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Early Career Teachers' Experiences of Developing Professional Knowledge - from research-based teacher education through five years in the profession

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This study aims to explore early career teachers' (ECTs') experiences of professional knowledge developed during their research-based teacher education and throughout their first five years in the profession. This study uses Shulman's (1986) framing of professional knowledge, which posits that teachers must have content knowledge, general pedagogical knowledge, and pedagogical content knowledge. Ten Finnish primary school teachers with five years of work experience participated in this study. The data was collected from individual interviews and analysed using qualitative content analysis. Three major areas of knowledge were identified that together distinguish ECTs' professional knowledge: pedagogical and didactic, relational, and research-related knowledge. The results indicate that teacher education provides a solid foundation while the first five years of professional experience add to the teachers' professional knowledge.

Keywords: Early career teachers, professional knowledge, teacher education, research-based

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Introduction

During recent decades, research on teacher knowledge has rapidly increased (Connelly, Clandinin, & He, 1997). The topic of teachers' professional knowledge received renewed attention in the 1990s and the 2000s due to changes in teacher education in many countries, more common international testing, and comparisons across country contexts (Afdal & Nerland, 2014). This development is confirmed in Cochran-Smith's and Fries' (2008) overview in *Handbook of Research on Teacher Education* during the 1980s–2000s. The dominant approaches show a focus on codifying the professional knowledge base for teaching and an understanding of how teachers learn to teach. A more recent review of the teacher education domain from 1992 to 2012 in *Teaching and Teacher Education* also highlights that the structure of the research base for teaching was frequently cited in research studies conducted particularly between 1992 and 2005 (Özçınar, 2015). According to Ben-Peretz's (2011) review of the research on teacher knowledge between 1988 and 2009 in the publication *Teaching and Teacher Education*, the understanding of teacher knowledge has expanded beyond subject-matter, curriculum, and pedagogical content knowledge to include generic issues, such as globalisation and multiculturalism.

The present article deals with teachers' knowledge, more specifically, the knowledge that teachers need in practising their daily work. The development of this kind of knowledge or professional knowledge is a current issue in educating prospective teachers. Teachers' professional knowledge is regarded as even more crucial today because of the increasing general trend of academisation of teacher education (Hansén, 2015). Research-based knowledge (see Aspfors & Eklund, 2017) is expected to strengthen the profession by providing Shulman's (1986) three categories of knowledge for teacher education: subject-matter content, pedagogical content, and curriculum knowledge.

Historically, initial teacher education has been designed to serve the practical needs that are regarded as important for citizens, as well as knowledge and skills about societal life and ethical values (Aspfors, Eklund, Hansén & Wikman, 2018). When referring to professional knowledge as rooted in an academic knowledge base, the so-called theory and practice relationship may be challenging. The academisation process raises the question of how scientifically generated professional knowledge is experienced by teachers after completing a research-based five-year master's teacher education and during the first five years in the profession (see Hansén, 2015). Teachers' experiences from their initial education and work may reveal various experiences of professional knowledge and expose how the qualification serves as a rationale for teaching practice.

Against this background, the present study aims to explore early career teachers' (ECTs') experiences of developing professional knowledge during their research-based teacher education and throughout their first five years in the profession. This study is part of a five-year comparative, longitudinal research project started in 2015 to explore ECTs' experiences of research-based teacher education in relation to the realities they encounter once they have begun their teaching profession (Jakhelln et al., 2019).

Theoretical framework

Professional knowledge is a multifaceted concept that can be defined in various ways, depending on the angle taken for scrutiny. For this study's purposes, three categories from the

perspective of professional knowledge have been identified. From Shulman's (1986) well-known distinctions of professional knowledge, the categories *content knowledge* (CK), *pedagogical content knowledge* (PCK), and *general pedagogical knowledge* (GPK) offer one way of highlighting aspects on the content structure of Finnish teacher education (König et al., 2014). Several scholars have emphasised the personal dimension of professional knowledge.

Content knowledge, general pedagogical knowledge, and pedagogical content knowledge

Often defined as the subject knowledge of teaching, CK is an important precondition for appropriate teaching but is not fully comprehensive. CK focuses on the *what* of teaching and refers to the amount and the organisation of knowledge. Shulman (1986) originally defined CK as the knowledge that should be learned by students. According to some scholars, this definition covers a wide range of knowledge, from academic to every other type of knowledge taught in schools (see Evens, Elen, Larmuseau & Depaepe, 2018). GPK concentrates on the *how*, that is, the generic principles of teaching and classroom management. Teachers' GPK is linked to teaching quality and depends on their education, as well as their level of teaching experience as newly qualified teachers (Lauermaann & König, 2016). PCK comprises a synthesis of both CK and pedagogy, which is necessary for teaching, that is, making the subject matter understandable for students. According to Shulman (1987), PCK is the most important category of teachers' professional knowledge base, the unique province of teachers' special form of professional understanding. For instance, knowledge of instructional processes, students' learning, and knowledge of curriculum and assessment of students' achievements can be included (Paulick et al., 2016; Shulman, 1986). According to Kind (2009), several factors contribute to the development of PCK among ECTs: sufficient knowledge of the subject matter, classroom experience, personal characteristics, such as self-confidence, and a supportive work atmosphere, with collaboration among colleagues. Furthermore, mentor programmes have been developed to provide social and emotional support for new teachers (Heikkinen et al., 2012). Emotional and relational issues are not explicit in Shulman's (1987) typology even though they have been prominent in several studies (see Aspfors & Bondas, 2013; Isenbarger & Zembylas, 2006; O'Connor, 2008; Smeby, 2007; Sutton & Wheatley, 2003).

Personal practical knowledge

Several scholars (e.g., Ruohotie-Lyhty & Kaikkonen, 2009; Sun, 2012) have acknowledged the personal and practical dimension of professional knowledge. Elbaz (1981) conducted research on teachers' personal practical knowledge. Connelly and Clandinin (1997) further developed the concept of practical knowledge, the personal way that every teacher reconstructs the past and formulates the intentions for the future to deal with the requirements of the present situation (see. Smith, 2007). The knowledge gained during teacher education is consolidated and transformed when teachers start working. The ECTs' personal practical knowledge is highly implicit and embodied; not always easy to elaborate or articulate, it includes personal beliefs, values, and attitudes that strongly influence how the teachers act in and interpret their work situations (König et al., 2015).

Thus, knowledge is situated and experiential, developed uniquely among individuals as teachers encounter diverse work experiences in different school contexts. The new

information they acquire becomes a part of their knowledge base through a process of interpretation in which new information is influenced and shaped by previous experiences and beliefs (Ruohotie-Lyhty & Kaikkonen, 2009). Teachers' own school experiences also affect their personal views of knowledge as well as interact with and are reshaped by the reconstruction of their progressing experiences in the everyday life of a complex and multifaceted profession (see Aspfors, Bendtsen, Hansén & Sjöholm, 2011; Connelly et al., 1997; Skaalvik & Skaalvik, 2015).

Teachers not only consume but constantly produce knowledge. The way they perceive the profession is intimately linked with their view of knowledge itself. If teachers consider knowledge as something beyond their grasp, they express a technical orientation; that is, they do not commonly make use of it in practice. Instead, if teachers can interpret new information and draw on their personal experiences, values, and reflections, they will develop a critical orientation (Kronqvist & Estola, 1999). A critical view can be related to the teachers' personal practical knowledge, which evolves when PCK and practical knowledge interact in a dialectic process. Reflection is thus crucial in building up teachers' professional knowledge and one way of promoting reflection (Ulvik & Riese, 2016).

Research on the development of teachers' professionalism shows that the path to becoming an expert teacher is much longer than merely passing the initial teacher education examinations (Berliner, 2004; Fessler, & Christensen, 1992). Initial teacher education offers different kinds of learning opportunities, compared with the ECTs' teaching experience or work conditions. Several years of in-service teaching and deliberate practice are essential since the development of expertise is complex and varies among individuals. The personal practical knowledge acquired during teacher education is thus consolidated and transformed in varying ways when teachers start working (cf. König et al., 2015; McCormack et al., 2006). Referring to Gess-Newsome, Evens and colleagues (2018, p. 245) elucidate and add to the relationship between the personal and the specific context by emphasising that teachers' personal practical knowledge can be viewed as "knowledge of teaching a particular topic in a particular way for a particular purpose to particular students for enhanced student outcomes."

In this article, teachers' personal practical knowledge thus lies at the core of the understanding of professional knowledge. As shown by Kind (2009), several factors contribute to the development of PCK. In accordance with the author's interpretation, professional practical knowledge thus stems from teacher education and is further developed during the early years of teaching, here limited to the first five years of practice.

As shown in the overview, teachers' professional development can be characterised as a back-and-forth movement between being and becoming. ECTs advance in the process of acquiring their personal practical knowledge and increasingly evolve as professional teachers. This progress is an ongoing and long-lasting process since such development is highly complex (Berliner, 2004). The challenge is thus how to systematically develop teacher education in a way that promotes teachers' career-long professional development (Sjølie, 2014).

Method

As stated, this study aims to investigate the experiences in ECTs' development of professional knowledge during both their teacher education and throughout their first five years in the profession. The study can be characterised as a single case in the sense that the data have

been collected from the third and last part of a larger longitudinal and comparative research project (Hamilton & Corbett-Whittier, 2013). In connection with the operationalisation of the concept of professional knowledge, the aim is specified in the following research question: What characteristics of professional knowledge do ECTs develop during their research-based teacher education and throughout their first five years in the profession?

Context of the study

This study collected empirical data from ECTs who have been educated at a Swedish-speaking teacher education department in Finland. Finnish teacher education has been university-based since the 1970s and is characterised by a research-based approach, highlighting the teachers' ability to practise argumentation, decision-making, and justification in solving pedagogical problems (Griffiths, 2004). Teacher education aims to qualify reflective and critically thinking professional teachers (Tirri, 2014). Explicit research activities form a crucial part of teacher education. Students become familiar with scientific research, write scientific texts, and attend specific research methodology courses. Furthermore, they carry out their own research projects for their bachelor's (BA) and master's (MA) theses, using scholarly methods and gaining insights into scientific tools (Jakku-Sihvonen & Niemi, 2006).

Primary school teacher education (teachers of 6–12-year-old pupils) comprises three component areas: subject didactics, teaching practice, and education in its general sense, that is, classroom management, evaluation, collaboration with parents, etc. Student teachers acquire broad competence in all subjects taught in primary schools and specialise in one or two subjects. Teaching practice is mainly organised in government-owned practice schools closely connected to teacher education and, to a lesser extent, in ordinary field schools. Ideally, this system facilitates stable encounters between campuses and localised school activities (Toom et al., 2010).

Informants and data collection

In the autumn of 2016 and the spring of 2017, a sample of ECTs who graduated in 2010–2011 were invited to participate in the study. Of the approximately 80 graduates from the teacher education department, 10 (seven females and three males) were randomly selected among those who had finished their education in approximately five years. All the selected informants agreed to participate in the study and were 29–32 years old (except one who was aged 37). All were educated as primary school teachers but had specialised in various subjects, for example, physical education, mathematics, biology, and pre-primary teacher education. Some were also qualified as special education teachers. Nine informants had been working as primary school teachers for four to five years, while one had been working for three years. Developed within the overall research project, the semi-structured interview guide comprised three main themes concerning the ECTs' backgrounds, professional knowledge, as well as professional identity and development. In this article, though, the theme of professional knowledge has been in focus for analysis. Six informants were interviewed by two research assistants and four informants by the researchers themselves. Regarding the theme of professional knowledge, 20 interview questions were asked, along with follow-up questions when appropriate. Entire interviews lasted about 60–75 minutes each and were recorded and transcribed verbatim.

Data analysis

The interviews were analysed inductively, using qualitative content analysis (see Boeije, 2010; Schreier, 2014). To achieve acceptable validity, the analyses were divided into two phases. In the first phase, the researchers divided the interviews equally, carefully read the transcripts, and selected the essential parts that were relevant for the study. An open coding procedure was conducted on the selected parts, resulting in many different initial codes or themes. In the second phase, the researchers discussed the open coding process and finalised a more systematic coding process together. The codes were compared for similarities and differences and grouped into higher-order categories. These were finally condensed and abstracted into three main knowledge areas. Through a peer debriefing process, the researchers strived to conduct the analysis as reliably as possible to ensure the study's trustworthiness. In this article, the knowledge areas are described and illustrated with original excerpts from the ECTs' responses (Creswell, 2013). The informants are identified by gender (F/M) and number. The study follows the general ethical standards approved by the scientific community of the Finnish Advisory Board on Research Integrity (2016).

Findings

As a result of the inductive analysis, three major areas of knowledge are identified. These areas cover the types of professional knowledge developed by the ECTs throughout their first five years in the profession.

Pedagogical and didactic knowledge

The first knowledge area refers to the general pedagogical basis and substantive didactic elements related to the *what* and the *how* questions about teaching. According to the participating teachers, the research-based approach is of general value for the profession, particularly for a firm theoretical foundation. The education equips teachers with professional status, and Finnish teacher qualification is acknowledged as a sound education in other countries. Most of the teachers (N = 8) in the study explicitly emphasised that research-based teacher education has given them a solid basis for the profession. "I got the theory, but later, I received the practice I needed. . . . But, of course, I also got the whole approach to learning and how to meet the pupils and other colleagues and parents. I got a backpack of knowledge from the education" (F3). The teachers mentioned having matured and developed as individuals during their initial education. One teacher especially referred to this aspect and how she gradually grew in her role as a teacher during her studies. "It is also a process of maturing; the time that it takes to participate in and research for the master's education—there is much surrounding it that makes you mature and grow [in] the role of a teacher" (F10). Although the teachers view research-based teacher education as relevant, they neither fully realised how to use their acquired theoretical knowledge nor recognised its relevance for the profession. They note that it would have been easier for them to relate to the profession during their education if they had gained previous experience of teaching and teachers' work before beginning their studies.

A common expectation among student teachers is that teaching is primarily a practical profession, with a focus on teaching and classroom management. In contrast, teachers themselves refer to the complex and multifaceted work of teaching, where a lot of tasks and responsibilities simultaneously call for attention. In this study, the teachers also bring up an

increased lack of time, juggling many different work duties, and a heavy workload. They expect to spend much more time on teaching and teaching-related activities but find that they have to deal with many other obligations and tasks, for example, paperwork, activities outside the classroom, enforcing discipline, child protection, and parent–teacher meetings.

It is a lot of work and quite a high level of stress, and you have to be very flexible and be... a doctor and a psychologist and a curator and everything... So it is like teaching is becoming... it feels as if it is becoming smaller and smaller, and the fostering part is becoming larger and larger all the time..., and then, this administration and paperwork is becoming more and more..., and the focus on the pupils is becoming smaller, unfortunately. (F9)

The teaching profession is characterised by continuous change and mutability, which demand that teachers develop and keep up with reforms; this aspect is noticeable in all interviews. For example, the Finnish comprehensive curriculum reform was mentioned by all the teachers. In addition to the normal work of teaching, teachers find it challenging to stay up to date with the new reforms and their more extensive approach to learning and teaching. Another aspect that comes to light is the rapid development of digitalisation and new techniques, which also challenges teachers to stay current in this area. As ECTs often change workplaces and schools at the beginning of their careers, they must also handle new work methods and routines in different school contexts. For example, one teacher pointed out that she has had to develop educational materials largely by herself since it is difficult to obtain school books and learning materials.

The participating teachers claimed that during their teacher education they learned to plan from both short-term and long-term perspectives and to structure complex, multidimensional tasks and activities. They developed didactic and practical knowledge for the profession—for example, how to write weekly letters to parents and how to teach different subjects. They also gained broad insights into all subjects taught in primary school. “You need a solid basis, and I think I got that from the teacher education. I learned something in every subject, so I got a solid basis...” (F1). As student teachers, they further specialised in different school subjects and deepened their knowledge of specific subsidiary subjects, while as teachers they now experience using their subject knowledge and feel more competent in that particular area. For example, they stress their competence in special education and physical education. Furthermore, they point out that their competence in a subsidiary subject is appreciated in the school context since they are often assigned tasks and responsibilities that enable them to utilise their subject of competence. Although the teachers pointed out that they developed a general didactic basis during their teacher education, they desired more concrete, hands-on knowledge. “Generally, I would say that the education has not given me so much flesh on the bones. It is more when you enter the working life that you get the real picture—what it really means to be a primary school teacher” (M2).

The teachers appreciated their practical experience in field schools during their teacher education, although obviously, they would have liked to gain more experience. They now find it especially difficult to support pupils at different levels in the learning process and emphasised that differentiation has been challenging when working as a teacher—for example, how to meet each pupil’s needs in large classroom settings and composite classes as well as the needs of gifted children. Their ability to further develop these skills and their capacity to handle issues concerning differentiation and individualisation have gradually increased.

In sum, the teachers experience pedagogical and didactic knowledge as stable and appropriate for professional practice. The *what* dimension of didactic knowledge is perceived as positive, while the *how* dimension is experienced as insufficient in terms of the complexity of the entire profession.

Relational knowledge

The teaching profession is relational by nature, and teachers must continuously handle various kinds of relationships, such as with parents, pupils, colleagues, and headteachers. In this study, the teachers describe how they have developed these relational capabilities in their everyday work.

Teachers emphasised the importance of cultivating relationships with parents and have gained confidence from them. However, they experienced contact with parents as challenging at the beginning of their careers. “It is actually a great part of your job, and [for] a newly qualified teacher, it is quite a new and perhaps scary experience when starting out in the profession” (F4). Some teachers (N = 6) in particular claim that several parents have questioned and kept an eye on them, requiring them to explain and defend themselves and their work. They have also often felt insecure in situations with more demanding parental contact; in some cases, the contact with the parents has even been nearly impossible to handle without additional help from other authorities. Nevertheless, they have developed the ability to handle different kinds of parental expectations and challenges in the profession.

All teachers report a sound and positive relationship with their pupils, and they underscore such a relationship as the most rewarding part of their job. They seem quite confident in how they want to foster good teacher–pupil relationships. They desire to be fair and want to treat every pupil as an individual to create fruitful collaboration with each and offer supportive learning conditions. At the same time, they understand the importance of enforcing clear regulations and rules and try to give every pupil the same opportunities. However, a general trend seems to be increasing individualisation and restlessness among the pupils. “The respect for other people is lacking. There are many pupils who are only thinking of me, me, me. They are such selfish individuals. If we take my class with 18 pupils as an example, they have difficulties seeing that they are not the only one[s] [who] can get attention. . . . It is very difficult” (F4). The teachers find it challenging to pay attention to and handle various personalities in the classroom and treat them in the same way. A few teachers (N = 3) further point out that it is quite demanding to know how to handle aggressive pupils and those with behavioural problems. They sometimes even feel resigned if a child uses physical or psychological violence against adults or his/her peers.

The teachers’ relationship with their colleagues is generally perceived as positive and encouraging. In the beginning of their careers, their colleagues played an important role in welcoming and introducing them to the school. Four teachers have been offered formal mentoring, while the majority have found informal mentors in school. The teachers’ positive experiences of both forms of mentoring have offered them both professional and personal support. They share close collaboration in matters such as curriculum planning, exchanging ideas, and teaching materials, especially in cases where the teachers have colleagues in parallel classes. “It is such richness to put your heads together and be able to think together. To have a colleague as a sounding board is also a great way to develop your own teaching” (F9). The relationship with the headteacher is not specifically mentioned or regarded as problematic

among the teachers. Headteachers in Finland have teaching duties themselves, which results in a virtually equal relationship. The personal support received by the teachers from their colleagues, the headteachers, and their mentors is appreciated and viewed as a basis for their further professional development. They could ask for help or discuss any issues they experience as problematic. “The safety of having an informal mentor has, of course, contributed to becoming more secure and being able to develop in your own way. You have confirmation that it is working out great. In this way, it has given me a lot—that the safety is there and you feel the support” (F3). However, teachers sometimes encounter a situation where the school authorities make decisions that affect their work in important ways without sufficiently communicating with the teachers themselves.

To sum up, the teachers’ view of their relational knowledge relates mainly to their experiences in the profession and not explicitly from their teacher education. In the beginning, the teachers felt insecure in coping with the parents but have gradually learned how to communicate with them. When entering the profession, the teachers appreciated the positive and encouraging support from their colleagues. However, they report establishing and maintaining relationships with their pupils as the most important aspect of the profession, sometimes rewarding, sometimes deeply exhausting. In conclusion, the teachers’ development of relational knowledge is attached to their experiences of handling dichotomous tensions between functional and dysfunctional relationships.

Research-related knowledge

The interviewed teachers emphasised that their research-related knowledge has largely been developed through the master’s thesis process. While writing a master’s thesis is a large and challenging project, it means that teachers become more conscious; they can evaluate knowledge in relation to previous facts and circumstances, enabling them to envision their job from a long-term perspective. However, the teachers experience a gap between the master’s thesis and the profession, and they do not really recognise how the thesis could be utilised in their work. Nonetheless, one teacher emphasised that she had made ample use of the action research method applied in her thesis, and the approach had contributed to her continuous development as a professional teacher. “Well, I have made a lot of use of action research as a method. . . . I think all the time of how I would like to renew and improve my teaching. I teach, consider, and reflect on how it went. Did it turn out well, or is it something I should do better or change?” (F9). This teacher experienced the concrete use of action research in her teaching compared to teachers using more conventional research methods in their thesis. The meaning of the research-based approach appeared quite unclear to these teachers even after five years of experience. One teacher even suggested replacing courses in research methods with more hands-on activities.

During their education, the teachers learned how to access information and process it reflectively and critically. They gained different perspectives on issues. “Research gives perspectives on life; it offers vast expanses. You become more conscious about things, and above all, when it comes to new information, you can put it in some sort of perspective” (F8). Teachers also view the information competence they have achieved as useful in the profession. A qualified teacher needs to be up to date all the time and able to find new information and facts about key issues. The critical approach they developed during their teacher education is considered crucial since they could then teach their pupils to be critical,

handle information reflectively, search for information, and conduct research. “In the teaching work in the classroom, we do research almost every week.... For example, if we read about the forest, the pupils are assigned the task of searching for facts about trees. Then, the pupils write down facts about the tree[s] and look for videos [about] the forest” (F1).

Besides the ability to find reliable information, the digitalisation of society requires teachers to continually increase their competence in information technology. Writing a master’s thesis also means gaining insights into different kinds of statistical tools and word processing programmes; this capability is perceived by some teachers as crucial in the profession.

In teacher education, students can choose to write a master’s thesis on a topic in which they are interested. In general, the teachers experience that they can use the CK acquired from the master’s thesis in their profession, especially if the topic of the master’s thesis is perceived as relevant to their actual job situation. This relevance, though, is restricted to particular themes, such as outdoor education, immigrant parents, and bullying. In other cases, the teachers experience the CK gained from the master’s thesis as useful but mainly at a principal level and not primarily in the classroom. During the thesis process, teachers learn to read, understand and write scientific texts. They further increase their vocabulary, develop academic language, and learn how to discuss a topic and argue convincingly. “When you write academic texts, you also have possibilities to put forward different arguments convincingly” (M10). All schools where the teachers are employed have development projects, and seven teachers explicitly mentioned their own engagement in different kinds of projects, including learning platforms, curriculum development, and outdoor education. The teachers are conscious of their strengths and limitations and their need to develop their skills in certain areas relevant to their professional job. Eight teachers expressed different visions on how to advance further in the profession, such as with special education, leadership education, and information and communication technology.

The results reveal that research-related knowledge is perceived as important for the ECTs. They have learned how to search for information, handle it reflectively and critically, and utilise academic language. The teachers expressed their ability to orient themselves in the scientific landscape by identifying, using, and understanding scientific texts. As shown, the most strongly emphasised benefit of thesis writing is the possibility of acquiring profound knowledge in a specific area. Besides these positive experiences, one critical point touches on the perceived weak relationship between the master’s thesis and the teachers’ daily work in the classroom with the pupils.

Discussion

This study aims to explore ECTs’ experiences of the professional knowledge developed during their research-based teacher education and throughout their first five years in the profession. In this concluding discussion, the identified knowledge areas—pedagogical and didactic, relational and research-related—are scrutinised in relation to the professional knowledge discussed in the theoretical framework.

The first knowledge area, *pedagogical and didactic knowledge*, is generally perceived as a stable and appropriate basis for teaching. Particularly, the *what* dimension is covered well, and the ECTs show a positive attitude. The teachers disclose that research-based teacher education equipped them with broad, manifold knowledge, comprising insights into all subjects taught in primary school and advanced knowledge in specific subsidiary subjects. The

context and the teachers' personal views of knowledge are very useful, and the knowledge gained during teacher education was consolidated and transformed when the teachers started working as professionals (see Connelly et al., 1997). The teachers flexibly adapt their pedagogical and didactic knowledge to the challenges and demands they experience in the school context (König et al., 2015; McCormack et al., 2006; Ruohotie-Lyhty & Kaikkonen, 2009).

Despite an appropriately experienced *what* dimension in teacher education, teachers often describe the *how* dimension of the profession as complex and multifaceted. The countless everyday tasks and responsibilities of teaching compete simultaneously for attention. Experiences of time pressure and other duties besides teaching add to the heavy workload. A common expectation among student teachers is that the profession is primarily practical, with an emphasis on teaching and classroom management. The teachers ask for more knowledge relevant for handling generic principles of teaching and classroom management. The teachers also highlight their work as fluid and mutable, including the rapid development of digitalisation and new techniques. An additional aspect that increases the strain on teachers is their frequent change of workplace, particularly in the beginning of their careers; this requires them to cope with different schools and new routines, methods, and cultures. This result corresponds with previous research findings confirming that the *how* dimension is experienced as insufficient (Aspfors, Bendtsen, Hansén & Sjöholm, 2011; Skaalvik & Skaalvik, 2015).

The second knowledge area, *relational knowledge*, also attaches the *how* dimension of teaching and stands out as an essential part of teachers' professionalism. Teachers call for more practical hands-on knowledge from their teacher education about how to handle different kinds of challenging responsibilities even though this ability has been developed, consolidated, and transformed during their first years in the profession (Connelly et al., 1997; Smith, 2007). At the beginning of their careers, the teachers experienced contact with parents as particularly challenging because of their insufficient knowledge and experience. They often felt insecure in handling this issue, especially in parental relationships that are particularly demanding. Gradually, they have increased their ability in how to communicate with the parents.

Establishing and maintaining relationships with their pupils is regarded as the most important aspect of the profession, sometimes highly rewarding. Maintaining good relationships with pupils could nevertheless be demanding and sometimes exhausting due to increasing individualisation, restlessness, and even aggression among the pupils. This result is in line with those of previous studies stressing the dichotomous tensions between functional and dysfunctional relationships (Aspfors & Bondas, 2013; Isenbarger & Zembylas, 2006; O'Connor, 2008; Sutton & Wheatley, 2003). However, the emphasis on relational knowledge among this study's informants is not so apparent in previous research related to personal practical knowledge (see Smeby, 2007).

The encouragement and support of colleagues is perceived as essential for the teachers. Receiving help in overcoming difficulties, especially in the beginning, and being offered opportunities to reflect on key issues together have enabled the new teachers to develop their professional knowledge. In Finland, a peer-group mentoring model has been implemented nationwide since 2010. Although this programme has been funded by the Ministry of Education and Culture, it is up to the municipalities to decide on the extent to which they will offer formal mentoring for teachers (Heikkinen et al., 2012). Only a few teachers

involved in this study have experienced this kind of formal mentoring, but those who have participated appreciate the support.

The third knowledge area, *research-related knowledge*, is generally perceived as a relevant platform for the profession in terms of the ability to handle information and different kinds of scientific texts as well as acquire profound knowledge of a particular topic. Through writing their master's thesis, the teachers developed academic language and learned to read, understand, and write scientific texts (Aspfors & Eklund, 2017). They also note the importance of knowledge for handling information in relation to both their own development and teaching and their pupils' learning.

Although the master's thesis provides a stable research base, some teachers find it quite challenging to recognise its concrete relevance to the profession and the school community (Eteläpelto et al., 2015; Toom & Husu, 2012). The critical point touches on the repeatedly expressed weak relationship between the master's thesis and the teachers' everyday work in the classroom with the pupils. This result points to the necessity of paying more attention to the question of how to develop the master thesis that serves and supports teachers' everyday work (Eklund, Aspfors & Hansén, 2019). According to the informants, an action research design would be one way forward (Bendtsen, Eklund, Forsman, & Pörn, 2019).

All the teachers, except one who used action research, have experienced the thesis as having limited practical use in their actual job situation, despite the possibilities of making use of some specific topics from their thesis in their everyday work. The teachers explicitly mentioned research-based knowledge when talking about the different development projects they are participating in or are responsible for in their schools (König et al., 2015; Ruohotie-Lyhty & Kaikkonen, 2009). The purpose of research-based teacher education is for teachers to develop research-related competence, that is, critical thinking and the ability to reflect on key issues related to the profession (Tirri, 2014). Although all teachers claim that they work in a research-oriented way, only one explicitly confessed using an action research approach in her work (Ulvik & Riese, 2016). The five-year teacher education program and the first five years in the profession have provided appropriate requirements for the teachers' maturity and development, that is, their personal professional knowledge.

Limitations and further research

The gender distribution corresponds to the average distribution of female and male teachers working in Finland and internationally (Jensen et al., 2012). Nevertheless, due to the limited number of interviewees, it is difficult to know if the participants are representative of the group as a whole. Another challenge of the study is the selection process. Six randomly selected informants were interviewed by two research assistants. However, since it was difficult for the assistants to recruit teachers as participants, the other four informants were interviewed by the researchers because being teacher educators made it easier to get in touch with potential informants. The interview guide, originally developed for the Norwegian part of the research project, was comprehensive and covered three themes. For this study we have only one of the themes: professional knowledge. Since only the interview data was utilised in the study, there is a missing link between the teachers' verbal knowledge and practice. To deepen understanding of the relationship between these two facets, future studies could include detailed observations and documentation of teachers' actions in classrooms (see Ben-

Peretz, 2011). In the larger longitudinal and comparative research, of which this study is a part, it would be motivating to continue and further expand the comparative analysis of teachers' work experiences.

Conclusions

Research-based teacher education in Finland has gained much attention over the last decade. However, less is known about how the professional knowledge acquired during teacher education functions and is applied and further developed in teachers' daily practice. This study highlights how ECTs experience the professional knowledge they have developed during their research-based teacher education and throughout the first five years of their teaching careers. When relating the study's results to the theoretical framework of professional knowledge, particular patterns emerge.

The concept of research-based teacher education is prevalent in its inherent *research-related knowledge*. In teacher education, student teachers learn to navigate in a scientific landscape characterised by their ability to reflect, use academic language, and acquire profound knowledge in a specific area. However, entering the school practice means a disruptive change from being student teachers to becoming full-fledged teachers. The ECTs suddenly realise that they are navigating in a quite different landscape, where they find it demanding and difficult to act and apply the knowledge gained in a different operating structure.

In contrast, *relational knowledge* is mainly developed in the profession; compared with teacher education, the work as a teacher requires adaptation to another kind of relational structure. This kind of personal practical knowledge is situated and experiential, developed among individuals as teachers encounter diverse work experiences in different school contexts. Teachers bear the entire responsibility for their students and as members of the faculty; they also interact with parents and the local community. The teachers' knowledge interacts with and is reshaped by the reconstruction of their experiences in everyday life. However, the emphasis on relational knowledge among our informants is not so apparent in previous research about personal practical knowledge.

Pedagogical and didactic knowledge corresponds to Shulman's concept of PCK, the knowledge necessary for teaching, such as instructional processes, students' learning, understanding of the curriculum and teacher performance assessment, and sufficient subject-matter knowledge. According to this study's results, ECTs develop a pedagogical and didactic basis in teacher education for performing as teachers, while early career practice further contributes to deepening their personal practical knowledge.

The results reveal the need for relational and collective support for the teachers to navigate in an unpredictable professional landscape. When synthesising the findings, the contours of a two-sided picture emerge. The first side, which points to the *what* dimension, indicates that teachers experience teacher education as a solid theoretical foundation. The second side, which refers to the *how* dimension, reveals that teachers find that the first five years of working as teachers have developed their personal practical knowledge and skills, which were not provided sufficiently in teacher education.

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