



Student Teachers' Transfer of Knowledge to the School Community

(Received on November 17, 2023 – Accepted on July 7, 2024)

John Henriksson¹, Gunilla Eklund² and Jessica Aspfors³

Abstract

Previous studies have revealed some ambiguity regarding the role of research in teacher education and teachers' use of research in their profession. In view of this, a research project was started in 2019 with the aim of developing a connection between research and practice through a popular scientific approach. Student teachers create video pitches and didactic materials based on their master's theses to transfer knowledge to the school community. The current study investigates how teachers perceived student teachers' scientific master's theses when they are communicated in a popular scientific way. Ten Finnish primary school teachers were interviewed in 2022 and 2023, and the data was analysed through reflexive thematic analysis. The findings show that the teachers found the student teachers' popular scientific materials to be beneficial to the teachers' own learning, the development of students' digital competence and the recruitment of new teachers. The teachers also noted that the student teachers' materials were more accessible than traditional theses, but they identified the need for further developments in the platform, material quality and practical application. Based on these results, we suggest that educational research should develop formats for dissemination and knowledge transfer that are more applicable to teachers in their daily practice.

Keywords: teacher education, master's thesis, popular science, knowledge transfer

Introduction

Over the past decades, there has been a growing emphasis on the need to develop top-quality teacher education programmes that prepare teachers to adapt to future demands and changing circumstances (Darling-Hammond & Hylér, 2020). Despite variations at the national level, certain challenges are common in teacher education in general. One such challenge is the inherent conflict between professional and academic objectives, as teacher education must maintain a balance between academic rigour and practical relevance (Elstad, 2023). This challenge has been extensively discussed, and the intricate relationship between theory, research, and practical application is a well-known subject amongst educators around the world (Menter & Flores, 2020). With a specific emphasis on the relationship between research and practice, scholars have drawn attention to research-based teacher education (Alvunger & Wahlström, 2018; Puustinen et al., 2018).

Research-based teacher education in Finland is the starting point of the present study. The current form of Finnish teacher education stems from the creation of the comprehensive school system during the 1970's which also lead to reforming the teacher education (Jakku-Sihvonen & Niemi, 2006). Finnish teacher education was characterised by a craft-based apprenticeship approach until 1974 when teacher education was transferred to universities (Jakku-Sihvonen & Niemi, 2006). During the following years, academic teacher education was developed focusing on linking teacher education to research and making it comparable to other university studies. One component of this reform was the implementation

¹ Åbo Akademi University, FINLAND, john.henriksson@abo.fi, ORCID: 0000-0001-5447-500X

² University of Agder, NORWAY, gunilla eklund@uia.no, ORCID: 0000-0003-1876-1441

³ Åbo Akademi University, FINLAND & Nord University, NORWAY, jessica.m.aspfors@nord.no, ORCID: 0000-0002-1865-6302

of the master's degree examination, in 1979 for all teachers in the new system (Jakku-Sihvonen & Niemi, 2006; Malinen et al., 2012; Niemi & Jakku-Sihvonen, 2011).

Today, teacher education embraces a research- and master's-based approach (Sitomaniemi-San, 2021) and is closely connected with the academic knowledge tradition and the aim of educating autonomous and reflective teachers who can continuously analyse and develop their own practice in a systematic and reflective way (Tirri, 2014). However, previous studies have revealed some ambiguity regarding the role of research in Finnish teacher education (Puustinen et al., 2022) and teachers' use of research in their profession (Koski et al., 2023). Despite this, Finnish research-based teacher education has not been the subject of discussion in the same way as in several other European nations (Elstad, 2023), for example, Norway (The Norwegian Ministry of Education and Research, 2023), Iceland (Sigurðsson et al., 2023) and Austria (Parlament Österreich, 2024).

In view of this, a research project was started in 2019 with the aim of developing the connection between research and practice through a popular scientific approach (Henriksson et al., 2021). In this project, student teachers create video pitches and didactic materials based on their master's theses in order to transfer the knowledge to the school community. In line with our experience, the project was received positively. However, it is also evident that the relevance of student teachers' popular scientific materials for teaching practice was not fully clear to in-service teachers (Henriksson et al., 2021). Therefore, this article investigates how the teachers perceived the student teachers' scientific master's theses when they were communicated in a popular scientific way. Accordingly, the research questions are as follows:

1. How do teachers perceive the relevance of student teachers' popular scientific materials?
2. What are teachers' recommendations for the future development of popular scientific materials for student teachers?

In the following sections, we present the background of the study, the method, and the key findings. We conclude by highlighting the implications for teacher education.

Previous Research

Many previous studies have focused on research-based teacher education in general (Forsström & Munthe, 2023). However, the literature has given less consideration to how teachers use research in their everyday practice (Koski et al., 2023). Below, we elaborate on relevant research from both perspectives.

Research-based teacher education

Studies conducted in the Finnish context have typically presented a positive view of research-based teacher education (Byman et al., 2009; Jyrhämä et al., 2008). Student teachers have found the research-based approach to be a valuable foundation in their methodological studies and master's-level education. Furthermore, they have interpreted it as a way to enhance their professional development and ability to apply educational research skills to build expertise (Eklund et al., 2019; Heikkilä et al., 2020; Jyrhämä et al., 2008; Maaranen, 2010; Niemi, 2011). However, student teachers have also contended that research-based studies in general should be more relevant to the teaching profession, and they have struggled to connect their research-based activities to the knowledge and skills required in teaching practice (Afdal & Spernes, 2018; Baan et al., 2020).

Similar trends can be observed among Finnish teachers in their views on research-based teacher education. While they have expressed appreciation for their education, they have acknowledged the difficulty of applying their research-based knowledge to their daily work (Aspfors & Eklund, 2017; Jakhelln et al., 2019). This challenge of combining theoretical knowledge with educational practice has been reiterated by Heikkinen et al. (2015). To make learning meaningful, research-based activities must encourage active and independent student participation and be closely connected to educational

practices (Baan et al., 2019; Flores, 2018; Nikolov et al., 2020). Given that teacher education has the professional duty to prepare future teachers, it must necessarily integrate research and school practice (Sitomaniemi-San, 2021; Säntti et al., 2018). Such integration will support the development of new skills for student teachers, university teacher educators, and teachers alike (Ellis et al., 2019; Flores, 2018).

Teachers' use of research in their profession

Despite the long tradition of research-based teacher education in Finland, surprisingly little large-scale empirical research has been conducted on how the research-based approach is realised in teachers' work (Kansanen, 2014). This issue is associated with the well-known gap between research and teaching that is also found in public policies, which, regrettably, often lack the foresight to recognise that "the discovery of knowledge (research), its practical application (development), and its dissemination (teaching)" should be seen as interconnected endeavours in a knowledge-driven society (Ramsey, 2000, p. 52).

Koski et al.'s (2023) study on how teachers engage with research has revealed the rather discouraging and unexpected finding that only a few teachers actively sought out educational research after finishing their master's-level education. Moreover, teachers primarily acquired new educational knowledge through media sources such as newspapers, magazines, breakfast TV, and social media. Their lack of engagement with research was mainly due to time constraints and the difficulty of accessing relevant studies. The separation of the contexts of teachers and researchers hindered collaboration, and the teachers expressed a desire for a common platform and more interaction between the two groups, as they believed that it would benefit them both.

These results largely correspond with those of Martinovic et al.'s (2012) action research study, especially the factors identified as barriers to teachers' incorporation of research into classroom practice. These factors include insufficient time and research funding, the difficulty of accessing research findings, the perception that academic research is not relevant to the classroom context, and low confidence in the teacher's ability to engage with academic research. Similarly, in a systematic review, Hemsley-Brown and Sharp (2003) found that the most common critique of teachers regarding educational research centred on its limited connection to real teaching situations and its shortcomings in terms of generalisability and validity. Additionally, Wahlgren and Aarkrog (2021) noted that research-based knowledge appears to be more valuable as a tool for thinking and talking about practice, as opposed to a direct guide for practical implementation by teachers. The conclusion has been affirmed by the study of Martinovic et al. (2012), in which teachers frequently perceived themselves as passive recipients of knowledge and appreciated research that is pertinent and solution-oriented, practical, contextually relevant, credible, and easily accessible.

The gap between research and teaching also connects to the ongoing research field of knowledge transfer, as well as to Professor Røvik's work on examining successful instances' knowledge transfer to different organisations (Røvik, 2016, 2023). His translation theory of knowledge transfer proposes that knowledge transfer can be linked to the act of translating different languages, such that the translators in this analogy follow specific rules and that the ways in which translations are performed impact the outcomes of knowledge transfer. Røvik (2016) specified three main modes of knowledge translation: the reproducing translation mode, the radical translation mode and the modifying translation mode. To achieve a successful transfer of knowledge across borders the translators need to have a good translation competence, which Røvik (2023) defined as context knowledge and knowledge regarding translation rules. In our study this means that the student teachers themselves need to have knowledge of the context in which they direct their material in order for it to become relevant to their target group.

Popularising master's theses – depicting the context

As part of a mandatory 5 ECTS course in primary school teacher education at a Finnish university, around 55 student teachers develop popular scientific materials alongside their master's theses each year without altering the conventional scientific form of the traditional thesis process (Eklund, 2019). Initiated in 2019 by the research group (the authors of this article), the course involves lectures, independent work and an examination based on the creation of popular scientific materials and reflective logbooks. It is the final course for student teachers in their teacher education. All participants consent to the publication of their popular scientific materials on the project's website (abo.fi/popmag).

The student teachers create video pitches, which they primarily record on smartphones and finalise with various editing tools, to succinctly present their master's theses in less than two minutes in a popular scientific manner. Each video pitch usually starts with a hook, which is followed by a brief summary of the results and a call for action at the end. Based on their master's theses, the student teachers also develop didactic materials intended for practising teachers and other target groups. The format of the didactic materials varies depending on the thesis theme and target audience but can, for example, be a learning material, lesson plan, exercise, information package or an op-ed in a local paper. The popular scientific materials always feature an engaging headline and lead paragraph. The videos are posted to the project's YouTube channel, the podcasts are uploaded to Soundcloud and text documents are hosted on the university's public website. All products are compiled in a post on the project's website, which contains links to the full theses on the university's publication platform.

The course structure (Figure 1) has undergone several revisions over the years and continues to evolve. Initially, the emphasis was on enhancing the quality of student teachers' video pitches, with the challenge being the genre shift (Fahnestock, 1986; Henriksson et al., 2021) required to transform scientific knowledge into popular science. When needed, students are allowed to borrow video production equipment (GoPros, microphones, and iPads) and receive instruction in the various stages of video creation. While the quality of the student teachers' video pitches has improved over the years, there are still challenges in the development of podcasts and didactic materials.

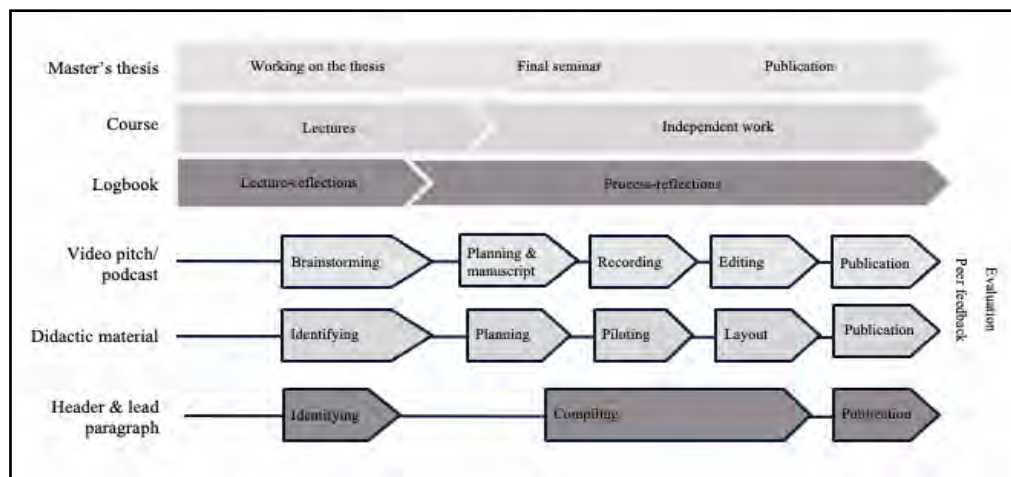


Figure 1: An overview of the course structure and students' tasks

Method and Analysis

In this study, 10 Finnish primary school teachers were interviewed in 2022 and 2023. They were chosen by purposive sampling in order to gain an in-depth understanding (Robinson, 2014). The criteria were experience with general school development, network within the school community and geographical spread within Finland. A total of 30 teachers were identified and contacted of which 10 were willing and able to participate in the study. The group consisted mostly of seasoned teachers, some

with over 20 or 30 years of experience in the field representing different parts of Finland. Each of them was or had been a tutor teacher, a role implemented by a government initiative in 2016 that entails working around two teaching hours per week to support peers within their schools in the development of new teaching practices (Finnish National Agency for Education, 2018). Participation was voluntary with no compensatory incentive, and each interview lasted about 45 minutes.

The semi-structured interviews were conducted via Zoom and began with the interviewer explaining the website's structure and the project's goals. The website that was shown to the interviewees (abo.fi/popmag) has been revised and re-structured since the time of the interviews, and new student materials have been added. Instead of watching sample videos that were pre-selected by the researchers, the interviewees were asked to choose which videos to watch and discuss based on their own interests, which made the interviews more representative content-wise. The sessions followed a set protocol that covered the project, platform, video pitches, and student teachers' didactic materials. Screen sharing in Zoom allowed for live exploration of the website. The interviews were recorded and transcribed. While the video files were saved for potential references during the analysis, they were ultimately not needed and were thus excluded from the dataset.

The analysis of the data was conducted through the lens of reflexive thematic analysis (RTA) as conceptualised by Braun and Clarke (2021). This analytic model is dedicated to deciphering the experiences articulated within the data to reveal themes with shared meanings throughout the entire dataset. An intrinsic feature of RTA is the contemplative introspection of researchers concerning their multiple roles in the research process (Braun et al., 2022; Braun & Clarke, 2022a). All three researchers, who had been engaged in the project since 2019, were actively involved in instructing and guiding students in their creation of popular scientific materials as part of the project. Consequently, the researchers had a vested interest in the success of the student teachers in producing materials of substantial value for practising teachers, and they were keen to receive feedback on the operational aspects of the project.

The analysis followed the six phases of RTA identified by Braun and Clarke (2022b). The primary author assumed responsibility for the first phase, familiarising himself with the dataset (Phase 1) and generating preliminary codes (Phase 2). Subsequently, the researchers collaboratively established the initial themes (Phase 3) and refined and reviewed them (Phase 4). At this juncture, the analysis was presented at an academic conference (Henriksson et al., 2023). Based on the feedback received there, the themes were further refined, defined, and named (Phase 5), and sub-themes were defined in preparation for the final phase of writing up the findings (Phase 6). The study follows the general ethical standards approved by the Finnish Advisory Board on Research Integrity (2023).

Findings

This section conveys the findings of this study. First, it considers the potential target audiences of student teachers' materials. Then, it presents the findings related to the two research questions. The teachers identified in-service teachers and parents as the primary target audiences, but they also mentioned a constant need for content aimed at pupils. Newly qualified teachers were also acknowledged as potential recipients, especially when themes were already prevalent in staff discussions, and school management and principals were considered possible targets for specific materials intended for use in school development. Finally, substitute teachers were highlighted as potential audiences, particularly for ready-made didactic materials that facilitate immediate application with minimal prior planning.

Relevance of popular scientific materials

The following section presents the findings pertaining to the first research question, which asks how teachers perceive the relevance of student teachers' popular scientific materials. The analysis

revealed three main themes – learning activities, digital competence and recruitment – as well as two sub themes: informal learning and formal learning.

Learning activities

The teachers identified two sub-themes of relevance concerning their own learning. The first sub-theme was *informal learning*. Five teachers highlighted the convenience of having materials easily accessible on the platform and on YouTube, which enabled independent engagement driven by curiosity or professional needs and was more time efficient. They appreciated the platform's aggregation of the latest research, as it made it easy to check up on contemporary topics and identify useful materials:

Often, valuable work is still done on current themes and the like, so I definitely think this could be a way to keep a bit of an eye on what's happening in that area. (Teacher 6)

However, one teacher was sceptical about prioritising this content amidst the abundance of materials targeting teachers, and they questioned whether they would personally invest time in exploring the material.

The second sub-theme was the *formal learning* activities organised by the school's leadership or external actors. Five teachers suggested that the students' materials could serve as conversation starters in meetings or co-planning sessions to introduce fresh perspectives or underscore a theme's relevance:

Then, surely, this could also be used in the context of teacher meetings to foster discussion around such topics. A common issue in the teachers' lounge is the lack of time for educational or didactic discussions. Here, there would be an opportunity to utilise some of these [materials] as discussion starters at times as well. (Teacher 4)

Two teachers noted that the student teachers' materials could support professional development by incorporating timely topics. One suggested inviting the students to give lectures on relevant themes, while another proposed the allocation of a segment of the mandated professional development time (three days annually) to engage with these materials.

Digital competence

Six teachers emphasised the importance of student teachers creating popular scientific multimodal products (e.g. videos and podcasts) to enhance their digital competence. The teachers saw this as a vital skill in creating teaching materials and supporting students' creative endeavours – and one that is often lacking among teaching professionals.

I wish that the student teachers today become those who see that multimedia is a part of school today. Sound, composition, and light, and things like that...it's good to know. (Teacher 10)

Furthermore, the teachers addressed what they considered a common misconception: that young, newly qualified teachers inherently possess multimodal production skills due to their upbringing in the social media era. Therefore, they underscored the importance of the task of creating multimodal content. One teacher also connected the need for these skills to the challenges posed by generative artificial intelligence in education, and they asserted that teachers must guide students in creating and analysing diverse content to bolster their media literacy.

Recruitment

Five teachers suggested that the platform could aid in recruiting new or substitute teachers. They observed that, unlike traditional master's theses, student teachers' video pitches and podcasts showcase their personalities and specialised interests. They proposed that principals could use the platform to headhunt newly qualified teachers to fulfil specific school needs, and they underlined its efficacy for this purpose. They also stressed the need for student teachers to effectively market themselves to stand out.

Well, my thinking is, if I were one of these newly qualified teachers, I would immediately see this as an opportunity to market myself. [...] And it also means when school principals come and browse here, they might catch something, like, This is exactly what we need in our school. Here is someone very creative and someone who seems...and here is someone very structured and someone who... . So, yes, this is...definitely, I think that s excellent. (Teacher 8)

One teacher noted potential downsides to the personal nature of student teachers' popular scientific content, fearing that it might over-emphasise the marketing of individual students over the theme of their thesis. The teacher also believed that it could disadvantage students who are uncomfortable appearing on camera, and students specialising in high-demand themes might unfairly benefit at the expense of deep knowledge production in less sought-after areas.

Development of student teachers' popular scientific materials

Analysis of teachers' recommendations for the future development of student teachers' popular scientific materials was performed to address the second research question. This analysis identified three main themes – accessibility, quality and applicability – as well as sub-themes: format and usability. These are described in the following sections.

Accessibility

All teachers concurred that the student teachers' popular scientific materials, especially their video pitches, podcasts and didactic materials, were more accessible and engaging than traditional theses, which they saw as cumbersome and uninviting despite their availability on public portals.

It s entirely in line with today s thinking that one doesn t want to take on a paper thesis without knowing what it is about, or even open it and look at the abstract. (Teacher 7)

The teachers suggested enhancing the marketing of the platform and student materials, including newsletters and social media promotion, admitting that they were unaware of the platform even though they were the target audience. They supported more investment in the project's YouTube channel, which they recognised as a common resource for teachers, but they also recommended maintaining the project's independent website.

Three teachers critiqued the website's chronological structure, suggesting instead that content categorisation by subject or target group should be visible upon entering the platform. While recognising the search function's utility, they found that it was not well placed for easy access. Still, they all agreed that the website's foundational layout, which featured headlines and lead-in paragraphs for various materials, offered a positive user experience.

One teacher remarked on the importance of engaging with the theses before using the didactic materials to comprehend the themes more in depth. In contrast, two teachers viewed the theses as supplementary materials to be consulted as needed when using the didactic resources.

Quality

All teachers stressed the need for students to uphold excellence in the content and technical execution of their materials. They compared the students' materials to social media content, noting that videos, in particular, must have high standards for credibility and reach. They added that the competence to succinctly present content is vital for teachers, especially when they are deeply knowledgeable about a topic, as the students were with their theses.

Four teachers emphasised that student teachers need to write concrete, appealing, and believable headlines and lead-in paragraphs. One cautioned against misaligning promises in the introduction with the actual content of the video pitch or didactic materials. Eight teachers highlighted the importance of

depth in student teachers' didactic materials, and two disapproved of tip lists and bullet points, which they viewed as superficial and subpar.

That's just high-flown words with nothing concrete [...] everything is just that vagueness that's somewhere up high, and the teachers completely lose interest in it, and it's like one more thing to figure out how to do. (Teacher 6)

In addition, three teachers highlighted technical issues in student materials, such as varying sound levels, poor lighting, or low-quality video editing and graphics. They valued high-quality audio for potential background listeners and polished visuals for clarity. One teacher also mentioned spelling mistakes:

I reacted instantly, for example, that she had a spelling error in the headline. That was kind of, Oh no, that's not good. So, in that sense, it can also be negative. (Teacher 8)

This teacher further questioned whether it is necessary for students to appear personally or feature their own voices in their video pitches and podcasts, especially since student teachers undertake this task at the very end of their studies and may be in a hurry to complete it, which may compromise the quality of the material.

Applicability

The idea of applicability was most relevant to the *format* (sub-theme 1) of the student teachers' materials and to the *usability* (sub-theme 2) of their didactic materials. Regarding the format, six teachers expressed scepticism about whether a podcast was a viable medium for the popular scientific dissemination of a student's master's thesis. Three teachers remarked on the divisiveness of the podcast format, as teachers either listened to podcasts or did not. This point implies that the format itself might preclude a portion of the target audience from accessing the content. Three teachers shared that they listened to podcasts about popular culture topics but did not like to use podcasts for professional learning. They explained that podcasts are often longer than videos, require more engagement, and are seen as more deliberate media compared to the casual nature of videos.

Teachers largely favoured videos over podcasts, believing that the former was a more universal medium that did not carry the same connotations as the latter. Six teachers expressed a preference for students to produce their didactic materials in a video format, noting that most of the other didactic materials on the platform were text-based. They were particularly interested in student teachers creating instructional videos for pupils when they were compatible with the thesis theme.

I haven't seen anyone do a concise and good video as their didactic material. That would have been great. If I would have been a student, I would probably have done that. (Teacher 4)

The six teachers also highlighted an ongoing demand for brief video clips that could be utilised to introduce a theme, explain a theory or concept, or serve as a resource for substitute teachers. Additionally, two teachers suggested that student teachers could develop video content specifically for in-service teachers. They expressed a desire for students to take certain textual guides available on the platform and transform them into instructional videos alongside their video pitches.

The second sub-theme of applicability concerns teachers' perceptions of the *usability* of student teachers' materials. Regarding these didactic materials, the teachers all referenced the dilemma that over-explaining theoretical aspects seems to naively assume that the audience lacks subject expertise, which, as they noted, is rarely true for teachers with master's degrees. At the same time, linking materials to scientific theses is essential to attaining adequate theoretical grounding and justification.

What's tricky about it – and I don't mean to belittle student teachers – is that they often have a great deal of enthusiasm and a strong drive to do things and make an impact, but they lack the necessary experience. (Teacher 2)

Two teachers discussed the self-confidence of student teachers and recognised the challenge of creating content for their highly experienced peers. However, given their in-depth thesis work, student

teachers may, in fact, have deeper theoretical knowledge and more current insights into certain areas. They need to have the courage to trust their findings and to believe in their contributions to educational advancement.

Eight of the teachers elaborated on the importance of material being practically applicable to teachers. They emphasised the consistent demand for new instructional materials in the field. One of the teachers clarified their thought processes when encountering new material:

I pick out the golden nuggets – that is, what's good and adds something to what I already have in my own repository of materials or to my own thoughts, opinions, and ideas. Whatever brings something new, I take that. Those golden nuggets. The rest, I've probably tried before or considered but decided that this works better with the student group I have, and so on. [...] I don't think many who have worked for 10 or 20 years want to read all that before they use it.
(Teacher 10)

The teachers stressed that didactic materials need to have a specific target audience and be aligned with the thesis theme. They preferred materials that are ready for immediate or adaptable use and that teachers could customise for their classrooms. Furthermore, seven teachers called for didactic materials that addressed existing content gaps, especially in underrepresented themes in the Swedish-speaking Finnish context. They believed that student teachers who are familiar with current resources through their thesis work should identify and fill these gaps, although they admitted that opportunities vary depending on the thesis theme.

It really depends on what the theme is. This one was not something that a teacher should work with in their teaching, so then this didactic material cannot be a practical guide, practical tips on what to do in the teaching. Of course, it can be that, but here it is more these informative infographics that fit well here. But if it is a practical theme that directly is something where teachers can develop, train themselves in this subject and develop their ability, then maybe it needs to be a more concrete didactic material... (Teacher 8)

In summary, the educators perceived the student teachers' materials to be relevant to a wide audience, and they particularly valued the accessibility afforded by the novel format and platform. However, they identified a need for further developments, most notably regarding the quality and applicability of the didactic materials created by the student teachers.

Discussion

This study aimed to investigate teachers' perceptions of student teachers' scientific master's theses when they are communicated in a popular scientific way. Regarding the *relevance* of the student teachers' material, the teachers had generally positive views of the project, and the materials generated by the students (Henriksson et al., 2021), which they perceived as relevant and accessible. Thus, the initiative to develop teacher education through a popular scientific approach represents an opportunity to bridge the gap between theory and practice (Elstad, 2023; Menter & Flores, 2020). In terms of the interconnected endeavours noted by Ramsey (2000), the study promotes the relationship between the discovery of knowledge, its practical application and its dissemination in a knowledge-driven society.

The teachers indicated that the material could be utilised for the professional development of teachers – either informally by individual teachers or formally as part of an organised initiative. The relevance for individual teachers is in line with the aim of a research-based approach for training autonomous reflective teachers who continuously develop their own practice based on research (Tirri, 2014). As noted, to make learning meaningful, research-based activities must be closely tied to practice (Baan et al., 2019; Flores, 2018; Nikolov et al., 2020). Because of its long tradition (Sitomaniemi-San, 2021), research-based teacher education in Finland is intimately connected with the academic knowledge tradition and language that characterises the teaching profession (Afdal & Nerland, 2014).

In this sense, popular scientific material can be seen as contributing to the practices of the teaching profession, as explained by the teachers.

The teachers believed that the task of creating multimodal products was crucial to building the digital competence of student teachers. This role relates to the need for teachers to be adaptable to changing circumstances (Darling-Hammond & Hyler, 2020) as well as the Finnish national curriculum requirements regarding multiliteracy and digital competences as two of the seven transversal competence areas (Finnish National Agency for Education, 2014). The task of popularising master's theses presents one way to integrate the creation of multimodal products at the very end of student teachers' studies, thus contributing to the development of teacher education. In addition, the teachers expressed that the project afforded more opportunities for student teachers to market themselves and their specific competencies in future recruitment processes. This idea is consistent with the project's overall goal of increasing interactions between teacher education and the school community.

Although the teachers had a generally positive view of the accessibility of the student teachers' popular scientific materials, they also identified some challenges and suggested paths for the future development of the materials. Koski et al. (2023) reported that time constraints and difficulty accessing relevant studies were reasons for teachers' lack of engagement with research. Notably, the teachers in our study viewed popular scientific material as more accessible than traditional research. They also mentioned time constraints and found that video pitches were more convenient than podcasts. The video format is in line with the new sources of educational knowledge noted by Koski et al. (2023), with the difference being that the content in the present study is research-based. The video format can also be linked to the modifying translation mode defined by Røvik (2016), as the task for student teachers was to translate their master's theses into forms more accessible for teachers. The teachers recommended increased marketing and structural revisions of the project platform to compete with other media sources, and they highlighted the importance of maintaining a high technical quality of materials to attract viewers and appeal to teachers. Other comments regarded the use of lighting, sound quality, and the credibility of headline and lead-in paragraphs. This connects to the credibility of the material, which has also been stressed by Martinovic et al. (2012). The teachers typically preferred videos over podcasts; the podcast format was viewed as divisive amongst the teachers, and they generally felt that listening to a podcast was a conscious action, whereas videos could be encountered casually.

The most prominent theme of discussion with the teachers was how they perceived the applicability of the student teachers' materials. This subject relates to the continuous discourse on the relationships between theory, research, and practice (Elstad, 2023; Menter & Flores, 2020) and between teacher education and the school community (Afdal & Spernes, 2018; Baan et al., 2020; Puustinen et al., 2018). The teachers recognised that creating materials for highly experienced teachers was inherently challenging for student teachers in two regards: first, the student teachers could seem overly naive if they communicated the applicability of their materials on a very large scale based on a rather small study, and second, the student teachers might lack confidence in their own results and miss out on possibilities to identify or communicate their materials' applicability. To overcome this dilemma, student teachers must find a middle ground where they can identify concrete applicability that seems credible to the recipient teachers while accounting for the fact that some teachers have considerable experience with the theme of the study. Ideally, the material should also be useful for teachers with less experience.

There was also a desire for student teachers to clearly define their target audience and ensure that their materials filled an existing gap. This advice follows previous research showing that teachers need practically and contextually relevant knowledge in their daily practice (Hemsley-Brown & Sharp, 2003; Martinovic et al., 2012). However, some of the topics and knowledge contributions of the master's theses may cater to different target groups and be better suited to certain types of materials. Op-eds or

discussion points could be more valuable tools for thinking and talking about practice, as noted by Wahlgren and Aarkrog (2021).

The teachers' comments on the applicability can also be mirrored to Røvik's (2023) translation theory of knowledge transfer and, specifically, the translation competence. In line with this, the translator's task is to contextualise the information and adhere to the norms and rules for translation. The findings of our study show that, in many cases, the student teachers seem to have limited translation competence. Thus, the challenge for teacher education lies in teaching student teachers the translation competence required with regard to specific contexts and target groups, as well as the common types of content materials used by teachers.

Limitations

This study was conducted in a Finnish context with a small number of primary school teachers, and the conclusions may be limited. Interviews were conducted with ten purposively sampled primary school teachers who were chosen for their extensive experience in school development. All participants were current or former tutor teachers who possessed expertise in managing extensive quantities of pedagogical support materials. Additionally, they had valuable insights into the current needs and topics relevant to their schools as a whole. They were all educated in the same teacher education programme, but they varied in gender, age, educational profile, work experience, and regional affiliation. Thus, the selection of participants ensured a wide range of experiences even though the final amount of data could have been more extensive. The generalizability model of case-to-case transfer (Polit & Beck, 2010) can be applied to this study as the study provides a detailed description that allows the readers to extrapolate the findings to other settings. The interview guide was reasonably comprehensive and provided the same basis for all interviews as well as similar opportunities for participants to express their thoughts and views on the project. At the beginning of each interview, each interviewee individually chose a sample video pitch to watch to enhance the discussion.

The interviewer knew all of the participants personally on some level, which is often the case in a small school community. This familiarity might have impacted the interviews in a negative way if commonly understood topics remained unsaid or in a positive way if superficial topics were omitted. The interviewees showed great trust in the interviewer, as they dared to acknowledge where school development initiatives had failed or where they themselves had made mistakes in regard to certain themes.

The analysis was performed in six phases, and the findings were revised in multiple constellations to support internal reliability and validity. Since only the interview data were utilised in this study, there may be a missing link between the teachers' verbally expressed views and their practices. Nevertheless, the study has explicitly aimed to investigate teachers' perceptions, not their actions, and the use of interviews was a fruitful method to enrich our understanding of teachers' views of student teachers' scientific master's theses when they are communicated in a popular scientific way.

Conclusion

The potential of this study and its contribution to the literature lies in the development of new ways to disseminate research and transfer knowledge so that teachers can make use of it in their practice. Popular science can be a mediating factor as researchers compete with news media and social media. As this study has shown, popular scientific materials are seen as relevant for teachers, but their applicability should still be further developed. This finding underscores the importance of continuous collaboration among student teachers, teacher educators and teachers. Educational research in general must identify formats that are more applicable to teachers in their daily practice. In a research-based teacher education context that seeks to prepare teachers to be autonomous and reflective, there is a particular need to integrate research and school practice.

Disclosure statement

The authors report no potential conflict of interest. The first author analysed the data and collaborated with the other authors in drafting the manuscript. All three authors read and approved the final manuscript.

Acknowledgement

This study was supported by grants from by The Swedish Cultural Foundation in Finland, Högskolestiftelsen i Österbotten and Svensk-Österbottniska Samfundet.

References

- Afdal, H. W., & Nerland, M. (2014). Does teacher education matter? An analysis of relations to knowledge among Norwegian and Finnish novice teachers. *Scandinavian Journal of Educational Research*, 58(3), 281–299. <http://dx.doi.org/10.1080/00313831.2012.726274>
- Afdal, H. W., & Spernes, K. (2018). Designing and redesigning research-based teacher education. *Teaching and Teacher Education*, 74, 215–228. <http://dx.doi.org/10.1016/j.tate.2018.05.011>
- Alvunger, D., & Wahlström, N. (2018). Research-based teacher education? Exploring the meaning potentials of Swedish teacher education. *Teachers and Teaching*, 24(4), 332–349. <https://doi.org/10.1080/13540602.2017.1403315>
- Aspfors, J., & Eklund, G. (2017). Explicit and implicit perspectives on research-based teacher education - newly qualified teachers' experiences in Finland. *Journal of Education for Teaching - International Research and Pedagogy*, 43(5). <http://dx.doi.org/10.1080/02607476.2017.1297042>
- Baan, J., Gaikhorst, L., Noordende, J., & Volman, M. (2019). The involvement in inquiry-based working of teachers of research-intensive versus practically oriented teacher education programmes. *Teaching and Teacher Education*, 84, 74–82. <https://doi.org/10.1016/j.tate.2019.05.001>
- Baan, J., Gaikhorst, L., & Volman, M. (2020). Stimulating teachers' inquiring attitude in academic and professional teacher education programmes. *European Journal of Teacher Education*, 43(3), 352–367. <https://doi.org/10.1080/02619768.2019.1693994>
- Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, 18(3), 328–352. <https://doi.org/10.1080/14780887.2020.1769238>
- Braun, V., Clarke, V., & Hayfield, N. (2022). 'A starting point for your journey, not a map': Nikki Hayfield in conversation with Virginia Braun and Victoria Clarke about thematic analysis. *Qualitative Research in Psychology*, 19(2), 424–445. <https://doi.org/10.1080/14780887.2019.1670765>
- Braun, V., & Clarke, V. (2022a). Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, 9(1), 3–26. <https://doi.org/10.1037/qup0000196>
- Braun, V., & Clarke, V. (2022b). *Thematic analysis: A practical guide*. SAGE Publications Ltd.
- Byman, R., Krokfors, L., Toom, A., Maaranen, K., Jyrhämä, R., Kynäslähti, H., & Kansanen, P. (2009). Educating inquiry-oriented teachers: Students' attitudes and experiences towards research-based teacher education. *Educational Research and Evaluation*, 15(1), 79–92. <https://doi.org/10.1080/13803610802591808>
- Darling-Hammond, L., & Hyster, M. E. (2020). Preparing educators for the time of COVID ... and beyond. *European Journal of Teacher Education*, 43(4), 457–465. <https://doi.org/10.1080/02619768.2020.1816961>

- Eklund, G., Aspfors, J., & Hansén, S-E. (2019). Master's thesis – a tool for professional development? Teachers' experiences of master's theses in Finnish teacher education. *Nordic Journal of Education and Practice*, 13(2), 76–92. <https://doi.org/10.23865/up.v13.1973>
- Eklund, G. (2019). Master's thesis as a part of research-based teacher education: A Finnish case. *Journal of Teacher Education and Educator*, 8(1), 5–20.
- Ellis, V., Souto-Manning, M., & Turvey, K. (2019). Innovation in teacher education: Towards a critical re-examination. *Journal of Education for Teaching*, 45(1), 2–14, <https://doi.org/10.1080/02607476.2019.1550602>
- Elstad, E. (2023). Why should people outside the Nordic region be interested in teacher education in the Nordic region? In E. Elstad (Ed.), *Teacher education in the Nordic region: Challenges and opportunities* (pp. 1–13). Springer. https://doi.org/10.1007/978-3-031-26051-3_1
- Fahnestock, J. (1986). Accommodating science: The rhetorical life of scientific facts. *Written Communication*, 3, 275–296. <https://doi.org/10.1177/0270741088386003003001>
- Finnish National Agency for Education. (2014). *National core curriculum for basic education* (3rd ed). Finnish National Agency for Education.
- Finnish National Agency for Education. (2018). Facts Express 3C/2018: Tutor teacher activities in basic education in Finland. *Finnish National Agency for Education, publications*. <https://www.oph.fi/en/statistics-and-publications/publications/facts-express-3c2018-tutor-teacher-activities-basic>
- Finnish National Board on Research Integrity (TENK). (2023). The Finnish code of conduct for research integrity and procedures for handling alleged violations of research integrity in Finland 2023. <https://tenk.fi/en>
- Flores, M. A. (2018). Linking teaching and research in initial teacher education: Knowledge mobilisation and research-informed practice. *Journal of Education for Teaching*, 44(5), 621–636. <https://doi.org/10.1080/02607476.2018.1516351>
- Forsström, S., & Munthe, E. (2023). What characterizes Nordic research on initial teacher education: A systematic scoping review. *Nordic Studies in Education*, 43(3), 241–259. <https://doi.org/10.23865/nse.v43.5588>
- Heikkilä, M., Hermansen, H., Iiskala, T., Mikkilä-Erdmann, M., & Warinowski, A. (2020). Epistemic agency in student teachers' engagement with research skills. *Teaching in Higher Education*. <https://doi.org/10.1080/13562517.2020.1821638>
- Heikkinen, H. L. T., Aho, J., & Korhonen, H. (2015). *Ope (ei) saa oppia. Opettajankoulutuksen jatkomon kehittäminen* [Teacher learns not. Development of teacher education continuum]. University of Jyväskylä. Finnish Institute for Educational Research. <https://jyx.jyu.fi/bitstream/handle/123456789/85227/978-951-39-6093-3.pdf?sequence=1>
- Hemsley-Brown, J., & Sharp, C. (2003). The use of research to improve professional practice: A systematic review of the literature. *Oxford Review of Education*, 29(4), 449–471. <https://doi.org/10.1080/0305498032000153025>
- Henriksson, J., Eklund, G., & Aspfors, J. (2021). A genre shift in disseminating knowledge – Student teachers' experiences of communicating their master's theses as popular science. *Nordic Journal of Education and Practice*, 15(3), 70–87. <https://doi.org/10.23865/up.v15.3227>
- Henriksson, J., Eklund, G. & Aspfors, J. (2023). Connecting People -Communication of Master's Theses in a Popular Scientific way. Presented at the NERA-conference, Oslo 2023. Unpublished conference-presentation.
- Jakhelln, R., Eklund, G., Aspfors, J., Bjørndal, K., & Stølen, G. (2019). Newly qualified teachers' understandings of research-based teacher education practices in Finland and Norway.

Scandinavian Journal of Educational Research,
<https://doi.org/10.1080/00313831.2019.1659402>

- Jakku-Sihvonen, R., & Niemi, H. (Eds.), (2006). Research-based teacher education in Finland – Reflections by Finnish teacher educators. *Research in educational sciences*, No. 25. Finnish Educational Research Association.
- Jyrhämä, R., Kynäslähti, H., Krokfors, L., Byman, R., Maaranen, K., & Kansanen, P. (2008). The appreciation and realisation of research-based teacher education: Finnish students' experiences of teacher education. *European Journal of Teacher Education*, 2(4), 369–382. <https://doi.org/10.1080/02619760701844993>
- Kansanen, P. (2014). Teaching as a master's level profession in Finland: Theoretical reflections and practical solutions. In O. McNamara, J. Murray, & M. Jones (Eds.), *Workplace learning in teacher education* (pp. 279–292). Springer. https://doi.org/10.1007/978-94-007-7826-9_16
- Koski, A., Puustinen, M., Sääntti, J., & Salminen, J. (2023). Exploring the research-based approach of academic classroom teachers in Finland. *Teachers and Teaching*. 29(7–8), 833–849. <https://doi.org/10.1080/13540602.2023.2208034>
- Maaranen, K. (2010). Teacher students' MA theses: A gateway to analytic thinking about teaching? A case study of Finnish primary school teachers. *Scandinavian Journal of Educational Research*, 54(5), 487–500. <https://doi.org/10.1080/00313831.2010.508923>
- Malinen, O-P., Väisänen, P. & Savolainen, H. (2012). Teacher education in Finland: a review of a national effort for preparing teachers for the future. *The Curriculum Journal*, 23(4), 567–584. <http://dx.doi.org/10.1080/09585176.2012.731011>
- Martinovic, D., Wiebe, N., Ratkovic, S., Willard-Holt, C., Spencer, T., & Cantalini-Williams, M. (2012). 'Doing research was inspiring': Building a research community with teachers. *Educational Action Research*, 20(3), 385–406. <https://doi.org/10.1080/09650792.2012.697402>
- Menter, I., & Flores, M. A. (2020). Teacher education, teacher professionalism and research: International trends, future directions. *European Journal of Teacher Education*, 44(1), 1–4. <https://doi.org/10.1080/02619768.2020.1850550>
- Niemi, H. (2011). Educating student teachers to become high quality professionals: A Finnish Case. *CEPS Journal*, 1(1), 43–66. <https://doi.org/10.26529/cepsj.440>
- Niemi, H. & Jakku-Sihvonen, R. (2011). Teacher education in Finland. In M. V. Zuljan & J. Vogrinc (Eds.), *European dimensions of teacher education - similarities and differences* (pp. 105–113). University of Ljubljana, Faculty of Education.
- Nikolov, F., Saunders, C., & Schaumburg, H. (2020). Pre-service teachers on their way to becoming reflective practitioners: The relevance of freedom of choice in research-based learning. *International Perspectives*. <https://doi.org/10.18833/spur/3/4/6>
- Parlament Österreich (2024). Neukonzeption der Lehramtsstudien bringt einheitlich dreijähriges Bachelor- und zweijähriges Masterstudium. *Parlamentsskorrespondenz no. 381* Vom 18.04.2024. https://www.parlament.gv.at/aktuelles/pk/jahr_2024/pk0381
- Polit, D.F. & Beck, C.T. (2010). Generalization in quantitative and qualitative research: Myths and strategies. *International Journal of Nursing Studies*, 47(11), 1451–1458. <https://doi.org/10.1016/j.ijnurstu.2010.06.004>
- Puustinen, M., Santti, J., & Simola, H. (2022). Five decades of persistent decontextualisation of academic teacher education in Finland. *International Journal of Educational Research*, 116, 102053. <https://doi.org/10.1016/j.ijer.2022.102053>
- 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>

- Ramsey, G. (2000). *Quality matters: Revitalising teaching: Critical times, critical choices: Review of teacher education in NSW*. Department of Education and Training.
- Robinson, O. (2014) Sampling in interview-based qualitative research: A theoretical and practical guide. *Qualitative Research in Psychology*, 11(1), 25-41, <https://doi.org/10.1080/14780887.2013.801543>
- Røvik, K.A. (2016). Knowledge transfer as translation: Review and elements of an instrumental theory. *International Journal of Management Reviews*, 18, 290–310. <https://doi.org/10.1111/ijmr.12097>
- Røvik, K. A. (2023). A translation theory of knowledge transfer. *Oxford University Press*. <https://doi.org/10.1093/oso/9780198832362.001.0001>
- Sigurðsson, B., Björnsdóttir, A., & Jóhannsdóttir, T. J. (2023). Five-year teacher education for compulsory school in iceland: Retreat from research-based to practice-oriented teacher education? In E. Elstad (Ed.), *Teacher education in the Nordic region: Challenges and opportunities* (pp. 209–223). Springer.
- Sitomaniemi-San, J. (2021). *Fabricating the teacher as researcher: A genealogy of academic teacher education in Finland* [Doctoral thesis]. University of Oulu <http://jultika.oulu.fi/files/isbn9789526209937.pdf>
- Säntti, J., Puustinen, M., & Salminen, J. (2018). Theory and practice in Finnish teacher education: A rhetorical analysis of changing values from the 1960s to the present day. *Teachers and Teaching: Theory and Practice*, 24(1), 5–21. <https://doi.org/10.1080/13540602.2017.1379387>
- The Norwegian Ministry of Education and Research. (2023). Flere lærere i barnehage og skole. Strategi for rekruttering til lærerutdanningene og læreryrket 2024–2030. [More teachers in kindergarten and schools. *Strategy for recruitment to teacher education and the teaching profession 2024-2030*]. Regjeringen, Kunnskapsdepartementet.
- Tirri, K. (2014). The last 40 years in teacher education. *Journal of Education for Teaching*, 40(5), 600–609. <https://doi.org/10.1080/02607476.2014.956545>
- Wahlgren, B., & Aarkrog, V. (2021). Bridging the gap between research and practice: How teachers use research-based knowledge. *Educational Action Research*, 29(1), 118–132. <https://doi.org/10.1080/09650792.2020.1724169>