

The Role of Educational Science in Professional Knowledge: Student Teachers' Reflections

Mirva Heikkilä¹, Ville Mankki², Tuuke Iiskala¹, & Mirjamaija Mikkilä-Erdmann¹

1. University of Turku, Finland.

2. University of Jyväskylä, Finland.

Contact: Mirva Heikkilä, University of Turku, Finland. mirva.heikkila@utu.fi

Abstract

The significance of theoretical knowledge for professional practice is widely acknowledged, but how students in professional education construct meanings of their major subject remains understudied. This study examined how primary student teachers reflect on the role of educational science in their professional knowledge. Textual data were collected after their first practicum in a Finnish primary teacher education programme. Discourse analysis identified four discourses. In the discourse of depth, educational science enabled a thorough understanding of pupils. In the discourse of multifacetedness, simultaneous consideration of multiple aspects of teaching was evident. In the discourse of topicality, teachers could stay updated regarding the knowledge society through educational science. The discourse of systemicity underscored the contribution of educational science to societal progress. This study provides a better understanding of student teachers' professional knowledge in curriculum development and programme design within teacher education.

Keywords

Professional knowledge, discourse analysis, teacher education, educational science, major subject

Introduction

In professional higher education, students' major subjects play an important role in shaping how knowledge resources are adopted and adapted for use in practical training and future professional practice. An abstract theoretical knowledge base is a key characteristic of any profession (Hatlevik & Smeby, 2015). In professional education, the major subject is the main mediator of this knowledge. However, newly qualified teachers often struggle to integrate the theoretical knowledge they gained during their studies into their practical work (e.g. Leijen et al., 2015; Puustinen et al., 2018; Zaragoza et al., 2021).

To better support student teachers' academic study achievements, further research has been called for to examine how teachers perceive their studies (Lähteenmäki et al., 2024). Despite this need, students' perceptions of their major subjects, which are integral to their professional knowledge, have been scarcely studied. Existing research has focused on the reasons and values underlying the choice of a specific major (Goller et al., 2019) or the change of a major (Bäulke et al., 2022) rather than on the role of major subjects in building professional knowledge. In addition, there are challenges in the Finnish teacher profession that also challenge teachers' professional knowledge, such as an increasing school segregation and selectiveness that cause societal differentiation (Peltola, 2021). On the international level, there are even more challenges, such as difficulties in recruiting competent teachers, teachers' declining academic achievements, and the declining status of the teaching profession (Alatalo et al., 2021). These challenges further highlight the importance of examining student teachers' relationships with their training.

In this study, we investigated Finnish primary student teachers' reflections on educational science, which is their major subject. In Finland, educational science as a major includes studies in educational psychology, general didactics, research skills, thesis work, and several supervised teaching practicums in teacher training schools. We used discursive methodologies that focus on the ways in which meanings are constructed by language use. This perspective is beneficial because professional discourses and narratives are not confined to the individual but are constituted through reciprocal relationships embedded within cultural conventions (Heikkilä, 2022b). This study enhances the previous understanding of how student teachers construct meanings of their professional knowledge (Heikkilä & Hermansen, 2024; Hermansen & Mausethagen, 2023; Nerland & Jensen, 2012) by addressing the research question, "How do primary student teachers construct meanings of educational science as part of their professional knowledge?"

Professional knowledge of teachers' work

Knowledge formation and construction are prerequisites for developing a coherent understanding of teachers' work (Campbell, 2018) and thus for mastering the core challenges of the teaching profession (Guerriero & Révai, 2017). However, over the years, there has been considerable debate about what constitutes professional knowledge in teaching, which can also

be understood as underlining the importance of knowledge to the profession (Loughran, 2019). Some researchers consider only research-based knowledge as professional knowledge (e.g. Zaragoza et al., 2021), whereas others include practical, relational, and experience-based knowledge (e.g. Hermansen & Mausethagen, 2023). This study follows the latter view, focusing on theoretical knowledge (Hatlevik & Smeby, 2015), while also recognising the need to integrate it with other knowledge resources to be properly used in the profession (Phillips et al., 2023).

Acting in the profession, teachers draw on a diverse range of knowledge sources, including those related to school subjects, subject didactics, pedagogical knowledge, social relations, organisational knowledge of the school sector, specific student groups and their families, and the community surrounding the school (Heikkilä & Hermansen, 2024; Shulman, 1987). These knowledge sources are also evident in efforts to categorise teacher knowledge, as exemplified by the seminal classification proposed by Shulman (1987), which includes content, pedagogical, and pedagogical content knowledge and its elaborations, such as the technological pedagogical content knowledge framework developed by Mishra and Koehler (2006). The existence of multiple domains and their intersections underscores the multifaceted nature of the knowledge necessary for effective teaching.

The realities of day-to-day teaching fuel the need to understand teachers' professional knowledge and its development, use, and value through practice, which involves understanding the synergetic relationship of formal and practical knowledge (Loughran, 2019). Thus, at the individual level, situational and practical experiences can also contribute to professional knowledge, provided that they are understood, interpreted, reflected upon, and elaborated through the lens of practical knowledge. By critically reflecting on previous teaching episodes, teachers can use both personal and practical knowledge (Wieser, 2016). This is because teachers require continuous adaptation to emergent and evolving classroom processes and situation-specific skills to exercise professional judgement (Biesta, 2007). Teachers enrich their professional knowledge through application and reflection within the specific circumstances and pedagogical contexts in which they navigate between general and specific knowledge (Loughran, 2019).

Recent research has increasingly focused on examining teachers' professional knowledge from theoretical stances rooted in social practice-based perspectives (Hermansen & Mausethagen, 2023; Knorr Cetina, 2001; Nerland & Jensen, 2012). The present study examined the diverse relationships and cultures surrounding professional knowledge in teachers' work, emphasising that knowledge use is context-dependent and involves conceptual and material artefacts. This means that knowledge takes on different purposes depending on its context of use. In teacher education, this can be particularly evident in practicums, where student teachers navigate between several knowledge sources.

The role of teacher education in the development of professional knowledge

Teacher education is crucial in shaping student teachers' professional knowledge. How student teachers learn to construct meanings of professional knowledge is likely to impact their pre-service qualification process and future professional practice (Hermansen & Mausesthaugen, 2023). Research suggests that teacher education programmes focused on research are effective (Tatto, 2015) because they help students and in-service teachers perceive and interpret their teaching experiences in ways that would otherwise not be accessible to them. The research base of teacher education has been strengthened in many countries (Afdal & Spernes, 2018; Darling-Hammond et al., 2017). Learning to consume and conduct research fosters critical, creative, and productive engagement with professional knowledge (Barnett, 2005). The research used must be of sufficient quality, up to date, relevant to the situation in which the teachers work, and judiciously applied, in line with ethical demands and role obligations (Phillips et al., 2023). In this process, the major subject plays the most important role.

Epistemic diversity is a key characteristic of teacher education (Hermansen & Mausesthaugen, 2023). It manifests in curricular divides between academic disciplines, school subjects, and educational foundations, as well as in the major separation between university and school as distinct learning arenas (Hatlevik & Smeby, 2015) characterised by differences in institutional practices, logics, and conventions for defining legitimate knowledge (Knorr Cetina, 1999). This separation is further emphasised by the differing epistemic beliefs held by institution-based and school-based teacher educators (Hatlevik & Smeby, 2015).

Consequently, student teachers may struggle to grasp the relevant knowledge in teachers' work and to achieve a sense of epistemic coherence owing to the various institutional practices and knowledge types associated with each context (Heikkilä & Hermansen, 2024). Knowledge acquisition by student teachers must undergo negotiation processes to establish meaningful relationships with various types and aspects of knowledge that render them applicable in practical work (Hatlevik & Smeby, 2015). Previous research has illustrated how student teachers actively engage in knowledge work as they apply knowledge from one institutional context to another by using research skills in the practicum (Heikkilä, 2022a).

Epistemic diversity has often been verbalised in the gap metaphor between theory and practice, which are perceived as distinct and separate entities, thus usually strengthening the dichotomy. In this context, *theory* typically refers to educational theories and research-based knowledge taught in teacher education, whereas *practice* refers to teachers' practical work in the classroom (e.g. Hermansen, 2020; Leijen et al., 2015). This perceived gap between theory and practice has been considered problematic (Jenset et al., 2019; Puustinen et al., 2018), making it challenging for students and newly qualified teachers to apply theoretical

knowledge to their teaching practice and connect theories to their work (Leijen et al., 2015; Zaragoza et al., 2021).

Rather than reinforcing the dichotomy between theory and practice, an increasing focus is placed on understanding how different forms of knowledge are intertwined in specific situations of professional practice. The aim should be to find a non-dualistic position that acknowledges the importance of both theory and practice (Biesta, 2007; Hermansen & Mausethagen, 2023; Hordern, 2019). Emphasising personal reflections on knowledge makes it possible to overcome the gap between theory and practice, and recognise that professional knowledge encompasses both theoretical and practical elements. Student teachers play an active role in creating personal and agentic relationships with professional knowledge (Heikkilä, 2022a; Heikkilä & Hermansen, 2024). This involves attention to outputs and processes (Healey, 2005). In other words, in the instruction of the major subject, the focus should be not only on knowledge resources but also on knowledge generation processes, such as practising research skills (Hermansen & Mausethagen, 2023). To build on this tradition, we examined how student teachers construct meanings of educational science. Thereby, educational science is viewed not only as theoretical information to be digested (which is also important) but also as processes of doing, that is, of engaging with education science in classroom practice through more advanced methods of noticing, interpretation, and decision-making.

Methods

Context of the study

Teaching is a valued profession in Finland, and Finnish teachers have a great deal of agency in their work (Heikkilä et al., 2023). Teacher autonomy is guaranteed by law, as there are no standardised tests or school inspections. Teachers are not expected to merely train children in specific skills but to provide them with a more holistic education (Mikkilä-Erdmann et al., 2024). The acceptance rate for primary teacher education programmes is less than 10%, which means that universities can choose the best-suited students for the profession (Mikkilä-Erdmann et al., 2024). Moreover, the accountability policy in Finland is different from that in many other countries, and initiatives are implemented through consensus, collaboration, and shared development (Toom & Husu, 2021).

In other countries, many teacher education programmes include some kind of educational science as a subject domain, but its organisation and whether it forms a “major” vary across geographical and educational contexts. In Finland, primary student teachers major in educational science, study subject didactics, and take minors such as special needs pedagogy or advanced studies in subject didactics, such as music or mathematics, which allows them to teach in more numerous positions.

This study was conducted at a university that represents a typical primary teacher education programme in Finland. According to the curriculum of the primary teacher programme at that

university, the point of departure for the programme is close, research-based interaction between teaching and educational and multidisciplinary research (Mikkilä-Erdmann et al., 2024). The professional basis for the programme is teaching in grades 1–6 in comprehensive schools. The structures of the primary teacher education programmes in universities throughout Finland are basically similar, although some regional differences and emphases exist.

Data collection

We collected textual data from student teachers' coursework after the completion of their first teaching practicum, which was part of a wider entity of the course and was assessed as either "passed" or "failed." Prior to the practicum, student teachers had studied the basics of educational science and research skills on campus. The practicum took place in a teacher training school, as in primary teacher education in Finland in general, and its goals included introducing teachers' workload and the learning environment and multicultural classrooms, observing interconnections between theory and practice in teaching and learning situations, and introducing various teaching methods (Mikkilä-Erdmann et al., 2024). Of the 100 student teachers enrolled in the practicum, 61 (61%) consented to participate in this study; thus, their reports were analysed. Of the participants, 51 were female and 10 were male, and their ages ranged from 19 to 45 years, however most were in their early 20s.

The student teachers were given the following guidelines for writing their reports:

Reflect on your thoughts about the following topics and justify your views (why you think like that). Link your reflection to the practicum and other study modules in the teacher education programme and literature if you wish. Write in your own words. You can use the numbered parts as subtitles. Aim for a reflexive writing style instead of mere descriptions.

In the part used for this study, the guidelines were as follows:

Reflect on the significance of educational science in the teaching practicum: What is educational knowledge according to your view? What is the significance of educational science in teachers' work? What is the role of research skills in teachers' work? How can teachers develop their work? What educational phenomena did you notice in the practicum? How were they manifested?

Although the topic of educational science was only one part of the report, it was the only part used in the study. Our initial goal was to use the whole report, but we found that the parts were quite separate and written differently. The section concerning educational science in the practicum was mostly written in a way that was both reflexive and profound, and appeared to stimulate the student teachers to reflect on professional knowledge, although this was not explicitly asked. The length of the parts used ranged from 100 to 300 words.

This study complies with the ethical principles of research with human participants and the ethical review in the human sciences in Finland, published by the Finnish National Board on Research Integrity TENK (TENK, 2023). According to these guidelines, a formal ethics review statement from an ethics committee for human sciences was not required for this study. Identification codes were used for anonymity. The student teachers were asked to provide written permission for their report to be used for research purposes, however they did not know the exact topic of the research, which means that it did not influence their answers.

Data analysis

We used discourse analysis to examine how the student teachers constructed meanings of educational science. Discourse analysis is a broad methodology for studying language in use and is simultaneously an analysis of language and practices in society (Gee & Handford, 2012). It is founded on the idea that through speaking and writing, we make the world meaningful in certain ways and not in others, and we shape, produce, and reproduce the world through language in use (Gee & Handford, 2012). The origins of discourse analysis are social science and philosophical frameworks by postmodern theorists, such as Michel Foucault (1926–84). However, discourse analysis, which may also be called textual analysis, is now also used in small-scale educational research in more applied ways (Atkins & Wallace, 2012).

The term *discourse* simply signifies an expression of a point of view that is taken for granted and left unquestioned (Atkins & Wallace, 2012). Such expressions are not always formulated as explicit arguments but are often conveyed through subtler means that can be revealed through textual analysis. Discourses are constructed by careful choices of emotive words or a careful selection of facts, which leaves out those that do not fit the point of view in case (Atkins & Wallace, 2012). They are also interconnected with the cultural expectations with which the speaker or writer negotiates (Heikkilä, 2022b). In other words, individuals do not entirely or consciously choose specific recourses; rather, they draw upon and enact culturally available discourses to make sense of their experiences and activities. Thus, discourse emerges through the use of grammatical and linguistic resources situated within a specific cultural context.

In addition, we also draw from linguistic research by paying attention to Hyvärinen (2008) and Tannen's (1993) "evidence of expectation," which includes features such as repetition, hedging, negation, contrast, evaluative language and evaluative verbs. Analysing these grammatical resources reveals how individuals negotiate between personal and cultural expectations, demonstrating that such expectations are socially shaped and conventionalised (Hyvärinen, 2008). In this way, language is examined not only as a tool for communication but also as a social practice embedded within broader societal structures (Gee & Handford, 2012).

We began the analysis by carefully reading all the reports. After the research theme was narrowed to student teachers' reflections on educational science as part of their professional

knowledge, we focused on the part concerning educational science in their practicums. Following Hyvärinen (2008) and Tannen (1993), we paid particular attention to repetitions, hedges, negatives, contrastives, evaluative language, and evaluative verbs to reveal the grammatical resources that the student teachers used. On the basis of this analysis, we found that the student teachers constructed meanings of educational science through four discourses, each reflecting a particular aspiration for their future professional roles. Across all discourses, educational science appeared to be something they wished to engage with proactively. However, the nature of this engagement varied: Two discourses emphasised individual-level practices, while the other two were oriented towards broader societal change.

After identifying the discourses, we used colours to highlight those parts of the data. We presupposed that the discourses would be visible and change between sentences and inside sentences; thus, we were prepared to use a small unit of analysis. However, it turned out that the discourses emerged in larger parts of the text, often consisting of several sentences. After completing the analysis, we also found that the four discourses were fairly equally represented in the data. However, some sentences were written at such a general level that they did not indicate any discourse.

Findings

In the following sections, we present four discourses indicating striving for depth, multifacetedness, topicality, and systemicity. The first two discourses focused on individual teachers' professional development. In the latter two discourses, the perspective on educational science was broader, relating to society and its changes.

Discourse of depth

The discourse of depth was characterised by expressions related to understanding pupils and their needs in a profound manner. In this discourse, educational science was manifested as vital in understanding pupils' behaviours, backgrounds, and families to teach and educate them. Scientific educational knowledge enabled the student teachers to rise above the firsthand impressions that a person without teaching qualifications might rely on. The outputs and processes of educational knowledge were visible in this discourse. First, research orientation and the skills of noticing and observing, which the student teachers had just learned and practised, were expressed as important. Second, reading educational research literature was considered effective in deepening pupils' understanding. The ability to diagnose learning difficulties was also mentioned. In the following excerpt, educational science is depicted as a foundation that provides teachers with insights into what issues are important and how and why to take certain actions:

For a teacher, educational knowledge is important. It highlights the importance of observation and makes the teacher more responsive to observations. Studying educa-

tional science also makes it easier to process the observations. It is easier to understand causalities in pupils' behaviour or learning by having a knowledge base of the issue. Educational science also gives the teacher the tools to discuss these issues and helps to understand the child and support them further.

In addition, research skills play an important role in teachers' work. Such skills speed up the teacher's observations. The teacher is also able to utilise observations in planning teaching and connect pieces of knowledge more quickly to each other. (Student Teacher 11)

In this excerpt, the student teacher strives to understand the pupils deeply. The discourse appeared to maintain that the teacher should not depend on everyday firsthand observations, as mastering educational science reveals further nuances. The message is highlighted by several positive verbs, such as "to make easier," "to understand," "to give," "to help," "to be able," and "to utilise." The processes of educational science are emphasised by the argument that research skills make teachers more capable of observing, while the outputs are evident in the statement that a teacher's knowledge base makes them more capable of understanding those observations. Both perspectives are strengthened by metaphors: research skills as "giving tools" and knowledge base as "connecting pieces." An efficiency perspective, presented in a positive light, is also visible in terms of "speeding up" observations and integrating knowledge "more quickly." Thereby, the discourse argues for the role of educational science in facilitating communication in the school environment.

Discourse of multifacetedness

The discourse of multifacetedness also focused on individual teachers' professional development, but in a different way. The nature of teachers' work was manifested as situational and thus required multiple perspectives. The expressions highlighted that the circumstances slightly differed every day; therefore, teachers were required to continuously adapt to what transpired in the classroom. The discourse presupposed that there is no ready-made or one-size-fits-all recipe for good teaching. Professional knowledge involved reading a wide array of educational research literature because it offers many multifaceted views on teaching. For example, by reading scientific articles, they can gain insights and ideas to modify their teaching. Research literature was described as useful in shaping their professional identity as teachers because professional knowledge was about realising this many-sidedness. In the following excerpt, the student teacher reflects on the multifaceted character of teachers' work, which requires combining knowledge resources, such as theoretical knowledge and knowledge from different policy levels:

Educational science is significant in teachers' work because education and teaching are always goal-oriented activities. It is meaningful because education and teaching are not just occasional activities happening for occasional reasons. Educational science and understanding education have an important role in the teachers' work and

education, whereby the teacher bases their activities on scientific knowledge. Therefore, teachers' work is not only based on their own opinions and views but also has a scientific basis. For example, during the practicum period, it was easier to plan lessons when you understood the objectives of the subjects and were able to combine the different phases and objectives of the lessons with each other. During the practicum period, the knowledge learned from the courses also helped in constructing the lessons. (Student Teacher 71)

In this excerpt, the role of educational science is viewed as intertwined with teachers' professional practice. The discourse was constructed by depicting different aims, which link educational science and professional practice. The student teacher mentions aims at many levels: general aims of education and teaching, school subjects in the curriculum, and separate lessons. These aims are conceptual artefacts that guide teachers' work. From their point of view, this work was rendered more effective and versatile by mastering educational knowledge, which offers multiple perspectives on daily teaching. The discourse is highlighted by strong adjectives, such as "significant," "meaningful," and "important," and by two uses of the adjective "occasional" (repetition). Words such as "whereby," "therefore," and "for example" support the argument for tying knowledge resources from the campus and practicum.

Discourse of topicality

The discourse of topicality is characterised by the element of time. In general, teachers' work and professional development were manifested as strongly tied to time, and teachers' professional knowledge included several approaches. First, the discourse maintained that teachers must keep up with changes in society. For example, teachers must discern valid knowledge from disinformation and misinformation. Second, to perform well, they must keep up with the educational research literature as new, up-to-date research findings emerge all the time. Third, teaching methods and education styles have evolved. Fourth, reflection is a prerequisite for teachers' professional development. However, in this discourse, teachers' tasks were expressed not only as trying to keep up with everything but also as proactively impacting school development (e.g. the curricula). This is also expressed in the following excerpt:

In the practicum, we had the opportunity to practice the knowledge we had drawn from the university. Educational knowledge is the theoretical knowledge that we learn at the university and that we can concretely implement in the practicum and working life. It involves studies on society and education, which aim at developing teachers' know-how on improving oneself as an educator. Producing educational knowledge by research is necessary because society is changing all the time and thereby also people. That's why it's important to find new perspectives and causalities. Thereby, we can change while the world is changing, and educational knowledge remains topical and high-quality. Being a teacher is about constant development. As a teacher, you can

develop yourself by reflecting on your work and searching for new information from the most topical studies. (Student Teacher 18)

In this excerpt, the approach is more holistic than in the previous discourse; it is about not only the teacher but also society. Verbs such as “improve,” “change,” and “develop” involve the aspect of time and simultaneously refer to optimism concerning society and education. The expectation appears to be that if teachers turn to research-based knowledge and have the energy for professional development and reflection, education can be improved. In general, the attitude towards educational science is manifested as positive in this extract, as indicated by verbs such as “having an opportunity” and “can,” the latter of which is expressed several times. The excerpt also shows a shift from the subject position of the teacher to a wider perspective: The student teacher argues that educational knowledge must remain topical and high quality. In general, the discourse of topicality appears to be interwoven in several ways. The changing society makes teachers’ professional development and conducting educational science necessary; however, this is not depicted as a strict obligation but as an inspiring opportunity.

Discourse of systemicity

In the same vein as in the previous discourse, the discourse of systemicity extended beyond the individual teacher’s work. This discourse highlights the interconnectedness of research and teaching. The perspective was not only that teachers should have knowledge of educational research literature and base their teaching on research findings, but also that teaching impacts research. In addition, the participants referred to the role of educational science as not only informing teachers about how to teach but also being vital to developing schools and society in general. For example, knowledge of curricula could not be viewed as stable and something that teachers should simply adopt, as curricula are updated according to recent research. Thus, educational knowledge is expressed as ambivalent and ever-changing in society. Teachers’ professional development was characterised by learning to see connections between different phenomena. In the following excerpt, a wider picture of educational science beyond teachers’ work is illustrated:

In my view, educational knowledge is knowledge of education, cultures of education, and processes and institutions of growth and learning. Educational knowledge is formed by wide-ranging research on education, civilisation, and its societal relations. Education plays an important role in teachers’ work. Educational knowledge is critically and creatively applied in educational practices and pedagogics. The role of research skills in a teacher’s work is to maintain the quality of teaching. Science is constantly evolving, and that is why it is important that the teacher keeps up with current research on educational phenomena. In this way, we guarantee education that is based on recent research and is of high quality and equal in Finland, regardless of regions, schools, or teachers. (Student Teacher 90)

In this excerpt, educational research-based knowledge is defined broadly not only by pedagogy, but also by cultures, processes, and institutions of education, and it is linked to relationships in society. Striving for systemicity is visible in the view of teaching as part of this whole, and powerful words are used, such as “the processes and institutions of growth and learning,” “wide-ranging,” “civilisation,” and “to evolve.” In addition, the value of educational science is manifested not only as informing the teacher but also, more broadly, in its critical and creative application in wider practices of education. “Criticality” and “creativity” are skills that university-based teacher education can, at its best, offer; however, explicit use of these expressions requires advanced reflection from a student teacher. When speaking about research skills, the output view is more strongly emphasised. In this excerpt, being up-to-date with educational research literature is linked to the macro-level aims of high-quality and equal education. Verbs such as “to maintain” and “to guarantee” refer to the wide purposes of educational science, and the pronoun “we” refers to an expectation of a collective responsibility of teachers and a will to be part of that.

Discussion

This study examined Finnish primary student teachers’ reflections on the role of educational science as their major subject and contributes to discussions of professional knowledge in professional education (Hatlevik & Smeby, 2015; Heikkilä & Hermansen, 2024; Hermansen & Mausesthaugen, 2023; Nerland & Jensen, 2012). The discourse analysis of student teachers’ written reflections revealed distinct aspirations, illustrating the diversity in which student teachers perceive educational science. Despite having spent only a few months at the university and participating in a limited number of courses related to educational science before engaging in their practicum, the student teachers constructed a meaningful relationship between educational science and professional practice. The reflections did not exhibit a clear dichotomy between theory and practice (cf. Puustinen et al., 2018). Instead, they revealed the significance of theory for practice and vice versa while differing in terms of whether the focus was more on an individual or societal level. The practicum context, where the student teachers reflected on their major, highlighted knowledge processes alongside knowledge outputs (Healey, 2005; Hermansen & Mausesthaugen, 2023).

In summary, the discourses indicate that beginner student teachers exhibit diverse needs and purposes for educational science. This ranges from seeking depth and versatility in their teaching to staying current with societal trends and comprehending the broader societal implications of their work regarding contributing to change, educational quality, and equality. In countries where primary teaching is not a popular profession and programmes lack suitable candidates, a similar situation is difficult to imagine. For the present, these findings are encouraging.

In the discourses of depth and multifacetedness, the focus was on individuals: understanding and supporting the pupil or teacher. The reflections manifested skills that included observing

pupils, planning lessons, and providing rationales for teachers' actions. According to previous research, observation can help student teachers better understand their students and their backgrounds (Heikkilä et al., 2023). In the discourse of depth, educational science was a valuable tool for conducting in-depth examinations of individual pupils and classrooms.

The discourses of topicality and systemicity transcended individual pupils or teachers. Further, by acknowledging community, society, and cultural levels, extended beyond the confines of "the school walls." Within these discourses, teachers were not perceived as solitary figures in their own classrooms. Instead, they were recognised as professionals with a societal impact. While the discourses of depth and multifacetedness emphasised the importance of theory for practice, the discourses of topicality and systemicity underscored the importance of practice for society. Hence, the latter discourses portrayed teachers as school reformers engaging in collaboration with the community. Considering the current challenges related to the increasing segregation of schools in Finland (Peltola, 2021), educational science could equip student teachers with agency to actively contribute and express themselves in society as educational professionals in a large sense.

Particularly in the discourse of systemicity, attention was given to the importance of practice influencing theory. This relationship introduced a sense of epistemic agency, depicting teachers as active contributors engaged in knowledge-laden activities (Heikkilä et al., 2023). Teachers were portrayed as proactive actors who took a stance (e.g. regarding equal education) as part of their expertise. This discourse incorporated ethical considerations into the reflections on the teaching profession. However, in depicting the discourses in this manner, we do not imply that the latter two discourses depict more advanced ways of engaging with educational knowledge. Indeed, in the discourses of depth and multifacetedness, research literacy (Eriksen, 2022; Phillips et al., 2023) and specific research skills, such as observation and critical thinking, were emphasised. Such research skills can help student teachers reflect on themselves as future professionals (Heikkilä et al., 2023).

The student teachers' reflections on their experiences in the practicum underscore the inherent interconnectedness of theory and practice within the realms of teaching and teacher education. This article actively contributes to ongoing discussions surrounding the relationship between theory and practice in teacher education, aligning with prior studies that challenge the utility of rigidly distinguishing between the two (Hermansen & Mausethagen, 2023; Hordern, 2019). Our findings also indicate that student teachers perceived their major subject as meaningful and relevant to their professional development. Methodologically, the discourse analysis illustrated how student teachers constructed the meanings of educational science at the language level. As a practical implication, the role of teacher educators is to actively facilitate the process of establishing meaningful connections between diverse knowledge domains. In addition, teacher educators are tasked with making this amalgamated knowledge visible to ensure that student teachers can effectively integrate and apply their learning across various facets of their educational journeys.

This study has limitations. First, as the data were collected in connection with a course, it remains unclear how the participants might have responded in a different setting, such as an interview or written task conducted by a researcher from another institution. Second, the study did not capture the evolution of the student teachers' reflections and did not include the perspectives of more experienced teachers. However, the novice student teachers could already construct wide and varied meanings of educational science.

Teacher education is shaped by sociocultural norms and predefined notions of the ideal teacher, which influence student teachers' views of themselves as professionals (Juutilainen, 2023). Therefore, further research is needed into how student teachers' discourses on educational science evolve during their initial teacher education and professional careers, and into how to best support student teachers in perceiving their role in the knowledge society.

Conclusion

Providing support to students in their professional fields to enable them to engage with their majors as part of their professional knowledge involves considerations at multiple levels. While individual teacher educators must attend to this aspect, this study conveys a significant message for the broader domains of programme development and curriculum design in teacher education. The discourses of depth and multifacetedness indicate that student teachers are willing to examine their own work in practicums and in future teaching and articulate a need to have theory and research skills as entangled tools when entering the classroom. In addition, insights from the discourses of topicality and systemicity provide valuable knowledge. The findings highlight that novice student teachers perceive themselves as integral actors in society and are driven by broader aspirations to contribute to educational change, equity, and school development. Finally, it is a question of the meaningfulness of work. In teacher education programmes, the ultimate goals of the teaching profession should be visible and discussed with student teachers. The student teachers seem to be interested in how the profession is constructed through time and determining the ethical drivers of the profession.

However, student teachers may not receive ample support and encouragement in this direction throughout their studies. In Finland, primary teacher education programmes often emphasise educational psychology but place less emphasis on educational sociology, educational philosophy, and educational history, and those areas are less visible in the practicums. Teachers' role as developers of schools and communities (Reinius et al., 2024) could be strengthened through a more comprehensive consideration of various perspectives from different educational science traditions. Alongside educational psychology, educational sociology, philosophy, and history should also be taught and integrated with teaching practicums to support student teachers' professional development into agentive actors in society. Thus, the fundamental question of what areas of study to include in the major is still valid for curriculum design and programme development in teacher education and other professional fields.

In any professional field, students' aspirations for their major should be supported. It is not self-evident that students in all professional fields have a clear vision of their major and its practical benefits in their future profession, as was observed in the participants of this study. The main implication of this study is that it provides tools for teacher educators to know the student teachers and support their aspirations. The study enables actors within teacher education to understand that there are several, different perspectives on the major among student teachers. For curriculum design, the study gives an idea that the teaching of educational science could be organised according to the principles that are found as discourses in this study: depth, multifacetedness, topicality and systemicity. In addition, the study highlights that the teacher educator can help student teachers to step back and reflect on their own thinking about the role of educational science in the teachers' professional development. When student teachers are asked to reflect on their major, it also makes possible for student teachers to discover that it can have many, complementary roles in their future profession.

The role of the major subject varies between professional fields. Although the abstract theoretical knowledge base taught in professional education is important to any profession, teacher education faces challenges (Hatlevik & Smeby, 2015). Those who apply to teacher education programmes may have the teacher profession, rather than the major, in mind. In contrast, in study fields leading to generalist professions, the role of the major is highlighted. For example, students of sociology or cultural history may focus more on creating personal meanings for their major and construct their profession based on those meanings. Therefore, the multiple meanings that the student teachers in this study created for their major were somewhat surprising. Reasons for this may be found in several sources. According to prior research, the way theories are taught and how students study may influence students' views of the importance of theoretical knowledge for professional practice (Hatlevik & Smeby, 2015). If the significance of educational science is conveyed to student teachers from the beginning of their studies and integrated into practicums, student teachers are more likely to construct personal meanings of it.

In addition, students' study efforts may be essential for perceiving theoretical knowledge as important for professional practice (Hatlevik & Smeby, 2015) and academic achievements (Lähteenmäki et al., 2024). In Sweden, teachers' grade average in compulsory school has significantly declined (Alatalo et al., 2021). The recruitment problem in Sweden implies that many primary school teachers are uncertified, and research indicates that these teachers have lower grades than certified teachers (Alatalo et al., 2021). In Norway, teacher education became a five-year master's programme in 2017 (Mausethagen, 2024), which has implications for how student teachers perceive their major. In Finland, teacher education still attracts many motivated applicants who have the potential to digest theoretical knowledge and tailor it to a specific profession. However, in the future, it is imperative that professional programmes in teacher education and other professional fields address and nurture students' aspirations during their study years and working life.

Article history

Received: 03 Feb 2025

Accepted: 16 Aug 2025

Published: 21 Nov 2025

References

- Afdal, H. W., & Spernes, K. (2018). Designing and redesigning research-based teacher education. *Teaching and Teacher Education*, 74, 215–228.
<https://doi.org/10.1016/j.tate.2018.05.011>
- Alatalo, T., Hansson, Å., & Johansson, S. (2021). Teachers' academic achievement: Evidence from Swedish longitudinal register data. *European Journal of Teacher Education*, 47(1), 60–80. <https://doi.org/10.1080/02619768.2021.1962281>
- Atkins, L., & Wallace, S. (2012). *Qualitative research in education*. SAGE.
<https://doi.org/10.4135/9781473957602>
- Barnett, R. (2005). *Reshaping the university: New relationships between research, scholarship and teaching*. McGraw Hill Open University Press.
- Biesta, G. (2007). Bridging the gap between educational research and educational practice: The need for critical distance. *Educational Research and Evaluation*, 13(3), 295–301.
<https://doi.org/10.1080/13803610701640227>
- Bäulke, L., Grunschel, C., & Dresel, M. (2022). Student dropout at university: A phase-orientated view on quitting studies and changing majors. *European Journal of Psychology of Education*, 37, 853–876. <https://doi.org/10.1007/s10212-021-00557-x>
- Campbell, L. (2018). Pedagogical bricolage and teacher agency: Towards a culture of creative professionalism. *Educational Philosophy and Theory*, 51(1), 31–40.
<https://doi.org/10.1080/00131857.2018.1425992>
- Darling-Hammond, L., Burns, D., Campbell, C., Goodwin, A. L., Hammerness, K., Low, E., MacIntyre, A., Sato, M., & Zeichner, K. (2017). *Empowered educators: How high-performing systems shape teaching quality around the world*. Jossey-Bass.
- Eriksen, A. (2022). The research literacy of professionals: Reconciling evidence-based practice and practical wisdom. *Professions and Professionalism*, 12(3), Article e4852.
<https://doi.org/10.7577/pp.4852>
- Gee, J. P., & Handford, M. (2012). *The Routledge handbook of discourse analysis*. Routledge.
- Goller, M., Ursin, J., Vähäsantanen, K., Festner, D., & Harteis, C. (2019). Finnish and German student teachers' motivations for choosing teaching as a career. The first application of the FIT-Choice scale in Finland. *Teaching and Teacher Education*, 85, 235–248,
<https://doi.org/10.1016/j.tate.2019.06.023>
- Guerriero, S., & Révai, N. (2017). Knowledge-based teaching and the evolution of a profession. In S. Guerriero (Ed.), *Pedagogical knowledge and the changing nature of the teaching profession* (pp. 253–269). OECD.
<https://doi.org/10.1787/9789264270695-en>

- Hatlevik, I., & Smeby, J. C. (2015). Program coherence and epistemological beliefs. *Nordic Psychology*, 67, 136–153. <https://doi.org/10.1080/19012276.2015.1031553>
- Healey, M. (2005). Linking research and teaching: Exploring disciplinary spaces and the role of inquiry-based learning. In R. Barnett (Ed.), *Reshaping the university: New relationships between research, scholarship and teaching* (pp. 67–78). McGraw Hill Open University Press.
- Heikkilä, M. (2022a). *Agency as polyphony: Student and primary teachers' narration embedded in theory and practice* [Doctoral dissertation, University of Turku]. Turku University Library. <https://urn.fi/URN:ISBN:978-951-29-8871-6>
- Heikkilä, M. (2022b). Methodological insights on teachers' professional agency in narratives. *Professions and Professionalism*, 12(3), Article e5038. <https://doi.org/10.7577/pp.5038>
- Heikkilä, M., & Hermansen, H. (2024). Epistemic coherence in teacher education. In V. Domovic, G. Doetjes, M. Mikkilä-Erdmann, & K. Zaki (Eds.), *Coherence in European teacher education: Theoretical Models, empirical studies, instructional approaches* (pp. 37–54). Springer. <https://doi.org/10.1007/978-3-658-43721-3>
- Heikkilä, M., Hermansen, H., Iiskala, T., Mikkilä-Erdmann, M., & Warinowski, A. (2023). Epistemic agency in student teachers' engagement with research skills. *Teaching in Higher Education*, 28(3), 455–472. <https://doi.org/10.1080/13562517.2020.1821638>
- Hermansen, H. (2020). Knowledge discourses and coherence in professional education. *Professions & Professionalism* 10(3), Article e3713. <https://doi.org/10.7577/pp.3713>
- Hermansen, H., & Mausethagen, S. (2023). Beyond the research–practice gap: Constructing epistemic relations in teacher education. *International Journal of Educational Research*, 119, Article 102171. <https://doi.org/10.1016/j.ijer.2023.102171>
- Hordern, J. (2019). Knowledge, evidence, and the configuration of educational practice. *Education Science*, 9(2), 70. <https://doi.org/10.3390/educsci9020070>
- Hyvärinen, M. (2008). Analyzing narratives and story-telling. In P. Alasuutari, L. Bickmann, & J. Brannen (Eds.), *The SAGE handbook of social research methods* (pp. 447–460). SAGE.
- Jenset, I. S., Hammerness, K., & Klette, K. (2019). Talk about field placement within campus coursework: Connecting theory and practice in teacher education. *Scandinavian Journal of Educational Research*, 63(4), 632–650. <https://doi.org/10.1080/00313831.2017.1415968>
- Juutilainen, M. (2023). *Construction of student teachers' professional agency in primary teacher education* [Doctoral dissertation, University of Jyväskylä]. JYU Dissertations. <http://urn.fi/URN:ISBN:978-951-39-9782-3>
- Knorr Cetina, K. (1999). *Epistemic cultures: How the sciences make knowledge*. Harvard University Press.
- Knorr Cetina, K. (2001). Objectual practice. In E. V. Savigny & T. R. Schatzki (Eds.), *The practice turn in contemporary theory* (pp. 175–188). Routledge.

- Leijen, Ä., Allas, R., Pedaste, M., Knezice, D., Marcos Mena, J. J., Meijer, P., Husu, J., Krull, E., & Toom, A. (2015). How to support the development of teachers' practical knowledge: Comparing different conditions. *Procedia - Social and Behavioral Sciences*, 191, 1205–1212. <https://doi.org/10.1016/j.sbspro.2015.04.455>
- Loughran, J. (2019). Pedagogical reasoning: The foundation of the professional knowledge of teaching. *Teachers and Teaching*, 25(5), 523–535. <https://doi.org/10.1080/13540602.2019.1633294>
- Lähteenmäki, M., Mikkilä-Erdmann, M., Laakkonen, E., Warinowski, A., & Clinton, J. (2024). Student teachers' study profiles—Longitudinal perspective to research-based teacher education. *Professions and Professionalism*, 14(2), Article e5807. <https://doi.org/10.7577/pp.5807>
- Mausethagen, S. (2024). Blurred discourses of professionalism in teacher education institutions. *Teachers and Teaching*, 31(1), 118–132. <https://doi.org/10.1080/13540602.2024.2439563>
- Mikkilä-Erdmann, M., Heikkilä, M., Iiskala, T., & Warinowski, A. (2024). Research-based teacher education—A Finnish perspective. In V. Symeonidis (Ed.), *Enhancing the value of teacher education research: Implications for policy and practice* (3. ed., pp. 42–61). Brill. https://doi.org/10.1163/9789004689992_003
- Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record*, 108(6), 1017–1054. <https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Nerland, M., & Jensen, K. (2012). Epistemic practices and object relations in professional work. *Journal of Education and Work*, 25(1), 101–120. <https://doi.org/10.1080/13639080.2012.644909>
- Peltola, M. (2021). Everyday consequences of selectiveness. Borderwork in the informal sphere of a lower secondary school in the metropolitan area of Helsinki, Finland. *British Journal of Sociology of Education*, 42(1), 97–112. <https://doi.org/10.1080/01425692.2020.1861930>
- Phillips, K. P., Eriksen, A., & Mausethagen, S. (2023). Educational research literacy: Philosophical foundations and empirical applications. *Professions and Professionalism*, 13(2), Article e5307. <https://doi.org/10.7577/pp.5307>
- Puustinen, M., Sääntti, J., Koski, A., & Tammi, T. (2018). Teaching: A practical or research-based profession? Teacher candidates' approaches to research-based teacher education. *Teaching and Teacher Education*, 74, 170–179. <https://doi.org/10.1016/j.tate.2018.05.004>
- Reinius, H., Hakkarainen, K., & Korhonen, T. (2024). Teachers' perceived opportunity to contribute to school culture transformation. *Journal of Educational Change*, 25, 369–391. <https://doi.org/10.1007/s10833-023-09496-4>
- Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review*, 57(1), 1–22. <https://doi.org/10.17763/haer.57.1.j463w79r56455411>

- Tannen, D. (1993). What's in a frame? Surface evidence for underlying expectations. In D. Tannen (Ed.), *Framing in discourse* (pp. 14–56). Oxford University Press.
- Tatto, M. T. (2015). The role of research in the policy and practice of quality teacher education: An international review. *Oxford Review of Education*, 41(2), 171–201.
<https://doi.org/10.1080/03054985.2015.1017405>
- TENK. (2023). *The Finnish code of conduct for research integrity and procedures for handling alleged violations of research integrity in Finland 2023* (TENK 4/2023). Finnish National Board of Research Integrity TENK. https://tenk.fi/sites/default/files/2023-05/RI_Guidelines_2023.pdf
- Toom, A., & Husu, J. (2018). Teachers' work in changing educational contexts. In H. Niemi, A. Toom, A. Kallioniemi, & J. Lavonen (Eds.), *The teacher's role in the changing globalizing world: Resources and challenges related to the professional work of teaching* (pp. 1–9). Brill Sense.
- Wieser, C. (2016). Teaching and personal educational knowledge—Conceptual considerations for research on knowledge transformation. *European Journal of Teacher Education*, 39(5), 588–601.
<https://doi.org/10.1080/02619768.2016.1253673>
- Zaragoza, A., Seidel, T., & Hiebert, J. (2021). Exploring preservice teachers' abilities to connect professional knowledge with lesson planning and observation. *European Journal of Teacher Education*, 47(1), 120–139.
<https://doi.org/10.1080/02619768.2021.1996558>