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Author(s): Koski, Jenni; Metsäpelto, Riitta-Leena; Kyllönen, Mari; Poikkeus, Anna-Maija

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Finnish student teachers as a focus of teacher education research: a 10-Year scoping review of empirical research

Jenni Koski [a], Riitta-Leena Metsäpelto [b], Mari Kyllönen [c] and Anna-Maija Poikkeus [c]

[a]Department of Teacher Education, University of Jyväskylä, Jyväskylä, Finland; [b]University Services, University of Jyväskylä, Jyväskylä, Finland; [c]Faculty of Education and Psychology, University of Jyväskylä, Jyväskylä, Finland

ABSTRACT

This scoping review examines the trends and themes of teacher education research in the specific educational context of Finland. It focuses on peer-reviewed studies published between 2011 and 2021, including empirical data collected from students in Finnish teacher education programmes. The first objective was to analyse the trends in the research volume, research methods and designs and impact regarding the publication channels used. The second objective was to examine the themes via thematic categorisation guided by a conceptual framework, The Multidimensional Adapted Process Model of Teaching. A total of 258 articles were identified in the databases and through manual searches of peer-reviewed journals. The results revealed a notable increase in the number of studies over a 10-year period and an increase in the relative impact, as indicated by the impact factors of the journals in which the studies were published. The study designs were characterised by relatively small samples, cross-sectional designs and qualitative methods. The most predominant thematic categories consisted of studies focusing on the professional development of student teachers; their professional beliefs, values and ethics; and their teacher identities. Some competence domains, such as teacher resilience, communication, argumentation and reasoning skills as well as personal dispositions were less frequently a focus. The findings suggest a need to expand the diversity of research methods and designs to advance the field and further develop teacher education research.

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Scoping review; preservice teacher education; teacher education research methodology; professional development

Initial teacher education (ITE) prepares students for a profession requiring complex expertise that are developed and renewed through formal and informal learning throughout a teacher's education and career (Desimone, 2009). The purpose of ITE is to equip them with the essential skills, knowledge and competences for a successful transition into the teaching profession. Despite extensive interest in the learning processes of becoming a teacher,

CONTACT Jenni Koski jenni.p.koski@jyu.fi Department of Teacher Education, University of Jyväskylä, Jyväskylä, Finland

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to the best of our knowledge, no studies have summarised the trends of current empirical research on teacher students in Finland. An overview is needed to identify current research gaps and critically analyse research; this includes assessing the extent to which the current research is conducted and reported with methodological pluralism, as highlighted by Borko et al. (2007), and identifying the specific research foci. The present study aims to fill this gap by focusing on empirical research on student teachers in Finland to better understand knowledge production in the field over 10 years.

Teacher education research

Teacher education research has a broad focus, ranging from theoretical analyses of abstract ideas and concepts (e.g. Darling-Hammond, 2021; Uusiautti & Määttä, 2012) to analyses of institutional and systemic factors within educational systems (Evangorou et al., 2015; Harju-Luukkainen et al., 2019). The core of this research revolves around the experiences, learning and professional development of student teachers. In teacher education programmes, the formal curriculum defines the intended learning opportunities (e.g. van Den Akker et al., 2010), but the curriculum is interpreted and implemented by teacher educators as teaching and learning processes. Students utilise these opportunities to develop the competences necessary for their profession. By analysing students' participation, it is possible to unveil the processes and effectiveness of professional development in producing the complex set of competencies required for teaching.

Researchers have distinguished various approaches in teacher education research that have distinct epistemologies and measurement systems and that reflect different assumptions (Rosiek & Gleason, 2017) and conceptualisations of knowledge (Borko et al., 2007). One approach to understanding the effects of teacher education attempts to identify "what works" by reporting patterns of relationships between teacher education and student learning (Borko et al., 2007) and estimating the educational impact with rigorous scientific designs (Rosiek & Gleason, 2017). It uses large samples and statistical analyses to identify generalised patterns of findings. Another approach aims to comprehend students' perspectives and nuances of educational practice in complex sociocultural contexts (Borko et al., 2007; Rosiek & Gleason, 2017). This interpretive approach captures teachers' and student teachers' understanding of specific events or experiences; these situated perspectives are explored via qualitative methods, such as interviews and reflective journals, and are analysed via data-based induction or deduction through conceptual frameworks.

Teacher education research has been characterised as noncumulative in nature (Blömeke et al., 2008), where single studies rarely add up to a greater understanding of phenomena relevant to advancing the field. Research reviews could provide an overall understanding of the processes of becoming a teacher and the various contributing factors. Although Cochran-Smith and Villegas (2015a, 2015b) acknowledge the benefits of reviews in different cultures and educational systems, they argue that teacher education research represents a historically situated social practice that is heavily affected by local educational policy and demographic trends. Therefore, investigating ITE within a specific context is crucial for interpreting the findings and considering the unique features of the educational system.

Previously, a review of teacher education research in the UK revealed that research in the first decade of the twenty-first century consisted mostly of qualitative studies with small samples (Menter, Hulme, Elliot, et al., 2010). Similar findings have been reported

in reviews of teacher education journals (e.g. Livingston & Flores, 2017; Sleeter, 2014). Recent methodological advances (Rosiek & Gleason, 2017) have allowed for the use of complex designs and modern technology to collect data, for example, video recordings to analyse learning in teaching practice (Heikonen et al., 2017; Lutovac et al., 2015; Toom et al., 2019) or eye-tracking devices to investigate professional vision (Wyss et al., 2021). However, little information is available on the extent to which these methodologies are used to complement more traditional datasets. Although cross-sectional research is valuable in illuminating students' learning or thinking at a single moment, far fewer studies utilise longitudinal designs to detect changes or developments over time.

Like other countries, teacher education in Finland has been affected by certain megatrends, such as an increasingly diverse student population and growing inequality (Tirri, 2014). Simultaneously, increased attention has been given to the quality of education systems and teachers' understanding of learning and knowledge (Cochran-Smith & Villegas, 2015a). In Finland, the response has manifested in large-scale educational reforms in the National Core Curriculum for Primary and Lower Secondary Education (National Board of Education, 2014) and in increased funding for the development of teacher education and research to improve the effectiveness and quality of education (Ministry of Education and Culture, 2022). Differences in ITE policy and practice affect its research (Cochran-Smith & Villegas, 2015a, 2015b), and the strong contextual embeddedness of this research may affect its scientific impact, channels and quality of publications. The present study reviews 10 years of research in a specific educational context, Finland, by focusing on studies that included empirical data from students in Finnish teacher education programmes. Specifically, the first goal was to gain an understanding of the volume of teacher education research, evaluate the impact of research journals and identify the research methods and designs.

Thematic overview of teacher education research

The scope of teacher education research has been characterised as sprawling and its size as massive (Cochran-Smith & Villegas, 2015c, p. 389), and various attempts have been made to categorise its overall themes. For example, Cochran–Smith and Villegas (2015a, 2015b) review more than 1,500 studies to identify the major themes in teacher education research between 2000 and 2012; they identify three programmes of research: research on the accountability, effectiveness and policies of ITE; research on the preparation of teachers for the knowledge society; and research on the development of students' skills to respond to diversity and issues of inequity. Similarly, the second goal of the present study was to examine the overall themes investigated in Finnish student teacher research.

Specifically, we aimed to systematically identify and report on patterns or themes within this line of research. We were guided by a conceptual framework to ensure alignment with one of the current Finnish approaches to key dimensions of teaching. The multidimensional adapted process model of teaching (MAP model; Metsäpelto et al., 2022b) was developed by a national group of teacher educators from seven university-based teacher education providers. The model is based on international research to be as representative as possible of the understanding of the knowledge and skills needed to be a teacher. It was originally designed to guide the assessment of competencies in admission tests, but it has recently become useful for curriculum development and teaching in ITE programmes (Metsäpelto et al., 2024). The use of the MAP

model is not intended to validate its accuracy, but rather, to highlight key themes and map the existing research landscape. This is consistent with the scoping review methodology (Arksey & O'Malley, 2005).

The MAP model is adapted from the original model of Blömeke et al. (2015); it presents teaching as a dynamic and multidimensional process with different components contributing to teaching quality and student outcomes and distinguishes between individual competencies and teaching competences. Individual competencies include the underlying aspects of teaching, such as the knowledge base, cognitive and social skills, personal orientations and professional well-being. Teaching competences involve classroom practices and quality processes, such as the teacher's ability to respond to students' needs, to set clear behavioural expectations and to promote higher-order thinking. Additionally, teaching competences include professional practices such as planning lessons and learning content, communicating effectively with parents and colleagues and engaging in professional development. Finally, the model incorporates situation-specific skills such as perception, interpretation and decision-making, which are critical for effective instruction in diverse learning environments. These key dimensions of teaching are developed throughout ITE and beyond, providing a useful basis for analysing research on student teachers. The competence domains are presented in Supplementary File A.

The context: initial teacher education in Finland

ITE is offered by 13 universities in Finland, five of which are universities of applied sciences. Each university has high autonomy in curriculum design and responsibility for programme quality (Niemi, 2011; Tirri, 2014). The master's programmes have a standard structure with basic, subject and advanced studies in education (or, e.g. in special education), language and communication studies, thesis studies and pedagogical studies (containing mandatory teaching practices). Higher education institutions independently decide on the content of ITE, and national standards for teacher education apply only to the minimum number of credits for pedagogical studies and supervised teaching practices (Niemi, 2011; Tatto & Pippin, 2017). The most common programmes include early childhood education, primary education, special education, subject education and vocational education (Table 1).

Finnish educational discourse describes ITE as research based (Sitomaniemi-San, 2015), which also characterises teacher education in many other countries (e.g. Schulz & Hall, 2004). A goal of research-based ITE is to promote a professional orientation towards teaching by training students to be researchers, reflective practitioners and integrators of theory and practice (Sitomaniemi-San, 2015). Future teachers are encouraged to apply research activities and research-based knowledge in their daily work (Brew & Saunders, 2020; Tirri, 2014). Despite discontinuities and suboptimal implementation (Puustinen et al., 2022), this idea of research-based ITE is embodied at the administrative and organisational level, indicating the implementation of teacher education as part of higher education and the involvement of students in projects supervised by research-active scholars, leading to a master's degree (Sitomaniemi-San, 2015). Additionally, research is integrated into degree programmes and courses (Byman et al., 2009; Krokfors et al., 2011; Puustinen et al., 2018; Toom et al., 2010).

Table 1. Coding scheme research methods.

Information on research methods	Code	Definition
Research method		
Qualitative study	1	Non-numerical data and qualitative analysis
Quantitative study	2	Numerical data and statistical analyses
Multimethod study	3	Both qualitative and quantitative approaches
Research design		
Longitudinal study	1	Repeated data collection from the same individuals to examine changes or developments across time
Long-term longitudinal study	1.1	Time lag between data collections more than a year
Short-term longitudinal study	1.2	Time lag between data collections one year or less
Pre – post research design	1.3	Comparing the dependent variable measured before and after an intervention
Cross-sectional study	2	Data collection at a single point in time
Teacher education programme		
Unknown programme	1	Unidentified teacher education programme
Multiple programmes	2	Multiple identified programmes
Primary teacher	3	Grades 1–6, major studies in education
Subject teacher	4	Grades 7–9 or general upper secondary, major subject-specific studies, pedagogical studies
Special education teacher	5	Grades 1–9, major studies in special education
Early childhood education teacher	6	Bachelor's or master's degree in early childhood education
Vocational teacher	7	Vocational degree and work experience, pedagogical studies

Finnish ITE providers are committed to a research-based orientation (Krokfors et al., 2011), and it is recognised as a central paradigm, orientation, leading principle or organising theme in our educational landscape (Krokfors et al., 2011; Puustinen et al., 2018). Although the organisational structures support the approach, they are a product of historically and culturally constructed educational discourses; these discourses portray teachers as autonomous, modern and liberated from traditional ways of understanding teaching (Sitomaniemi-San, 2015). A particularly important aspect of research-based teacher education is its development as an object of research (Krokfors et al., 2011). There has been wider interest in understanding and improving ITE, its methods and outcomes. It is also relevant to understand how professional development is conceptualised and understood, how it is supported and the extent to which ITE is successful in fostering it.

Aims of the present study

The current study aims to conduct a scoping review of empirical teacher education research published between 2011 and 2021, focusing on Finnish student teachers in ITEs. We examine teacher education research by analysing the amount of research conducted over time and assessing the methodological diversity of the research base. Because our primary aim was to gain insights into the methods and designs used in teacher education research, we focused exclusively on empirical studies, excluding other genres, such as theoretical research. We are interested in the number of empirical studies, the type of methodological design, the impact rank of the journals and the thematic content of the research. Methodological design includes considerations of research methods (qualitative, quantitative and multimethod studies), research design (longitudinal, cross-sectional) and sample characteristics (teacher education programme, number of

participants). The main themes of the present study are thematically categorised via the conceptual framework of the MAP model (Metsäpelto et al., 2022b). We addressed the following questions:

1. What is the overall picture that emerges from the reviewed studies of Finnish teacher education research focusing on student teachers in the period from 2011 to 2021 regarding the number of studies conducted over time, their methodological designs and the impact of the journals in which the studies were published?
2. Which research themes emerge as primary foci, and which are less explored or absent from the research base?

Methods

Scoping review

A scoping review was conducted to systematically explore the empirical research on students in Finnish teacher education programmes published between 2011 and 2021. This research strategy was chosen to answer broad research questions about complex and heterogeneous research literature that has not yet been comprehensively reviewed (Peters et al., 2015). Levac et al. (2010) described a scoping review as "mapping" because it represents the breadth and depth of a field by summarising across the available research base. It provides comprehensive research coverage by summarising and disseminating research to policymakers and teacher education researchers (Arksey & O'Malley, 2005; Levac et al., 2010).

Identifying and selecting studies through database and manual searches

The inclusion criteria were as follows: (1) original empirical research articles; (2) written in English, Finnish or Swedish; (3) published in a peer-reviewed journal; (4) available as a full text; (5) published between 2011 and 2021; (6) included teacher students as participants from Finnish universities or universities of applied sciences; and (7) conducted during the students' enrolment in the teacher education programme. A formal database search was conducted at the Educational Resources Information Centre (ERIC) at the beginning of 2022. We used the following keywords that were found anywhere in the article (i.e. not limited to the abstract or title): teacher education, teacher training or ITE; student teacher, teacher student, preservice teacher or developing teacher; and Finnish or Finland. The search produced 1,011 articles, which were screened and evaluated according to the inclusion criteria. We excluded 825 articles and included 186 relevant articles in the scoping review.

To ensure adequate coverage of studies, a database search using the same protocol was performed via ScienceDirect. The search produced 306 articles that were screened and evaluated for relevance, resulting in the identification of 13 articles. Thus, the two databases produced a total of 1,317 records, which were checked for eligibility and duplicates, after which 199 articles were included in the scoping review.

Next, we conducted a manual search by screening journals in which Finnish researchers typically publish research written in Finnish or Swedish (i.e. *Kasvatus, Kasvatus ja Aika, Aikuiskasvatus, Ainedidaktiikka, Ammattikasvatuksen aikakauskirja, NMI-Bulletin* and *Puhe ja Kieli*). Using the same inclusion criteria, peer-reviewed, full-text articles were screened and assessed for eligibility, resulting in the identification of 41 additional studies.

Finally, to include a complete set of relevant articles, we conducted a supplementary manual search of four journals (*Teaching and Teacher Education, European Journal of Teacher Education, Scandinavian Journal of Educational Research* and *Journal of Teacher Education*). The search was based on prior observations that no single search engine or database provides perfect coverage of scientific publications in a research area; therefore, multiple search strategies are necessary to increase the coverage of the information retrieved (Pastor-Ramón et al., 2022). We identified 18 new studies: 17 from *Teaching and Teacher Education* and one from the *European Journal of Teacher Education*.

Thus, a total of 258 studies were identified for the next phases of the scoping review. Figure 1 illustrates the review process according to the PRISMA 2020 flow diagram (see Page et al., 2021). The complete list of articles is included in Supplementary File C.

Data extraction

Next, basic descriptive information was extracted from 258 articles: authors, title, journal and year of publication. We extracted information on the data collection methods, design and teacher education programmes. Table 1 shows the coding scheme. We also recorded the sample size of the participants. In studies with several participant groups, we reported only the number of Finnish students or, sometimes, international degree or exchange students attending Finnish teacher education courses. We utilised the journal impact factor, which represents the average number of citations received per article published in the journal (Fu et al., 2011), to examine the impact of research. Using Clarivate Analytics, we searched each journal on the Web of Science platform and reported the journal's annual impact factor. We recorded the impact factor by selecting it for the year in question. Because the impact factor varies from year to year, the same journal could have multiple impact factor entries. For example, Teaching and Teacher Education received an impact factor of 1.607 in 2013 and 3.782 in 2021, reflecting the changing impact of the journal over time.

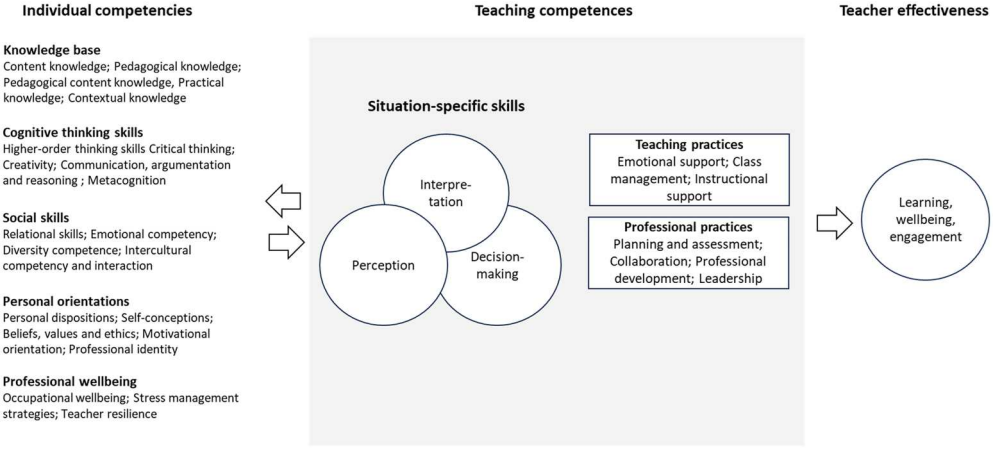


Figure 1. Multidimensional adapted process model of teaching (Metsäpelto et al., 2022b; model adapted from Blömeke et al., 2015).

Qualitative content analysis of thematic research foci

The review used qualitative content analysis to identify patterns and themes in the studies using the MAP model as a conceptual framework (Metsäpelto et al., 2022b). Individual competencies and teaching competences are presented in Figure 2 and Supplementary File A. In the analysis, we focused on the information provided in the theoretical background, research questions and keywords. Each article was classified into one of the key dimensions of teaching in the MAP model. Each study was coded based on its primary focus.

Several studies used similar constructs to those in the MAP model, which facilitated the coding process. For example, Niiranen et al. (2020) investigated students' confidence in technological pedagogical content knowledge (TPACK), which was assigned to the domain of pedagogical content knowledge. Sometimes, thematic coding was less straightforward because of the multiple equally important research objectives. In response, the researchers discussed the results until a consensus about the primary focus could be reached. Studies that were not unequivocally coded were excluded from the thematic analysis (n = 10).

Results

Descriptive overview of the research

We first provide an overview of Finnish empirical research on teacher students; the number of studies, data collection methods and designs, participants and research impact (RQ1; see Supplementary File B for a detailed description of the research base).

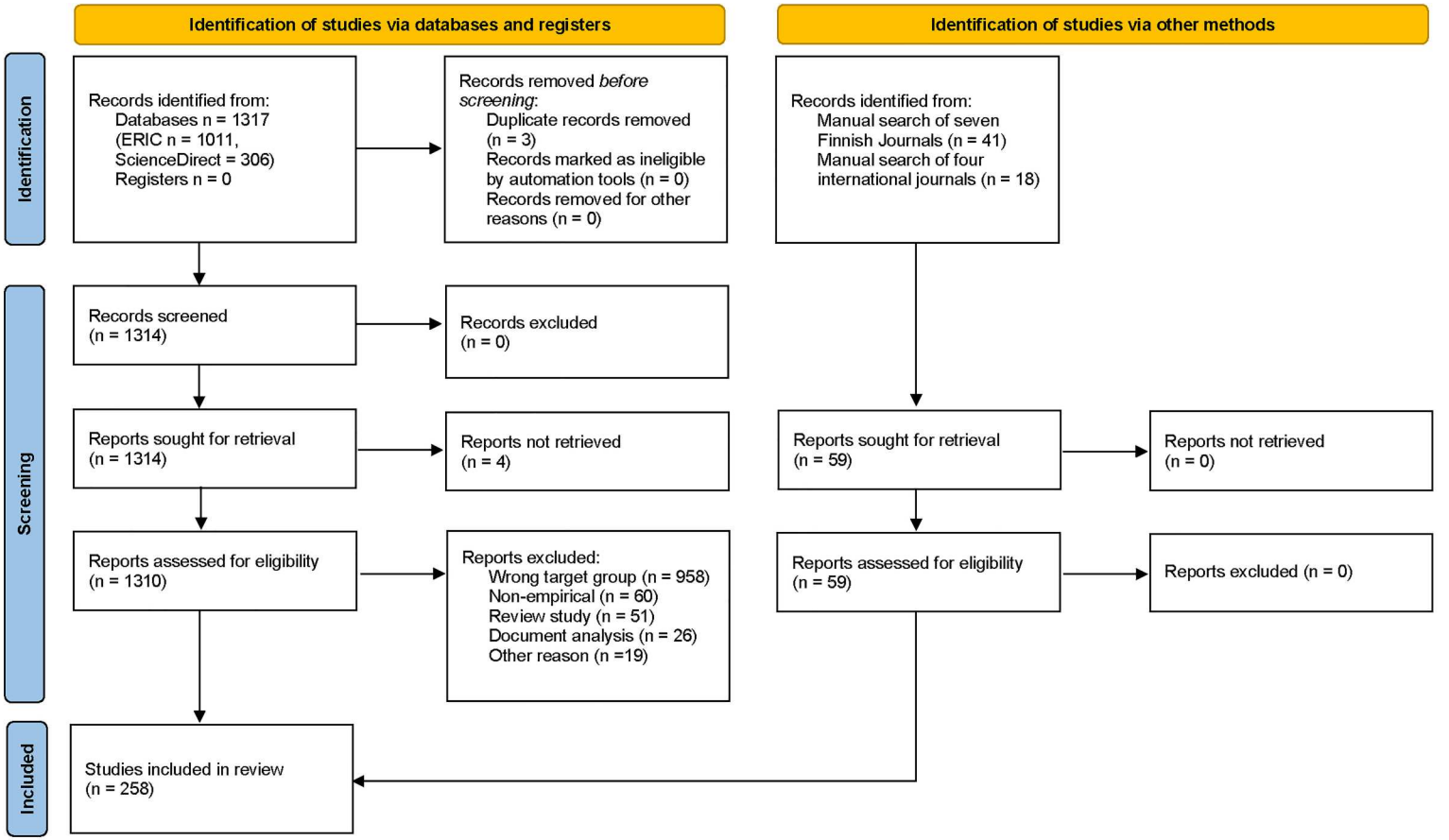
Number of studies

The data from a total of 258 studies included 217 articles from international journals (84%) and 41 articles (16%) from Finnish journals. Within the 10-year period between 2011 and 2021, the number of studies varied between 10 and 37. Figure 3 shows an increasing trend in the annual number of studies, starting with 10 articles published in 2012 and peaking at 37 in 2019. The number of studies in 2019 was almost four times greater than that in 2012. Although this number was high in 2020, it dropped to 22 in 2021. The distribution shows a shift and a strong upwards trend after the first four years: 81% of the studies were published after 2015.

Data collection methods

The most used data collection methods included surveys or questionnaires containing structured items (e.g. ratings or, infrequently, multiple-choice questions) or open-ended questions. Questionnaires were used as the primary data collection method in 110 articles (43%). Almost as often, in 106 articles (41%) the data included written, textual or visual materials, such as learning diaries. Individual or group interviews were also popular, used in 66 articles (26%). In some studies (n = 10), interviews were combined with video recordings to create stimulated recall interviews.

Other data collection methods were less common. Altogether, 19 studies used video recordings of learning situations in ITE, including footage of small group discussions or practice lessons by student teachers. Sometimes, the data consisted of assessments of



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Figure 2. PRISMA flow diagram.

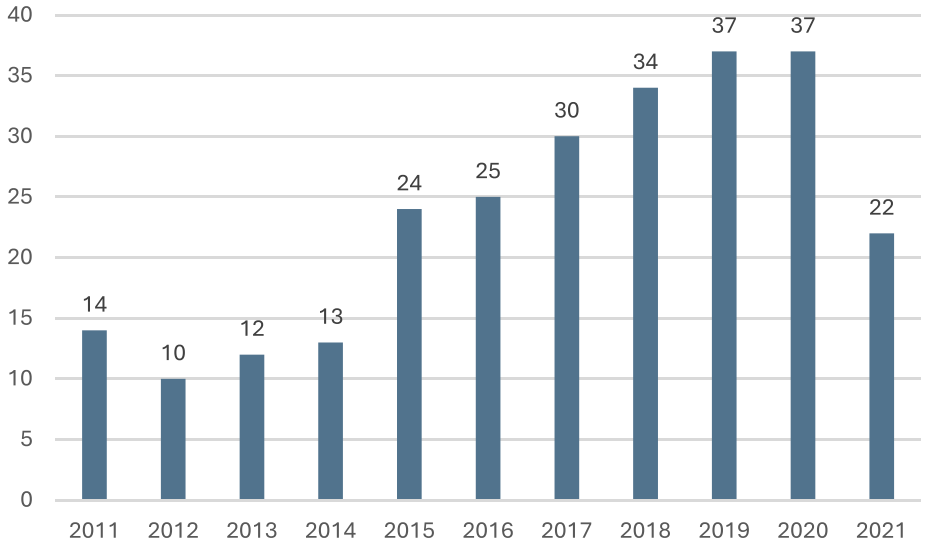


Figure 3. Annual number of studies (N = 258).

skill or knowledge levels (n = 9), observations of learning situations (n = 11), researcher ethnographies (n = 7) or observations by student teachers in various learning contexts (n = 8). Interestingly, many studies used versatile datasets, combining questionnaires with interviews, learning diaries and reflective writing (Acquah & Commins, 2017).

A closer analysis of the research methodology revealed that 70% (n = 180) of the studies could be classified as qualitative research, whereas 20% (n = 51) could be classified as quantitative research. The remaining 10% (n = 27) could be classified as multimethod or mixed methods research, in which the chosen topic was investigated via several different methodological approaches.

Research design

Most studies were identified as cross-sectional studies (84%, n = 218), with the data collected at a single point in time. Sometimes, the research data were collected over a longer period, but the analysis did not consider any temporal aspects, such as changes over time. These studies were categorised as cross-sectional. Only 40 studies were longitudinal studies; they had a design that examined either long-term (n = 13) or short-term (n = 27) development or change. The long-term longitudinal studies examined gradual changes or developments over long periods of time. One study examined the development of study-related burnout and how students' ability to manage their pace of study helped buffer against burnout over a two-year period (Väisänen et al., 2018). These studies were mostly quantitative, but there were also qualitative longitudinal studies of students' autobiographical narratives to explore the development of language learner identity and bilingualism over a period of two to three years (Moate & Ruohotie-Lyhty, 2020).

The short-term longitudinal designs often analysed learning, development or change during a specific ITE course. Some studies (n = 14) included repeated measurements of the same individuals at two time points (i.e. pre – and post-measurements) to statistically

analyse changes in a phenomenon of interest over time or assess the effects of ITE courses on student learning.

Study participants

Information about the teacher education programme was available for 223 studies. More than half of the studies (54%) had primary teachers (77; 30%) or subject teacher students (61; 24%) as the programme of the sample. A smaller proportion had vocational teacher students (11; 4.3%), early childhood education students (10; 3.9%) and special education students (9; 3.5%). Fifty-four studies (21%) examined more than one teacher education programme, for example, special education students, who were otherwise rarely the subject of research.

The number of participants widely varied (Table 2). Notably, 105 studies (41%) had fewer than 25 participants. Of these, 24 studies had one to five participants, almost 1 in 10 (9.3%). Only six studies had over 500 participants.

Journal impact factor

The articles were published in 113 journals. Information on the journal impact factor was available for 44 journals and 132 publications. As shown in Figure 4, there was an increasing trend. The mean impact factor for all identified journals was 1.612, ranging from 0.184 to 4.159. There was no information on the impact factor for 126 publications. Either the journal was not on the platform, or the information was missing for the intended publication year.

One-fifth of the articles were published in the following journals: the *European Journal of Teacher Education* (6.6%), the *Scandinavian Journal of Educational Research* (4.6%) and *Teaching and Teacher Education* (10.5%). The Finnish journal *Kasvatus* published 4.3% of the articles. Most articles were published in a variety of journals, with only one or no other articles in the same journal.

Thematic foci of research

The results of the qualitative thematic analysis, which used the MAP model as a conceptual framework for the 248 studies, are summarised in Table 3 (RQ2). Ten studies focused on multiple competence domains. Because these studies could not be clearly categorised, they were excluded from the analysis.

Table 2. Number of participants.

Number of participants	Number of studies ($N = 258$)	Proportion (%)
1–25	105	41%
26–50	33	13%
51–100	48	19%
101–200	26	10%
201–300	20	7.7%
301–500	11	4.2%
500+	6	2.3%
N/A	9	3.5%

Note: It should be noted that the group of studies with 1–25 participants included four studies that probably used the same sample and research data.

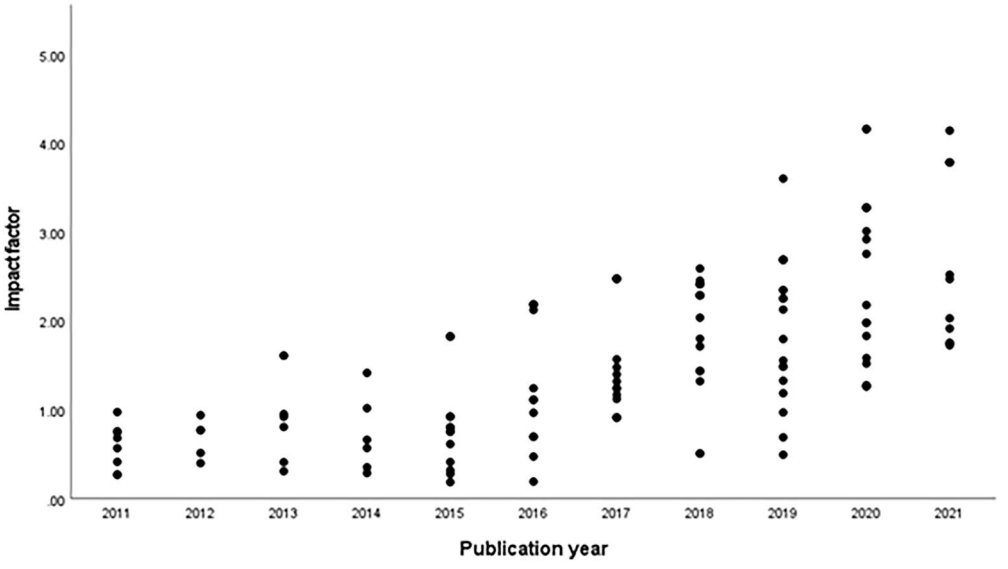


Figure 4. Journal impact factors.

Knowledge base of teaching and learning

This domain unites critical aspects of knowledge to the teaching profession. The 37 studies focused mostly on how students build pedagogical content knowledge (n = 21). These studies used various data collection methods (e.g. questionnaires, interviews and textual data). Notably, half of the studies focused on the use of digital technology in teaching, such as students' appraisals of their TPACK (Valtonen et al., 2020). The second largest category, content knowledge (n = 8), examines specific subject fields, such as students' definitions of the area concept in mathematics (Tossavainen et al., 2017). Studies on content knowledge differ from other knowledge domains; they included various ways of assessing students' level of knowledge, and nearly all were conducted in the context of math and science or learning technology. The other categories were rare:

Table 3. Thematic categorisation of Studies (*N* = 248).

MAP Domain
Knowledge base (37)
Content knowledge (8), pedagogical knowledge (1), pedagogical content knowledge (21), practical knowledge (3), contextual knowledge (4)
Cognitive thinking skills (19)
Higher-order thinking skills (1), critical thinking (4), communication, argumentation and reasoning (0), creativity (3), metacognition (11)
Social skills (40)
Relational skills (4), emotional competency (4), diversity competency (12), intercultural competency and interaction (20)
Personal orientations (70)
Personal dispositions (0), self-conceptions (8), professional beliefs, values and ethics (27), professional identity (26), motivational orientation (9)
Professional well-being (7)
Occupational well-being (3), stress management strategies (4), resilience (0)
Teaching competences (75)
Situation-specific skills (1), teaching practices (12), professional practices (62) [professional development (60), participation in professional community (2)]

pedagogical knowledge was represented by one study, practical knowledge by three studies and contextual knowledge by four studies.

Cognitive thinking skills

The domain of cognitive thinking skills, often called twenty-first-century key skills, contains higher-order generic skills that are used to process information and solve problems in complex, information-intensive environments. Nineteen studies were coded in this domain. The largest group of metacognitive processes examined students' self- or coregulation of learning processes (n = 11). For example, studies investigated the role of self-regulation and processing strategies in science text comprehension (Vilppu et al., 2013). Questionnaires were the most common data source, but some studies on socially shared regulation or coregulation also used video recordings of small group discussions (Näykki et al., 2017). Fewer studies examined other cognitive skills, such as information processing (one study), critical thinking (four studies) and creativity (three studies). Interestingly, studies on creativity were related to subject teacher education in the field of arts, such as students' training in music (Randles & Muhonen, 2015). No studies investigated "communication, argumentation and reasoning".

Social skills

This domain refers to a set of skills for regulating and expressing one's emotions, engaging constructively with others and respecting their individuality. Forty articles were coded in this domain. Most studies investigated students' intercultural awareness and ability to navigate sensitively in multicultural contexts (n = 20). These studies combined different qualitative methods. For example, students' understanding of intercultural situations were studied through reflective essays and focus groups (Dervin & Hahl, 2015). Diversity competence (n = 12), was examined via questionnaires and textual data through reflective writing, learning diaries and autoethnographic data. Some studies examined self-perceived competence, well-being and sense of belonging when children with diverse needs are encountered (Nislin & Pesonen, 2019). However, studies on emotional competency (n = 4) and relational skills (n = 4) are scarce.

Personal orientations

The domain of personal orientation includes managing oneself in the teacher's role. This involves the continually evolving processes by which a person understands and manages aspects of the self, including personal and motivational characteristics, and which a person negotiates one's teacher identity. Seventy articles were coded in this domain, making it the second largest in the study. Most studies examined professional beliefs, values and ethics (n = 27) via questionnaires and written textual data. For example, the studies investigated students' views on the relevance of biology education as a school subject via semi-structured interviews and mind maps (Mutanen & Uitto, 2020). Another large group on professional identity (n = 26) was examined via qualitative data, such as narrative interviews and portfolios. For example, studies investigated the differences in teacher identity between beginning and advanced primary student teachers (Stenberg & Maaranen, 2020). There were slightly fewer studies on self-conceptions (n = 8) and motivation to become teachers (n = 9). No studies examined personal dispositions.

Professional well-being

Professional well-being refers to feelings of job satisfaction and work engagement as well as the ability of resources and skills to respond to the complex demands of the profession through effective stress management strategies and resilience. Only seven studies were coded in this domain; these articles examined occupational well-being (n = 3) and stress management strategies (n = 4). Four studies investigated the negative aspects of well-being (burnout, exhaustion and anxiety), physical symptoms and students' strategies to mitigate their effects. Two studies examined positive aspects of well-being, such as work engagement. The studies used survey or questionnaire-based data and tended to have larger samples (> 190) than the other domains, allowing for the application of advanced statistical analyses (e.g. structural equation modelling). These studies investigated, for example, students' self-evaluated, study-related anxiety and exhaustion, self-regulated learning, teaching experiences (Näykki et al., 2018) and expressed work engagement (Mäkinen, 2013). No study focused on resilience.

Teaching competences

Teaching competences refer to skills in the everyday praxis of teaching, including the teaching practices associated with the quality of classroom interaction and situation-specific skills for perceiving, interpreting and responding to moment-to-moment classroom situations. This domain also includes the professional competences enacted outside the classroom: collaborating with parents and the professional community and advancing one's professional development.

This domain was the largest category in this review (75 articles). Teaching practices in authentic classroom situations were investigated in 13 articles. Most studies involved students in supervised practicums, and the data often included videotaped lessons, sometimes supplemented by stimulated recall, guided reflection or interviews. There were 62 articles on professional practices. Two articles investigated students' abilities to participate in the professional community. The research on professional development (n = 60) concerned patterns or processes of learning, changes in thinking, attitudes, values, practices or knowledge, personal growth or professional transformation of ITE students. Notably, professional development was an inherent part of most teacher education research in this area. To avoid the proliferation of this category, the studies here focused on overarching "themes" that sought to capture students' development over the course of their studies and specific courses regarding how they conceptualised their path towards becoming the teacher they wanted to be, how they perceived their skills and readiness for work and what factors facilitated or hindered their professional development. Conversely, the categories of individual competences in the MAP model (knowledge base, cognitive thinking skills, social skills, personal orientations and professional well-being) were applied when the individual competences were identified as the primary focus of the study.

Some of these studies explored professional development either as a process with distinct stages (Viinikka & Ubani, 2021) or as a learning trajectory over time (Lamminmäki-Vartia et al., 2020). Others highlighted the key role of meaningful learning experiences (Virtanen & Rasi, 2017) and reflection in professional development (Körkkö et al., 2016). The studies often explored a specific pedagogical model, module or experiment or a teaching approach through students' experiences and perceptions in questionnaires,

interviews or portfolios (e.g. Knif & Kairavuori, 2020) to understand if and how they promote professional development. Alternatively, the studies investigated whether the desired learning outcomes in specific teacher education programmes or courses were achieved. The students assessed their satisfaction with their studies (Saloviita, 2019), the success of the programme in providing them with critical skills and competences (Niemi & Nevgi, 2014), coherent learning experiences (Canrinus et al., 2017) or whether courses or pedagogical models promoted professional development (Kervinen et al., 2016). The studies also reported challenges in professional development because the students may have found the pedagogical approach in a particular course difficult (Räihä et al., 2018), that some key Finnish ITE concepts were unclear and distant (Puustinen et al., 2018) or that the mentoring relationship undermined professional development (Atjonen, 2012). The studies also encouraged reflection between theory and practice, which is an essential tool for professional growth (e.g. Stenberg et al., 2016).

Discussion

The purpose of the present scoping review was to provide an overview of current teacher education research on Finnish student teachers. The review examined trends in the number, methods and design of empirical studies and their thematic focus over a 10-year period. Our findings, based on 258 articles, revealed an increase in the number of studies. The studies were mainly cross-sectional, used qualitative methods and had relatively small sample sizes. The thematic content findings indicated a range of 22 themes, but there was a concentration of topics such that the five most common topics covered 62% of the studies. The most frequent theme was professional development.

Although the current study focused on research in a single country, Finland, its approach is consistent with the fact that teacher education research is historically and culturally contextualised and influenced by the education system and other contextual factors (Cochran-Smith & Villegas, 2015a, 2015b). Single-country designs have been criticised for their potential lack of external validity, hindering generalisability across countries, particularly those with very different educational systems. However, a strength of in-depth analyses in single-country studies is their internal validity (Pepinsky, 2019). Researchers in a specific context can consider the cultural and historical development of educational phenomena. A Finnish study can shed light on academic teacher education within an education system that is undergoing numerous changes because of increasingly heterogeneous student populations, the digitisation of education and curriculum reforms, all of which have potential effects on ITE and its research.

The analysis revealed significant research growth. The number of studies almost quadrupled between 2012 and 2020. This increase may be connected to a growing emphasis on research on the teaching profession in our society. Another explanation may stem from the shift in pedagogical emphasis in the most recent National Core Curriculum (National Board of Education, 2014), where learning environments supporting active collaboration, transversal competences and student-centred and inquiry-based learning are more prominent and likely stimulate research in these content areas. Another research boosting factor is the resources allocated via several rounds of funding calls from the Ministry of Education and Culture to promote research collaboration and development in the ITE (Ministry of Education and Culture, 2022).

This research increase may also be because of changing emphases regarding career paths within higher education. Finnish teacher education occurs mainly in master's programmes, and educators are expected to be productive researchers (Hökkä et al., 2017). This complies with the "publish or perish" mentality, where a failure to publish can adversely impact one's career progression. Moreover, the increase may reflect the growing importance of research in the information society. Two studies on the effects of knowledge production on teacher emotions (Chen & Cheng, 2022) and educational leadership in Asia (Hallinger & Chen, 2015) have documented an increasing trend in research volume. In addition to increasing volume, a review of Australian student teacher research (Stephenson, 2018) reported a decreasing number of studies at the end of the review period, like our study. It should be noted that the review period in the current study ended in the middle of the COVID-pandemic, which may have affected our results in ways that are difficult to specify. Many researchers may have been forced to focus on online teaching rather than research, but this may have also given some researchers more time to write. Future research needs to ascertain whether the overall increasing trend in the current study is temporary or whether it represents a genuine proliferation of teacher education research in Finland.

Regarding methodology, we found a clear preponderance (70%) of qualitative data collection methods. These were often analyses of students' interviews or reflective texts, such as essays or learning diaries. In previous studies (Borko et al., 2007; Rosiek & Gleason, 2017), this emphasis aligns with the interpretive approach to research in ITE. These studies aim to capture students' perspectives on specific teacher education courses or, more generally, their paths of professional development or life histories leading to the teacher profession. The multitude attests to interest in hearing students' voices, recognising them as experts in their own learning and creating opportunities for their involvement in ITE development. In the future, investigating the transformative impact of student voices and initiatives in their local contexts is important (Pearce & Wood, 2019).

Effectiveness research aims to answer the question of "what works" (Borko et al., 2007; Rosiek & Gleason, 2017). Designs on the effectiveness of certain practices or curriculum choices typically employ larger datasets and diverse methodological approaches, including statistical analyses of quantitative data and mixed methods, often applying pre- and post-measurements or experimental designs to assess changes in learning or skill acquisition. Blömeke et al. (2008) argued that effective teacher education research should specify the criteria for professional competence and model the individual, institutional and systemic factors that may influence the acquisition of this competence during teacher education. However, effectiveness studies were scarce in our review. Overall, studies with a quantitative approach were in the minority.

We noted a lack of long-term longitudinal studies examining continuity and change in professional development and competences over extended periods of time. This is likely because of the resources and strategic choices as long-term studies in the educational field are challenging to conduct with the prevailing policy of short-term external funding. Researchers may prefer short-term projects that produce quick results. The rarity of longitudinal studies may be because of the lack of comprehensive theories or specific hypotheses about competence development that can guide research over time (Blömeke et al., 2008). Thus, the prevalence of cross-sectional designs may be partly for

practical reasons because its data collection is less time-consuming and cheaper. A cross-sectional design may provide an easier fit with the goals of understanding specific teacher education phenomena for a specific group of students at a particular point in time.

Most studies (54%) used samples drawn from primary school teacher or subject teacher education programmes. This corresponds to the proportion of these programmes in Finnish universities. The number of participants varied, but for 40% of the participants, the sample size was 25 students or fewer. Nearly every tenth study contained one to five subjects, indicating that a sizeable proportion of the studies were case studies. In contrast, only six studies had very large sample sizes (more than 500), combining several cohorts from different ITE years or from different universities. The dominance of small sample sizes is consistent with the high proportion of qualitative research designs.

The first research question, which aimed at mapping the landscape of Finnish teacher education research on student teachers, revealed a reliance on relatively traditional approaches, with a strong emphasis on small-scale qualitative methodological approaches. These findings align with studies from over a decade ago, indicating a consistent pattern of emphasis (Menter, Hulme, Murray, et al., 2010; Sleeter, 2014). Remarkably few studies included diverse methodologies, such as structured classroom observation systems, eye-tracking, experience sampling methods or the utilisation of various online technologies to collect multimodal learning process data. Some researchers have viewed qualitative research as indicative of a theory-generating phase and quantitative research as a theory-testing phase (e.g. Edmondson & McManus, 2007). Sometimes, qualitative data collection at an initial exploratory stage can lead to a phase where more detailed theoretical models are created and tested via quantitative data. However, the development of a scientific discipline does not lend itself to a simplistic view of progressing from one phase to another (Kokkonen, 2009), and in a more mature discipline, the use of qualitative or quantitative methods or their combination is justified based on the research objectives. Although the current research can be characterised as somewhat narrow methodologically, the impact factor evaluation revealed that, by year, a small but increasing number of studies had undergone a peer review typical of high-impact journals. Recently, a clear increase has occurred in the use of high-quality publication channels.

To respond to our second research question on the themes that were a focus and those that were less explored or absent, we categorised the articles by main thematic topics. The frequent themes were professional development (60 articles); professional beliefs, values and ethics (27); professional identity (26); pedagogical content knowledge (21); and intercultural competency and interaction (20). The prominence of themes suggests a cluster of relevant topics emerged from the national perspective. These themes relate to educational megatrends, increasing cultural diversity and heterogeneous educational landscapes (Cochran-Smith & Villegas, 2015a). The themes such as teacher beliefs, identity and knowledge construction are consistent with international perspectives on relevant areas in the field of teaching (Baumert & Kunter, 2013; Korthagen, 2004).

The identification of 22 research themes across competence domains suggests thematical variance. However, a significant proportion of the studies (62%, listed above) concentrated on a relatively small number of topics. This can be beneficial for achieving critical mass and knowledge accumulation in the field of inquiry (Hallinger & Chen, 2015). The topics that received the least attention were communication, argumentation, reasoning, personal dispositions and teacher resilience. A study on the curricula of two Finnish

primary teacher education programmes revealed that personal dispositions and resilience were not included in the curricula, indicating that they may not be viewed as core goals in teacher education and research (Metsäpelto et al., 2022a). As mentioned, research depends on both views of educational and societal challenges and available funding. Here, in aftermath of the pandemic, there may be an interest in understanding student stress and fostering resilience as well as personal coping strategies.

Along with the thematic variation, there was a strong focus on professional development. The studies explored how students conceptualised their journey towards becoming teachers, how they perceived their skills and readiness for their future roles as educators and what factors either supported or impeded their professional development. We found, for example, that studies were organised to adhere to a specific structure (e.g. pedagogical module) to foster professional development and explore the role of various tools in promoting such development. Although acknowledging the inherent connection of professional development to nearly all empirical teacher education research with student teachers, this dataset provides in-depth insights for ITE providers, especially regarding students' growth throughout their studies or specific courses.

Limitations

The first limitation is that we may not have accessed all the relevant research. Because of the inconsistency of search engines in retrieving articles, we decided to use two databases and manual searches, which produced the most comprehensive search results. Some articles were omitted because their full texts were not available. Second, our empirical research on student teachers does not provide a comprehensive overview of all the research related to ITE. For example, theoretical articles and literature reviews were omitted. We aimed to acquire a dataset that could be analysed in a single study, thus seeking to strike a balance between providing essential details and constructing a comprehensive picture of the research field.

Finally, the journal impact factor was used to assess the impact of journals. The impact factor was found for only 44 journals, limiting the generalisations of the journals. Although the use of journal impact factors to identify high-quality journals for publication is common, we recognise that it is an imperfect quality measure. Therefore, these findings should be interpreted with caution, given the limitations of journal impact factors (Cone & Gerson, 2012; Herbison, 2011).

Conclusions

Our journey through a decade of research has yielded intriguing insights. First, the study may provide new perspectives for the self-understanding of teacher education research. Research has taken on the challenge of uncovering the "secrets" of becoming a teacher as, methodologically, students' subjective perceptions, experiences and learning trajectories have been emphasised. Thematically, the research asks, "Who am I as a teacher?" and "What kind of learning opportunities does ITE offer for professional development?" Students are recognised as agentic actors and authorities in their learning with valuable opinions. They are framed within a narrative of research-based ITE portraying teachers as active agents with the responsibility for developing their own practices (Sitomaniemi-San, 2015).

The present scoping review has identified general patterns and gaps in the literature that can encourage further studies. Given the strong emphasis on small-scale qualitative studies, future research could pay more attention to quantitative approaches, such as long-term studies that track students' development and change over the years of study; research on the effectiveness of teacher education; and studies with large national samples (+500 students) based on national and even international collaboration to increase the generalisability of findings. Our review also encourages greater diversity and innovation in methodological approaches to data collection. These could include, for example, learning analytics using data generated by learners' interactions with digital learning environments, and the use of mobile technologies and virtual reality simulations to create immersive, interactive environments in which student teachers can practice and reflect on their teaching. We believe that innovative approaches such as these could significantly deepen our understanding of what it means to become a teacher.

We found that empirical studies of student teachers represent different paradigms (e.g. interpretive, effectiveness research) that are often considered incompatible because they are based on different beliefs and practices that guide research. Although this can lead to debates about the legitimacy, usefulness and integration of the findings from different research traditions, multiple paradigms also offer a comprehensive understanding of the complex nature of teaching and learning. Optimally, reviews like this should encourage researchers to build on each other to develop a knowledge base for the field (Mayer & Oancea, 2021). However, differences need to be navigated to build a coherent body of knowledge that can inform policy and practice in teacher education.

The present study corroborates that teacher education research is a multifaceted field in which the goals of education and research compete and are influenced by diverse economic, social and political forces and modes of thinking (Cochran-Smith & Villegas, 2015a). Our study revealed that certain research features may characterise Finnish context, such as the emphasis on students' voices in describing their journey through ITE. However, we also identified similarities with international studies, notably the increasing trend in research volume, the focus on small-scale qualitative studies and the prominence of topics that align with the core aspects of teaching commonly found in international literature. However, future research needs to compare our findings to those of other countries, identifying the similarities and differences that contribute to a broader understanding of global trends in research. Considering calls for methodological pluralism (Borko et al., 2007) and diversity in teacher education research (Rosiek & Gleason, 2017), the findings suggest a need to diversify research approaches to advance the field and shape its future.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used DeepL to improve the language of the manuscript. After using this service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

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ORCID

Jenni Koski http://orcid.org/0000–0001–9206–2185
Riitta-Leena Metsäpelto http://orcid.org/0000–0002–6358–1602
Mari Kyllönen http://orcid.org/0000–0003–0465–6560
Anna-Maija Poikkeus http://orcid.org/0000–0001–7913–8691

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