Academy. The evaluation does not report the data analysis methods used.

We have added to the data from these two reports in the form of auto-ethnographical reflections, vignettes and journals from Academy participants from England, as collated and recorded in Kidd et al. (2019). By using these additional date sources, we seek to situate some of the teacher educators' professional learning within the context of England, a country which has undergone very significant "reforms" in its teacher education system. Essentially, we locate the accounts of two Summer Academy participants from England and two InFo-TED Council members, one of whom (JM) attended the Academy as a facilitator, within wider and recent calls for a renewed attention given to teacher educator professional learning in England (Czerniawski and Kidd, 2018). In writing this article, we adopt a range of complex positionalities then; we are variously experienced and inexperienced teacher educators, Summer Academy participants and project conveners, researchers, and policymakers.

One of us (AM) had only recently moved into university-based teacher education before attending the Academy (but had a wealth of experience in education management in a college setting); another (SV) had been working as a teacher educator

on a pre-service science education programme for more than 7 years before the Academy event. Neither of these participants had doctorates or sustained research experience at the time of the Academy. The two Council members (WK and JM) were both experienced teacher educators, who also sometimes positioned themselves as "educators of teacher educators" (Lunenberg et al., 2016). Like AM and SV—and the vast majority of teacher educators working on pre-service programmes in England— they had also made the transition from teaching in colleges or schools into the university, that is, from first order to second order practice (Murray, 2002). Both WK and JM had been intensively involved in many aspects of the general InFo-TED project, but neither were involved in the design or evaluation of the Summer Academy.

This tranche of data was collected retrospectively (up to 18 months after the event), sometimes systematically for an earlier study (Kidd et al., 2019) and sometimes on an "ad hoc" basis. It may seem then that, in terms of conventional research, there are distinct limitations to this additional data. We acknowledge these limitations and ask that the findings below are read through the lens of that acknowledgment. We emphasize that the sample for this data tranche is very small; there was certainly no formal or extensive sampling strategy, rather we researched as a group of colleagues working and learning in the same university; only self-report data collections methods could be used because of the above factors; that data was collected and analyzed by participants in the event and/or InFo-TED Council members at that time, although that analysis was systematic (see below); and, finally, one of us, as author, is also still involved in the on-going InFo-TED project. Our positionality in this research is therefore multiple and complex.

Nevertheless, we would stress that all aspects of the research aimed for authenticity, dependability and reciprocity, as valued alternative criteria for evaluating qualitative research (Denzin and Lincoln, 2011). The data was analyzed using a collaborative approach drawing on broad procedures from both action research and self-study research traditions. Within this approach, coding strategies derived from grounded theory (Charmaz, 2014; Corbin and Strauss, 2015) were deployed for identifying key themes, with the aim of making the analysis rigorous and trustworthy.

The English Context for the Study

Because our focus in this article is specifically on professional learning for teacher educators in England, we now give a brief account of that context. From 2010 onwards teacher education experienced radical "reforms" as successive governments made wide-ranging changes to provision. In implementing these reforms, policy makers were influenced by a model of teaching as a "craft" involving limited pedagogical knowledge—beyond a subject-specialist degree (Gove, 2010)—and best learned through apprenticeship in schools. These changes were underpinned by often explicit political and professional skepticism about the value of university contributions to teacher education.

For teacher educators based in universities, these changes brought new roles and working practices, often amidst shifting forms of power relations, autonomy, and trust (Brown et al.,

2015; Vanassche et al., 2019). There are multiple tensions around these new—and sometimes diverging—practices for teacher educators, involved in brokering and navigating change. In effect, teacher educators in England are often creating new practices, structures, and relationships in changing spaces as the landscape of teacher education shifts around them.

Working in teacher education in England can then be intensive and time-consuming, and to add to the complexity of this picture, as in many other countries, regulation and surveillance of teacher educators' work has increased, bringing a steep increase in management and accountability related tasks, especially in contexts which experience "policy churn." This then is an unstable workplace in a "state of radical discontinuous change" (McNamara et al., 2014, p. 13).

Most teacher educators' work is still conducted in workplaces within the walls of universities and their partnership schools, but it is not limited to just those physical environments where they engage with their learners and colleagues daily. Research and scholarship, preparation for teaching, student assessments and administrative tasks are frequently undertaken outside normal working hours and off-premises. Additionally, there are virtual spaces for teacher educators' work and learning, clearly well-beyond their physical workplaces.

In this complex educational landscape, there are multiple imperatives for teacher educators as an occupational group to navigate in developing their knowledge of both the first and second order contexts (Murray, 2002) in which they work. Yet formal professional learning opportunities for teacher educators are often limited (Czerniawski and Kidd, 2018). Where they exist, opportunities tend to be organized around the generic needs of the university (for example, attendance at short, institutional, training events) or focused on specific, short-term outcomes. Regulation, surveillance and auditing regimes mean that designated learning outcomes can be focused on strategic compliance with government or institutional agendas rather than on the learning required for professional growth by individuals. As in other national contexts, some opportunities do exist for professional learning through attendance at subject-specific seminars and conferences, but these have been severely limited by funding restrictions during a decade of austerity and budget cuts in many UK universities (Czerniawski and Kidd, 2018).

The phrase "learning in the workplace" may suggest that there is a designated space where opportunities for "authentic" professional learning exist; this is very often not the case in English faculties of education. Although such opportunities may well exist in some workplaces, in others they are too often likely to be constrained. The pressure and pace of work for many teacher educators means then that opportunities for learning may often be restricted by the working environment (Czerniawski and Kidd, 2018). In summary, then, many teacher educators' workplaces are likely to provide *restrictive* learning environments, with employers and managers often not identifying that learning could be a dimension of normal working practices. Within this landscape, the importance of professional learning for teacher educators needs then to be re-emphasized.

LEARNING DURING AND AFTER THE SUMMER ACADEMY

Our analysis shows that the overall effect of the Academy was to offer new learning to the participating teacher educators in three areas: "identity forging," personal practice, including teaching, research and scholarship, and the importance of professional development. This learning was initiated during the Academy but often generated new activities back in the workplace. Changes were, strikingly, underpinned by that sense of "identity forging" for all the participants but for those from English participants, in particular. Because this theme was so strong, we have chosen to focus on this first in the analysis which follows.

Identity Forging

As Kelchtermans and Deketelaere (2019, p. 3) states, in evaluating the Academy, for all the participants,

> "self-understanding (sense of identity) as teacher educators constituted a red thread throughout the programme of the Summer Academy and was present—one way or another- in almost every activity, session and discussion."

Rust and Berry (2019, p. 2) conclude similarly saying that, "the week enabled (*the participants*) to see and claim themselves as teacher educators. For some, this was transformative. For others, it confirmed and strengthened their identity."

For one participant, quoted in Rust and Berry (2019, p. 2), for example, the Academy offered a "great opportunity" to reflect on professional identity and professional development. For AM the whole week was "inspiring, offering a rare chance (*for*) time to reflect on my own professional journey, which for me was the crossing over from being a teacher to a teacher educator in HE." For AM, one specific session led by Geert Kelchtermans, on how teacher educators "confront their own vision and identity" was a key learning accelerator, leading to the reflection that "we have multiple identities, which often overlap and can at times create a "pedagogy of discomfort." For AM, the "novice" teacher educator from England, this work on identity development had long term effects. As she says,

> It is nearly a year since I participated in InFo-TED. During that time, I have developed more confidence in my new role and an understanding of its overlapping complexities. I am aware of the journey I am on to developing a new professional identity that reflects the nature of higher education.

Many of the planned sessions did involve discussion of deeply held personal convictions and knowledge about teacher education and teacher educators' work, so it is no surprise to find that participants' professional identity was often at stake. In both the general evaluations, (Kelchtermans and Deketelaere, 2019; Rust and Berry, 2019) participants reported that knowledge and understanding of both their own identities and the contexts within which they worked were deepened or refined. The programme seemed to have achieved this in large part because it gave opportunities for learning about the diversity of teacher

education including its organization, practices and belief systems in different contexts. This happened notably through the plenary sessions and the small group work, including an on-going activity in the programme called the storylines experience. Here participants mapped their learning biographies and personal stories of becoming and being teacher educators, whilst working in mixed groups.

For VS the storylines experience meant that she worked with a diverse group, comprising "three teacher educators from Norway, one from Scotland, one from Denmark and two from Israel." She soon realized that, although everyone was, in varying capacities, a second order practitioner involved in teacher education, they

> came from diverse professional backgrounds and contexts. We all seemed to have entered teacher education at different points of our careers with different experiences and had identified different learning needs in our storylines.

In each small group it was clear that participants were meeting new people from different countries and contexts to debate, compare and contrast and critique national systems and the assumptions underlying them. In many cases participants found that the same tensions and struggles were experienced across national contexts, with identification of the tensions between what Kelchtermans and Deketelaere (2019, p. 4) call "different normative views on good (teacher) education" and personal beliefs and pedagogies leading to rich discussions of education policies and differing types of regulation and "surveillance" of teacher educators' practices. This was possible in part because the small groups, over time, created senses of community and trust, constituting "a safe and yet constructively challenging learning environment" (Kelchtermans and Deketelaere, 2019, p. 3). In the words of one participant, this contributed to the programme as a whole forming "a safe place/third space" or "an edge environment" for professional learning (Rust and Berry, 2019, p. 2).

Developing Personal Practices in Teaching and Research

Planning for the programme was informed by the knowledge that, whilst teacher educators often have diverse roles and responsibilities as we outlined earlier, being a teacher and being a researcher emerge as the two dominant, but seemingly often contradictory, roles (Cochran-Smith, 2005; Smith and Ulvik, 2018). Planning also took into account that, whilst most teacher educators want to be involved in research, the participants would be at different stages of experience and achievement—from thriving post-docs, researching and publishing regularly, to those without doctorates or experiences of sustained research engagement—and some might be struggling to balance these two roles in their daily practice. Learning opportunities to re-think the roles and their inter-connectivity were therefore very important. Whilst the empirical survey (Czerniawski et al., 2017) showed that that many teacher educators distinguished between academic/research and pedagogic/teaching professional development needs, the

design principles rejected this distinction, and participants were challenged to re-think on-going dichotomies in education between research and teaching, what is sometimes referred to in shorthand terms as "the theory/practice divide." Throughout the Academy participants were invited to ask the question "what does this mean for me in my practice?," reflecting on how they thought their work, particularly their inter-related teaching and research roles, might change based on their learning.

Not surprisingly, one of the aims of the Academy was to provide focused "curriculum content," reflecting current research and thinking about teacher education, deploying relevant and engaging pedagogies, in each part of the programme. Both evaluations (Kelchtermans and Deketelaere, 2019; Rust and Berry, 2019) show that this aim was achieved, with participants noting the careful choices made for each session and the high quality of the pedagogical methods in use both to provide immediate models of the "teach-as-you-preach" principle and to spark inspiration for later use in personal practice. Certain metaphors for learning and teaching used in the programme had particular and enduring resonance and power for participants; these included the "pedagogy of discomfort," the zipper analogy for bringing together theory and practice, "voice over teaching," and the principle of how-I-teach-is-the-message (Kelchtermans and Deketelaere, 2019). These metaphors set within the pedagogic experiences of the Academy clearly led to new understandings and conceptions of the work of teacher educators as research-active teachers of teachers, with participants talking repeatedly about possible changes to personal pedagogic practice in the internal evaluation data (Kelchtermans and Deketelaere, 2019).

For VS, Geert Kelchtermans' presentation on the zipper analogy was a powerful point of learning, part of widening her existing knowledge in new ways and enabling her "to reflect on her practice from a more informed perspective" (quoted in Kidd et al., 2019, p. 5). The diverse "micro-communities of practice" formed during the Academy repeatedly allowed her to "share interests, discuss concerns and reflect the 'zipper' analogy for bringing together the theory and practice." She realized that,

> In order to merge the theory into practice, I would need to zip them together, so professional learning requires a conscious action to be taken i.e., enacting on what I took away from the sessions. If zipping is enacting the professional learning, then would a zipper jam be such a bad thing? The jam results from conflict, unease, problematisation, and brings us to a pedagogical discomfort triggering a heightened self-awareness and close reflection. I can learn so much during this discomfort This part of the learning could … involve disconnecting from my previous learning and starting afresh.

Here VS sees new knowledge emerging from her learning experiences; previous learning is left aside or disconnected in a process which may not always be easy and may well bring pedagogical or intellectual discomfort, but the end result will be new insights into teaching. Following Engeström (2001, 2005), Engeström and Sannino (2010) conceptualisations of expansive learning, this then may be seen as the creation of new professional

knowledge - not purely the learner's acquisition of pre-existing knowledge. That act of knowledge creation during the Summer Academy was supported by VS's realization that, within the micro community of practice or expansive learning environment formed by her group, diverse "professional backgrounds and spatial contexts influence(d) our interpretation of the content or the theory" of each session. As in Engestrom's conceptualization of learning then, at the Academy new knowledge was forged by working in a heterogeneous group of professionals from diverse national contexts to collaborate in discussing both the known and the unknown in teacher education practice.

This professional learning for VS also has future implications for the ways in which she teaches student teachers (often called "trainees" in England). In this she is typical of many of the participants for whom "possible changes in student teachers' learning results operated as the ultimate horizon and justification … of changes in their behavior" (Kelchtermans and Deketelaere, 2019, p. 5). Thinking about her personal learning (as above), alongside her students' learning needs, VS asks,

> Isn't this the same for our student teachers too? What they take away from our professional sessions vary depending on their interpretive framework and as teacher educators, surely, we can support them explicitly in taking conscious action on it i.e., help them in zipping up.

For VS then both transformed practices and novel theoretical conceptualization's for teacher education emerged from her learning experiences at the Summer Academy. These are two of the points of change which Engeström (2005) defines as evidence of expansive learning. These points of change were not uncommon for the participants. Rust and Berry (2019, p. 3) report that other teacher educators also "wrote about (future) plans to integrate practices from the SA (Summer Academy) into their teaching," again citing most frequently the storylines, voice over teaching, zipping, modeling, and the idea of a pedagogy of discomfort. The evaluators rightly conclude then that "'how I teach is the message' is being carried over into practice'; moving from the Academy to the workplace in new and creative ways, as VS's example shows.

Amongst other changes in practices occurring during and after the Academy, participants explicitly described themselves as "educators who were working with a researcher's attitude" (Rust and Berry, 2019, p. 8), implicitly involved in a "constant dialogue between theory, practice and research" (Cochran-Smith, 2005). Kelchtermans and Deketelaere (2019, p. 4) evaluation also comments on participants' "increased awareness of the central importance of research and theory in their work." As we have noted above though, for some teacher educators involvement in knowledge production through research can be limited by time, experience of research or lack of academic resources. This was certainly the case for the two participants from England. Emerging from the Academy, however, both shared a renewed sense of conviction about the importance of research and scholarship in teacher educators' practice. As AM stated, engagement in research

"is not only key to our growth as individuals, but also for the trainees we work with, who should benefit from the knowledge that can be gained through research, and related scholarly activity" (quoted in Kidd et al., 2019).

For both of these participants their engagement in research-informed practices was accelerated and taken in new directions through the continuing collaborations begun through the Academy. For both this led to the formation of new "local" (here defined as institutional) learning groups or communities of practice focused on research-informed practice. Rust and Berry (2019) in their evaluation identify the benefits of two or more colleagues coming to the Academy from the same institution for generating local research activities afterwards. This was certainly so for AM and VS, both of whom formed new research partnerships with each other and with WK and JM. As AM says,

> In July, a colleague and I will do a conference presentation at another university into the expansion of the teacher education provision at our university as a means by which to widen participation for non-traditional learners.

This initiative has now also resulted in two related publications in research journals.

In defining the three points of change occurring in expansive learning, Engeström (2005) signals the importance of new or renewed senses of agency. This is exactly what the data shows here as engagement in the Summer Academy has left distinct legacies for VS and AM in terms of their growing engagement in research and their self-identification as researchers.

The Importance of Professional Learning

Another enduring legacy of the Academy was participants' enhanced commitments to professional learning or development. As Kelchtermans and Deketelaere (2019, p. 6) comment, their insights into the "multi-layered phenomenon of professional development" were more conscious, concrete and complex and their attitudes toward the importance of teacher educator learning were "further grounded and strengthened."

This was certainly so for VS and AM, with the latter commenting that, "There should always be a place in our busy work lives for our own personal and professional development. This is … key to our growth as individuals." Both were convinced of the need for local and national learning programmes for teacher educators, including both induction and continuous professional development (CPD). Such programmes were seen by VS as alleviating "some of the initial feelings of inadequacy that are common amongst teacher educators" and as it would improve "teacher educators own professional practice throughout their careers and hence will lead to better quality and experiences of their student teachers."

Differentiated Experiences and Outcomes

We have already stated the methodological limitations of this study, and we emphasize them again here as a frame our largely positive findings. There were, however, undoubtedly some less positive aspects of the Academy, difficult as it is to see in the

two evaluation reports. Rust and Berry (2019, p. 12) do, however, include one section on "suggestions for improvement" for the next iteration of the Summer Academy. Here, some of the evaluation participants suggest "spending less time on product oriented (*sic*) working in groups that may not have complete buy-in from all participants particularly when the time allotted was too short to finish the product." Others note "concerns about continuation of dialogue and support.... i.e., sustainability."

Some of these concerns were justified. One of the more difficult aims of the Academy was certainly to achieve the elusive goal of "sustainability," as required by the European Commission funding criteria for Erasmus+ grants. The project design planned to achieve this in part through the group plans for future activities, but to date, only one group achieved this longer-term aim. This was the group in which VS worked during the Summer Academy. Focusing on focused on initiating and researching their practices using new technologies, this group "developed a clear path forward with a time line and deliverables" (Rust and Berry, 2019). As planned, their emerging findings were presented at an international conference the year after the Summer Academy, publication of a journal article is forthcoming, and plans for mutual visits have been made. This group then was particularly well-focused in terms of deciding its future and communal teaching and research activities, and that work has since generated more extensive networks within and beyond the group members. Other groups have networked and engaged in some informal, shared activities but, in most cases, these are currently without clear senses of direction.

Another area where engagement did not happen as planned was the VLE, planned to support pre- and post-attendance at the Summer Academic. Despite a very strong design, informed by all relevant research and practice in e-learning, this did not function as fully as intended. Rust and Berry (2019, p. 15) noted comments that the online engagement was "helpful ... for knowing who else was coming and giving them something of an idea of what to anticipate," but use before the Academy was "limited except when prompted through email." This was disappointing, not least because the design principles tried to maximize "ownership" by participants. One explanation for this relative lack of engagement is timing: the Summer Academy happened just after the end of the academic year, at one of the busiest times for teacher educators. At this point in time, opportunities for participation in the VLE may have been limited for some. Another explanation may be that engagement required participants to take "a leap in the dark" in terms of sharing personal details and professional situations with others they did not yet know; in this sense perhaps some form of more extensive form of "induction" into the e-learning might have been useful in building more sustained senses of understanding and trust amongst participants.

We should note that follow-up engagement after the event was also limited. Rust and Berry (2019) state that, since the Summer Academy, participants have only gone back to the VLE "to download papers and presentations." As stated above, sustainability of other formalized activities, notably the group work, was limited. In terms of the VLE, in particular, this may have been exacerbated because the planned roles and responsibility within the Council for encouraging that

participation and presence on the VLE could not be implemented as planned.

Overall, our analysis shows that the Summer Academy had a positive impact on many of its participants. But the "suggestions for improvement" and caveats stated above do indeed give the InFo-TED Council information to help plan improvements for the next Summer Academy in 2021[1].

CONCLUSION

This article has analyzed the impact of the InFo-TED Summer Academy as a one-off learning event on its participants and shown that it had an enduring legacy in generating longer-term activity and learning back in the workplace. The three points of change which Engeström (2001, 2005), Engeström and Sannino (2010) describe as occurring through expansive learning—transformed practices, novel theoretical conceptualizations and a new or renewed sense of agency—are all present in the evaluations of the Academy and its legacies. New forms of learning, practice, and identity emerged then within this expansive learning environment.

We suggest that this has been achieved because many of the features of the Summer Academy replicated those of Engestrom's (Engeström and Sannino, 2010) and some of his many interpreters' (see, for example, Fuller and Unwin, 2004; Boyd et al., 2011) descriptions of an expansive learning environment. The Academy set up close, collaborative working in high trust environments with heterogeneous groups of learners; those colleagues were mutually supportive but at the same time ready and able to challenge, debate and critique; there was an explicit focus on teacher educator learning in ways that integrated many areas of practice that went beyond institutional and national priorities and norm-based assumptions; it gave space for participants to stand back from their own working contexts in order to think differently about their identities and practices; and finally, this "off-the" "job learning" had high relevance for further professional learning in the workplace. Throughout the week participants seemed to be not just participating but creating and enacting new learning—and they continued to do that back in their own institutions. In many senses then this was true participatory learning, following Engestrom's (Fuller and Unwin, 2004; Boyd et al., 2011) model for expansive learning within an expansive learning environment.

For the participants from England working as teacher educators in an unstable and fast changing workplace, where boundary crossings and new practices within an emerging "third space" are required on a regular basis, the opportunities brokered within the Academy were perhaps particularly needed. Certainly, the expansive learning they experienced there has, as Engestrom's (Fuller and Unwin, 2004; Boyd et al., 2011) work suggests, had the potential to transform aspects of their professional identities, knowledge bases, visions and practices. These things are valuable in themselves, but they have also generated new learning

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[1]Originally scheduled for summer 2020, this second Summer Academy at the University of Limerick has now been postponed until summer 2021, due to the Covid19 pandemic.

opportunities for these teacher educators, for their colleagues and for their student teachers within both the immediate workplace (the institution concerned), as well as nationally and internationally. As VS concluded, "the Summer Academy sessions have been the most thought provoking and productive that I have attended in my 7 years as a teacher educator."

Overall, as Rust and Berry (2019, p. 5) conclude, "the impact of the SA may, like a pebble thrown into a pond, have a ripple effect reaching and influencing the practice of teacher educators far beyond … (those) who participated in the SA."

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by NTNU Ethics Committee. The patients/participants provided their written informed consent to participate in this study. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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Expansive Learning in Inter-Institutional Communities of Practice for Teacher Educators and Policymakers

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The current study deals with participation in inter-institutional Communities of Practice (CoP) (Wenger, 1998) as a form of professional learning for experienced teacher educators who hold leadership positions in their institutions. In these CoPs, collaboration between teacher educators and policymakers resulted in expansive learning, which is the creation of new practical and theoretical knowledge, and a change of practice rather than adoption of knowledge constructed elsewhere. The current study describes three such communities, the expansive learning cycles that each of them triggered, and shared characteristics that may have contributed to these outcomes. The multiple case study methodology was employed. Data sources were interviews with thirteen participants (coordinators, Ministry of Education representatives and additional members from each CoP), and documents (such as meeting minutes and research papers) that were produced in each CoP. The findings show that expansive learning occurred due to a shared vision, reflective and critical dialogue, trusting relationship, and mutual support among participants. Furthermore, the inter-institutional composition of the CoPs, and the influential position of the participants within their respective organizations enabled them to introduce coordinated changes that transformed their practice at the individual, organizational and national levels.

Keywords: communities of practice, teacher educators, professional development, policy formation, educational policy, expansive learning, workplace learning

INTRODUCTION

Teacher education has significant influence on teachers' quality (European Commission, 2013). Since most teacher educators acquire their profession in their practice (Goodwin et al., 2014), their in-service professional learning is crucial (Lunenberg et al., 2014; Vannassche et al., 2015). Teacher educators' practice is embedded in narrow, as well as in wide contexts (Vannassche et al., 2015). Therefore, their professional learning is not only significant in the context of their individual practice, but also in the wider context of teacher education.

In many instances, the terms "professional learning" and "professional development" are interchangeable, but clear distinctions may be made between the two (MacPhail et al., 2014). Professional learning refers to informal learning opportunities such as informal conversations with colleagues that are part of the daily routine of the workplace, whereas professional development refers to more structured upskilling opportunities such as formal courses.

The current paper deals with one of the prevalent modes of teacher educators' professionalization-participation in professional communities of practice (CoPs). These may take diverse forms such as Professional Learning Communities (cf. Avidov-Ungar, 2018; Hadar and Brody, 2018) or Communities of Research (cf. Willemse et al., 2016). Although CoPs are often organized by the workplace, the contents of learning are not determined in advance. Below, we will refer to CoPs as a form of professional learning.

Teacher educators' CoPs have attracted some research, but their outcomes, as well as the relations between CoPs and their wider work contexts, have received scant attention in the literature (Hairon et al., 2017). One of the reasons for this lacuna could be the prevalent conceptualization of teacher educators' professional learning as an individual or small group endeavor (Guberman et al., 2020). However, CoPs could be sites in which "expansive learning" is initiated and nurtured (Engeström and Sannino, 2010). Expansive learning is the construction of new practical and theoretical knowledge, and transformation of practices, as opposed to acquiring and implementing knowledge from external sources.

The current study deals with a unique type of CoP: inter-institutional CoPs (Wenger, 1998; Wenger-Trayner et al., 2015). In these CoPs, experienced teacher educators who hold leadership positions in their institutions collaborate with policymakers and other stakeholders. The current study describes the CoPs, the expansive learning that each one triggered: their novel conceptualizations and the changes they introduced, and indicates common characteristics that may have supported these outcomes. Such CoPs can contribute to the transformation of education at regional, as well at national levels.

THEORETICAL BACKGROUND

Characteristics of Communities of Practice

A CoP is a group of professionals who meet on a regular basis to examine their professional knowledge and practice, aiming to improve these (Wenger, 1998; Wenger and Wenger-Trayner, 2015). CoPs may either consist of members sharing the same professional practice, or of those who have different professions but who share a domain of interest: "CoPs–not in the simple sense of having the same practices, but in the more complex sense of forming heterogeneous learning partnerships to transform existing practices" (Wenger-Trayner et al., 2015. p. 97).

CoPs differ from teams of professionals engaged in specific tasks, or staff meetings. Participants of CoPs are committed practitioners who enjoy professional discretion and view their membership as part of their professional identity and vision (Roberts, 2006; Stoll et al., 2006). That shared vision "ignites members" imagination' (Wenger-Trayner et al., 2015, p. 106), encourages them to "step out of their comfort zones" (p. 116) and inspires their activities. To achieve their shared vision, CoP members focus on improving their professional practice. Their practice is the basis of discussions, and the forum in which conceptualization and new knowledge is created, applied and examined (Wenger, 1998; Stoll et al., 2006). CoP members share

their practice with each other, engage in reflective discourse and receive honest and critical feedback (Andrews and Lewis, 2007). During discussions, implicit knowledge becomes explicit and is linked with knowledge from additional sources (Wenger, 1998; Stoll et al. 2006). Communication among CoP members is continuous and results in a quick dissemination of ideas, information, and innovations, as well as requests for help (Wenger, 1998; Stoll et al., 2006). Social interactions within CoPs are based on trust that is built over time. Successful CoPs manage to strike the balance between mutual support and trust on the one hand, and critical discussion of members' practices on the other hand. Hierarchical power relationships within CoPs, as well as competitiveness and antagonism among members, prevent the development of trust and may ultimately harm the learning process (Thompson, 2005; Roberts, 2006). CoP members share common norms, values and working patterns. A repertoire of tools and products is an expression of the learning and the unique contribution of the CoPs and is one of the salient characteristics of their distinct entity (Wenger, 1998; Stoll et al., 2006). Nonetheless, there is a continuous flow of people and ideas in and out of CoPs. Wenger-Trayner and his colleagues (2015) believe that interaction and knowledge sharing with external parties and member turnover are natural and even desirable processes that prevent stagnation. However, sudden and significant changes in the number of participants, as well as a high turnover rate endanger CoPs' existence (Thompson, 2005; Stoll et al., 2006).

In the 1990s, CoPs became one of the most recommended models for ongoing professional learning of educators. Professionals involved in CoPs can be teachers, teacher educators, school principals and other stakeholders (MacIver and Groginsky, 2011). Some communities operate out of one institution (Margolin, 2011; Hadar and Brody, 2018) whereas others are inter-institutional (Dickson and Mitchell, 2014). The current study focuses on inter-institutional CoPs comprised of teacher educators and policymakers and on expansive learning processes that occurred in the course of their work.

Expansive Learning

Engeström (1999) coined the term "Expansive Learning" to describe the creation of new professional knowledge, as opposed to the acquisition of existing knowledge previously unknown to the learners. Expansive learning involves a three-pronged change: a transformed pattern of activity, a corresponding new theoretical conceptualizations, and an enhanced agency of the professionals who are involved in creating this theoretical and practical change (Engeström and Sannino, 2010).

In contrast with "action," "activity" is the collective and coordinated engagement of groups, organizations or communities toward achieving certain objectives or goals. Teacher education can be viewed as an activity system aimed at providing high quality preparation for student teachers and in-service professional development for teachers. Teacher education is divided among multiple activity systems such as teacher educating institutions, schools, and the Ministry of Education. Each of these systems has rules, norms, tools and division of

labor, and the objects of their activities are either closely inter-connected or shared (Engeström, 2001; Bakhurst, 2009).

Engeström and his associates (Engeström and Sannino, 2010; Sannino et al., 2016) identify several components in expansive learning processes: Expansive learning begins when professionals discover inherent contradictions, gaps or an undesirable state of affairs that impede their activity. Such discoveries result in questioning, critical examination and analysis of current practices and assumptions, in order to understand how undesired outcomes are formed. The analysis can result in the modeling of a new solution, examining and improving the new model, and implementing it. Reflecting on the process, consolidating and generalizing the new practice may follow. These components are not a fixed sequence of events, and are not necessarily part of all expansive learning processes. The process is fraught with misunderstandings, lacunae, conflicts, and unexpected outcomes. It is heavily influenced by the personal characteristics of the participants, their existing knowledge and goals, and their values, emotions and habits.

Expansive learning develops gradually occurring as a cyclic process in organizations' "proximal development zone" (Vygotsky, 1978): A new circle opens when existing, stable achievements that were formed in the previous cycle are called into question. The outcome is not guaranteed, and it is quite possible that disagreements and other constraints will lead to the failure of the entire process. However, these failed processes may become a source of inspiration for others.

In order to achieve expansive learning, Change Laboratories are often employed. Change Laboratories are formative interventions that focus on transformations in object-oriented activities of work organizations, typically in times of crisis. In addition to external intervention experts, the participants in the Change Laboratories are committed members of the relevant organization(s) with a high sense of agency. Together, they analyze current practices and identify inherent contradictions that prevent their activity system from attaining its goals (the "first stimulus"). These contradictions may be found within a single activity system, or among objects of interconnected activity systems of different stakeholders. As they try to resolve these contradictions, participants create artifacts and generate ideas that help them change their work environment (the "second stimulus"). Some of these ideas turn out to be particularly fruitful ("germ cells") as they open up rich and diverse possibilities of conceptualization, practical application and development of characteristics of expansive learning (Sannino and Engeström, 2017; Sannino, 2020). However, a single Change Laboratory intervention may be too short for expansive learning to take place (Sannino and Engeström, 2017).

Change Laboratories Versus Communities of Practice

Like Change Laboratories, CoPs also have the potential to promote expansive learning. The open, critical and inquisitive qualities of CoPs' discourse, as well as the participants' commitment to a shared vision, are conducive to questioning and expressing a willingness to experiment with new ideas that are part of the expansive learning process. In comparison with Change Laboratories, CoPs' continuous activity over a long period enables them to design models and experiment with their ideas, sustain successful changes and further develop their conceptualizations and work patterns. For example, Haapasaari and Kerosuo (2015) describe such a CoP that operated in a single organization. After intensive, but short-term intervention, this CoP was able to sustain changes and further develop them. CoPs are usually formed to achieve continued improvement and are not necessarily reacting to acute crises, as is often the case with Change Laboratories. Furthermore, CoPs do not require external intervention experts. Inter-institutional CoPs can be exceptionally fertile ground for expansive learning because they bring together individuals with varied points of view and enable dissemination of new ideas to a wide swathe of stakeholders. They can achieve collaboration and coordinate between different activity systems. In an illustration of this advantage, MacIver and Groginsky (2011) reported on an inter-institutional CoP of stakeholders in education from Colorado, United States who collaborated to tackle an acute problem of high-school dropout. Together, they identified contradictory practices that exacerbated the problem within activity systems (such as schools' suspension of truant students) and between inter-connected activity systems (such as schools and social services' privacy policies that prevented information sharing). Then, they introduced coordinated changes into their respective organizations, resulting in lower dropout rates.

The current paper deals with expansive learning cycles that were triggered by three inter-institutional CoPs whose members were teacher educators and other stakeholders, mainly policymakers from the Ministry of Education. These CoPs operated in the premises the MOFET Institute in Israel.

The Study Context: Inter-institutional Communities of Practice in the MOFET Institute

The MOFET Institute is a nonprofit organization set up by the Ministry of Education in Israel to encourage professional learning of teacher educators who work in academic teacher-educating institutions: colleges and universities. CoPs for teacher educators who hold similar educational leadership positions in various teacher educating institutions are among the many services MOFET offers (Golan and Reichenberg, 2015). The main aim of these CoPs is to provide a framework for professional learning that is adapted to the needs of senior teacher educators, who do not often have colleagues with similar job remits within their respective institutions. In some of these CoPs, policymakers, as well as other stakeholders such as representatives of non-governmental organizations and school principals also participate. After a short description of each CoP we will ask the following questions:

1. What expansive learning processes occurred in each CoP and how did these contribute to their domains of interest?

2. Which of the CoPs' characteristics may have contributed to their expansive learning?

METHODS

This is a multiple case study that adopts the "learning from success" approach (Schechter et al., 2004). A case study is based on the assumption that specific cases, unique as they may be, can provide important insights about humans or organizations. A multiple case study enables researchers to explore a phenomenon through the common characteristics of individual cases (Stake, 2006). "Learning from success" is a method that aims to describe successful cases of practitioners' actions and to use the tacit knowledge they employed to make explicit formulations that can be implemented in teachers' practice (Schechter et al., 2004).

Data Sources
CoPs
Two criteria were used to select CoPs for this study: 1. Inter-institutional communities, whose members include teacher educators and policymakers from the Ministry of Education (with the possible addition of representatives of other stakeholders), 2. Communities that have been fully active for more than three years. Six communities met these two criteria, and we chose to focus on three with which we had close acquaintance and access (see below). 1) A CoP of heads of support centers for students with learning disabilities; 2) a CoP of leaders of students' practical teaching experience within the (PDS) partnership model; and 3) a CoP of leaders of beginning teachers' internship and induction.

Participants
The description of the three CoPs is based on interviews conducted with thirteen interviewees: four coordinators (The PDS CoP was headed by two coordinators), three Ministry of Education representatives (one for each CoP) and two additional members from each CoP. All the names mentioned below are pseudonyms.

Authors' Positioning
The study was initiated by the fourth author, who at the time was in charge of MOFET's CoPs. She noticed that some of the CoPs operating out of MOFET are very influential, attract members from different institutions and have high attendance rates over a long period, whereas others fail to thrive. She therefore asked the co-authors to study the success of some influential CoPs.

One of the authors (O.D.) coordinates the CoP of support centers for students with learning disabilities and is a former participant in the other two CoPs. She was therefore very familiar with both CoPs. Naturally, her familiarity with the CoPs may have influenced data interpretation. Two of the authors (A.G. and O.A.) had previously been coordinators of two of MOFET's CoPs. This positions the first three authors as colleagues of the interviewees, having no relationships of authority with any of them. CoP coordinators are appointed and remunerated by MOFET, whereas for the other participants, membership is part of their job in their respective institutions. To minimize the effect this may have had upon the interviews, the fourth author, R.S. did not participate in them. It is also important to realize that CoP coordinators have leadership positions within their respective organizations and receive a relatively small part of their salary (up to 12.5%) for this role. They all have tenure, and are therefore entitled to a full position and salary, whether or not they coordinate a CoP or take on other responsibilities.

Interviews
All the interviewees were asked to describe the CoPs from their point of view: the goals of the CoP, the main issues they dealt with and the activities they performed over the years. The interviewees explained how their own activities, as well as those of prominent participants they identified, contributed to the CoPs, and the effects the CoP had on their own professional learning, their institution and on wider contexts. They were asked about the relationships between teacher educators, policymakers and other participants (where relevant) within the CoPs. Finally, they were questioned about difficulties they encountered and how they dealt with them. The interviews were conducted in Hebrew.

Documents
We examined all the documents produced by both communities: minutes of the CoP meetings, annual summaries, research papers, position papers, books and legislative proposals. The minutes and annual summaries were produced by CoP coordinators as part of their work routine. They are available to the public on their respective internet sites (in Hebrew). Position papers and legislative proposals were produced by CoP members as tools they used to change their work environment ("second stimuli" in the terminology used by Sannino and Engeström, 2017). Research papers fulfilled the same role and in addition, they were produced to share CoP members' new conceptualization with their colleagues in the academia. Together, the documents enabled us to follow the discussions held at CoPs' meetings, their conceptualizations and how they changed over time, as well as the changes introduced by the CoPs that were implemented in practice.

Data Analysis
Thematic analysis was used to analyze the interviews (Braun and Clarke, 2006; Shkedi, 2019). During the first phase, each interview was analyzed separately. From each interview, we extracted excerpts that referred to the goals of the CoP, its work methods, composition and social relations, its development, significant events that happened over the years, difficulties and challenges, as well as outputs the CoP produced. Combining deductive and inductive approaches, we looked for themes that characterize CoPs, expansive learning, as well as other themes that emerged from the data. During the second phase, we built a thematic and historical account of each CoP by triangulating information received from the different sources: the interviewees, minutes of meetings and publications. We used the minutes of meetings and annual summaries to complete our knowledge about the issues the CoPs discussed and the activities they performed. All other publications provided information about

theoretical conceptualizations the CoPs constructed, as well as significant changes in practice. We gave the resultant "thick" case descriptions of the CoPs to some of the interviewees to ensure that they accurately reflected what they had said, and that the whole description was consistent with their perceptions of their CoPs. During the third stage, we focused on events we perceived as incidents of expansive learning: incidents in which the CoPs transformed current practices and constructed new conceptualizations. We tried to identify shared characteristics that could have led to expansive learning. Throughout this process, we held joint discussions with all four researchers to ensure credibility and achieve consensus.

FINDINGS

In this section, we describe the activities and expansive learning processes that occurred in each CoP. We then look for shared characteristics of CoPs that could have supported expansive learning.

Heads of Support Centers for Students with Learning Disabilities
Background and Initial Contradictions
Members of this CoP are heads of support centers in higher education institutions' for students with learning disabilities. Other stakeholders who take part in this CoP are policymakers from government ministries (education, health and social welfare), non-governmental organizations' representatives and former students. The CoP has existed for more than fifteen years and meets nine to ten times during the school year, with about 30 people attending each meeting.

The CoP coordinator presented its vision in a document distributed in September 2008 by the MOFET Institute, to explain what the CoP does, and to attract additional participants: "Currently... there is no doubt in academia in Israel that a student with learning disabilities should be provided with study options on a par with all other students... However, there is not enough knowledge sharing and collaboration between different support centers. The participants we interviewed shared this vision of equity and inclusion. For example, Alice, the representative of the Ministry of Education in the CoP said: "Being a participant turned me into an ambassador promoting this issue in the Ministry of Education, in the Knesset [Israeli Parliament] and in every forum in which I participated."

One of the main objects of academic institutions is to provide high quality education to students. The support centers operate as units in academic institutions to help students with learning disabilities complete and graduate from academic studies. The conflict of motives within, and between, these activity systems arises from two conflicting conceptualizations of higher education goals (Snoek at al., 2003): "Individualistic-pragmatism" defines the goal of higher education as preparing students for the requirements of a knowledge-based competitive economy. Institutions must compete for students, research funds and their academic reputation in order to survive. In contrast,

"Social coherent idealism" aims at striking a balance between supporting individuals' aims and those of society as a whole. In democratic societies, "idealism" includes educational institutions' commitment to social justice and equity. This inherent contradiction leads to a set of secondary contradictions, such as the conflict between higher education institutions' roles as gatekeepers of the professions they teach and educators, as well as conflicts concerning academic institutions' reputation: Strict adherence to demanding policies may result in high attrition and low recruitment. On the other hand, low standards may harm the institutions' academic level, lead to low recruitment, and even loss of official recognition. In the realm of teacher education, institutions that align themselves with the "Individualistic-pragmatism" approach cannot claim they provide high quality preparation for teachers, if they cannot help their own struggling students.

The secondary contradictions were evident when the heads of the support centers shared their concerns and difficulties in CoP meetings. For example, a protocol documenting a CoP meeting that took place on February 19, 2008 recorded a dialogue in which one of the participants expressed her doubts whether a student with dyslexia could become a good teacher and should be certified by her academic institution:

> Tina: When the class is not functioning... and the teacher is not good [and] writes with spelling mistakes ... I do not want this teacher.
>
> Dalia: The connection you made between spelling errors and dysfunction is a stigmatizing generalization. When all the students fail, it is clear that the teacher is not good... But we need to discuss the core of the profession and examine whether the student with the learning disabilities is not good at the core.

It is evident, that back in 2008, some of the participants did not wholeheartedly identify with the CoP's vision, and felt there was a contradiction between their role as support providers and their role as gatekeepers of the teaching profession. In a meeting that took place four years later, on November 25, 2012, the CoP participants were more confident, but they felt that their supervisors were doubtful:

> Amy: When I am summoned to stakeholders, I am perceived as a money wasting factor... The head of the teaching and learning center told me: "whenever I see you–I see problems..." I wish to be perceived as a solution and not as a problem-a solution that saves money to the system and prevents dropouts... I have to initiate the submission of reports, but there is not too much interest in them.
>
> Irene: I also feel that the [support] center is an economic problem. It exposes the fact that there are people with problems in the institution. They prefer to see the outstanding [students] rather than the miserable ones.
>
> Diane: Our president, when he hears "learning disabilities," his hair stands on end.

The CoP Coordinator Recalls:

Many support centers' supervisors felt... alone... Some were corrective teaching specialists, but they were not experts in adults with learning disabilities. Even those who were, had never learned how to be administrators. Their relationships with the academic institution were unsatisfactory. During the first years, support centers were controversial due to skepticism concerning the suitability of students with learning disabilities to academic studies. They often received negative messages expressing the dissatisfaction of college or university heads with the growth and development of the support centers... fearing that the university's name would be associated with learning disabilities. The mass influx of students with learning disabilities to higher education in a specific academic institution could deter other students from enrolling.

Sharing those concerns was the first stimulus that explicitly exposed the conflicting motives toward students with learning disabilities: On the one hand, the wish to help them succeed, and on the other hand, fears that it could lower professional standards and be harmful to the academic institution.

The Second Stimulus

During the first years, the CoP participants shared their doubts and difficulties, as well as professional knowledge. For instance, many of the meetings that took place in 2008 dealt with preparing students with learning disabilities for the workplace. The meetings contributed to participants' wellbeing and professional learning:

We have inclusion, empathy, giving... I may invite other professionals who are interested. This is not a closed clique. On the contrary, we are encouraged to invite more people. I like to go to meetings... I feel I am not alone. I receive counseling and support (Ada, a support center head).

Initially, the CoP did not generate a solution to the conflict. The turning point was the participants' decision to perform and publish case studies of students who were helped by their centers and attained significant academic and professional accomplishments. They thought these stories would prove that students with learning disabilities could be supported without lowering academic or professional standards. This idea turned out to be the "second stimulus:" external symbolic artifacts, with the help of which the participants tried to gain control of the problematic situation (Sannino and Engeström, 2017; Sannino, 2020). Working toward identifying and describing success stories was introduced into the CoP's schedule at the beginning of the 2009/2010 academic year.

While working on their respective case studies, it became apparent that the support centers' staff possessed extensive tacit knowledge, which became explicit when discussed. Working methods, which led to successful outcomes, had been tried out over the years intuitively and unsystematically. These methods

that were not previously recognized as such, had now been identified and integrated as routine working practices. Naturally, many of these practices involved students with learning difficulties who were making use of the centers. For example, the CoP members realized that support center staff had to be available to help students outside of standard working hours and also to be willing to meet them at other venues, not only at the support centers' offices. Staff availability increases students' confidence that staff members believe in their ability to succeed and attach high value to students' success. Other practices involved recruiting help from other stakeholders within the institution and introducing systemic changes. For example, in one of the institutions, the support center succeeded in raising the grades of students who turned to the center for help in English. Following their success, the English department decided to refer all struggling students to the center. This, and similar stories from other institutions in other disciplines, led the CoP participants to the realization that their work could be promoted if they were proactive in reaching out to teachers, explaining what learning disabilities are, and asking them whether they had students who needed help. They realized that with this proactive approach it was easier to get teachers' consent for special accommodations, such as ignoring spelling mistakes. In the same meeting that took place in November 2012, ten of the thirteen participants took it upon themselves to perform tasks that would enhance the centers' impact, through actions directed at other stakeholders in their respective institutions. For example, one participant distributed flyers explaining what learning disabilities are, organized a college event with a lecture and a stand-up show about attention deficit disorders and produced a film for the college's internet site that describes the center's services. This minutes of the meeting also attest to the participants' commitment to the CoP's work. The success stories and the extracted operating principles were published in a book (Shemer et al., 2016). They provided the CoP participants with improved tools to perform their roles. Furthermore, they resulted in changing the CoP's object from teaching students with learning disabilities to recruiting, guiding and coordinating between different stakeholders: Mainstream students were recruited to serve as mentors to students with learning disabilities and their work was supervised by the support centers. The centers disseminated information about learning disabilities to other teachers and the institutions' administrators. Teachers were asked to collaborate in referring students to the centers and providing them with adjusted teaching and assessment, according to centers' guidelines and explanations. Legislators, policymakers from the Ministry of Education and academic institutions' administrators were asked to introduce supportive policies and secure budgets. The systemic work transformed the CoP members' personal positioning from undervalued and isolated teachers into acknowledged professionals who work collaboratively, endowing them with a new sense of agency (Engeström and Sannino, 2010): "[The CoP] raised the position's status [i.e. the position of support center's head], put us on the map, it is important and not obvious" (Ann, a support center head).

The Second Cycle of Expansive Learning: Multiple Disability Centers

The above-mentioned expansive learning cycle resulted in the institutionalization and professionalization of the support centers' activities. Currently, every higher education institution has a center, and their existence is no longer viewed as a threat to institutions. This development took place in higher education institutions' zone of proximal development (Sannino and Engeström, 2017): the previously existing restricted centers flourish and their work is now coordinated with that of other stakeholders. However, the support centers' success in making academic studies accessible to students with learning disabilities raised awareness about the needs of other excluded populations. It seemed that by ignoring other populations, the centers undermined their own vision of equity and equal opportunities for all students. This inherent contradiction could be noticed only after the success of the previous cycle. Discussions about turning support centers into multiple disability centers began a few years ago, and opinion was divided. Some members argued that the centers specialized in learning disabilities and that expansion would harm staff professionalism. Others argued that no one else is equipped to provide a solution for students with multiple disabilities and that it is only natural for the centers to provide support for the entire range of special needs. In order to enhance the centers' ability to support all students, the CoP invited representatives of multiple organizations that provide help to students with different needs. These members helped to bridge professional gaps. Eve, a participant from the Ministry of Education noted:

> I believe that the addition of a director of a project that supports students with mental health issues to the CoP was a welcome addition, and may have lowered concern about working with this population… I feel that directors of support centers for students with learning disabilities are often forced to deal with people with mental health issues and this meeting helped them…

The National Insurance Institute encouraged this transformation, as the CoP coordinator explained: "The National Insurance Institute held professional training for "accessibility supervisors…" It offered funds for building, expansion and equipment to centers that agreed to handle multiple disabilities." These means are part of the efforts to overcome the inherent contradiction of having support centers only for students with learning disabilities (the second stimuli). The centers' activity have been vastly transformed and most of them provide services to students with physical disabilities and mental health issues, in addition to students with learning disabilities. However, the transformation is not completed yet. Discussions currently revolve around additional populations that the centers could assist.

Due to the expanded role of the support centers, some of the CoP discussions are no longer relevant to all of the participants. The CoP tried to handle the problem by setting up ad-hoc working groups. Others felt that adding new members leads to repetition of issues, fatigue and frustration:

> The very high turnover rate in this field is not easy for me. New members join and ask questions and I no longer have the patience for this. We are a limited nucleus of people who have been involved in this field for a long time and while it is nice that new members join, it is also a bit tiring. (Ada, a support center head).

To summarize, the main achievements of this CoP are conceptualizing the support centers' operating principles, consolidating their practices, and expanding their services. The object of the support centers changed from teaching students with learning disabilities to helping students with multiple disabilities and coordinating services with a wide array of stakeholders.

Leaders of Students' Practical Teaching Experience within the Partnership Model

Background

The partnership model between higher education institutions and schools (PDS-Professional Development Schools) is guided by two basic principles: Student teachers are heavily involved in different aspects of their school's educational work, and all the partners in the teacher education process: student teachers, pedagogical counselors, teacher mentors, and other involved parties participate in professional learning (Darling-Hammond, 2006). The CoP was set up fifteen years ago at the MOFET Institute by teacher education colleges that started to work according to this model in an exploratory manner. The CoP met six times during the school year, with up to 30 people attending meetings. The CoP members dealt with shared challenges, such as selecting partner schools and involving them in teacher education.

Expansive Learning

The PDS initiatives try to solve the dissonance between closely inter-related activity systems: teacher preparation by higher education institutions and schools' expectations of teachers. Historically, his contradiction emanates from the "academization" of teacher education (Robinson, 2017), and is therefore shared by many institutions worldwide. The vision of PDS initiatives is to provide teacher preparation that addresses practical needs through extensive practice in schools and collaboration between schools and academic institutions (Teitel, 2003). The schools' activity expands to educating student teachers, whereas the academic institutions' activity expands to providing professional development to in-service teachers. In Israel, the first PDS initiatives lacked a supportive infrastructure, and modes of operation were not consolidated. According to the coordinator:

> The goals were to develop knowledge about partnership models. To have a dialogue with decision makers at the Ministry of Education… to encourage teacher education colleges to adopt partnership models, and to have a framework to discuss problems that interfere with the execution of partnership arrangements. We were learning by reading papers and research, as well as from partnership models worldwide. We tried to produce the principles of partnership between academia and the education field in the Israeli

context. We were looking to forge a path and for partners to join us on the journey.

The second coordinator adds that the CoP goals were: "meeting people from different colleges. PDS models are applied somewhat differently in different places. So, to share ideas, expose difficulties... on the one hand, and learn from successes on the other hand."

The CoP members published their distinct models and accumulated knowledge in academic publications. Research findings indicated that student teachers who participated in the PDS model were better prepared teachers with a higher retention rate. Nonetheless, it was very difficult to maintain the model since it is time consuming and requires a lot of extra work for all those involved. The CoP had representatives of the Ministry of Education, but they worked in the teacher education department, and their work was not coordinated with that of other ministry departments. The latter initiated projects that required teachers to participate in numerous professional development activities. Concurrently, a national teaching reform was launched that required teachers to spend more time on individual tutoring of pupils. These requirement left no time for meetings with student teachers and teacher educators.

The CoP authored a position paper, and presented it to the Ministry of Education. This publication was the second stimulus, attempting to overcome the contradictions between the activity systems of the Ministry, schools and teacher educating institutions. For example, the position paper stated that designated time slots for students, teachers and academic supervisors' meetings should be assigned, and that mentor teachers should receive professional preparation and remuneration. In 2016, the Ministry of Education initiated a program based on the PDS model. The Ministry acknowledged the contribution of the CoP's experience and publications in its policy paper (the "Academy-Classroom" project), and accepted many of the requests that appeared in the position paper (including those cited above). By implementing this model, policymakers took over the leadership of the process from the CoP, which ceased operations in 2017, the second year in which the Ministry of Education's program was implemented.

The PDS model changes schools, teacher educating institutions and the government's activity systems. Schools become partners in teacher education, in addition to teaching pupils. Teacher educating institutions take part in school teachers' professional learning and student teachers are integrated into school staff. The PDS model that was dependent upon the goodwill of individual schools and teacher educators who decided to collaborate, is now mandated, budgeted, regulated and monitored by the Ministry of Education.

Leaders of Beginning Teachers' Internship and Induction Units
Background

The high attrition rate of beginning teachers is a persistent challenge that bothers all stakeholders in education (Craig, 2017). The professional literature indicates several factors that could increase beginning teachers' perseverance. The most prominent factors are: Intensive pre-service practical experience (Ingersoll et al., 2014); mentoring (Ingersoll and Strong, 2011); and support of beginning teachers by the school principal and other teachers (Thomas et al., 2019).

In 1990, the Israeli Ministry of Education decided to support first year teachers through an internship program. Over the years, the support expanded to cover the first three years in the profession. Teacher education colleges established "transition into teaching" units that are responsible for supporting beginning teachers and for training mentors. The heads of internship programs CoP was established in 1996. Currently, the participants of the CoP are heads of internship, induction and mentor training programs, as well as heads of the "transition into teaching" units from all teacher educating institutions in Israel. The CoP coordinator is the administrator in charge of beginning teachers in the Ministry of Education. The CoP meets 9–10 times during the school year, with 60–70 people attending each meeting. This poses a difficulty, since the larger the CoP, the harder it becomes to provide a solution for each member's individual needs. This CoP tried to solve this issue by working in sub-groups.

The CoP's vision, as it appears on its internet site, is "to ascertain that high quality [beginning teachers] integrate and persevere in teaching." Although membership in this CoP is compulsory, many practitioners have adopted the CoP's vision. A participant named Helen said: "It is a deeply moving experience to meet so many peers who are so highly-motivated to ensure the optimal absorption of beginning teachers." This quotation reveals Helen's identification with the CoP's vision, as well as her belief that other participants are equally committed.

The CoP initiated projects that aim to raise stakeholders' awareness of beginning teachers' difficulties and improve the support they receive: annual competitions of beginning teachers' stories and posters, as well as a competition for the "best absorbing schools" award. The CoP coordinator consults with the participants before new policies are set. She notes: "'Policies are decided upon in the CoP and each member is responsible for implementing them in his/her college. Having the chance to be part of a policy-making team strengthens the members' commitment to participate."

The CoP is characterized by the good ambience of professional friendships in which members can talk about their difficulties and receive help. Mary, a participant, said "It is lonely for me... in the college. Within the CoP, I can meet the other coordinators and Ministry of Education representatives. They give advice and support for a wide range of issues. They understand me."

Expansive Learning

Teacher attrition is a complex challenge that does not result from a single cause. One contradiction that the above mentioned methods of supporting teachers' induction does not address is that teacher educating institutions are disconnected from absorbing schools following the students' graduation. Even in institutions

in which students are provided with extensive practical experience, the schools in which they gain their experience are not the same schools in which they work after graduation. Thus, teacher preparation is "generic," whereas teachers' induction takes place in a specific context. Similar to the previous example, this contradiction also emanates from the "academization" of teacher education (Robinson, 2017).

The "second stimulus" was the "Multi-player Induction Team" (MIT) model developed in 2012 by one of the teacher educating colleges (Beit-Berl College) that participates in this CoP. According to this model, interns and beginning teachers are introduced into a school or a community as a group. Beginning teachers' workshops take place at the absorbing school or community, and are facilitated by the college. They are attended by mentor teachers, pedagogical counselors, beginning teachers and additional stakeholders, such as representatives of the local authority, the school principal, homeroom teachers or the school counselor. This model positions beginning teachers as a focus of interest, expands the support they receive, and allows for immediate treatment of problems they encounter (Thomas et al., 2019). MITs empower and encourage beginning teachers to contribute as a group to their school or community, thus strengthening their sense of autonomy and professional efficacy (Ryan and Deci, 2000). The partnership between the teacher educating institution and the absorbing school or community contributes to closing the gap between the two, and encourages both institutions to introduce changes into their preparation and absorption practices, respectively. The MIT model changes the teacher education activity system from pre-service preparation of student teachers to include graduates' induction into absorbing schools, and expands their interfaces with inter-connected activity systems (schools and local authorities).

The MIT model was introduced to the CoP in 2015. By the end of 2016, there were six teacher education colleges that had established MITs. This project was supported by the European Union from 2017 to 2019 (https://proteach-project.macam.ac.il). Further support is currently provided to nine colleges that have MITs to prepare mentors within this model (https://promentors.org/).

Shared Characteristics that may have Contributed to CoPs' Expansive Learning

At first sight, the three CoPs are very different from each other in their visions, domains of interest, and the nature of expansive learning they achieved. However, **Table 1** reveals similarities, some of which could be conducive to expansive learning.

The CoP members were committed to the shared vision: providing higher education to students with special needs and bridging the gap between teacher preparation and schools, in order to improve beginning teachers' absorption and retention. The members attested that the CoPs provided them emotional support and knowledge. Based on mutual trust that developed over time as a result of the support the CoPs provided, the members held open and honest discussions that focused on

practice, including inherent conflicts in their activity systems. Being committed to the vision, they were willing to step out of their comfort zones and try to implement new ideas, such as reaching out to other teachers in their institutions or to school principals and providing professional learning opportunities to teachers. These ideas were further explored during the CoPs' regular and frequent meetings. As mid-level administrators and policymakers, they were able to introduce changes into the units they led, in addition to changing their own practices. The three CoPs included various stakeholders from different organizations. This inter-institutional composition is important, not only because the members are exposed to different views and realms of knowledge, but also because it enables the CoPs to introduce coordinated and complementary changes of practice simultaneously. Therefore, although the number of members in each CoP was viewed as too large by some of the interviewees, it may have helped in disseminating changes originating in CoPs to a large number of organizations. The participating organizations had complementary roles. This is particularly true of teacher-educating institutions and the Ministry of Education. The Ministry of Education provided regulatory support to educational initiatives, whereas teacher educators implemented policies and provided feedback to policymakers. The CoPs' publications are part of their repertoire, and disseminate their conceptualizations to other institutions and stakeholders.

DISCUSSION

The current study describes three CoPs that led to learning at the individual, organizational and public level. In the following, we discuss the CoP characteristics and expansive learning processes shared by the three communities, and then deal with the theoretical implications of this study and the empirical implications for teacher educators' professional learning.

Expansive Learning Triggered by Communities of Practice

The CoPs' participants were practitioners who enjoy professional autonomy and who were attempting to improve their practice. Each of the three CoPs had a shared vision that inspired the members' work: providing equal academic opportunities to students with special needs in the first CoP, and bridging the gap between teacher preparation in academic institutions and retention of high quality teachers in schools in the other two (Wenger, 1998; Stoll et al., 2006; DuFour et al., 2008). The members were able to disclose and share their difficulties (Andrews and Lewis, 2007) because of the trusting relationship within the CoPs, which is an outcome of long-term cooperation and mutual support (Stoll et al., 2006). The participants' commitment encouraged them to step out of their comfort zones and look for ways to achieve their vision (Wenger-Trayner et al., 2015). Working collaboratively over a long period is needed in order to devise, try out, improve and conceptualize changes (Sannino and Engeström, 2017). The inter-institutional composition of both CoPs was important not only because

members were exposed to different views and realms of knowledge (Engeström, 1999; Engeström and Sannino, 2010), but also because it enabled the CoPs to introduce coordinated and complementary changes of practice simultaneously. Being mid-level administrators and policymakers, the members were able to introduce changes into the units they led (Wenger-Trayner et al., 2015), in addition to changing their own practices, thereby gaining a new sense of agency (Engeström and Sannino, 2010). Expansive learning cycles were triggered by all the CoPs. The object of the support centers' activity changed from teaching students with learning disabilities to helping students with multiple disabilities and coordinating services with a wide array of stakeholders. In the case of the other two CoPs, the object of teacher educating institutions changed from preparing student teachers to collaborating with schools in teacher preparation, beginning teachers' induction and in-service teachers' professional learning. Governmental departments realized they need to be more involved, supporting change processes with suitable policies and budgets, instead of hoping that academic freedom and market forces would suffice. Changes were therefore observed at the national, institutional and individual levels. New conceptualizations concerning support for students with special needs and teachers' preparation, induction and professional learning have emerged and been published.. The CoPs' publications are part of their repertoire (Wenger, 1998). They enable dissemination and further examination of their new conceptualizations by other stakeholders.

Theoretical Implications

When we first embarked on a theoretical analysis of the change processes triggered by each of the CoPs, we believed they were similar to Cultural-Historical Activity Theory's third-generation studies (Sannino and Engeström, 2017), since closely inter-connected activity systems were involved that transformed from being compartmentalized practices and expertise into becoming collaborative work named "knotworking" (Engeström and Sannino, 2020, p. 10).

The PDS model CoP was different from the other two, since its successful attempt to transform teacher preparation led to the cessation of its operation. Participant turnover was evident in all the CoPs, as could be expected in view of their long period of operation. One of the Non-Governmental organizations that took part in the support centers CoP ceased to operate after a few years. Changes in participating individuals and organizations is in alignment with the "fourth generation" activity systems, in which multiple organizations attempt to tackle persistent challenges. Such attempts entail "the involvement of a wide variety of actors at multiple levels–local, regional, national and possibly global" (Engeström and Sannino, 2020, p. 11). In our case, attempts to improve teacher education involved individual teacher educators, schools, teacher educating institutions and the Ministry of Education. During their activities, "some organizations merge or redefine their responsibilities. Yet we also see that these shifts are promptly dealt with: replacements and new actors step in, organizations regroup to compensate for gaps" (*ibid*). As Engeström and Sannino (2020) acknowledge, the theory of "fourth generation" activity systems is still under construction. We

hope that this process takes into consideration conceptualizations developed by Wenger-Trayner and his colleagues (2015). Specifically, we believe that in order to address meaningful and persistent challenges, collaborative action of multiple individuals and organizations is required. In such cases, CLs may be insufficient due to their short duration and cost, as well as the large number of heterogeneous parties involved and the lack of cohesiveness among them. Our findings show that inter-institutional CoPs consisting of committed representatives of multiple stakeholders that operate over a long period can replace CLs as change agents.

Teacher Educators' Professional Learning

It is currently agreed that teacher educators' career-long professional learning is crucial for high quality teacher education (European Commission, 2013; Lunenberg et al., 2014; Vannassche et al. 2015). However, professional learning is predominantly viewed as the responsibility of individual teacher educators. Although some institutions provide professional learning opportunities to their staff, these opportunities are not coordinated, and institutional involvement is minimal (Griffiths et al., 2014; Meeus et al., 2018; Guberman et al., 2020). As a result, different paths of professional learning may come at the expense of each other, as is often the case in the main areas of teacher educators' professional learning: teaching, research and educational leadership (Griffiths et al., 2014; Guberman and Mcdossi, 2019; Smith and Flores, 2019).

Teacher educators who have educational leadership roles within their respective institutions are in a particularly vulnerable position with respect to their professional development, because they work in isolation, without colleagues with similar roles and concerns. Inter-institutional CoPs offer them an opportunity for professional learning together with others who have similar positions in other institutions, in which they are active in initiating practical experimentation and theoretical conceptualization (MacPhail et al., 2018). Furthermore, such CoP participants can provide coordinated and institutionalized professional learning opportunities for teacher educators within their respective departments. These opportunities may combine changes in conceptualizations and practice that are examined through practice. Thus, inter-institutional CoPs have a potential of transforming the currently fragmented landscapes of teacher education (Flores, 2016) into coherent ones.

Establishing inter-institutional CoPs is not an easy task. In the current study, the CoPs' members and the organizations they represented had a shared vision, but they were also competing with each other over students, academic and public reputation. Under these circumstances, the already difficult challenge of building a trusting relationship was even more challenging (Thompson, 2005; Roberts, 2006). However, we believe that the potential gains outweigh the difficulties.

The study limitations are the small number of CoPs examined and the interpretative nature of the analysis. We suggest a close scrutiny of the CoPs' discussions to observe how mutual relationships and change processes develop within CoPs over time. The expansive learning which occurred in these and in other, similarly structured CoPs,

TABLE 1 | CoPs' characteristics.

	Support centers	PDS	Beginning teachers
Organizational characteristics			
Type of participation	Voluntary	Voluntary	Compulsory
Size	30	Max. 30	60–70
Number of meetings per academic year	9–10	6	9–10
Life span in years	15	16	29
Participating organizations			
Teacher-educating institutes	V	V	V
The ministry of education	V	V	V
Other ministries	V	X	X
NGOs	V	X	X
School principals	V	V	X
Others	V	X	X
Shared vision	V	V	V
The discourse			
Focus on practice	V	V	V
Ongoing	V	V	V
Reflective and critical	V	V	V
Sharing	V	V	V
The participants			
Autonomous practitioners	V	V	V
Enjoy high status within their organizations	V	V	V
Involved and committed	V	V	V
Social interactions			
Trust	V	V	V
Mutual support	V	V	V
The community as a distinct entity			
A repertoire of tools and products	V	V	V
Dynamic yet clear boundaries	V	V	V

encouraged the Ministry of Education to initiate new CoPs consisting of policymakers and heads of academic programs. We suggest that these also be studied to examine whether expansive learning occurs in them as well.

DATA AVAILABILITY STATEMENT

The datasets generated for this study are available on request to the corresponding author.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the MOFET Institute IRB. Written informed consent for participation was not required for this study in accordance with the national legislation and the institutional requirements.

AUTHOR CONTRIBUTIONS

Ainat Guberman wrote the main paper. Interviews were conducted by AG, OU and OD. All authors participated in collecting data about the CoPs and documents they produced as well as data analysis

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