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TRANSFORMING UNIVERSITY-BASED TEACHER EDUCATION THROUGH INNOVATION

A NORWEGIAN RESPONSE TO RESEARCH LITERACY, INTEGRATION AND TECHNOLOGY

Edited by
Ida K. Riksaasen Hatlevik, Rachel Jakhelln
and Doris Jorde

ROUTLEDGE

Transforming University-based Teacher Education through Innovation

This Norwegian-led, internationally relevant edited collection provides new insights into the transformation of teacher education programmes of the future by collating novel and cutting-edge innovations gleaned from ProTed, the Centre for Professional Learning in Teacher Education in Norway.

Presenting research findings from a 10-year funded period of innovation and practice, the book discusses the implementation and dissemination of successful innovations to other teacher education institutions, both national and international. Led by direct experiences combined with empirical results, chapters explore a variety of methods that promote best practice within universities and higher education programmes. These include the progression and coherence in programme design, the relationship and partnerships between university campus and schools, teachers' professional identities and communities, integrated teacher education, and the advantages of using video technology in teaching practice for a digital future.

Ultimately serving as a useful tool for research-based knowledge to inform policy development, this book will be of interest to researchers, scholars, and postgraduate students in teacher education, higher education, and teacher reform more broadly. Those interested in research design will also find the book useful.

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Foreword

Auli Toom

Teacher education is one of the key factors contributing to teacher learning and capabilities, pupils' learning and well-being, quality of education and schools, and further to the development of society. Education is an essential grounding both for individual and societal activities. In the everyday life of schools, teachers are the key persons responsible for enacting education and teaching and taking responsibility of schooling in practice. These are the reasons why it is important to be interested in teacher education and invest in its quality and development. These are also the reasons why it is important to set high goals and quality requirements for teacher education and provide research-based academic education for teachers (cf. Toom & Husu, 2023). This is emphasized in UNESCO's (2021) most recent report, where the "transformative work of teachers" is highlighted. Doing scientific research on structures, curricula, and pedagogies of teacher education and investigating student teacher learning and development of teacher professionalism during teacher education are of high importance in strengthening the scholarship and relevance of teacher education in a broader sense. In addition, providing sufficient support for teacher education in terms of educational policy making and allowing such developments that are necessary in certain societal and sociocultural contexts are essential.

This book is dedicated to describing and elaborating the extensive research, development, and educational policy work of initial teacher education in the Norwegian context. It especially reflects on the central role of the Center for Professional Learning in Teacher Education (ProTed), the first National Centre of Excellence in Higher Education in Norway, in this wholeness, which is unique and interesting from an international perspective. The book analyses from various perspectives the versatile research-based developments, innovations, and changes in teacher education that have been done in certain universities in Norway during the recent decades. It also shows how the pioneering work and visions of teacher education scholars, researchers, and practitioners in certain teacher education units and universities have influenced on the more extensive developments and changes in teacher education in the whole of Norway. This is what we know about the situation in Norway at the moment (cf. Cochran-Smith, Alexandersson, Ellis, Grudnoff, Hammerness, Oancea & Toom, 2021).

The focus of the book is on elaborating the pioneering research and development work of teacher education done in Norway, which is really unique and interesting. At the same time, it is possible to perceive the connections of the Norwegian developments of teacher education with the broader development trends – or turns – in teacher education. Cochran-Smith (2004; see also Toom & Husu, 2021) has discussed the turns in teacher education development, meaning research or university turn, practice turn, and accountability turn, which can be identified internationally and also locally in their unique forms in many teacher education contexts. As can be perceived through the chapters in this book, these turns are also being realized in the Norwegian context during the developments and changes in teacher education.

In Norwegian teacher education and development, research turn has meant, for example, having a National Centre of Excellence Professional Learning in Teacher Education (ProTed), doing research on a variety of aspects of teacher education, applying research on building coherent curricula, reforms, and quality for teacher education, piloting a variety of solutions by utilizing research, developing master thesis as a genuine part of teacher education, as well as emphasizing quality pedagogies of teacher education for student teacher learning. Here, one of the key questions seems to be how to engage (and not to disengage) student teachers in teacher's work through the means of research (cf. Antonsen, Toom, Ulvik, Drageseta, Olsen, Hjardemaal & Sæther, submitted). Research or university turn has also meant – quite recently – moving primary and lower secondary teacher education to the academic university context. Practice turn is realized in Norwegian teacher education, for example, in reflecting on the variety of practice and practical experience student teachers would need during teacher education, building practice partnerships with local and university schools, designing relevant school-based mentoring for student teacher learning, and profession-oriented mentoring for student teachers. Accountability turn in the Norwegian context is realized, for example, in the several teacher education reforms since the 1970s, the recent educational policy regulations and curriculum frameworks set for teacher education, evaluation of teacher education programs, and assessment of student teacher learning outcomes.

I congratulate the editors and authors for this valuable and comprehensive book elaborating thoroughly the Norwegian teacher education, its development, and the role of the National Centre of Excellence Professional Learning in Teacher Education (ProTed) in this endeavor. The book demonstrates the innovativeness of Norwegian teacher education scholars when building research-based teacher education and utilizing research in versatile ways while doing it. At the same time, the book demonstrates the extensive research scholarship of Norwegian teacher educators. I encourage researchers, practitioners, and stakeholders of teacher education internationally to familiarize themselves with this book and utilize the lessons in a variety of ways in their own research, practice, and policy of teacher education. The book is a unique

coherent collection of research articles devoted to the Norwegian teacher education development and ProTed.

Helsinki September 27, 2023

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Part I

Development of integrated teacher education in Norway

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1 Transforming teacher education through innovation

Ida K. Riksaasen Hatlevik, Rachel Jakhelln and Doris Jorde

Introduction

Teachers are key agents in educating citizens for the future, and they face challenges related to equity issues and in preparing students to handle complex environmental, economic, and societal challenges related to sustainability both today and in the future. Sustainability calls for transformative teacher education (TE) that can make a difference and promote self-transformation and the transformation of schools and societies (Wolff & Ehrström, 2020). A transformative perspective on learning, teaching, and education emphasizes the importance of an inquiring attitude to challenges and acting based on acquired knowledge about what will be the best solution (Mezirow, 2009). A transformative perspective encourages a research-oriented, proactive, and forward-thinking mindset. Thus, a transformative TE implies that educational programs are subject to continuous quality development and that they foster transformative agency among teacher educators and prospective teachers (Lund & Vestøl, 2020). Moreover, transformative agency is a vital competence for school leaders and teachers to act as change agents in schools "who can successfully transform aspects of how organizations operate. In education, teachers as change agents are increasingly seen as vital to the successful operation of schools and self-improving school systems" (Brown et al., 2021, p. 1).

Transforming teaching quality in schools through university-based teacher education

Internationally, there are two main strategies for designing TE programs. One aims to strengthen the dominant university-based system of TE and professionalize TE, while the other promotes greater deregulation and privatization, with shorter teacher training routes taken in schools (Hoban, 2004; Zeichner, 2014). In several countries, there are training colleges that hold a lesser academic standing than universities where universities have only a minor role or are excluded. For instance, some countries appoint unqualified people to teach in schools and then provide teacher training in schools (Menter & Flores, 2021). Orchard and Winch (2015) point out that, in England, the place of

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educational theory and research in TE is in serious jeopardy. They draw attention to the observation that, in recent years, there has been "a concerted and systematic move toward a school-led system of initial teacher training," where "the role of universities, and particularly their part in engaging new teachers with theory, has been radically challenged" (p. 5).

TE in Norway has developed with a strong emphasis on the research-based and practice-oriented professionalization of TE programs led by universities and university colleges. In the past decade, reforms have emphasized the development of research competence for student teachers, enabling them to continually develop their own and the school's collective practices (Norwegian Ministry of Education and Research, 2018). Simultaneously, the Norwegian government started a new program for developing centers of excellence in teaching in higher education. The first center was to work with the development of TE in that TE programs were seen as fragmented and not responsive to the ideas of program coherence for all involved participants, including student teachers, university staff, and mentors in practice schools. With the government calling for more research-based TE relevant to practice, the inclusion of a research strand culminating in a master's degree became an important innovation area for combining these ideas. Societal changes, including the introduction of digital resources in higher education and in schools, as well as issues related to sustainability, democracy, and classroom diversity, were also important to be introduced into TE programs.

National Center of excellence in teacher education: A driving force for transforming teacher education in Norway

The first National Centre of Excellence in Higher Education in Norway was awarded on December 15, 2011, to the University of Oslo (UiO, the host) and UiT The Arctic University of Norway (UiT). The center, called ProTed (Center for Professional Learning in Teacher Education), was created to stimulate the development of excellence in teaching while contributing to a knowledge base on quality features in teaching and learning. Established in 2012 as a consortium between the two universities, ProTed's goal was to develop "excellent" research-based TE in cooperation with partner schools. The timing of the award was strategic because Norway moved toward implementing five-year TE programs starting in 2017. ProTed was funded for a 10-year period (2012–2021) as a developmental unit, as a national provider of insights, and as an internationally recognized partner for the development of a knowledge base for TE. Center funding was used to initiate and organize the internal development of innovation and allow staff time to evaluate and disseminate successful ideas. The center was housed within the structure of the two participating TE institutions such that all teacher educators and program leaders were connected to activities within the center.

ProTed worked as a catalyst for research and development through systematic interventions, evaluation, and dissemination within integrated five-year

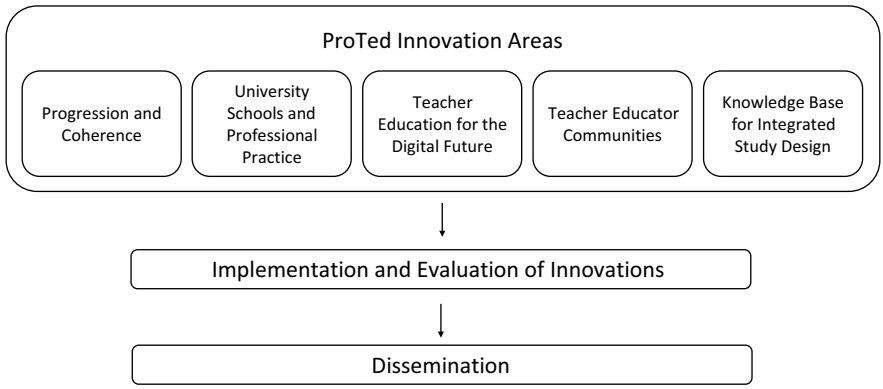

Figure 1.1 The ProTed model for transforming teacher education through innovation and dissemination.

TE programs. Based on the challenges facing TE, the ProTed center identified five thematic areas during its 10-year funding period (2012–2022): 1) progression and coherence in program design, 2) development of a knowledge base for integrated program design, 3) university schools (partnerships) and professional practice, 4) TE for the digital future, and 5) building TE communities. Implementation and evaluation, followed by the dissemination of successful innovations to other TE institutions, both at the national and international levels, was an important part of the mandate of the center. Figure 1.1 illustrates ProTed's model for transforming TE through innovation and dissemination.

This anthology presents a selection of ProTed's innovations. Thus, this book is part of an international dissemination of knowledge derived from ProTed's innovations aimed at transforming TE.

Thematic areas in the anthology

The anthology is presented in five thematic sections to help the reader navigate through different types of innovations: 1) development of integrated TE, 2) research literacy in TE, 3) bridging the gap between the university campus and schools (theory and practice), 4) development of professional identity, and 5) video as a means of connecting coursework to teaching practice.

Development of integrated teacher education

TE has been criticized for being disconnected from professional practice (Caspersen & Raaen, 2014; Jakhelln & Lund, 2019; Jenset et al., 2018), and on-campus teaching has been criticized for being fragmented (Haug, 2010; NOKUT, 2006; Trippestad et al., 2017). These challenges have gained the attention of research on coherence, emphasizing increased program coherence

in TE between learning on campus and during practice periods in schools and between courses on campus with different knowledge bases and traditions (Hammerness, 2013; Klette & Hammerness, 2016). Program coherence includes a clear and shared vision of good teaching among teacher educators (conceptual coherence), a program design where the various components in TE build on and reinforce each other (structural coherence), and opportunities to enact teaching (Klette & Hammerness, 2016). In describing coherent programs, coherence and integration are used as closely linked concepts. Vestøl (2016) points out that integrated programs have a "coherent study design where scientific subjects, school subjects, pedagogy, subject didactics, theory, and practice constitute a whole as a basis for teaching as a profession" (p. 74).

Chapters 2–5 represent the coherence and integration of TE and its background. Chapter 2 provides a theoretical framework of quality features for professional TE programs internationally that serve as the basis for designing and transforming the TE programs at UiT and UiO. Chapter 3 describes Norwegian TE and how it is designed and the context while outlining UiT and UiO's current models for integrated TE programs. Chapters 4 and 5 represent two cases of research-based TE reforms at UiO and UiT; thus, these chapters provide insights into reform processes.

Research literacy in teacher education

Research is identified as a key dimension for enhancing the teaching profession and improving the quality of TE (Menter & Flores, 2021; Tatto, 2015). This means that TE "is seen as a key space for developing a research stance" (Menter & Flores, 2021, p. 122) and "should be an educative process that develops thoughtful, informed, and highly able professionals" (Loughran et al., 2016, p. 416). Menter and Flores (2021, p. 122) and the BERA-RSA report (Furlong et al., 2014, p. 5) proposed a broad and inclusive perspective on the role of research in teaching and TE:

1) The content of TE is informed by research-based knowledge and scholarship.
2) Research is to be used to inform the design and structure of TE programs.
3) Teachers and teacher educators should be equipped to engage with and be discerning consumers of research.
4) Teachers and teacher educators should be equipped to conduct their own research, both individually and collectively, to investigate the impact of particular interventions or explore the positive and negative effects of educational practice.

Menter and Flores (2021) propose a research agenda connecting research and professionalism in a way "that should shape our approaches to all aspects of teacher education" (p. 124). For several decades, a research-oriented approach

to teaching in Finland has been grounded in the idea of the teacher as a "professional," in which research-based TE is about educating autonomous, professional teachers who take an inquisitive stance to their own professional practice (Toom et al., 2010; Westbury et al., 2005). In Finland (Niemi, 2016), as well as in Norway and Ireland (Conway & Munthe, 2014), student teachers should develop an inquiry-based stance toward their own teaching and should make autonomous, professional choices based on research-informed reflection. Eriksen and Brevik (2022) discuss how research literacy can enrich TE by allowing for the development of a research literacy way of thinking. They conceptualize research literacy as more than an engagement with research through research-based education and argue that "to enrich the understanding of how to develop research literacy in teaching and teacher education, emphasis should be placed on connecting research and education by actively engaging students in research" (pp. 1–2).

Chapters 6–10 present the innovations related to the development of the research-based five-year TE program, ending in a master's degree thesis related to the practice field. Examples show how programs may be organized to include the research and development component needed to promote research at the master's degree level. The chapters show how researchers integrate student teachers into research projects as they work with their master's degree thesis and give examples of the relevance of the master's degree. Chapter 6 shows how research and development contribute to establishing coherence in TE programs. Chapter 7 accounts for the relevance of the master's thesis for becoming a professional teacher. Chapter 8 is about student teachers as coresearchers. Chapter 9 focuses on multilingualism as a theme for the master's thesis investigation and Chapter 10 shows how master's theses act as boundary-crossing mediating artifacts.

Bridging the gap between the university campus and schools

Transformative and equal partnerships between TE institutions and a few selected schools have been identified as a prerequisite for good TE that can contribute to making teaching on campus and research in TE practice oriented (Darling-Hammond, 2006; Jakhelln & Postholm, 2022; Lillejord & Børte, 2014, 2017). Equal partnerships are referred to as a paradigm shift or reconfiguration of the relationship between universities and the school sector (Ellis & McNicholl, 2015). We recognize that the teachers in our partner schools are also teacher educators. In 2013, ProTed commissioned a systematic review of partnerships in TE from the Knowledge Centre for Education in Norway. The review highlights a range of preconditions and elements of successful partnerships between TE institutions and schools (Lillejord & Børte, 2014, 2016) that have guided UiO's and UiT's collaboration with university schools. Inspired by UiO and UiT working within the ProTed center, closer collaboration between schools and universities in TE has been a central prioritization for TE in Norway (Norwegian Ministry of Education and Research, 2018).

Chapters 11 and 12 present the innovations related to the links between campus instruction and classroom practice. Chapter 11 outlines ProTed's model for transformative partnerships with university schools and gives examples of various collaborations. Chapter 12 presents school-based mentoring tools that combine research knowledge, student teacher needs, and teacher professional judgment.

Development of professional identity

Developing a sense of professional teacher identity is an important component in the process of learning to become a teacher. A sense of professional identity is related to teachers' self-efficacy, motivation, commitment, and job satisfaction—and, therefore, is essential in becoming and being an effective teacher (Flores & Day, 2006). The development of teacher identity can be understood as a process that integrates personal perceptions, attitudes, and values with the profession-specific demands of teacher training and working in school (Beijaard et al., 2004). Previous research highlights the need to address teacher identity effectively as a component of TE (Beauchamp & Thomas, 2009). A focus on the development of teacher identity during teacher training is important in terms of how the student teachers learn during their course (Heggen, 2010), their later professional work, and their subsequent professional development (Beijaard et al., 2004; Caza & Creary, 2016; Hammerness et al., 2005). As a result, a need exists for research that describes ways to foster teacher identity development in TE. Chapters 13 and 14 present the innovations developed to help student teachers on their path to becoming professional teachers. Chapter 13 describes a voluntary profession-oriented mentoring program, with teachers as mentors on campus, that promotes social and academic integration, students' sense of program coherence, and professional identity development. Chapter 14 describes an introductory program for all new student teachers that focuses on the motivation to become teachers and stimulates their awareness for the effort that is required to become good teachers.

The digital future: Video as a means of connecting coursework to teaching practice

A decade ago, research indicated that there was a gap between newly qualified teachers' ICT competence and the requirements they meet in their first years (Gudmundsdottir et al., 2014). In addition, the development of student teachers' professional digital competence was rarely rooted in the educational programs and a research-based approach. Instead, much depended on enthusiasts and more accessible expertise among teacher educators (Tømte et al., 2013). ProTed wanted to address this; thus, one of the center's main objectives is digital learning methods in TE, both as a tool to improve the quality of education in TE and enable future teachers to use such tools in their teaching. In its early phase, the center contributed to a national boost in digital competence for

teachers by publishing scientific and more popularized representations of digital competence for teachers and contributing to the development of digitalized environments and learning methods for student teachers through several projects related to the study programs (NOKUT, 2014; Rindal et al., 2015).

In addition, research stresses the need to anchor TE in practice to a greater extent than has previously been the case (Jenset et al., 2018) and to develop and use practice-based forms of learning and teaching in on-campus teaching (Forzani, 2014; McDonald et al., 2013). Research representing an enactment approach to practice-based TE has identified the "core practices" (Grossman et al., 2009) that student teachers should master before taking on responsibility for classroom teaching. Jenset (2017) underlines that an enactment approach to practice-based TE implies that teacher educators need the following:

> … to develop instructional practices (i.e., pedagogies of teacher education) that represent, decompose, and approximate central practices of teaching within the coursework on campus. It simultaneously rests upon an understanding of teaching practices as something that can be learned, rehearsed, and developed, as well as routinized, over time and with support. It sees such routinization as a steppingstone for being able to improvise and adapt to the situation. Finally, this development of professional practice demands not only rehearsal and enactment, but also examination and critical reflection informed by research or theory, experience, and literature to develop and change practice.
>
> (p. 23)

In this anthology, we report on ProTed's contribution in developing digital exams (see Chapter 4) and digital school-based mentoring tools (see Chapter 12). Chapters 15 and 16 draw on ProTed's work using digital innovations, such as classroom video of practice to improve campus-based instruction. Chapter 15 describes an innovation using video as a tool to prepare student teachers for professional practice, grounding TE in the practical work of teachers. Chapter 16 examines how a TE program has adopted a video-based formative assessment design to promote student teachers' reflection and learning about teaching.

Lessons learned

The intention of this book is to inspire the reader to see new possibilities in innovation for promoting transformative TE. Throughout this anthology, we share examples from Norway's first center of excellence in teaching (ProTed) and how our work has transformed our TE programs. Along the way, we have learned some important lessons. First, university-centered TE programs have a clear advantage in providing a research-based TE for the professionalization of teachers as change agents in schools. However, university teaching alone is

not enough in TE. Recognizing that teachers in schools are also teacher educators is essential for providing a coherent TE program for our students and staff. Second, transformative TE needs to continuously meet the societal changes reflected in the school curriculum. TE programs should have mechanisms for the development and evaluation of innovation, involving leadership in implementing new ideas when they are necessary to improve programs. As teacher educators, we need to be involved in teaching, research, and innovation. We were privileged to have funding for a center for innovation to work with transforming TE. However, additional funding to drive innovation should not be necessary if it is made a priority by leadership through connections to research and teaching.

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2 Quality in teacher education programs

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Introduction

The quality of a teacher education (TE) program has an impact on student teachers' competence development and, in the long run, is important for enhancing the quality of teaching practice in schools (Boyd et al., 2009; Darling-Hammond & Youngs, 2002). Conceptions of quality in TE are contextual and reflect current understandings of what the desirable aims are to work toward. In this chapter, the term quality is used as a positive description of necessary preconditions for and various characteristics of what constitutes good professional university-based TE programs.

Teaching is an exceptionally demanding profession, resulting in complex and interdisciplinary professional TE programs with challenges related to coherence and integration. Complexity and tensions are features of both learning in different arenas and teachers' professional knowledge (Hermansen & Mausethagen, 2023). Thus, quality in professional TE programs involves descriptions of various aspects of and actors in the programs. Previous research has identified several divisions of dimensions and various features and indicators of quality in professional and higher education in general and TE in particular. However, there is an "urgent need for conceptual frameworks and shared instruments as means to investigate quality features of teacher education" (Klette & Hammerness, 2016, p. 28). The aim of this chapter is to provide a conceptual framework and comprehensive overview of the quality features of professional TE programs that serve as the basis for designing professional research-based and practice-oriented programs. This chapter provides a theoretical framework describing quality features, particularly focusing on program coherence and integration; quality work; transformative partnerships with schools; professional knowledge base; continuing education of teacher educators; student teachers' agency and study engagement; and learning opportunities on campus and in schools. The description of the various quality features builds on high-profile studies found in the international and national literature on quality features in TE. The described features may serve as a framework to analyze and discuss how the innovations described in Chapters 4–16 contribute to enhancing the quality in the TE programs at

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the University of Oslo (UiO) and UiT The Arctic University of Norway (UiT). The framework may also serve as an inspiration for programs at other institutions.

Describing quality in teacher education

Although there is an overlap and interconnections between descriptions of quality in TE and quality in schools (quality in schools is described, for instance, in Blikstad-Balas et al., 2021; Hattie, 2011), the focus of this chapter is on quality in TE programs. The argument is that describing quality features in TE is a necessary starting point for analyzing and developing quality in research-based programs. However, the concept of "quality" in education can be perceived and described in various ways (Elken & Stensaker, 2018; Vestøl, 2016; UNESCO, 2021). The term "quality" has also been criticized for being contentless, vague, and fuzzy. Thus, the term quality needs to be operationalized and connected to something concrete, such as a description of the essential characteristics of objects, products, processes, institutions, or educational programs (Wittek & Kvernbekk, 2011). In this chapter, the term *quality* is used as a positive description of what the literature characterizes as the necessary preconditions for and features of good, desirable, and transformative TE programs.

A transformative perspective on teacher education

Living in the world today involves meeting challenges related to rapid climate change, equity issues, and artificial intelligence; in addition, in many countries, democracy is under pressure. For teachers and teacher educators, the rapid development of knowledge, society, and curriculum implies that teachers must constantly refresh and develop their professional competence. In Norwegian TE, it is a stated goal to educate teachers who have the competence to use research-based knowledge to observe, analyze, and further enhance their teaching practice and develop their professional competence (Norwegian Ministry of Education and Research, 2018). Thus, teachers and teacher educators face complex challenges requiring them to be agents that have the competence to change the situations they find themselves in, using resources or developing innovations "to break out of status quo and transform the situation" (Lund & Vestøl, 2020, p. 1). The concept of transformation is used to describe a significant or qualitative change, and a transformative perspective understands quality as a dynamic change and as a process that leads to increased value (Vestøl, 2015). Transformation is not a superficial change and cannot be reversed. Instead, transformation amounts to deeper and more sustained processes, meaning that we change as human actors (Lund & Vestøl, 2020). In the past decade, a transformative perspective has been used in at least three ways to describe quality in TE. First, it has been applied to describe the transformative processes linked to the development of TE as an organization and as

educational programs (Ellis & McNicholl, 2015; Lund & Eriksen, 2016). Second, a transformative perspective has been used to describe transformative learning activities that may lead to transformative learning processes within the individual student (Cheng, 2014; Hatlevik, 2018a; Mezirow, 2009). Third, a transformative perspective is utilized to describe desired learning outcomes, namely the transformation of knowledge and transformative agency (Fosse, 2016, 2023; Lund & Vestøl, 2020; Vestøl & Lund, 2017).

Underlying all three ways of using a transformative perspective on quality in TE is the premise that student teachers are at the center of attention and that those who take part in efforts to transform are agentive; through transformation, student teachers become empowered (Aagaard & Lund, 2020, Vestøl, 2016). In this chapter, those agents who take part in efforts to transform include both student teachers and teacher educators on campus and in schools. Furthermore, transformation involves a dialectical relationship between context and actors—both change along the way (Lund & Vestøl, 2020). When the actors are teacher educators, it is the program and learning opportunities provided that are transformed, and when the actor is a student teacher, it is professional competence and teacher identity that develop.

Quality dimensions and features of teacher education

In this chapter, a transformative perspective on quality in TE is acknowledged and supplemented by research focusing on other features of and preconditions for quality in TE programs, educational provision, and student learning. In doing so, various quality features of professional TE programs are outlined. The aim of this description is to operationalize and raise awareness of various characteristics of what constitutes good professional TE, that is, what are desirable aims to work toward in TE. In line with the three ways of using a transformative perspective in describing quality in TE, a distinction is made between quality features that describe the following three quality dimensions inspired by Gibbs (2010): 1) program quality—what precedes the educational provision; 2) process quality—what goes on as student teachers learn; and 3) product quality—product of the education, student teachers' competence, and identity development.

Product quality is understood in terms of the number and characteristics of student teachers graduating, the outcomes of their learning, and whether they have developed sufficient professional competence and identity as teachers. The indicators of product quality can provide a general indication of how well educational provision in total is functioning. However, the aim of this chapter is not on product quality but rather to describe features that particularly address what research literature provides of knowledge about the characteristics of good professional research-based and practice-oriented TE that can be used in designing, developing, transforming, implementing, and analyzing TE programs. Thus, this chapter concentrates on the first two quality dimensions.

Figure 2.1 illustrates the three quality dimensions in separate circles. The outer circle represents program quality, the middle circle represents process quality, and the inner circle represents product quality. Thus, the various circles illustrate that both program quality and process quality influence student teachers' competence and identity development (inner circle). The placement of different elements in the circles illustrates that the program quality features (outer circle) set the framework for process quality features (middle circle) and that student teachers' agency and study engagement and what happens in the various learning activities offered on campus and in schools (process quality) have the greatest direct influence on student teachers' learning and professional competence development (product quality—inner circle) (Gibbs, 2010).

Figure 2.1. is a static snapshot; in reality, the individual elements are in dynamic and reciprocal relationships with each other, which are commented upon in the following sections. The keywords in the outer and middle circles in Figure 2.1 represent the overarching quality features of the program and process quality described in more detail in the following text. Table 2.1, at the end of this chapter, summarizes the sub-features for each overarching quality feature in professional TE programs useful for analyzing, designing, developing, and transforming TE programs. The sub-features are also marked in italics in the main text.

Figure 2.1 Illustration of quality dimensions and overarching quality features in teacher education.

Program quality—What precedes the actual educational provision (outer circle)

There is a range of different quality features describing the context before student teachers start learning. First, the context includes funding and national standards and regulations for programs. TE in Norway is publicly funded, and learning outcome descriptions for the TE programs are nationally regulated (see Chapter 3 for more information). Second, the context concerns the characteristics of the student body admitted to the individual study program. Third, the context includes enabling inputs, such as physical infrastructure and facilities, teaching and learning materials, and human resources. These three quality features set the framework for TE programs and influence what learning activities are possible to offer. These are frames teacher educators must plan according to and may only have an indirect impact on. For instance, teacher educators are experts on TE and may, as experts, be consulted or actively seek to influence educational policy. Although this aspect is important, activities aimed at influencing educational policy are not the focus of this chapter.

Finally, the context is about the actual design of the study program and the characteristics of processes and work related to program design, assurance, maintenance, development, and transformation. A transformative perspective on program quality focuses on transforming TE through strengthening collaboration between teacher educators at the university and in schools, and student teachers (Ellis & McNicholl, 2015). In addition, this perspective emphasizes how knowledge sharing between stakeholders leads to creative innovations that enhance the quality of programs (Ellis, 2016; Ellis et al., 2019; Jakhelln et al., 2017). In the following sections, we focus on quality features for what precedes the actual educational provision that institutions have direct impact on and can do something about and that are especially relevant for designing and transforming research-based and practice-oriented TE programs, including coherence and integration, quality work, transformative partnerships with schools, teachers' professional knowledge base, and the continuing education of teacher educators.

Program coherence and integration

Program coherence plays a significant role in shaping what student teachers take away from their studies (Buchmann & Floden, 1992; Hammerness, 2006) and has been described as a key feature in strong TE programs (Darling-Hammond, 2006; Grossman et al., 2008; Klette & Hammerness, 2016). Previous research has emphasized program–fieldwork coherence (Grossman et al., 2008), conceptual coherence, structural coherence (Hammerness, 2006), students' sense of coherence (Hatlevik & Havnes, 2017; Lejonberg & Hatlevik, 2022), and coherence as process (Richmond et al., 2019) as important features for coherence in TE. *Program–fieldwork coherence* entails coherence between learning on campus and during practice periods in schools (Grossman et al., 2008). Klette and Hammerness (2016) propose that

> quality teacher education is designed around a clear and shared vision of good teaching; it is coherent in that it links theory with practice and offers opportunities to learn that are aligned with the vision of good teaching and it offers opportunities to enact teaching.
>
> (p. 28)

Opportunities to enact teaching are also a feature of process quality, which is further elaborated upon in the section "Learning opportunities on campus and in schools."

Conceptual coherence implies shared visions of good teaching—what and how student teachers learn—among the teacher educators on campus and in schools (Hammerness, 2006) and if student teachers "also share the vision, they will be motivated to gain the envisioned knowledge, skills, and dispositions" (Floden et al., 2021, p. 9). However, "Simply having a vision of good teaching is not enough. The vision needs to inform program design, curriculum, and pedagogy, and shape what and how new teachers learn" (Klette & Hammerness, 2016, p. 29). *Structural coherence* concerns designing the various components (courses on campus and practice periods in schools) in the program so that they build on each other and reinforce each other (Hammerness, 2006). A program that is conceptually and structurally coherent implies that different actors can "identify the central ideas that undergird the program across course syllabi, reading lists, and main assignments" (Klette & Hammerness, 2016, p. 29). Furthermore, Klette and Hammerness (2016) conceptualize coherence as

> a consistent approach to teaching and learning that informs program construction both within coursework, across courses and between fieldwork and university classes. A coherent program has a set of courses that are conceptually linked, is designed to deliberately build understanding of teaching over time, and has careful alignment between university coursework and field placements.
>
> (p. 29)

In addition, Floden et al. (2021) underline that to promote coherence, individual teacher educators need to "take responsibility for moving beyond the individual course they teach and consider how this set of experiences fits into the program vision and into the scaffolding of learning opportunities across the program" (p. 7). Coherence and integration are used as closely connected concepts in the description of ProTed's objectives, which aim to develop integrated TE programs. Integrated programs imply a "coherent study design where scientific subjects, school subjects, pedagogy, subject didactics, theory, and practice constitute a whole as the basis for teaching as a profession" (Vestøl, 2016, p. 74). Additionally, integration refers "to the way teacher education programs try to facilitate productive intersections between fields of knowledge such as scientific content knowledge, pedagogical knowledge and practical knowledge" (Vestøl, 2016, p. 76).

However, the core of the coherence problem is the extent to which student teachers perceive the study program as coherent (Canrinus et al., 2017). Floden (2021) describes this as the "insider/outsider" problem, meaning that individuals within the system (teacher educators) who regularly work with are collectively committed to a set of visions of good teaching that are not visible to those who do not live and work within this system (student teachers). The insider/outsider problem may lead to confusion, frustration, and a perceived lack of coherence among student teachers as they make their way through their program. Hatlevik and Havnes (2017) argue that student teachers' perceptions of educational content and demands being comprehensible, manageable, and meaningful are the core components of sensing coherence in professional education. Design principles related to *student teachers' sense of coherence* entail facilitating student teachers to 1) perceive the content of the education as understandable, structured, and coherent (comprehensibility), 2) become confident that they have sufficient resources alone or in cooperation with others to manage and master the requirements of education and later professional practice (manageability), and 3) perceive the content of the education as meaningful, relevant, and useful for professional practice as a schoolteacher (meaningfulness) (Lejonberg & Hatlevik, 2022). The last element—meaningfulness—is in line with what, according to Grimen (2008), can serve as an integrating element in professional programs, namely that the different parts of the program and different types of professional knowledge in various ways are relevant to professional practice. It is in professional practice in schools that one can see how different types of knowledge and skills play together, forming the necessary basis for planning, justifying, implementing, and reflecting on practice. Thus, clarifying the connection between the theoretical and practical parts of education entails providing practical justifications for the learning content. This especially applies to theoretical pedagogical knowledge that cannot be directly applied in teaching but that instead is suitable for explaining and providing a greater understanding of professional practice. However, tensions and inconsistency between different types of knowledge and learning in different arenas cannot be completely abolished (Hammerness, 2006) but are something student teachers must learn to manage. Buchmann and Floden (1992) point to the difference between consistency, which is logical relations without contradictions, and coherence, which "allows for many kinds of connectedness, encompassing logic but also associations of ideas and feelings, intimations of resemblance, conflicts, and tensions" (p. 4). Experiences of tensions and contradictions may provide an opportunity for the development of a deeper understanding of the learning content, thus promoting transformative learning (see the section "Learning opportunities on campus and in schools") and professional identity development (Engeström & Sannino, 2010). Therefore, students managing inconsistencies and experiencing a sense of coherence are something that the students themselves must create. This means that student agency is an important prerequisite for student

teachers' learning and competence development (see the section "Student teachers' agency and study engagement").

Coherence as process addresses variation about program goals and visions among teacher educators working in any given program and represents an ongoing principled reflection about program quality; it is characteristic of a high-quality program (Richmond et al., 2019). Collective reflection among teacher educators is important to ensure that visions of good teaching are not understood by individual student teachers in a variety of ways that are not intended by teacher educators (Floden et al., 2021). Facilitating program coherence—particularly coherence as process—requires an institutional culture that supports the time and space for teacher educators in the university and in schools (with distinctly different visions and commitments) coming together to recreate a whole that is coherent, with shared understandings of what student teachers should learn, how they should learn, and why (Floden et al., 2021). Coherence as a process is an essential characteristic of quality work in professional programs and a well-functioning transformative partnership with schools that is elaborated upon in the following section.

Quality work

The concept of quality work was launched by Elken and Stensaker (2018) as particularly suitable for analyzing the processes related to the enhancement and maintenance of the quality of educational programs in higher education. In the process of ensuring and increasing the quality of educational programs, there may not only be a need for significant transformation but there is also a need for maintenance and minor changes and adaptations, which can be better described as enhancement and further development. Elken and Stensaker point out that there are several activities and practices at educational institutions that address efforts to enhance and maintain quality in educational programs and label these as quality work. Quality work encompasses a dynamic and pragmatic understanding of quality that addresses the many processes, activities, and dilemmas involved in developing and running educational programs. Quality work involves *multiple processes, coordination*, and *communication between different actors* involved in TE. In TE, different actors typically include the representatives of partner schools, teacher educators with various professional backgrounds, administrative staff, and student teachers. An ongoing principled discussion among teacher educators about visions of good teaching labeled coherence as process in the prior section is an example of communication between different actors.

Furthermore, it is important that quality work take a practice-oriented approach, "where quality work *can span multiple organizational levels* and arenas within higher education institutions, *encompasses both formal and informal processes*, and involves a variety of actors within these institutions" (Elken & Stensaker, 2018, p. 190, emphasis added). In addition to spanning various

arenas within the TE institution, quality work includes cooperation with the field of practice. University–school partnerships represent an important strategy to ensure quality work in cooperation with the field of practice that helps ensure that TE is professionally relevant (see the section "Transformative Partnerships with Schools" and Chapter 11). Furthermore, a key dimension in quality work is that it "is purposeful and intentional, yet the outcomes need not to be predetermined" (Elken & Stensaker, 2018, p. 195).

Moreover, quality work is *based on the need to renegotiate and balance different points of view*, and it requires an open process in which the *intention can be to find good solutions to specific problems, innovation, or maintenance of educational programs.* Therefore, central to quality work is both collective collaboration and the role of the individual actors and their actions as a basis for understanding both the development and maintenance of educational programs. The various actors who put intention and effort into quality work become both problem solvers and innovators; however, their success cannot be taken for granted (Elken & Stensaker, 2018). In line with Fullan and Quinn (2016), Floden et al. (2021) argue that for program leaders, this involves "conversation about several topics to ensure high-quality implementation related to program goals:

> (a) focusing direction to build collective purpose; (b) cultivating collaborative cultures, which build collective capacity to do the work; (c) deepening learning, which can accelerate program improvement and innovation; and (d) securing accountability based on capacity built from within the program out to university leadership.
>
> (p. 9)

By emphasizing quality work as an important feature of quality in TE, this chapter highlights the importance of educational leadership and various actors' participation in the activities that aim at quality maintenance, development, and transformation in educational programs. In the following section, a transformative partnership with schools is elaborated upon as an important strategy to ensure the continuing quality work and transformation of TE programs.

Transformative partnerships with schools

Partnerships between TE institutions and schools are a prerequisite for good TE (Darling-Hammond, 2006) and can describe somewhat different arrangements regarding cooperation on student teachers' practical training and mentoring provision in schools (Farrell, 2023; Green et al., 2020; Smith, 2016). Jones et al. (2016) distinguish between connective, generative, and transformative partnerships. Transformative partnerships are characterized by collaboration and "active involvement of all partner members in planning and

delivery of curriculum for the purpose of professional learning" and as "ongoing and embedded in the programs of the collaborating institutions" (p. 115). In addition, Jones et al. (2016) point out that a transformative partnership facilitates professional development among both student teachers and teacher educators at schools and the university. Since 2009, establishing this type of transformative partnership between TE institutions and a few selected university schools (also named TE schools) has been an important strategy put forth at both UiO and UiT to ensure continuing quality development of TE programs, strengthen the quality of practical training, and increase research-based development in schools (Hunskaar & Eriksen, 2019; Jakhelln, 2015; see Chapter 11).

Previous research indicates that well-functioning partnerships with university schools can influence the quality of TE programs by contributing to the management and implementation of study programs, including courses, teaching, evaluation, and practical training on campus and within school practice (Hatlevik et al., 2020). However, partnerships between universities and schools involve challenges and tensions (Breault & Breault, 2010). Zeichner (2010) has introduced the term *third space* as a metaphor for a participatory approach to professional practice *where teacher educators on campus and in schools, together with student teachers, collaborate and co-construct knowledge about teaching*. In a scoping review of partnerships as third spaces for professional practice, Daza et al. (2021) find that previous

> studies conceptualize the third space as a construct where identities are in constant negotiation and where epistemologies converge. The potential of the third space to support a less hierarchical structure in school–university partnerships is evident across the studies. However, the studies also acknowledge tensions in the third space relating to both the participants' relationships and the sustainability of the third space in teacher education.
>
> (p. 12)

Moreover, the third space is an ongoing effort and a continuous process, requiring continuous negotiation and underlining the importance of facilitating coherence-as-process, which has been described in the section "Program coherence and integration."

In addition, previous systematic reviews of research on partnerships in TE (Green et al., 2020; Lillejord & Børte, 2016) have highlighted a range of preconditions and elements of successful partnerships between TE institutions and schools. First, s*trong academic and administrative leadership in TE institutions and engaged leadership in schools, coordination, sufficient resource*s, *and predictable funding* are highlighted as keys to successful partnerships. Second, it is important that the partnership emphasizes *symmetry* in the sense that the university and school are equal contributors to TE and that teacher educators

in the two arenas have complementary roles. *Equality* is about both parties recognizing that the actors in both learning arenas contribute important and complementary knowledge in TE. Third, a successful partnership is characterized by open and trusting relations that evolve over time between school and university personnel, which, in turn, implies the importance of clear communication and facilitating *dialogue between the parties on how the collaboration should be formulated and implemented*. This means both that meeting places are established for collaboration and that the various parties participate and contribute to each other's arenas. Fourth, it is important that both schools and TE institutions recognize that they benefit from the partnership, meaning that they *collaborate in ways that both parties perceive as meaningful and useful for their primary social mission*. For the TE institution, this means that the university–school collaboration contributes to the development of the quality of TE, thus promoting the student teachers' learning. Similarly, this means that university schools find collaboration to be a benefit for the professional development of the school and individual teachers, hence having a positive influence on students' learning. Fifth, *mutual and realistic expectations*, *a common goal, and a shared understanding and vision* are important preconditions for successful partnerships, which implies that partners must fully understand what the partnership expects of them and how they may contribute. Sixth, *concrete collaborative projects* are those in which the partners jointly create a common product. Seventh, the cooperation is not static entities but constantly evolving. Therefore, partnerships should be perceived and treated as *dynamic and continuous processes*.

Professional knowledge base

Teachers' professional knowledge has an impact on teaching quality and students' learning in schools (König & Pflanzl, 2016; Kunter et al., 2013). Thus, an overview of the main features of the professional knowledge base is a necessary starting point when selecting or making changes to learning content and curriculum in TE programs. The knowledge base of professions is a complex phenomenon, which can be described as an amalgam of theoretical knowledge drawing on different scientific disciplines and practical skills and familiarity with specific situations. Thus, teachers' professional knowledge base is not well connected theoretically, and various knowledge elements in curriculum in TE programs are chosen because they can illuminate and/or provide a basis for action in professional practice (Grimen, 2008; Hermansen & Mausethagen, 2023). Shulman (1987) provides a well-known framework of categories of the knowledge base for teachers that has inspired research on the development of teachers' professional knowledge and selection of learning content in TE. In more recent studies, the descriptions of the categories have been somewhat altered, and additions have been made. Inspired by Shulman, a recent review by Metsäpelto et al. (2022) and other relevant research literature, the description of the professional knowledge base student

teachers need to learn is divided into seven main types of knowledge: 1) content knowledge, 2) pedagogical knowledge, 3) subject didactics, 4) professional digital competence, 5) contextual knowledge, 6) practical knowledge, and 7) research literacy.

Content knowledge refers to

> domain specific knowledge, of facts, concepts, and key phenomena, comprehension of the structure of the subject knowledge and how such knowledge is generated [Shulman, 1987; see also Ball et al., 2008], and thorough understanding of the curricular content to be taught [Baumert et al., 2010].
>
> (Metsäpelto et al., 2022, p. 11)

Content knowledge concerns the educational *what* while both pedagogical knowledge and subject didactics concern the educational *why, how*, *when*, and *whom* but at different levels of abstraction.

Pedagogical knowledge is generic and domain general and includes "broad principles and strategies of classroom management and organization that appear to transcend subject matter" (Shulman, 1987, p. 8), knowledge about the learners and their individual characteristics, the learning processes, motivation, instruction, assessment (Guerriero & Révai, 2017), and adaptation—how to deal with heterogeneous learning group (König et al., 2011).

Subject didactics, which is also called pedagogic content knowledge, combines the subject content with teaching (Shulman, 1987) and concerns teachers' understanding of how to help students understand specific subject matter (Magnusson et al., 1999, p. 96). Subject didactics consists of the knowledge of the curriculum, the most regularly taught topics in one's subject area and their most useful forms of representation, an understanding of what makes the learning of several topics easy or difficult for students, curriculum, assessment, and the purposes and goals of teaching (Evens et al., 2018).

For the past 10 years, the integration of digital technology into pedagogy has emerged as a crucial teacher competency (Gudmundsdottir & Hatlevik, 2018; Ottestad et al., 2014). *Professional digital competence* concerns "how to make optimal use of ICT and make the best of potential that lies in ICT for teaching and learning" (Brevik et al., 2019, p. 1), which implies that student teachers acquire "the ability to develop innovative ways of using technology to enhance learning environment, and to encourage technology literacy, knowledge deepening and knowledge creation" (UNESCO, 2011, p. 8). Professional digital competence involves both the ability to adapt teaching practices to digitalization and to design and enact learning environments and activities conducive to their students' learning (Lund et al., 2014). Thus, professional digital competence "is highly contextual and requires student teachers who can assess the affordances of digital resources and connect them to learning objectives to achieve optimal outcomes" (Brevik et al., 2019, pp. 1–2).

Contextual knowledge is an understanding of the sociocultural context in which the teaching occurs (Metsäpelto et al., 2022). Contextual knowledge involves knowledge of and critical reflection on micro, meso, and macro levels and understanding how the different levels interact and are influenced by each other (Darling-Hammond, 2006; Hovdenak, 2014). The micro level is about the school and the classroom: Who are the students and the teachers, and what resources do they have at their disposal? The meso level concerns the normative guidelines for the content of the school: What do the curricula say about what to teach, and how is this curriculum operationalized in the classroom? The macro level is about the society for which teachers educate: What values should form the basis for our society, what is useful knowledge for the future (Hovdenak, 2014), and what is the purpose of and what constitutes good education? (Biesta, 2009).

Practical knowledge, also called wisdom of practice (phronesis) (Shulman, 1987), refers to the knowledge of and a capacity to grasp the salient features of situations in the classroom holistically and to make ethically and practically sound judgments in specific situations. Practical knowledge requires methodological knowledge (techne) and theoretical knowledge (episteme) (Hovdenak, 2014), which builds on knowledge from previous practices and is acquired through deliberative reflection about these practices (Cochran-Smith & Lytle, 1999). Practically wise teachers are aware of and concerned with not only their own interpretations in practice, but also the dialogic possibilities implicit in the recognition of the interpretations of students, coworkers, and others (Kinsella, 2012). A practical wise teacher deliberately seeks to make ethical choices and aspires toward the Aristotelian ideal of doing the right thing to the right person at the right time in the right way and for the right reason (Sellman, 2012).

Research literacy is defined by Evans et al. (2017) as "the ability to judiciously use, apply, and develop research as an integral part of one's teaching" (p. 404). The BERA-RSA report (Furlong et al., 2014) uses the term research literacy to describe a teaching profession that can develop schools from within, and research literacy is seen as a key dimension of the teacher as professional. Eriksen and Brevik (2022) conceptualize research literacy as more than engagement *with* research, arguing that simply reading, understanding, and applying research is not enough for student teachers "to get" research. They emphasize that active engagement both *with* and *in* research is essential for developing a research literacy way of thinking. This is in line with Edwards et al. (2002), who point out that the ultimate quality goal in TE is to educate professional teachers who are "users and producers of knowledge about teaching, in communities of practice which are constantly refreshed through processes of professional inquiry, in partnerships between practitioner and researchers" (p. 125). Chapters 6 through 10 shed light on how student teachers' participation in research and writing of master's theses contributes to developing research literacy in TE. This description of the complexity of the

various knowledge domains in teachers' professional knowledge base points to the complexity of competence requirements and the need for continuing education for teacher educators.

Continuing education of teacher educators

A good academic environment is important for the program quality and presupposes competence profiles among the teacher educators that contribute to the professional development of the study program and achievement of learning outcomes, good interaction between employees, thoughtful use of external teachers, cooperation on the development of the study program, and the inclusion of the student teachers in professional communities (Aarstad et al., 2019). Thus, teacher educators play a crucial role in the learning process of student teachers (van Veen, 2013); here, the role of teacher educators and the didactics of TE are highlighted as crucial to raising the quality of TE. It has been pointed out that the teacher educator must be recognized and supported in this work (OECD, 2019). Therefore, a description of the quality features of TE also touches on a description of the knowledge base of teacher educators and competence requirements and routines for educating the educators. A teacher educator is "someone who provides instruction or who gives guidance and support to student teachers, and who thus renders a substantial contribution to the development of students into competent teachers" (Koster et al., 2005, p. 157). Thus, the concept of "teacher educator" includes both teacher educators in schools and on campus (Andreasen et al., 2019).

In schools, teacher educators are schoolteachers with mentoring responsibilities during student teachers' practical training periods. Clarke et al. (2014) point out that teacher educators in schools, in addition to being schoolteachers, are key contributors to TE by offering an authentic learning context, modeling professional practice, providing feedback to student teachers, facilitating the development of their practical knowledge and professional reflection, being agents of professional socialization by including student teachers in colleague communities, being gatekeepers to the profession, and acting as change agents in the school community. In the literature, these schoolteachers are called cooperating teachers (Clarke et al., 2014), supervisors (Burns et al., 2016), and mentors (Hobson et al., 2009; Schwille, 2008). In this anthology, the concepts of mentor and mentoring are used to signal a less hierarchical and more dialogical understanding of the task of guiding and supporting the student teachers in their practical training. Schwille (2008) points out that "good teachers do not automatically become good mentors" (p. 165) and that mentoring is a professional practice. Conceptualizing mentoring as a professional practice implies that mentors, in addition to possessing professional teacher knowledge (outlined in the previous section, "Professional knowledge base"), need to learn a repertoire of mentoring strategies (skill sets), knowledge about the student teachers, and how to connect the various knowledge elements

(Schwille, 2008, p. 165). The complexity of mentoring tasks indicates that special knowledge and expertise are required to be a mentor and that this should have implications for who should be responsible for the mentoring and how they are prepared and supported for this work (Burns et al., 2016; Hobson et al., 2009; Schwille, 2008). In a review, Nesje and Lejonberg (2022) found that, when used strategically, the use of technological, discursive, and epistemic tools in mentoring may contribute to quality in mentoring by linking theoretical knowledge to student teachers' experiences in school. Thus, TE institutions' engagement in developing mentoring tools may enhance quality in student teachers' practical training periods in schools (see Chapters 12 and 16). In addition, Burns et al. (2016) point out that mentors should have the competence to evaluate their own practice (conduct self-study) and participate in research and innovation to improve mentoring provision. Self-study entails that mentors have the competence and time to collect and analyze information about their own practice. Examining one's own practice can be jointly carried out between mentors to increase the collective mentoring competence at the school. By participating in testing and research on new models and methods and tools that can be used in mentoring, the participants can both increase their own mentoring competence and contribute to producing knowledge about mentoring. In short, mentors need to be *carefully selected*, participate in *mentoring programs* provided by the university, and *conduct self-study*; in addition, there should be *routines for follow-up of the mentors from the school's management and from the university.*

Being a university teacher educator is a diverse and complex profession (Flores, 2017; Langørgen & Smith, 2018), and teacher educators at universities have diverse backgrounds and may differ in their professional identity and understandings of their role as teacher educators (Vanassche & Kelchtermans, 2014). Davey (2013) has identified three pathways for working as a university teacher educator: 1) previous work as schoolteachers (the practitioner pathway), 2) holding a doctorate degree in an academic discipline or in the field of education/pedagogy (the academic pathway), and 3) a combination of both 1) and 2) by starting out as a schoolteacher and gaining a doctorate degree later in their career. There is scant research on what constitutes the knowledge base of teacher educators at universities (van Veen, 2013). However, Mork et al. (2021) have outlined the knowledge domains for science teacher educators that can be transferred to other groups of teacher educators at the university level; they underline that, even though subject knowledge is essential, being a university teacher educator involves much more than being a competent schoolteacher. University teacher educators are expected to have in-depth and meta-level knowledge and skills building on and extending those possessed by schoolteachers and need knowledge of teaching and learning for students in higher education (see the section "Process quality—What goes on as student teachers learn (middle circle)") to model how to teach in schools and demonstrate research-based teaching. Being a teacher educator differs from other academic positions at the university because teacher educators

model the profession for which they educate (Ulvik & Smith, 2016). Thus, being a teacher educator is constantly holding a dual role (Ben-Peretz et al., 2010). On the one hand, they must teach student teachers about academic knowledge and pupils' learning, and on the other hand, they must constantly be aware of their own teaching and modeling, both of learning and of the role of a teacher. In addition, Loughran (2013) argues that, implicit in the term university teacher educator, there is a premise that "a teacher educator should be a scholar, and that scholarship itself is deeply embedded in an interactive process of research and practice that has a major focus on learning about the teaching of teaching" (p. 20). Thus, a prerequisite for developing professional TE is *professional teacher educators who research and develop their own practice and ensure teaching quality in a community of teacher educators.*

However, formal education or training of university teacher educators has traditionally received little attention (Grossman, 2013; Loughran, 2014; Lunenberg et al., 2014), and few countries have designated programs for becoming a teacher educator at university (van Veen, 2013). The lack of formal education to become a teacher educator and the lack of guidelines and standards for the work they do contribute to the fact that what characterizes what teacher educators do tends to be private (Dinkelman, 2011). To sum up, there is a need for *induction programs for newly appointed teacher educators* that address the diverse competence requirements for teacher educators described earlier, as well as other quality features for professional TE programs. In addition, a *culture for collegial collaboration among teacher educators* can enhance peer learning among colleagues and increase their knowledge of other parts of the program than what they themselves teach, thereby affecting their possibility of promoting coherence. Peers can provide each other with relevant and useful feedback on teaching practice (Curlette & Granville, 2014). Peer-based feedback on teaching can provide support regarding handling challenges while motivating teacher educators to experiment creatively to improve their teaching practices (Price et al., 2011).

Process quality—What goes on as student teachers learn (middle circle)

Learning is a complex phenomenon. On a general level, learning is about change in the form of increased mastery and understanding. However, there are different views regarding what kind of change and what mechanisms underlie and promote it. The most important distinction is between an individual-oriented cognitive perspective and a situated contextual perspective. In the 1990s, there was a strong tendency to highlight the differences between the perspectives (Anderson et al., 1997), whereas there are now several attempts to see cognitive and situated perspectives on learning as partially overlapping and with an emphasis on different aspects of learning (Illeris, 2009). Sfard (1998) argues that one loses something if one chooses only one of the perspectives. However, it is uncertain whether it is possible to create a

common theory of learning that does not have its main emphasis within one of the two positions. Instead, we must build on what Sfard (1998) describes as "patches of coherence." In this chapter, learning is understood as a phenomenon that encompasses both cognitive and social processes. A common feature of both perspectives is student teachers' participation in academic activities and self-effort are premises for learning. Specifically, a transformative perspective on quality in TE puts student teachers at the center, so there is a focus on empowering the learner (Vestøl, 2015). The individual is an actor in their own learning, and learning involves constructing meaning and understanding between new and already acquired knowledge, between different professional knowledge components, and between professional knowledge base and probable future competence needs. Thus, quality features concerning student teachers' learning processes in TE comprise their agency and study engagement and learning opportunities on campus and in schools. Gibbs (2010) points out that the features that describe process quality are those that are the most influential on students' learning. Thus, knowledge about process quality features is important both to those designing (educational leaders), the student teachers, and those implementing the program (teacher educators on campus and mentors in schools) that provide teaching and learning opportunities to student teachers.

Student teachers' agency and study engagement

Student teachers' agency is important for both learning on campus and in schools. Agency is understood "as a multifaceted construct describing the idea that human beings make choices, act on these choices, and thereby exercise influence on their lives as well as their environment" (Goller & Paloniemi, 2022, p. 3). The concept of transformative agency goes even further and is described by Virkkunen (2006) as "breaking away from given frame of action and taking initiative to transform it" (p. 233). Transformative agency is linked to meaning making, emerging as a capacity in humans when they seek to alter the circumstances they face by assessing alternatives, overcoming potentially conflicting motives, or making decisions with the help of resources that are available or invented (Aagaard & Lund, 2020; Vestøl & Lund, 2017). Transformative agency is especially relevant for teachers when they are facing concrete challenges by seeking to transform the situation and create new conditions and is a desirable learning outcome of TE. Transformative agency is consistent with ideas about teachers as "change agents in ensuring quality in education as a human right for the common good" (Cochran-Smith et al., 2022, p. 447). However, student teachers cannot be expected to possess transformative agency when they start studying. Transformative agency and becoming change agents emerge ecologically as an interplay between individuals' capacities and the educational environment (Priestly et al., 2015). Thus, transformative agency is something that educational provision should

foster. Still, student teachers can be expected to take responsibility for their own study efforts and actively engage in the educational provision offered. Therefore, central to student teachers' agency is student engagement, which refers to being socially and academically integrated and belonging to a learning community. Two examples where one of the objectives is to contribute to social and academic integration and student engagement are presented in Chapters 13 and 14.

How successful students in higher education go about studying has been thoroughly investigated in the research on student engagement (Kuh et al., 2014; McCormick et al., 2013), students' approaches to learning (Ramsden, 2003; Watkins, 2001), and self-regulated learning (Pintrich, 2004; Schunk, 2005). Although these three research perspectives have different academic origins, they have come up with similar results in terms of what characterizes students who succeed with their studies and what characterizes the learning environment and teaching that promotes students' learning (for a detailed comparison, see Hatlevik, 2018b). Previous research within all three perspectives highlights the importance of *students being agents in their own learning* and that they can influence their own learning situation and learning outcomes. Successful students are characterized by *taking responsibility for and being active and engaged in their own studying and learning*. These students put in *great effort, manage to endure, spend energy on going into depth of the subject matter, and seek to understand the learning content* (Hatlevik, 2018b). Research on self-regulated learning emphasizes student teachers as agents in their own learning and provides detailed descriptions of how they can *monitor, regulate, and control cognitive, motivational, emotional, and behavioral aspects of their own learning* and some aspects of the context in which learning takes place (Pintrich, 2004). Instead of learning being something that happens as a result of participation in teaching, according to the theory of self-regulated learning, learning is an activity that the learner does for their own sake (Zimmerman, 2001). In addition, the research on self-regulation provides a thorough description of the complexity of students' study motivation, how motivation can be a driving force for students' involvement in their own learning, how it can be controlled and regulated by the learner, and how students' study motivation can be promoted by teaching (Pintrich, 2004; Wolters & Taylor, 2012).

Agency is also highlighted as essential for professional placement learning (Eteläpelto et al., 2013; Goller & Paloniemi, 2022). Billett (2011, 2014) and Eraut (2012) have pointed out that there is a correlation between the student teachers' own efforts, the quality of practical training given, and the students' learning outcomes. Furthermore, Hobson (2009) points out that previous research indicates that successful mentoring depends on the "willingness" to be mentored on the part of the student teacher. This implies that student teachers themselves are responsible for *being proactive and making the most of their practical training*, which includes having an awareness of their own limitations and potential. Therefore, in TE, both on campus and in schools, it is

crucial to design learning activities that are open, allowing and enabling student teachers to engage and take control. This means facilitating learning processes that are learner and not teacher led.

Learning opportunities on campus and in schools

Professional competence development requires three distinct levels of learning: assimilative, accommodative, and transformative learning (Illeris, 2009). Assimilative learning involves adding new theoretical and practical knowledge to existing knowledge. Knowledge learned through assimilative learning is relatively easy to remember and apply in similar situations, but it can be difficult to transfer and use in new contexts. Accommodative learning goes beyond assimilative learning and involves changing and reconstructing existing knowledge in light of new knowledge. This is demanding and requires great mental energy and motivation. However, what is learned through accommodative learning can easily be remembered and applied in new situations because one has thoroughly understood the knowledge content. Transformative learning presupposes that assimilative and accommodative learning has taken place, which implies using metacognitive reasoning that applies critical thinking that involves becoming aware of, considering, and revising one's assumptions, attitudes, and preconceptions by considering new experiences and newly acquired knowledge that challenge the existing ways of understanding and acting (Cheng, 2014; Hatlevik, 2018a; Mezirow, 2009). Transformative learning is an advanced form of learning that is profound, highly demanding, and connected to professional competence and identity development. Illeris (2014) points out the following:

> If and when genuine transformative learning takes place, we have to do with the processes that pave the way for what truly can measure up to the buzzword of competence development when changes in mind and behavior are followed by more concrete changes in understanding and acting.
>
> (p. 160)

Transformative learning can be promoted and take place in a social context through dialogue, by gaining new experiences, and by becoming familiar with others' perspectives and theoretical and research-based knowledge. Examples of learning activities that may lead to transformative learning include experiencing authentic placement situations with real students and discussing and critically reflecting on cases and professional practice with other student teachers and teacher educators, both on campus and in schools. A literature review on transformative learning in TE indicates that *transformative learning activities can promote critical reflection on teachers' professional practice*, leading to a change in the perception of teaching and learning, increased social awareness about how diversity and equity issues affect students' learning, and a change

in student teachers' attitudes regarding the role of the teachers and schools and their obligations toward the students and society (Hatlevik, 2018a; see Chapter 9 on multilingualism). Furthermore, transformative learning activities can promote student teachers' development of professional identity as a teacher (see Chapters 13 and 14). However, to successfully engage student teachers in a transformational learning process, student teachers' mastering of basic teaching skills is an important prerequisite, and key factors to consider are practical experiences, student-active learning methods, and perceived relevance (Hatlevik, 2018a).

To strengthen the relevance of TE for practice and foster the mastering of basic teaching skills, researchers have advocated for a turn toward practice (Darling-Hammond et al., 2017; Forzani, 2014). Grossman et al. (2009a) compared the opportunities to enact professional practice in TE with other professions, such as clergy and clinical psychology, outlining a framework of representation, decomposition, and approximation of practice as pedagogies for practice in professional programs. Thus, high-quality practical training both on campus and in schools is characterized by giving student teachers the opportunity to *observe good role models in professional practice* (Grossman et al., 2009b), and the opportunity to *try out learning activities that are central to the actual professional practice in the classroom, so-called core practices* (Darling-Hammond & Bransford, 2005; Kennedy, 2016). In addition, *work tasks should be decomposed into individual skills, and there should be a progression in the complexity of practical training* (Billett & Choy, 2013; Grossman et al., 2009a, 2009b). This means that student teachers are allowed to practice and test individual skills, preferably on campus, before they are to carry out more complex tasks in authentic settings in school. The concept of *core practices* was introduced by the Core Practice Consortium "as a way to support teachers and teacher educators to integrate work on developing skills with work on developing the knowledge and judgment required to put those skills to use when working with students" (Grossman 2018, p. 4). Core practices are identifiable components that teachers enact to support learning, and Grossman et al. (2009b) have described core practices as those practices that occur with a high frequency in teaching; that student teachers can enact in classrooms across different curricula or instructional approaches; that student teachers can begin to master; that allow student teachers to learn more about students and about teaching; that preserve the integrity and complexity of teaching; and that are research based and have the potential to improve student achievement. Different researchers and educational programs have developed their own sets of core practices, and the various lists vary in size and content specificity (see Grossman, 2018, for more detailed descriptions and lists of core practices).

As part of the Coherence and Assignment Study in Teacher Education (CATE)[1], Jenset (2017) has, in her PhD thesis, reviewed the literature on the enactment approach to practice-based TE. She accounts for eight dimensions that are used in the CATE study to analyze instructional practices in TE that

provide opportunities to learn that are grounded in practice in coursework (on-campus teaching) in TE: 1) plan for teaching and teacher role; 2) practice and rehearse teaching and teacher role(s); 3) analyze pupils' learning; 4) include teaching materials, artifacts, and resources; 5) talk about field placement; 6) take the pupils' perspective; 7) see models of teaching; and 8) see connections to national or state curriculum (Canrinus et al., 2019; Hammerness et al., 2020; Jenset et al., 2018). Providing opportunities to enact teaching with an emphasis on core practices is an example of this turn toward practice that has had a major impact on the TE programs at UiO over the past decade (see Chapters 4 and 15).

In TE, like other professional education programs, there is the intention that teaching on campus and practical experience and training in schools should be complementary, together promoting the development of adequate professional competence (Smeby, 2008). However, campus teaching and practical training in schools account for different approaches to professional knowledge. Both are essential, and together, they help qualify student teachers for professional practice in schools (Sullivan, 2005).

On-campus teaching

Characteristics of quality in on-campus teaching in TE include both the general features of good teaching in higher education and profession-specific characteristics. Previous research (Pascarella & Terenzini, 2005; Pintrich, 2003; Ramsden, 2003) has highlighted a range of universal characteristics of good teaching in higher education. In summary, good teaching requires *communicating clear goals for what should be learned, how well it should be learned, and justifications for why it should be learned*. The teaching should *emphasize the students' understanding of the content and focus on the key concepts and central parts of the syllabus*. It should *facilitate student-active forms of learning and collaboration between students, and a safe learning environment* so that students dare to be active. Furthermore, good teaching is characterized by the fact that the *teacher educators themselves are engaged in the academic content they teach, use a variety of teaching methods, adapt teaching according to the students' level of competence and already acquired knowledge, and give valuable feedback on the students' contribution to learning assignments* (Hatlevik, 2018b). Moreover, *teacher educators should research their own practice* with the aim of increasing the quality of their teaching (see the previous section, "Continuing education of teacher educators"). It is worth noting that the above-mentioned features of good teaching in higher education are consistent with what is known as good teaching, which promotes students' learning in schools (Hattie, 2011).

In addition, perceived relevance is a key element in a user perspective on quality, which Vestøl (2015) underlines as of particular interest to TE. A user perspective refers to student teachers', students', parents', and school owners' perceptions of the relevance of education, which means that *practice-relevant content knowledge, learning activities, and forms of assessment* are key

characteristics of quality in TE. A user perspective corresponds to the importance of perceiving meaningfulness (see the previous section "Program coherence and integration") to achieve a sense of coherence. However, previous research has shown that student teachers may find it difficult to see the relevance and connection between some parts of the theoretical knowledge taught on campus and what they learn in practical training in schools (Canrinus et al., 2017; Grossman et al., 2008; Hatlevik & Smeby, 2015). Making the relevance of theoretical knowledge appear visible to the student teachers can be seen as a key challenge for TE. When it comes to the teaching of theoretical knowledge on campus, Kvernbekk (2001) emphasizes that whether a theory is relevant to practice is not, in theory, an inherent characteristic. Relevance is something created by using and explaining how theories can be used as a justification for and reflection on professional practice. For the TE institution, this shows that good knowledge of student teachers' learning in schools and cooperation with the practice arena is a prominent issue for all actors who contribute to the design and implementation of teaching on campus.

Moreover, to promote the student teachers' engagement and learning during the practical training in school, student teachers need to be *supported on campus in advance, during and after the practical training periods.* Billett and Choy (2013) point to four important preparation activities. First, in line with the emphasis on core practices, it is a prerequisite that student teachers possess certain basic skills required in the execution of work tasks. This should be developed and trained in advance of the practical training periods. Second, student teachers need to know what is required of them to get the most learning out of practical training—that is, what it means to be an agent in their own learning. Third, it is important to clarify the expectations and responsibilities of the various parties. Information must be provided to student teachers about what is expected of them, what they can and should not do, and how they should interact with others. Fourth, student teachers should be informed that they may face unpleasant experiences, as well as situations where they will feel that they are unable to master the situations or tasks that occur. Billett and Choy (2013) also point out that, after the practical training in schools, it is important that students on campus receive help to process and share what they have learned and that they are helped to link what they have learned in practice with what they learn on campus. Akkerman and Bakker (2011) underline that all learning involves transcending boundaries, and in line with this perspective, it becomes crucial to define how teacher educators on campus and in schools collaborate.

Practical training and mentoring in schools

Student teachers' practical training and experiences in schools are fundamental to their competence development in TE (Cochran-Smith & Zeichner, 2009; Orland-Barak & Wang, 2021) and promote moving from a layman's everyday understanding to developing a professional understanding of teaching (Burns

et al., 2016; Dunst et al., 2019). Practical experiences can provide student teachers with a more realistic picture of what being a teacher involves, change the focus from themselves to teaching methods and students' learning, strengthen their ability to act and change teaching patterns, provide the opportunity to reflect on their own teacher identity, contribute to stress reduction, increase confidence, and increase awareness of their own professional development (Sørensen & Bjørndal, 2021). Mentoring is essential for student teachers' learning (Orland-Barak & Wang, 2021), and mentors can act as brokers by asking critical questions, providing constructive feedback, and contributing to the development of authentic tasks that link theoretical knowledge to practice, point out connections between curriculum theory and the curriculum that is practiced, and place lesson planning within a larger curriculum context (Burns et al., 2016).

Quality in practical training in schools requires *opportunities to observe good role models, enact core practices in authentic situations, and progress in complexity* (Grossman et al., 2009a; Munthe et al. 2020). In addition, *feeling accepted and included by the teaching staff in the school and being part of a learning community of fellow student teachers can influence their learning outcome* (Sørensen & Bjørndal, 2021). Creating learning communities where students can support and challenge each other, discuss, and reflect together on practice and give each other constructive feedback requires structures that can promote the experience of community and good relations between the students (Burns et al., 2016). Moreover, the mentor's mentoring competence and ability to create a *safe learning situation* is crucial for the student teachers' competence development and a valuable experience of the practical training periods (Zeichner, 2002). Student teachers may perceive theoretical perspectives as irrelevant unless the mentor also actively relates to theoretical knowledge (Sørensen & Bjørndal, 2021), which implies that mentors have a particularly significant role when it comes to promoting the students' perceptions of connections between theory and practice (Burns et al., 2016). Thus, student teachers need mentors who provide *constructive feedback on student teachers' teaching practices, promote critical reflection, be good role models, provide challenge and support, help students manage emotions and stress, promote the experience of connections between theory and practice, develop students' understanding of lesson planning, and place planning within a larger curriculum context*. This review reveals that quality in practical training and mentoring in schools contains many common characteristics with quality in on-campus teaching and that what happens on campus affects learning in schools and vice versa. Thus, Table 2.1 summarizes these features together.

Summary

In the literature, there are many viewpoints about what constitutes quality in TE (Brooks, 2021; Russell & Martin, 2016), and the term quality is

vague and fuzzy, hence needing to be operationalized and connected to something concrete (Wittek & Kvernbekk, 2011). In line with a transformative perspective, the characteristics of quality in TE are descriptions that develop gradually as society, school, and teachers' tasks change and new research is available. Thus, conceptions of quality in TE are contextual and reflect current understandings about what high-quality teaching and learning in TE looks like (Brooks, 2021). This chapter has identified program and process quality features in professional TE programs that serve as a basis for the design of and transformation of our professional, integrated, research-based, and practice-oriented TE programs and various innovations aimed at enhancing the quality of educational provision at UiO and UiT. These features are based on previous research and are summarized in Table 2.1.

In conclusion, professional TE aims at enabling students to transform knowledge and foster transformative agency (Vestøl & Lund, 2017). The transformation of knowledge can be expressed in the student teachers' ability to integrate research-based and practical knowledge (Fosse, 2016, 2023; Vestøl, 2015). Transformative agency is linked to meaning making and emerges as a capacity in humans when they seek to alter the circumstances they face by assessing alternatives, overcoming potentially conflicting motives, or making decisions with the help of innovations or available mediating tools or cultural resources such as research-based knowledge and participation in research on one's own professional practice (Vestøl & Lund, 2017). Transformative agency is especially relevant for teachers when they are facing concrete challenges by seeking to transform the situation and create new conditions (Lund & Vestøl, 2020). Thus, the professional teacher has the capacity to integrate and transform knowledge from various sources and apply, adopt, and transform this knowledge in professional practice. Central to this capacity lies practical knowledge and a research literacy way of thinking. Moreover, transformative agency is an especially important characteristic of teacher educators when designing and transforming TE programs. Therefore, it is imperative that the list of quality features in Table 2.1 must not become instrumental goals in themselves.

The intention of this chapter has been to provide a framework that gives an overview of various features of quality in TE that may also inspire teacher educators at other institutions when designing, analyzing, developing, and transforming TE programs. In analyzing quality in a specific program, these quality features need to be further operationalized into specific indicators that can be described and/or measured. The framework is comprehensive, and when planning changes in a program, it is recommended to concentrate on a few points at a time. Despite drawing on international literature, this framework has been prepared in a specific context and should be subject to critical reflection and transformation as new knowledge emerges and new challenges in society and schools arise.

Table 2.1 Quality features of professional teacher education programs

1. Coherence and integration
1.1 Coherence between learning on campus and during practice periods in schools (program–fieldwork coherence)
1.2 Shared visions of good teaching among the teaching staff on campus and practice supervisors in the school (conceptual coherence)
1.3 Organization of the various components of education build on each other and that can reinforce each other (structural coherence)
1.4 Learning content, learning activities, and forms of assessment that the students perceive as comprehensible, manageable, and meaningful (students' sense of coherence)
1.5 Ongoing principled reflection/discussion about visions aimed at preparing teachers for the current context (coherence as process)
2. Quality work
2.1 Multiple open processes that include coordination and communication between different actors (representatives of partner schools, teacher educators with various professional backgrounds, administrative staff, and student teachers) involved in the education
2.2 The actors involved renegotiate and balance different points of view
2.3 The intention could be to find good solutions to specific problems, innovations, or maintenance of programs
2.4 Encompasses both formal and informal processes
2.5 Can span multiple organizational levels and arenas
3. Transformative partnerships with schools
3.1 Strong and engaged leadership, coordination, sufficient resources, and predictable funding
3.2 Symmetry and equality
3.3 Continuous dialogue on how the collaboration should be formulated and implemented
3.4 Exchange of services that are meaningful and useful for both schools' and TE institution's primary social mission
3.5 Mutual and realistic expectations, a common goal, shared understanding, and vision
3.6 Concrete collaborative projects
3.7 The partnership is viewed as a dynamic and continuous process
3.8 The appearance of a third space where teacher educators on campus and in schools, together with student teachers, collaborate and construct knowledge about teaching
4. Professional knowledge base
4.1 Content knowledge (subject knowledge)
4.2 Pedagogical knowledge
4.3 Subject didactics (pedagogical content knowledge)
4.4 Professional digital competence
4.5 Contextual knowledge
4.6 Practical knowledge (wisdom of practice)
4.7 Research literacy

(*Continued*)

Table 2.1 (Continued)

5. Continuing education of teacher educators
5.1 Induction programs for newly appointed teacher educators on campus and carefully selected mentors in schools
5.2 Culture for collegial collaboration and peer learning
5.3 Routines for evaluating and researching one's own teaching and mentoring practice
5.4 Routines for follow-up of the mentors from the school's management and from the TE institution
5.5 Guidelines for practical training and mentoring in schools, and tools that can support mentoring
6. Student teachers' agency and engagement
6.1 Social and academic involvement and integration with fellow students and teacher educators
6.2 Self-regulation (planning, monitoring, controlling, and regulating and reflecting on one's own learning progression)
6.3 Being proactive and making the most of the learning opportunities provided
7. Learning opportunities on campus and in schools
7.1 Teaching and learning activities that promote a safe learning environment and student activity, engagement, transformative learning, transformative agency, and teacher identity and professional competence development
7.2 Teacher educators who are engaged, adapt the teaching according to the student teachers' prior knowledge, vary learning methods, emphasize central learning content and the student teachers' understanding, and provide valuable feedback on their work
7.3 Learning goals and program requirements are practice relevant, justified, and communicated clearly
7.4 Good role models for professional practice
7.5 Opportunities to enact core practices
7.6 Increasing complexity and progression in student teachers' learning
7.7 Teaching on campus facilitating student teachers to learn to use theoretical and research-based knowledge as a basis for professional practice and for reflection on their own practice, hence preparing them for what to expect and how to behave in practice periods in schools
7.8 Mentoring in schools that provides focused feedback on student teachers' teaching practices, promotes critical reflection on their practice experience and links these to theoretical and research-based knowledge, provides challenge and support, helps student teachers manage emotions and stress, develops students' understanding of teaching planning, and places planning within a larger curriculum context
7.9 Facilitating learning communities among student teachers on campus and in practice and teaching staff in schools that are welcoming and inclusive toward them

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Note

1 https://www.uv.uio.no/ils/english/research/projects/cate/

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3 Five-year integrated research-based teacher education for primary and secondary school

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Introduction

Teacher education (TE) in Norway is nationally mandated and subject to much political attention because education is an important social and cultural phenomenon with a significant place in policy and everyday life. TE "has been a subject of debate in Norway ever since the teaching profession rose to become a central vocation during the nation-building process in the 19th century" (Norwegian Ministry of Education and Research, 2018, p. 5). A main purpose of the latest TE reform implemented in 2017 is to raise the status and professionalism of teachers. The ambition of the Norwegian government is to permanently strengthen the teaching profession, thereby strengthening the quality of schooling overall by introducing a five-year master's degree as a requirement for all newly qualified teachers in primary and secondary school. In this anthology, we argue that we have accomplished something extraordinary in Norwegian TE for primary and secondary schools by ensuring that TE is research- and practice-based for all levels of education. This chapter describes the Norwegian TE context of today and the national requirements for the five-year integrated master programs for primary and secondary schools. To give the reader a background understanding of the various innovations in our TE programs presented in Chapters 4–16, we exemplify how the various programs are organized and structured at UiT The Arctic University of Norway (UiT) and University of Oslo (UiO).

The Norwegian teacher education context of today

The five-year integrated and research-based TE programs reported on within this anthology educate professionals for the Norwegian educational system, which is organized into three levels: grades 1–7, or primary level; grades 8–10, or lower junior secondary level; and grades 11–13, or upper senior secondary level. Schooling is built on the principle of nondifferentiated classes while adapting to the individual needs of students. Curriculum reforms often occur and are the subject of much political attention. The current core curricula for grades 1–13 have the three interdisciplinary topics of health and life skills,

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democracy and citizenship, and sustainable development (UDIR, 2020) as an umbrella across the curriculum, connecting with other academic subjects. Attending school is compulsory and free of cost for children and adolescents between the ages of 6 and 16. All young people between the ages of 16 and 19 have a statutory right to three years of upper secondary education, which can be either vocational training or preparation for further study in higher education. Fewer than 4% of students attend private schools in compulsory education and fewer than 8% in upper secondary schools.

Since the 1970s, the higher education system in Norway has undergone numerous mergers, with fewer and larger institutions offering TE. In the past decade, reforms, research, and innovation in TE in Norway have emphasized the development of a research-based and practice-oriented TE for student teachers to become professional teachers who can continually develop their own and their school's collective practices. In *Teacher Education 2025—National Strategy for Quality and Cooperation in Teacher Education*, there is a stated goal that TE at the universities and university colleges should be research based and that professional teachers shall be educated in close partnership with schools (Norwegian Ministry of Education and Research, 2018). Reforms are used as a "governmental measure intended to improve quality of TE and school efficiency" (Werler, 2017, p. 134). This is significant because it emphasizes the position of the teacher rather than the practice of teaching. Another consequence is a strong focus on standards. According to Brennan et al. (2017), "[R]ising standards in education and raising attainment in schools will be managed effectively only if teacher quality is improved. The best way to reform the teaching profession, according to this policy movement, is by changing the teacher education programmes" (Brennan et al., 2017, p. xi). In Norway, school policy has been "steered" by politicians to a large extent. Even though there are promising possibilities embedded within its policy agenda, there is a sense of urgency regarding the many reforms (Hardy et al., 2020). Today, the stated aim of the national policy strategy for TE in Norway outlined in the strategy document *Teacher Education 2025* is the following:

> to lay the basis for attractive TE programs of high quality. It is a goal to have academically strong and well-organized teacher education providers. The study programs must be perceived to be academically challenging and rewarding by both staff and students.
>
> (Norwegian Ministry of Education and Research, 2018, p. 6)

Furthermore, the national strategy document emphasizes the need for teachers to develop research-based skills as part of their work and engage in collaborative learning with their colleagues. TE should "educate professional practitioners. Teachers need to acquire solid, research-based skills and to have access to continued professional development within a professional learning community

to make informed decisions in their day-to-day work in kindergartens and schools" (Norwegian Ministry of Education and Research, 2018, p. 5). The new expectations, however, signal a lack of research-based competence among teachers (Trippestad et al., 2017). Norway's five-year integrated master's program and strong focus on research can be seen as an example of education for innovative and autonomous teachers who have the ability to develop and change the school. Thus, on the one hand, the policy seems to build on progressive and constructivist views of education like those of John Dewey and Lev Vygotsky and ideas about teachers being educated to become autonomous and professional in their work. On the other hand, there is a tension between the politicians' domination of the TE by using documents that indicate a lack of trust in the upcoming teachers and schools (Kemmis et al., 2020), thus setting the grounds for the reforms.

In the following paragraphs, we introduce the reader to the three current models for organizing TE in five-year integrated master's programs for primary and secondary school (grades 1–7, 5–10, and 8–13 have separate programs). In addition to the three integrated five-year master's programs, there is a one-year Postgraduate Certificate in Education program (grades 5–13) that requires an already completed master's degree. The four main TE programs in Norway are illustrated in Table 3.1.

In this book about ProTed, we concentrate on the three integrated five-year master's programs, which are marked with an (*) in Table 3.1. In the following, we describe the central courses specific for primary and lower secondary school TE (grades 1–7 and 5–10), after which we describe TE for lower and upper secondary school (grades 8–13). We argue that these three varying and overlapping TE programs have some fundamental similarities that may be seen as hallmarks of Norwegian TE and that educational research, higher education, and politics in Norway have been crucial for the development of teaching as a profession, including improving the status of the teaching profession. A closer look at the latest reforms for TE shows that they have influenced each other. TE programs for grades 1–10 have been expanded to five years, becoming more academic and more research oriented, while the 8–13 program was shortened to five years and with an increased orientation toward practice.

The master's thesis, required by all TE programs, has had the greatest impact on the transformation of TE and therefore requires a description. The MA thesis should be research based and related to the professional field teachers will be entering. The typical MA thesis written by student teachers is between 30 and 45 ECTS points, consisting of an introduction, theory, methods, results, analysis, and discussion/conclusion. Students have an internal advisor to guide them in their work. The thesis is judged on a scale of A–E (pass) and F (fail) by an internal and external evaluator at the end of the professional five-year study. Coursework during the last three semesters, including methods and advanced subject didactics, guides students on the development of their MA thesis.

Table 3.1 Four different teacher education programs in Norway for primary and secondary school

Teacher education programs	*Primary and lower secondary school (age 6–15)*			*Upper secondary school (age 16–19)*
	Lower primary level grades 1–4	*Upper primary level grades 5–7*	*Lower secondary level grades 8–10*	*Upper secondary level grades 11–13*
Master of Teacher Education for grades 1–7 (4 teaching subjects)*				
Master of Teacher Education for grades 5–10 (3 teaching subjects)*				
Master of Teacher Education for grades 8–13 (2 teaching subjects)*				
One-year Postgraduate Certificate in Education for grades 5–13 (1–3 teaching subjects)**				

* Five-year Master of Education programs.
** Students have been required to have a master's degree to be admitted to these programs since 2019.

Five-year Master of Education programs for primary and lower secondary schools, exemplified by the UiT model

Norwegian programs for primary and lower secondary schools TE have undergone six reforms since the mid-1970s, with the latest launched in 2017 (Trippestad et al., 2017). The most recent reforms have moved this TE from an experience-based tradition to a stronger focus on research and practice development, resulting in a paradigm shift inspired by Finnish educational reforms (Afdal & Nerland, 2014; Lillejord & Børte, 2017; Stølen, 2016). This shift has been implemented through two reforms: first in 2010, with a stronger focus on in-depth knowledge and research, and later in 2017, with a change from a four-year program at the bachelor's level to a five-year master's program (300 ECTS).

An international expert panel (the APT) was commissioned by the Norwegian Agency for Quality Assurance in Education (NOKUT) with the aim of following and evaluating the latest TE reform for primary and lower secondary schools. The APT report *Transforming Norwegian Teacher*

Education (Cochran-Smith et al., 2020) provides a description of the goals for the Norwegian TE reforms:

> Norway's reforms aim to establish stronger links between theory and practice and to make research central throughout the program. This is being accomplished in part through ground-breaking 5-year integrated programs and through the highly ambitious requirement that all student teachers complete master's theses that are practice-oriented and that treat research and practice as inherently inter-connected rather than as dichotomous. Norway's reforms also reflect high expectations regarding research rigor and educators' research capacity. This is being accomplished through sustained, innovative, and high-priority efforts to build research capacity for Norway's school-based teachers and leaders, for teacher educators at higher education institutions, and for student teachers.
>
> (Cochran-Smith et al., 2020, p. 48–49)

This latest national reform is intended to have high academic quality and ensure coherence between subjects, subject didactics, pedagogy, and practice placement. TE programs are expected to have close interactions with professional practice and the surrounding municipalities governing schooling. TE programs for primary and lower secondary schools are organized into two programs adjusted to the Norwegian educational system, namely grades 1–7 and grades 5–10 (The Norwegian Ministry of Education and Research, 2016a, 2016b). TE institutions have partnership agreements with schools for practice placement, and those who mentor student teachers are required to complete a formal mentoring course (minimum 15 ECTS) provided by TE institutions. The vision of the new TE is to cultivate a teacher identity that is marked by an inquiring attitude toward teaching. The national requirements for five-year integrated TE in grades 1–7 and 5–10 include the following:

- The program consists of 300 ECTS (five years) qualifying for a master's degree. The degree qualifies for postgraduate studies in education.
- The course of study should include at least four subjects for 1–7 and three for 5–10 and their associated didactics. All school subjects should be profession-oriented TE subjects and include subject didactics.
- Pedagogy and pupil-related skills (pedagogy), 60 ECTS, should be included, where knowledge of religion, philosophy of life, and ethics should make up a module equivalent to 15 ECTS.
- The teaching practice must consist of at least 110 days of supervised and assessed practice and at least five days of organized observation in school early in the course of study. Teaching practice must be a part of the program in four of the five years, and there should be progression in the practice placement. It should be an integrated element in all subjects forming part of the program.

- The TE should qualify the student teachers to provide instruction in Sami themes, including knowledge of the status of indigenous peoples globally, along with how to safeguard Sami pupils' right to education in accordance with the Education Act and the current national curriculum for primary and secondary education and training.
- In the third year of study, the student teachers should write a profession-oriented R&D paper combining a school subject and the subject pedagogy and pupil-related skills. Students will deliver a profession-oriented and practice-based master's thesis (minimum of 30 ECTS) at the end of the fifth year related to subject 1.

The guidelines are prescriptive for the institutions' provision of TE program and leave room for innovation and institutional adaptation in local planning and program development. At UiT, about 75 teacher candidates from grades 1 to 7 and 5 to 10 graduate each year. The two programs with their subjects are organized as a "matrix" and coordinated by the Department of Education, a unit under the Faculty of Humanities, Social Sciences, and Education. The subjects are steered by a coordinator responsible for preparing their own action plans for the programs based on the evaluation, study barometer, and the department's action plan. A steering committee, including the leader of the department, representers of the teacher educators, the student teachers, and the practice teachers, oversees the quality of the programs.

In Table 3.2, the current model for integrated TE for grades 1–7 at UiT is exemplified by the distribution of obligatory and examples of optional courses. Professional subjects, Norwegian (subject 1), mathematics (subject 2), and research and development courses (R&D) are compulsory courses. For the optional courses (subjects 3 and 4), student teachers can choose from among English, KRLE (Christianity, religion, beliefs, and ethics), physical education, arts and crafts, food and health, music, science, and social studies. In addition, the student teachers for grades 1–7 choose among the following six subjects for their master's subjects: beginner's education (literacy), English, mathematics, science, Norwegian, or social studies.

The current model for integrated TE for grades 5–10 at UiT differs from the program for grades 1–7. Subject 1 is identified as the master's subject and student teachers can choose between English, mathematics, science, Norwegian, and social studies. Subject 2 is chosen between English, mathematics, science, Norwegian, social studies, KRLE (Christianity, religion, spirituality, and ethics), physical education, arts and crafts, food and health, and music. Subject 3 is chosen between KRLE, physical education, arts and crafts, food and health, music, science, and social studies. Table 3.3 gives an example of the distribution of courses in the current model for integrated TE for grades 5–10.

The TE program at UiT builds on the experiences of seven years of piloting five-year integrated TE programs (see Chapter 5). All subjects are taught in the Department of Education with an integrated study design, allowing for close collaboration between the teacher educators of the academic subjects

Table 3.2 The UiT model for integrated teacher education for primary schools (grades 1–7), exemplified with Norwegian as subject 1 (master subject), mathematics as subject 2, arts and crafts as subject 3, and science as subject 4

Semester						Days in practice
10 9	Method 15 ECTS		Subject 1 Early Years Education in Norwegian Master's thesis 45 ECTS			
8	Subject 1 Early Years Education in Norwegian Master course 30 ECTS					10
7	Pedagogy 30 ECTS					20
6 5	Subject 4 Science 30 ECTS			Subject 1 Norwegian 15 ECTS	R&D paper 15 ECTS	20 10
4 3	Pedagogy 10 ECTS	R&D 5 ECTS	Subject 1 (obligatory) Norwegian 15 ECTS	Subject 2 (obligatory) Mathematics 15 ECTS	Subject 3 Arts & Crafts 15 ECTS	15 15
2 1	Pedagogy 10 ECTS	R&D 5 ECTS	Subject 1 (obligatory) Norwegian 15 ECTS	Subject 2 (obligatory) Mathematics 15 ECTS	Subject 3 Arts & Crafts 15 ECTS	15 5

Table 3.3 The UiT model for integrated teacher education for upper primary and lower secondary schools (grades 5–10) exemplified with Norwegian as subject 1 (master's subject), mathematics as subject 2, and science as subject 3

Semester						Days in practice
10 9	Method 15 ECTS		Subject 1 Norwegian Master's thesis 45 ECTS			
8	Subject 1 Norwegian Master course 30 ECTS					10
7	Pedagogy 30 ECTS					20
6 5	Subject 1 Norwegian 20 ECTS		Subject 2 Mathematics 20 ECTS	R&D paper 15 ECTS	R&D 5 ECTS	20 10
4 3	Pedagogy 10 ECTS	R&D 5 ECTS	Subject 2 Mathematics 30 ECTS	Subject 3 Science 15 ECTS		15 15
2 1	Pedagogy 10 ECTS	R&D5 ECTS	Subject 1 Norwegian 30 ECTS	Subject 3 Science 15 ECTS		15 5

and the professional subjects. Practical training is an integrated part of all subject studies and involves collaborating with approximately 35 schools, of which 10 are university schools (see Chapter 11). The progression of academic literacy, research literacy, and teacher proficiency throughout the program, along with how this is coordinated, is further described in Chapters 6 and 7.

Five-year Master of Education programs for secondary schools, exemplified by the UiO model

Traditionally, the way of becoming a subject teacher for lower and upper secondary schools in the Norwegian school system (grades 8–13) was to earn an academic subject degree at the bachelor's or master's level, followed by a year of postgraduate study in education. In 2003, the Norwegian authorities initiated a quality reform that reflected changes in higher education in Europe referred to as the Bologna process. Together these reforms allowed for the establishment of the integrated Master of Education program for TE for secondary schools. The new program qualified students for the position of lecturer in schools, thus becoming an alternative to the already existing add-on year. The latest reforms to the TE program for secondary schools were made in 2013. The national goals for preparing teachers for teaching in secondary schools include providing high-quality programs, integrating academic subjects, professional subjects (including pedagogy and subject didactics), and school practice. All TE programs in Norway are regulated by national guidelines that provide the minimum requirements for institutions. The national requirements for five-year integrated TE for secondary schools (grades 8–13) include the following:

- The program consists of 300 ECTS (five years) qualifying for a master's degree. The degree qualifies for postgraduate studies in education.
- Three subjects make up the minimum standards for the program:
  1) Academic major—with a minimum of 160 ECTS in a subject giving teaching competency for grades 8–13.
  2) Academic minor—with a minimum of 60 ECTS in a subject giving teaching competency for grades 8–13.
  3) Profession-oriented pedagogy—with a minimum of 60 ECTS consisting of 30 ECTS generic pedagogy and 30 ECTS in subject didactics related to the major and minor subjects in points 1 and 2 above.
- The profession-oriented pedagogy subject shall include scientific theory and methods; be connected to the practice field (schools); include knowledge about how pupils learn in a multicultural landscape and with different backgrounds; and include knowledge about youth culture.
- The teaching practice must consist of at least 100 days of supervised and assessed practice and must be connected to all three subjects mentioned above. The teaching practice must be a part of the program in four of the five

years, including progression in practice competency. Successful completion of practice is required to advance the study program. Student teachers should have practice in both lower and upper secondary schools.
- Student teachers deliver a master's thesis (minimum of 30 ECTS) at the end of the program and related to the major academic subject.

Institutions providing TE for grades 8–13 are free to organize study programs, as long as the minimum requirements are met. At UiO, about 200 teacher candidates graduate each year, making UiO the largest TE program for five-year integrated TE for secondary schools in Norway. The UiO model is a highly integrated study program involving five faculties and collaboration with 130 partner schools. The program consists of five specializations—English, foreign languages, culture and social studies, Norwegian, and science (mathematics and natural science)—and is seen as the largest and most complex interdisciplinary program at the university. Student teachers choose courses to fulfill their major and minor academic subjects from regular discipline offerings taught within an academic faculty (e.g., math, and science or humanities), while the professional courses are taught at the Faculty of Educational Sciences. The program is organized as a "matrix" and is coordinated by the Department for TE at the Faculty of Educational Sciences. A steering committee, including the deans of the five faculties and two student teachers, oversees the quality of the program, ensuring that the content and activities of the TE program are anchored across faculties and departments. The UiO model uses an integrated study design to provide coherence within the system and for student teachers. Table 3.4 shows the current model and the typical distribution of courses over five years, including academic major and minor subjects, professional courses, and practice.

Chapter 4 discusses the internal coherence found in professional courses, including pedagogy, subject didactics, and practice. The model assumes progression in research literacy leading to the master's thesis and in all activities and courses toward becoming a professional teacher. In the final three semesters, student teachers can choose a discipline-oriented or subject didactic master's specialization in their major subject. In Chapters 8 and 9, we show how student teachers work with research projects that will provide meaning for their coming profession. A profession-oriented mentoring program is offered to all student teachers throughout the entire program, where a focus is on the development of a teacher identity (see Chapter 13). From 2021 to 2022, all TE programs for grades 8–13 were evaluated by an external academic committee. Concerning UiO, the committee stated: "It is the committee's overall assessment that UiO has managed to create an excellent, well-structured and well-functioning TE that is well informed by research in the field, not least conducted by UiO's own researchers" (NOKUT, 2022, p. 207) (author translation).

Table 3.4 The UiO model for integrated teacher education for secondary schools exemplified by math and science courses

⟵ Profession-oriented mentoring program ⟶	10	Master's thesis Physics or Science Education (30 ECTS)			
	9	Physics or Science Education	Physics or Science Education	Physics or Science Education	15
	8	Physics and Math education in practice	Physics or Science Education	Methods	
	7	Professional courses (pedagogy/subject didactics)			45
	6	Physics Education	Professional courses (pedagogy/subject didactics)		25
	5	Thermodynamics and Statistical Physics	Philosophy	Geometry	
	4	Quantum Physics	Oscillations and Waves	Astronomy	
	3	Linear Algebra	Electromagnetism	Professional courses (pedagogy/subject didactics)	15
	2	Calculus and Linear Algebra	Probability and Statistical Modeling	Classical mechanics	
	1	Calculus	Introduction to Programming with Scientific Applications	Mechanics and modeling	
Semester		10 ECTS	10 ECTS	10 ECTS	Days in practice

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4 Coherence in teacher education

A case of research-based reform

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Introduction and background for the reform

> "The teacher education program at the University of Oslo has great organizational challenges, a great potential for improvement, and above all a serious reputation problem."
>
> (Universitas, September 2010)

The above quote is from a chronicle in the student newspaper at the University of Oslo (UiO), where representatives of the student teacher organization summarized the state of the program, after what had been a range of critical chronicles from student teachers that year. The student teachers' critique largely mirrored the international and national discourse around teacher education (TE), outlined in Chapter 1. Until 2012, there were few structures in the program that enabled alignment across courses, or structures securing progression throughout the program. All exams were written assignments connected to the respective courses. From 2000 to 2004 a technology reform project was implemented within the department. During this period, the student teachers produced portfolios based on written cases; written cases they wrote themselves from their placements; and video cases (Hauge, 2006). Still, there were no overall reforms to redesign the program in a coherent manner. Against that backdrop, a reform group at the Department of Teacher Education and School Research at UiO, established in the summer of 2010, started the work with a reform and redesign of the professional courses within its TE program for grades 8–13. In January 2011 the *PUPILS model* (Program for Education of Teachers at the Department of Teacher Education and School Research) was presented (Klette et al., 2011), and in the autumn of 2012, the model was operationalized and implemented in the one-year program, and in the spring of 2013 in the five-year program[1], as the PROF model.

The aim of this chapter is to *share a "case" of TE reform, in terms of its processes, components, and impact*. In the following, we first outline the processes leading to and implementing the redesign and illustrate how a redesign can be accomplished even more effectively by including the voices and perspectives of

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student teachers themselves. We then describe the individual components of the model in relationship to a set of research-based principles of strong TE. Finally, we present the impact of the redesign in terms of development of a research instrument and collected data to monitor the implementation and progress of the reform. The chapter provides knowledge of what reform efforts in TE might look like and lessons to be learned as to which affordances and constraints one may encounter. It also provides knowledge about specific features that can strengthen a five-year integrated TE program. This contribution is important, at a time when TE in Norway undergoes continuous reforms – and when TE internationally is under increased scrutiny.

Reform processes

The reform of the PROF model took place at a time with increased attention to TE nationally, followed by national initiatives and an increase of resources allocated to the sector. From 2019, all Norwegian student teachers are required to undergo a master's program (Norwegian Government, 2014), and a new national curriculum for TE was introduced on all levels (e.g., KD, 2016). In addition, a national graduate school for research in TE was established as a means of increasing the quality of TE and basing it in research to a greater extent (Smith, 2020). There was also a simultaneous emphasis on practice in Norwegian TE, which is recognized in the attention to creating effective partnerships with schools (Lund & Eriksen, 2016). Further, substantial resources and efforts have been invested in strengthening TE research (Munthe et al., 2011). Finally, the Center of Excellence in Teacher Education (ProTed) was established in 2010 (Lund et al., 2015), and TE was mentioned explicitly in the strategic plan for UiO the same year (UiO, 2010). This was an important indication that TE had the support and recognition on an institutional level, by the leadership at the university.

The reform at UiO was heavily informed by research on TE and principles of TE program design. The reform group read literature on the importance of coherence in TE, and that the student teachers should receive similar messages within and across their different courses, and between coursework and school practice (Darling-Hammond et al., 2005); on how a common vision among faculty could contribute to that end (Hammerness, 2012); and on the importance of grounding TE in practice (Grossman et al., 2009). In addition, faculty at UiO had established connections with scholars at the TE program at Stanford University, which has consistently been recognized among the top-ranked TE programs in the United States and had thus established a program for Inquiry into the Stanford TE Program (iSTEP Institute). During the process of reform, faculty from UiO participated in iSTEP on several occasions to learn about principles of strong TE and to operationalize them in the particular context of Norway and Oslo.

A final, but decisive, aspect of the reform was its inclusion of the student teachers and partner schools. In 2010, the student teacher representatives

delivered a report on the state of TE at UiO with suggestions for improvement. They were invited to a faculty seminar the same year to present the report and participated constructively in the process following the seminar. They were part of the reform group presenting the PUPILS model in 2011 and contributed to the working groups targeting the implementation of the model in 2012. Similarly, in the years up to 2012, the department was cooperating with about 80 partner schools where the student teachers had their school practice. Since 2009, some of these partner schools were chosen to become so-called university schools (see Chapter 11), with closer connections and collaboration with the department (Lund & Eriksen, 2016). Representatives from these schools were important partners in the redesign process and in the implementation of the reform.

Components of the reform

The reform targeted the professional courses of the five-year Oslo model (see Chapter 3), as this was identified as the area with the most potential to create coherence in the program. (The PROF model's placement within the five-year Oslo model is illustrated in Table 3.4, Chapter 3.) The main goal of the redesign was to thread key ideas about teaching and learning through both campus courses (pedagogical- and subject didactical courses) *and* school practice. The model has steadily developed, but as Figure 4.1 shows, four thematic areas still serve as the building blocks for the content and the structure of the program: *teaching and learning; classroom environment and -management; assessment of learning; and adapted teaching and differentiation*. The thematic areas permeate all courses and elements of the program, including the student teachers' assignments and exams during their studies.

Within the thematic area *teaching and learning*, the student teachers learn about the role of the national curriculum, learning theories and theories about motivation and learning strategies, and also the role of ICT for teaching and learning. These same topics are brought into subject didactical seminars where they are exemplified with specific subject-related literature for teaching the subject in schools. Similarly, within the thematic area *classroom environment and management*, topics like the design of a safe learning environment and classroom management are emphasized, as are issues like groupwork and classroom discourse. These topics are also related to the target group, focusing on youth and youth culture. Within the thematic area *assessment of learning*, topics including formative and summative assessment and ethical considerations related to assessment are presented, after which the student teachers learn about subject-specific aspects of assessment. The final thematic area *adapted teaching and differentiation* is concerned with concepts like heterogeneous classrooms, diversity, and social justice, and the student teachers learn about adaptive learning and special education, and ways to differentiate their teaching, and contribute to inclusive classrooms. Topics like cooperation with colleagues, school leadership, and external partners are also important within this

	Theme 1: **Teaching and learning**	Theme 2: **Classroom environment and -management**	Theme 3: **Assessment of learning**	Theme 4: **Adaptive teaching and differentiation**
COURSEWORK				
Pedagogical courses	Learning theories, motivation and learning strategies, ICT Introduction to education and school in society, national curriculum etc.	Design of learning environment, and management of classrooms Group psychology, group work and classroom discourse Youth and youth culture	Formative and summative assessment, ethical considerations, tools for assessment: feedback, dialogue, tests etc.	Adaptive learning, special education, heterogeneous classrooms, diversity, social justice, and differentiation Cooperation with colleagues, school leadership, and external partners Education and school in society
Subject didactics	Relationship between subject, teaching and learning activities National curriculum and regulations in subjects	Learning environment related to subject specific content areas	Assessment and -criteria connected to subject-specific content areas Subject specific aspects of assessment	Subject-specific differentiation Subject specific aspects related to heterogeneous classrooms Educating for the future: inter-disciplinarity, sustainable development etc.
			R&D design, research methods and professional approaches like interviews, surveys and logs and document data (student work)	
SCHOOL PRACTICE	4 weeks teaching in subject, focusing on classroom environment and -management		5 thematic days focusing on the role of the "home-room teacher", in terms of following up kids with special needs, conferencing with parents etc. 8 weeks teaching, securing a whole sequence leading to an assessment situation	
Exams	Video-case exam, attention to observation and reflection skills R&D assignment: evaluation and reflection around own teaching (one specific conducted lesson)		Home exam: given assignment with research question the student teachers are given 48 hours to complete R&D assignment: collection of data related to one area of one's own teaching that one intends to improve	

Figure 4.1 The PROF model.

thematic area. Finally, across all thematic areas, the importance of education and school in society is an overarching topic.

These changes in program design in 2012 had consequences for all parts of the study design. Not only was the coursework redesigned to be linked to the overall design in four themes, but also the content of the student teachers' school practice and design of exams was influenced.

Redesign of coursework

A key concern in redesigning the coursework was to (i) make the courses more aligned and coherent, (ii) design curriculum that purposefully enabled student teachers to build understanding over time of key conceptual ideas about teaching, and (iii) increasingly ground course syllabi in practice. A program design around the four thematic areas met these concerns. First, the explicit focus on the themes at specific time points during the program made it easier for the faculty to create alignment between courses. Second, the renewal of the study literature and course content, as well as the change of pacing across the program, were to contribute to a greater sense of progression throughout the program. Recognizing that knowledge and skills to work in heterogeneous classrooms is more complex than establishing a learning environment and managing the classroom, for instance, influenced the design and progression of the four thematic themes. Finally, the themes were chosen not only because they could function as a way to make the program more coherent, but also to ground the PROF model in the teaching profession. All four thematic themes take as a starting point what teachers need to know and be able to do. This made it easier to ground course content and readings in practice.

Redesign of school practice

There was an intention to start school practice as early as possible, and to align school practice and coursework to a greater extent. The organization of school practice has steadily developed, but at present, there is a one-week field placement and 10 individual days of school practice at the very start of the program, in the third semester of the five-year program, in addition to two major periods of teaching practice and some additional days of school practice later in the program (see Table 4.1).

All school practice has a specific curriculum that is tightly linked to the four thematic themes and linked to coursework through specific assignments. The first practice placement (one-week, so-called intensive practice, see Table 4.1) was designed in collaboration with the university schools. Groups of approximately 35 student teachers are placed at different university schools and go through a common schedule targeted toward learning to know the school as an organization, taking part in meetings, observing teaching, and trying to teach in collaboration with other student teachers. In addition, in the third semester, the student teachers have school practice one day a week throughout

Table 4.1 Organization of school practice in the five-year program

Semester	*Type of practice*	*Duration*
3	Intensive school practice	5 days
3	One-day weekly school practice	10 days
6	Thematic days of school practice	5 days
6	School practice in pairs	20 days/4 weeks
7	School-start practice	5 days
7	Individual school practice	40 days/8 weeks
9	Campus-based practical analysis	5 days
9	Research practice	10 days

the semester. Early in semester six, the student teachers have five thematic days of school practice to ensure that they participate in activities related to the role of the "homeroom teacher," such as meetings with collaborating partners of the school (social teachers, nurses, etc.) and meetings with parents or counseling with specific student teachers. Four-week practice is organized as a group practice, with 4–6 student teachers being placed together at one of the partner schools. The student teachers collaborate in planning and teaching, receiving common guidance from their mentors in the schools. The curriculum focuses on classroom management and the learning environment. Further, the student teachers have five days of "school-start school practice" early in their seventh semester, to provide insight into what schools and teachers do to prepare before school starts in the autumn, and to prepare for their eight-week placement later that semester. Eight-week practice in the seventh semester is organized as individual practice or practice in pairs, and student teachers are gradually given more responsibility for their own teaching, before finally taking over the class alone. The curriculum focuses on assessment and the heterogeneous classroom, similar to the curriculum in the campus courses. In semester nine, the student teachers have two different types of practical training related to preparation for their master thesis.

Documents have been developed that describe the curriculum for each period of school practice, and the responsibilities of the student teachers and the supervisors in schools. In addition, the student teachers are called back to campus for a "dialogue seminar" during their four-week placement, where student teachers, supervisors, and faculty meet to discuss cases based on student teachers' experiences during that placement period (Lund et al., 2010; Rørnes, 2013; see also Chapter 11). Student teachers receive supervision from a faculty member once during the eight-week placement.

New assignments and exams

Assignments and exams were seen as an important linking tool to enable coherence between school practice and coursework. All assignments were thus grounded in practice in different ways. This was done by framing the

assignments within a research and development (R&D) paradigm, emphasizing the importance of continuous learning and development of teachers, and an "inquiry stance" to the student teachers' own teaching practice. The overall objective of the new assignments and exams was to create opportunities for student teachers to demonstrate their professional competence, rather than to "control" student teachers' theoretical knowledge. The assignments and associated assessment criteria were thus designed for the student teachers to have the opportunity to demonstrate mastery in key components of an R&D-based professional practice, and student teachers were asked to observe, describe, analyze, and discuss real situations from classrooms. All assignments were integrated, meaning that they not only integrated coursework and school practice, but also integrated the different knowledge domains (pedagogy and subject didactics). The assignments are illustrated by the main exams in Table 4.2.

The PROF model also includes different modes of support for the student teachers while conducting their R&D assignments, such as lectures on research methods, and supervision and seminars connected to the individual assignments. The lectures and seminars are designed with a progression related to where they are at, in the process of planning, collecting, or analyzing data during their PROF courses – and with a progression toward the work on their master theses.

Impact of the reform: Monitoring redesign through research

Alongside the redesign efforts at UiO, researchers within the department designed a research project examining coherence in TE, based upon the same research that influenced the reform. This resulted in the CATE study (coherence and assignments in teacher education; see Hammerness, et al., 2020), an international comparative study funded by the Norwegian research council

Table 4.2 Main exams in the five-year program

Semester	*Exam*	*Description*
6	Video-case exam	In the digital home exam, student teachers must observe, analyze, and discuss a given video case
6	R&D assignment I	The student teachers are to demonstrate that they have completed an observation of a class in their four-week placement, that they have planned and conducted teaching in this class, and that they can discuss their teaching related to a self-chosen research question
7	Home exam (48 hours)	Assignment with research question the student teachers are given 48 hours to complete
7	R&D assignment II	Student teachers should conduct an individual empirical study during their eight-week placement and discuss a self-chosen research question related to their own professional practice

from 2012 to 2016. A survey instrument was developed within the CATE study to measure student teachers' perceived experience of coherence in the program, and their perceived opportunities to study and enact practice within their coursework at campus (Hammerness, Klette, & Bergem, 2014).

The survey was initially distributed to student teachers in our one-year program and was first distributed to the student teachers in the five-year program in 2018 (75 participants/40% response rate). It has since been distributed again in 2020 (46 participants/22% response rate) and 2021 (56 participants/25% response rate).

The CATE survey is a good measure to monitor central aspects of the PROF reform. Measures of student teachers' opportunities to study and enact practice during coursework are divided into two scales, the first scale tapping into practices close to students (e.g., discuss and analyze actual students' work; solving problems, reading texts, or doing assignments your own student teachers are expected to do) and the second scale tapping into practices more distant from students (e.g., see or analyze videos of classroom teaching; discuss and analyze teaching materials such as plans for a teaching sequence or teaching materials used by teachers). All items were scored on a Likert scale, ranging from 1 (no opportunities) to 4 (extensive opportunities). Table 4.3 presents the descriptives for each scale across years and for each year in which we collected data.

Across years, student teachers expressed having average opportunities to study and enact practices close to students (see Table 4.3). Regarding opportunities to study and enact practices more distant from students, student teachers expressed they explored these practices in some depth. Compared to other programs internationally, the student teachers perceive to have relatively many opportunities to study and enact relevant teaching practices (Canrinus, Klette, Hammerness, & Bergem, 2019).

To investigate whether the influence of the reform might influence student teachers' opportunities over time, we compared the data from the three time points. This showed that the student teachers did not differ across the time points ($p > .05$) in the extent to which they believe to have opportunities to study practices more distant from students. However, regarding practices closer to students, the student teachers from 2018 expressed to have more opportunities compared to the student teachers surveyed in 2020 and 2021 ($F[2]=7.42$, $p=.001$). The student teachers from 2018 experienced to have studied and practiced these practices in some depth (see Table 4.3), whereas the student teachers from 2020 and 2021 were closer to experiencing they briefly touched upon these practices.

Similarly, the reform's ambition to create a coherent program is also measured through the CATE survey. In this section of the survey, student teachers are asked to indicate their agreement to statements tapping into coherence between campus courses (e.g., the teacher education program has a clearly stated vision of teaching and learning; those who taught had good knowledge of what was going on in my other courses) and coherence between campus courses and their school practice (e.g., what I learned about in my university

Table 4.3 Item examples and means per scale across and per year (standard deviation between brackets)

Scale	*Example item*	*Total*	*2018 (n=75)*	*2020 (n=46)*	*2021 (n=56)*
Close to students**	Discuss and analyze actual students' work	2.66 (.64)	2.87 (.57)	2.49 (.65)	2.51 (.65)
Distant from students	See or analyze videos of classroom teaching	2.87 (.50)	2.86 (.44)	2.92 (.57)	2.84 (.53)
Coherence between campus courses*	The teacher education program has a clearly stated vision of teaching and learning	2.81 (.51)	2.87 (.50)	2.91 (.44)	2.67 (.54)
Coherence between campus and school practice**	What I learned about in my university courses reflected what I observed during my practice	2.66 (.60)	2.58 (.54)	2.98 (.54)	2.51 (.65)

* significant (p<.05) differences across the years.
** significant (p<.01) differences across the years.

courses reflected what I observed during my practice; those who taught in the teacher education program had good knowledge of my tasks at the practice school). All items were scored on a Likert scale, ranging from 1 (strongly disagree) to 4 (strongly agree). Compared to the enacting and studying of various practices, a slightly different pattern appears when zooming in on questions regarding experienced coherence. Across years, student teachers expressed agreement regarding statements on coherence between courses (see Table 4.3). Student teachers are relatively neutral when it comes to agreeing with statements regarding coherence between campus courses and the school where they had their practice (see Table 4.3). Compared to other programs internationally, this is average (Canrinus, Bergem, Klette, & Hammerness, 2017).

Again, to investigate the potential effect of the reform over time on student teachers' perceived coherence, we compared the data from the three years to investigate whether change over time had occurred. When asked about coherence between courses, student teachers from 2020 experienced significantly more coherence than student teachers from 2018 and 2021 ($F[2]=3.85$, $p=.05$). On average, student teachers from 2020 perceived a reasonable amount of coherence between courses (see Table 4.3). Student teachers in 2018 expressed somewhat less agreement with statements on coherence between courses, and student teachers from 2021 expressed a more neutral

stance (see Table 4.3). Regarding experienced coherence between campus and practice, we observed similar differences. Also, in this case, student teachers from 2020 experienced significantly more coherence (F [2] =9.80, p=.001). These student teachers experienced a reasonable amount of coherence between campus and school, whereas 2018 and 2021 student teachers experienced less alignment in this sense (see Table 4.3).

Overall, the results from the CATE survey are – not surprisingly – partly promising, partly disappointing. It is hard to read any clear indications of reform success. One reason for this is the response rates. The findings from 2018 are already based on less than half of the student teachers (40%). The response rates in 2020 and 2021 are even lower (22% and 25%, respectively). Although we believe that the student teachers who completed the survey are representative of the whole cohort, information is lost with fewer respondents. We also need to take caution about these results, as the years 2020 and 2021 are probably influenced by the COVID-19 pandemic. The pandemic might give a skewed picture of the student teachers' experiences as the reform was not directed at digital education in the first place, and opportunities to study and enact practice might have been harder in that format. That being said, a recent national evaluation of Norwegian integrated 8–13 TE concludes that the Oslo program is "excellent, well-structured and well-functioning (…) and well informed by research in the field" (NOKUT, 2022, p. 207). It is for instance highlighted that the Oslo student teachers are seen as competent by the school leaders who hire them, that the coursework is seen as relevant to the profession, and that the collaboration between UiO and the partnering schools seems well-functioning (NOKUT, 2022). These are certainly aspects at the center of the reform that might indicate positive effects of the work conducted in the last decade. Monitoring the reform is nevertheless continuous work, and the survey will continue to be used in the future. As such, the development of the CATE study and its research instruments, including the survey, alongside a reform process, illustrates the synergies of combining research and development work, and it demonstrates how reform efforts can be monitored through research.

Implications and lessons learned

An important lesson learned from the reform processes at UiO is the importance of doing research-informed changes in the program. The processes, as well as the components of the redesign, were informed by research in the field of TE and teacher learning. In that way, faculty developed a common language, and it made a common vision visible (Hammerness, 2012). This also made it easier to communicate and implement the redesign across faculty, collaborating partners, and other stakeholders. Research on leadership in higher education, and in TE, indicate that such external leverage is important to reinforce reform efforts (Cavanna et al., 2020; Hermansen, 2020). Further, the involvement with international research was deepened through

international cooperation with other strong TE programs, like the one at Stanford University. This provided a rich network of colleagues internationally to share ideas, learn from one another, and to hear about productive experiments.

The national focus on TE at the time was indeed a key factor, as was the strategic focus of the entire University on TE. This systemic support was decisive in the process of reform, as it functioned as a leverage point to pursue wanted changes internally, as is also emphasized as a crucial factor for strong TE programs internationally (Darling-Hammond et al., 2017). Including student teachers and other collaborating partners in the process provided powerful and valuable insights and experiences. These were used not just in designing the structure and organization of the program, but also in more detailed planning of the organization and content of school practice, for instance, or the design of the final exams. Including the student teachers' voice also meant that they *felt* represented and listened to and that the vision of the PROF model was not just shared by faculty but also by student teachers. The close collaboration with partner schools contributed to a more shared responsibility for TE, and especially faculty at the University schools connected to the program increasingly seeing themselves as teacher educators (Hatlevik, Hunskaar, & Eriksen, 2020; NOKUT, 2022).

Finally, continuous use of the CATE survey and a research-based monitoring of the reform will be important in the future. Even though the PROF model had a promising design and included enthusiastic processes from faculty and partners, reform efforts are always challenging. Creating coherence is increasingly seen as a common, dynamic process, rather than a static product (Richmond et al., 2019), and research indicates the importance of steady work and discussions within and across faculty – and with partnering schools – in order to maintain coherence (Floden et al., 2020; Levine et al., 2022; Richmond et al., 2019). The Department of Teacher Education and School Research at UiO has expanded tremendously in the last 10 years. There has been an increase in the number of student teachers accepted in the program, as well as an increase in faculty employed at the department. This might constrain the common vision and coherent practices among faculty – and illustrates the challenges in creating a coherent program. For instance, Levine et al. (2022) point to academic traditions and autonomy among faculty, as well as diverse faculty backgrounds and different theoretical orientations, as a key hindrance to program redesign and coherence. There is a need, also in the Oslo program, to continuously work not only on tinkering the program design but also on joining the forces of old and new faculty to ensure a common vision and steady work in the same direction and aligned with the design principles of the program model. Simultaneously, it is important to acknowledge how conflicts, resistance, and fragmentation will be an embedded part of redesign efforts in academic institutions, demanding "pathway flexibility" (Levine et al., 2022, p 12) in critical dialogue between faculty, and between faculty and school partners.

Note

1 The one-year program (Postgraduate Certificate in Education) is for student teachers with a five-year master's degree, who take a one-year add-on TE and are qualified to teach in upper primary and secondary school (level 5–13); while the five-year program is an integrated master TE program. Student teachers study two subjects and do their TE courses throughout their years at the university and then graduate, prepared to teach secondary school (levels 8–13).

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5 Transforming teacher education to the master's degree level, an experiment

Rachel Jakhelln and Siw Skrøvset

> "Norway's aspirations and its approach to teacher education reform stand out in the international context, reflecting a strong commitment to academic excellence, close partnerships with schools, and professionalisation of the teaching force."
>
> (Cochran-Smith et al., 2020, p. 49)

Introduction

The quote above reflects an evaluation of the national 2017 reform for teacher education (TE) at the primary and lower secondary levels in which a five-year integrated program was implemented. Prior to this bold transformation, a pilot program in TE was launched in 2010 at UiT The Arctic University of Norway (UiT) named Pilot in the North (The Pilot). The Pilot was the first Norwegian five-year integrated research and development (R&D)-based program at the master's level for primary and lower secondary school (PLS) teachers. The purpose of The Pilot was to educate early career teachers with the knowledge to take an active role in their own and the schools' professional learning and development (Jakhelln et al., 2019). The Pilot became a central part of the Center for Professional Learning in Teacher Education (ProTed) starting in 2011 and an important contribution to developing innovations related to TE. The launch of a national master program for (PLS) teacher education (Norwegian Ministry of Education and Research, 2018) builds on many of the main principles of The Pilot. The aim of this chapter is to take a closer look at the historical background leading to the design of The Pilot and how this model influenced the national development of the 2017 reform of TE for PLS. We give an account of our experiences and perceived challenges and conclude the chapter with some reflections on what our contribution can mean internationally.

A period of several reforms

The pace of reform has been high in Nordic TE in recent decades, and extensive reforms have been carried out with changes to the form and content of the education. In Norway, TE underwent reforms in 1999, 2003, and

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2010, with Sweden, Denmark, and Iceland having had nearly the same reform frequency. The Nordic countries are also affected by international trends, in this context the Bologna process, contributing to both the structure and content of TE programs internationally. Finland has had fewer reforms than the other Nordic countries. The last major reform came in 1979, when TE was fully integrated into the universities' examination system making Finland a quarter of a century ahead of the Bologna Reform. Finland's academization of TE 20 years before the Bologna Declaration has proven successful in terms of both the Programme for International Student Assessment (PISA) results and recruitment into TE.

Strong criticism of previous programs

An important driver of The Pilot is the strong criticism the Norwegian TE program for PLS received when it was evaluated by the Norwegian Agency for Quality Assurance in Education (NOKUT, 2006a). The criticism focused on how the TE program was fragmented, lacked coherence, and provided a weak basis for the teacher's work in schools. The evaluation report was followed up by the white paper *The teacher. The role and the education* 2008–2009 (Kunnskapsdepartementet, 2009), which suggested a five-year integrated master's education. However, the white paper was seen as controversial, and the Parliament chose to postpone the initiation of a five-year TE for PLS. Rather, a revised four-year TE for PLS at the bachelor's level was implemented in 2010 with a focus on research competence and school development. In the same year, as the only institution in Norway that had both the academic basis and the experience from TE covering all grades 1–13, UiT was given the opportunity by the Government to pilot a five-year integrated master's program for TE for PLS.

Merging of two TE institutions and two TE traditions

An important backdrop for The Pilot was the merger between then Tromsø University College and the University of Tromsø, effective from January 1, 2009, that created UiT The Arctic University of Norway (UiT). In this merger, two different TE traditions met. The TE programs for PLS (grades 1–10) offered at the teacher college were anchored in a seminar tradition and were four-year programs with 8–10 subjects. This tradition emphasized pedagogy and teacher formation and personal development (Haug, 2013). The five-year TE program at the university grew out of an academic tradition with 2–3 subjects and educated teachers primarily for lower and upper secondary schools (grades 8–13). Based on these contradictory traditions, The Pilot was important as a joint project for the newly merged institution as a boundary-crossing project (Edwards, 2010). The university needed an innovative TE program for PLS, unlike the traditional four-year TE. This point was a very strong one regarding the move toward a five-year research-based TE.

The development of The Pilot

Little research has been done on the design and development of TE for PLS both in Norway and internationally. We therefore had little research to build on about content, length, and structure, and which organizational models provide desirable TE programs (Kunnskapsdepartementet, 2009). However, the application to pilot a five-year master's program for PLS teachers was based on a thorough process. The drivers for the development of The Pilot were the Chancellors and boards of the two former educational institutions, Tromsø University College and the University of Tromsø. The process was grounded on: 1) NOKUT's academic assessment of the Norwegian TE for PLS in 2006/2007, 2) the Klemp (2008) report, 3) the further development of this model by local professionals, and 4) the white paper *The teacher. The role and the education* 2008–2009 (Kunnskapsdepartementet, 2009). These four main points make it clear how The Pilot to a lesser extent was governed by political decisions and was instead based on local thinking and initiatives.

Inspired by Finland

The Pilot has been referred to as a translation of Finnish TE. The aim of The Pilot was to develop the level of education for five-year TE, that is, an optimal adaptation to the Bologna model (3 years Bachelor + 2 years Master), while at the same time fully integrating TE into the examination system for higher education in Norway. The reform was seen as an important contribution to raising TEs for PLS academic and professional status and autonomy, with reference to Finland as a significant role model (Hansén et al., 2014). A representative from Finland (Hansén) participated in the working group that prepared the framework plan for the experiment at UiT, namely the Klemp report (2008). The purpose was to try out a model that could form the basis for turning TE for PLS in Norway into a five-year integrated master's degree program.

A thorough process involving many teacher educators in developing The Pilot

To develop an expanded and more R&D-oriented practice and a more differentiated TE with broader academic depth, an important purpose of The Pilot was to try out a comprehensive TE with coherence between subjects, subject didactics, pedagogy, and practice. Thus, nearly 100 academics were divided into 12 subject groups (social studies, religion, mathematics, science, music, arts and crafts, food and health, drama, Norwegian, English, pedagogy, and school practice) to develop study programs and course descriptions. A reference group of 25 members was to provide advice and input, and an external committee was appointed to propose the new models for TE for PLS. Based on the external committee's report, *Professional teachers at all levels. Integrated, differentiated and research-based teacher education* (Klemp et al., 2008), UiT's

board decided to establish the two programs, TE for primary school (grades 1–7) and TE for upper primary and secondary school (grades 5–10), applying for approval to the government in 2009. The result was thus two level-differentiated TE models. The Pilot was approved by the Ministry of Education in March 2010. With The Pilot, UiT was ready to implement a study design where the academic environment in partnership with the student teachers and practice schools would change from a four-year bachelor's program to a five-year integrated master's program. In this context, piloting was largely about problematizing and challenging assumptions about quality in TE programs for PLS (Dahl et al., 2016) in order to educate a new, professional teacher for the school of the future.

Collaboration between university and schools

TE is dependent on cooperation between two institutions, universities and schools, with different tasks and knowledge bases (Zeichner, 2014). The university is responsible for student teachers' development of theoretical and research-based knowledge documented through courses, examinations, and the master's thesis. The schools' main tasks are to educate children and young people and to nurture their development as citizens. In the development of The Pilot, more and better practice in school was central, as was the need to improve collaboration between practice schools and university courses. When these two institutions collaborate on TE, "boundary work" is a premise. Boundaries can be understood as "…social constructions which define who is included and excluded from interactions and which knowledge or meaning system is considered relevant in those interactions" (Edwards, 2010, p. 43). For The Pilot, it was a goal to achieve a closer link between practice and theory, between practice school and educational institution, and between research and practice. These professional perspectives included a practice and research orientation. The student teachers would also be immersed in subjects more than in the four-year education, and their professional knowledge would be elevated to a higher level. The mindset was taken from medical education, where studies and practices are seen in a close context and where the practice institution and learning institution are closely linked (Hatlevik & Hovdenak, 2020).

The design and progression of The Pilot's two study programs

The Pilot was differentiated into two programs, one for primary school (grades 1–7) and one for upper primary and lower secondary school (grades 5–10). UiT also offered TE for secondary school (grades 8–13), which was held outside the pilot program. The program for grades 1–7 provided teaching competence in four subjects, where mathematics and Norwegian were set as obligatory and led to a master's degree in pedagogy and pupil knowledge (pedagogy). The program for grades 5–10 provided teaching competence in

three optional subjects leading to a master's degree in subject didactics (see Chapter 3). Both programs included 120 days of practical training spread over four of the five years of the programs.

The Pilot was implemented in 2010 and continually revised until 2017 when the national reform was implemented. The revisions of programs were influenced by input and ideas from student teachers, practice teachers, rectors in schools, and university teachers. In addition, two external evaluations of the programs were conducted (UiT – Norges Arktiske universitetet, 2016). Over the years, dynamic changes characterized The Pilot, both according to terms of content and progression.

In the programs, pedagogy was given a central role in defining, specifying, and facilitating concepts such as *integrated, research and development-based*, and *professional TE* in becoming meaningful structures. Student teachers' professional development was given a special role in the progression throughout the programs: Year 1, to be a teacher in a classroom; year 2, to be a teacher in a classroom characterized by diversity; year 3, to be a professional teacher in a learning organization; year 4, to be a professional teacher in a school in society; and year 5, to be a professional and research-based teacher (linked to the master's thesis). This progression is reflected in school practices and in other subjects through the main descriptions in the UiT Stairway, illustrated in Figure 5.1. The UiT Stairway illustrates a shared description of the central content of both programs.

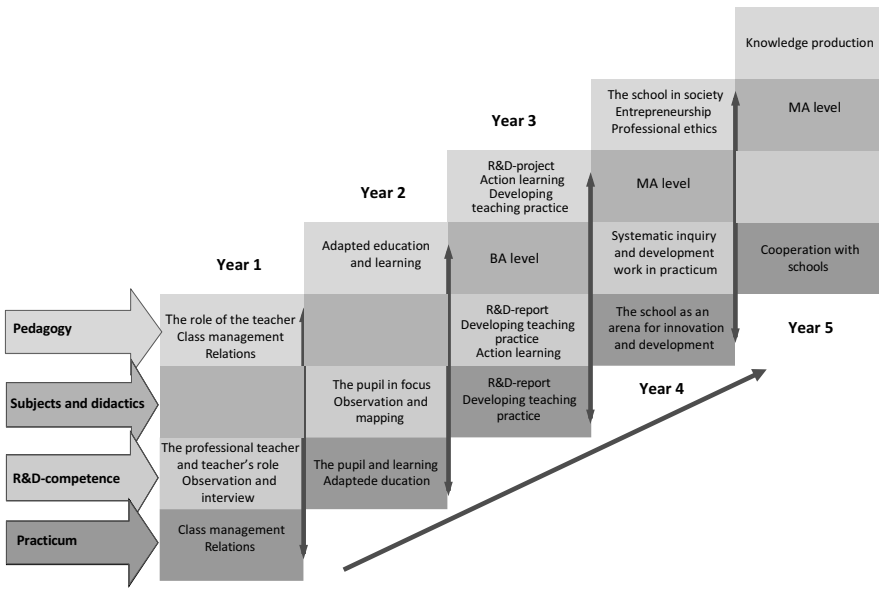

Figure 5.1 The UiT Stairway demonstrating progression and integration between pedagogy, subjects and didactics, R&D competence, and practicum.

In their third year of study, the student teachers in both programs were to write a research-based thesis within pedagogy, also described as "a smaller, practice-oriented action learning project." The thesis (the original BA thesis) was seen as a key element for strengthening the R&D basis for education and an important step toward building competency for the master's thesis. The TE environment in Tromsø has a long tradition of action learning and action research (Brekke & Tiller, 2013; Rönnerman et al., 2008; Tiller, 2006), and action learning was chosen as a theoretical and methodological framework for the assignment. Ideally, the thesis was based on empirical data from an intervention carried out during their two practicum periods and involving three stakeholders: student teachers (the practicum group of three), university teacher/researcher, and schoolteacher/mentor. The vision was for the student teacher to be able to lay the foundation for an inquiry-based perspective on one's own work.

The master's thesis in both programs was to be written in the tenth semester of the program. The student teachers could write their master's thesis alone or in pairs. The thesis (30 ECTS points) was to be professionally relevant and should preferably include empirical work (UiT 2013a, 2013b). The requirements for the thesis made it a prerequisite that the master's work and supervision started well before the last semester. In the eighth semester of the program, student teachers completed a methodology course where the exam consisted of creating a project outline for the master's thesis.

The UiT Stairway was developed over the years by the teacher educators, also inspired by ProTed at UiO. The stairway became a shared description of central content elements of the TE programs. See a further description in Chapter 6 of how the UiT Stairway describing program progression was developed and realized in the new TE 2017 reform for PLS.

Experiences and challenges

The Pilot was driven forward by a wide range of experiences, knowledge, initiatives, and innovations. With reference to NOKUT (2006a, 2006b), the work with the development of The Pilot argued for professionalization and higher competence, and increased quality of practice. As part of the effort to strengthening teachers' competence, research affiliation was emphasized and all parts of the education strengthened, including the school practice. In the following, we reflect on these themes and how they were applied in the development of The Pilot, representing changes in the realization of the reform.

Integration and progression

Hammerness (2013) emphasizes that strong TE programs share some common characteristics, namely, they have a clear vision, they are coherent, and they have a strong grounding in practice. Hammerness (2006) clarifies that developing "a coherent, integrated program will result in more powerful

learning for their students" (p. 1242). The Pilot represents the development of integrated study design for the TE program but is particularly complex because it is an arena where student teachers are introduced to several different scientific traditions while at the same time developing research competence in practice. Haug (2013) refers to how the complexity of TE has increased. This complexity requires that the link between different knowledge domains must always be in focus for working with an integrated study design. Integration in The Pilot implied at least two conditions. First, the student teachers were to complete a comprehensive course of study over five years, and the design thus differed from the traditional 3 + 2 design where the student teachers applied from the bachelor to master level. Furthermore, the four main components of *subjects*, *subject didactics*, *pedagogy*, and *practice* should interact throughout the course of study. An important ambition was to achieve a clear professional competence for the student teachers through a balance between the four main components.

The development of the pedagogy was based on the idea that it should "play a central role in the practical and theoretical orientations of the qualification process, thus making it possible to develop into an identity-creating hub throughout teacher education without neglecting the requirements for theoretical and subject didactic knowledge" (Klemp et al., 2008, p. 25). This idea about development has its origins in evaluations of previous TE for PLS (NOKUT, 2006b; Rambøll Management, 2007) where it is pointed out that the subject of pedagogy has an unclear role. The Pilot set out to create a model in which subject courses were to integrate didactics into their courses (e.g., science and science education) while at the same time considering the content of the professional courses and practicum and how these too are inter-related and integrated into courses. With many subject teachers coming from pure disciplines, this type of model took time to develop. Over time, local dialogues and external evaluation (UiT, 2016) led to the development of a more uniform and comprehensive way of integrating academic and professional didactic topics in all subjects offered in the TE.

Expected tensions between the pedagogy and the different school subjects were surprisingly few in the early years in The Pilot. Early in the development process of The Pilot, several arenas for integration, collaboration, and boundary crossing between university teachers and student teachers, and between the university and schools, were developed, including learning cafés, dialogue seminars, practice teacher forums, rector forums, academic days for schools, small courses/mutual academic dissemination, and university schools (see Chapter 11). Several of these arenas became permanent, while others only existed for a brief time. All such innovations became important for closer collaboration between student teachers, schoolteachers, and university teachers. This shared work can form a basis for further partnerships and community building.

Since the start of The Pilot, there have been few changes in the basic structures and principles of the education program. At the same time, it has been

demanding to work with the progression and design in The Pilot (Vestøl et al., 2015). The development of a true collaboration between the university and school and the development of integration of didactics into subject teaching has been in focus. A continuous evaluation, adjustment, and change of topics and assessment for strengthening integration has been required. Despite these challenges, The Pilot contributed to the new reform for TE for PLS in 2017, not least to the work of R&D-based education (see Chapter 6), supervision, and assessment of the master's theses (see Chapter 7) and the efforts that were put in place to develop partnerships through the university-school project (see Chapter 11).

Professional and research-based competence

The Pilot aimed at giving student teachers a solid professional competence (pedagogy) and a deep theoretical basis (including academic subjects) to the TE program and its student teachers. Thus, the Pilot offered 3–4 subjects with depth (against the previous 8–10 subjects), providing subject progression with a clear subject profile. The teacher educators in The Pilot were organized in social sciences, science, practical subjects, language subjects, and in addition, pedagogical subjects.

TE should contribute to upcoming teachers with backgrounds in different subjects and topics that will contribute to a diversity of teachers in the school. There should be no tension between the "knowledge teacher" and the "caring teacher." A reasonable balance between the requirement for broad competence and professional depth is considered in the models proposed in the report. The external committee of UiT The Arctic University of Norway (2016) argued for a five-year TE that would give a set of broader competencies and thereby contribute to both differentiations, interpreted as academic depth and integration of the subjects. Professionalization and higher competence appeared to be less present in The Pilot's early years and were thus more difficult to operationalize in the realization of the study programs. Over the years, through ongoing dialogues and analyses, in a progression, The Pilot developed a more complete academic environment and a foundation for the teacher profession. The TE profile covered both differentiation between subjects and integration of various subjects and educational subjects in the TE programs.

Research-based TE and improved practice quality

Inspired by Finland, a research-oriented approach to teaching has been grounded in the idea of the teacher as a "professional." Research-based TE is about educating autonomous, professional teachers with an inquiry stance to their own professional practice (Toom et al., 2010; Westbury et al., 2005). The argument that professional practice will be better off if future teachers learn to apply research-based knowledge and to apply new knowledge appears

in several publications (Brekke & Tiller, 2013; Caspersen & Smeby, 2023; Dahl et al., 2016; Menter & Flores, 2021; Munthe & Rogne, 2015; Toom et al., 2010). In parallel, the importance of a TE that is practice-oriented *and* profession-oriented is highlighted. Integrated study designs should unite these needs into integrated and coherent educational programs.

At The Pilot, *research base* indicated higher competence and guiding principles for the development of the PLS. Through this focus, TE should not only contribute to high academic standards but also attend to each student teacher's learning and professional development. Different R&D components functioned as integrating elements through the five-year program, demonstrated through the UiT Stairway model. During the first year, the student teachers were introduced to empirical inquiry as a method in education, at the same time put into use both in courses at campus and as guidelines for observation during the first practice placement. The R&D components progressively evolved in complexity toward the fifth year integrated across teaching, student work, and practice placements. The R&D thesis in The Pilot's third year and the master's theses functioned as key elements for strengthening the R&D knowledge and the student teachers' abilities to collect data and analyze data from their school practice. Through their own work with the thesis, the student teachers were able to lay the foundation for an inquiry-based perspective on their own work. Over time and through collective work, the university teacher's ability to mentor their student teachers' R&D work became a central element in The Pilot and gave positive results.

Through the study Relevant Master Education for teachers (Jakhelln et al., 2019), where we followed the first three cohorts who completed The Pilot (see also Chapter 7), we know something about how the newly educated teachers experienced their early work in school. Teachers who wrote didactic and practice-oriented master's theses expressed that this knowledge helped them to vary and adapt their teaching to different students, especially when teaching their master's subject. Those who wrote master's theses without direct relevance to the work in school experienced limited value of the task itself for their profession. Some graduates also became professional resource persons for experienced teachers at school – especially in mathematics, Norwegian, and English. The new teachers experienced mastery and motivation and were able to use different didactic approaches when teaching subjects with academic specialization.

Reflections and conclusions

As Norway moved from a four-year to five-year TE for PLS in 2017, the greatest changes have been related to creating research-based programs on university campuses, yet also connected more to the practice field of schools. In this chapter, we have shown how we built up the R&D progression through the five-year program in The Pilot and how research projects for student teachers and teacher educators became more related to the challenges faced in schools,

demonstrated by the UiT Stairway. The design and the continuous development of the program over time was dependent on collaboration, dialogues, and a continual focus on new ideas and innovations. At the start, the development of The Pilot was inspired by the Finish TE (Hansén et al., 2014) but over time also through ProTed, UiO's research traditions and contact with research literature (Hammerness et al., 2005; Hammerness, 2006; Zeichner, 2014) and universities as Stanford and Oxford.

Røvik (2014) emphasizes that the path from the intended study design, formulated in a vision and study plan, to implementation in the form of realized learning outcomes, is not linear. The development of The Pilot shows that a well-planned study design based on knowledge of TE from research and experience is central, but continuous transformational work is crucial to further development of an educational program. An ideal of professionalism as an *identity-creating hub* (Edwards, 2010) is not sufficient. Targeted study management, continuous evaluation processes, ongoing development measures, and evaluation involving all actors in the study programs in various compilations, close dialogues with university schools and partner schools, and, not least, student teachers, are needed to strengthen the connection between pedagogy, practice, and the other subjects in TE. The strengthened integration of the pedagogy components, and not least the practical training components, helps to highlight what coherence in education entails. At UiT, strengthening the pedagogy components in the subjects and developing projects across subjects, practice, and pedagogy has provided experience of what might make good integrative elements in the study programs.

From its inception in 2010 to its end in 2017, all subjects in The Pilot were under continuous development related to content, teaching, coursework requirements, and exams, and not at least in relation to integration with other subjects and with practice. The two master's programs were an innovation in the national context, with specialization in key school subjects, a strong emphasis on R&D, and strengthening of practical training. Practice should have a clear progression as an integrative element and where collaboration with university schools (see Chapter 11) contributes to linking practice, teaching, and R&D work in TE in a way that ensures integration.

After the completion of The Pilot, Norway adopted a national reform for TE for PLS (Norwegian Ministry of Education and Research, 2017). The road from The Pilot to the present represents a change from local development thinking to national governance. Experiences from The Pilot have provided recommendations for national reforms of TE programs. The R&D competence and the development of the master's thesis became the most important innovation. The results of the efforts for change and development depend on how the school community accepts the research-based approach and whether the new teachers' competence is considered valuable in the workplace in schools. The experience from The Pilot gives some pointers for further development far beyond the local innovations. The design allows for a systematic, exploratory approach to the practice of others and the student

teachers' own practice, for the integration and application of knowledge from scientific subjects, pedagogy, subject didactics, and practice, for dialogues and inclusive participation between the different actors and for constructive development and change, and for the student teachers' basis for developing innovative practices (Lund et al., 2015). The quality of practice training must be strengthened. There is a need to focus on the university teachers' qualifications to follow up the student teachers' practice and development partnerships with the school as well as to follow up with the practice teachers. Preserving the master's year for ensuring the relevance and breadth of tasks is important. When it comes to developing TE, all voices are important. There are still inspirations to be drawn from The Pilot in the development of TE.

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Part II

Research literacy in teacher education

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6 Using research and development to establish coherence in teacher education

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Introduction

A significant challenge in teacher education is the lack of coherence between different elements of teacher education (TE) (Munthe & Rogne, 2015). A well-known dilemma is how to integrate theoretically based knowledge, traditionally taught at the university, with experience-based knowledge traditionally found in classroom practice (Darling-Hammond, 2006, 2016). According to Hennissen et al. (2017), since the 1980s, TE has tried to develop alternative ways to bridge the gap. Inductive approaches, where practical experience is the starting point for the learning process of student teachers, in contrast to traditionally deductive approaches, where theory comes first, have now been emphasized. This is known as the "practice turn" in TE; and over the past few decades, it has created new demands for professional development in TE (Mattsson et al., 2011; Zeichner, 2008, 2010; Smith, 2003). One of these new demands is connecting research knowledge with teaching practice (Darling-Hammond, 2017; Mills et al., 2021), with previous literature arguing for the benefit of student teachers learning about research (Heikkilä et al., 2020; Smith, 2015).

An influential report from the British Education Research Association (BERA) (Furlong et al., 2014) argues that TE needs to fully integrate research and practice and include an inquiry-based orientation for the student teachers to educate research-literate teachers. To be research literate is to "get" research – to understand why it is important and what might be learned from it, and to maintain a sense of critical appreciation and healthy skepticism throughout (Furlong et al., 2014). This means that a research-literate teacher has knowledge about research methods and knowledge derived from research and can use this to develop one's own teaching practice and to participate in developing schools. BERA also states that there is a need to move from data-rich to research-rich schools where teachers move from describing data and trends to interrogating data and evidence from multiple sources and have the capability to use this to enhance their classroom practice and increase their impact. Thus, developing research-literate teachers is the foundation for research-rich schools.

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Both research-literate teachers and research-rich schools are emphasized in Norway as "The main objectives of the latest Norwegian teacher education reform to improve the quality of both teacher education and schooling" (Trippestad et al., 2017, p. 140). Central in the new five-year TE programs (see Chapter 3) is the development of the student teachers' knowledge of scientific theories and methods, to prepare the teachers for analyses of their daily work and for changes in the teaching and continuous professional development (Ministry of Education and Research, 2016a, 2016b). In Norway, the new TE programs use both the concepts of research and development inspired by the OECD (2015). The purpose of connecting research-based knowledge with TE is, according to The Norwegian Association of Higher Education Institutions, UHR (2015), a way to organize the education programs to ensure that it is up to date. According to UHR, the aim of the TE programs is for the student teacher to develop an understanding of research-based knowledge through different research approaches, and in that way, to obtain a better basis for continuing to update their professional knowledge as teachers in school (The Norwegian Association of Higher Education Institutions, UHR, 2015). Writing a master thesis involves learning scientific criteria for publishing results in a wider context. However, there is a risk that the reforms will highlight research knowledge through the program and to a lesser degree give new teachers the practical and developmental skills they need to work as teachers.

The new reform meant that all TE programs needed to rebuild and make program structures and courses according to the new national TE curriculum. At UiT The Arctic University of Norway (UiT), the TE program builds on the experiences of seven years of piloting five-year integrated TE programs (The Pilot, see Chapter 5). At UiT, Antonsen et al. (2022) investigated the three first cohorts from The Pilot and found that the student teachers claimed that doing action learning in the third year contributed to developing a critical attitude as part of their teacher's habitus; they understood teachers' work as a continuous search for improvement of everyday practice related to their teaching, collaboration, and local curriculum work. However, earlier external evaluations addressed the need for a clearer focus on research methods also during the first two years of the program, and a clear progression for building research and development (R&D) competency, relevant to the teaching profession. This resulted in the establishment of dedicated courses also in years one and two, and the establishment of a group to develop these courses with a focus on integration (of subjects, pedagogy, practicum) and progression. The chapter aims to explore this innovation in the form of a new approach for integrating R&D into TE.

Coherence and agency in teacher education

Lack of coherence in teacher education is heavily debated in international research (Heggen & Terum, 2013; Grossman et al., 2008; Hammerness, 2006). Grossman et al. (2008) emphasize that coherence refers to the degree

to which central ideas regarding teaching and learning are shared by all the individuals involved in educating teachers, and to which learning opportunities are organized, both conceptually and logistically, with respect to those goals. Coherent programs are characterized by the alignment of core ideas and learning opportunities, including coursework and clinical experiences (Darling-Hammond, 2006; Grossman et al., 2009). Hammerness (2012) suggests three key features that characterize powerful TE: a clear vision, coherence, and a strong core curriculum deeply tied to teaching practice. Based on several approaches, coherence is a vital ideal for curriculum design.

Hammerness (2006) separates structural and conceptual coherence. Structural coherence focuses on the structure of the program and how the different parts of the program (courses, assignments, practicum) are structurally connected and build sequentially on one another. In this way, structural coherence facilitates learning across the elements and gradual progression but does not ensure that it happens. Conceptual coherence refers to the connections between key program ideas (Hammerness, 2006). This is about to which extent the same ideas, concepts, themes, and types of assignments are used in different parts of the program, or how elements go into each other or cooperate. This is the content of integration and depends on structural integration to happen. Further, Canrinus et al. (2017) argue that university courses and practicum should be coherent, for example, by student teachers trying out content learned at campus courses, or student teachers taking experiences from practicum back to campus courses. This is about connecting learning across contexts, and we suggest it be called contextual coherence. Also, contextual coherence depends on facilitation by structural coherence. Together, structural, conceptual, and contextual coherence illustrates different aspects of coherence that arguably are vital to achieving coherent programs.

Student teachers need to be able to learn to act upon and change their teaching; such practices are not learned in isolation. Priestley et al. (2015, p. 19) conceptualize teacher agency as something that develops ecologically "through the interplay of personal capacities and the resources, affordances, and constraints of the environment by means of which individuals act." This conceptualizing is used by Cochran-Smith et al. (2022) to argue for student teachers' need to develop their teaching by getting experience from their practice in schools in collaboration with other teacher students and experienced teachers. The student teacher's ability to develop agency also includes knowledge about school cultures and structures, ways to collaborate, and ways to analyze and take their own actions related to new reforms (Cochran-Smith et al., 2022).

The Innovation: Presentation and description of the UiT R&D Stairway

Based on the literature review, we will now describe our innovation, the UiT R&D Stairway model. First, we describe the three core ideas underpinning the

model and next describe establishing a shared vision. We then present the R&D courses in detail for each year, with a focus on theme, method, what we request the student teachers to do, evaluation, and assessment.

The core ideas of the UiT R&D Stairway

The UiT R&D Stairway model is built upon three core ideas where TE should contribute to the student teachers' learning: *academic literacy*, *research literacy*, and *teacher proficiency*. Through a designed progression, the student teachers develop their competence within the three core ideas and broaden their perspective through the five years of the program. The intention is also to increase the demands for student teachers to develop their agency and as such prepare them to take the responsibility expected of professional teachers.

The first core idea, the progress to academic literacy, is about developing practical skills and strategies for critical reading and writing. Each year the program provides dedicated workshops both for reading and discussion of academic texts and for student teachers to write and give peer feedback on their texts. The progression in reading goes from reading textbooks chosen by the course leader to reading complete academic articles where the student teachers themselves critically choose the literature. Similarly, the progression of writing starts with writing relatively short texts with a large amount of scaffolding from the teacher educator in the writing process and culminates in the master thesis, with guidance to write in accordance with clear academic standards built upon research literature.

The second core idea is the development of research literacy through the gradual introduction to a variety of research methods. The development starts with conducting a limited investigation in the classroom, designed by the course leader, using observation and interview, and with guidance through the analysis process. Through the years, student teachers gradually acquire more responsibility in deciding the research design, such as formulating their own research questions and developing their own research tools, and the time frame and complexity of the investigation are expanded. For their master thesis in the fifth year, the student teachers independently choose research design, but the master thesis must relate to the teaching profession aiming to develop research-literate teachers.

The third core idea is to develop teacher proficiency, which is about developing the student teachers' competence about the role of the teacher and broadening their perspective on teaching and learning. In the first year, the program focus is on the teacher and the work of teaching; in the second year, the focus is on the pupil; and in the third year, the perspective is broadened to a focus on the classroom and on exploring and developing teaching in their own practice. In the fourth year, the focus is on the school as a part of society, locally and internationally. When writing the master thesis, the student teachers choose the perspective of their study themselves.

The design of the model and the progression of the three core ideas, academic literacy, research literacy, and teacher proficiency, is an attempt to develop the student teachers' agency through the five years of the program. From being instructed and closely guided, the student teachers move toward being research-literate teachers who can take informed and critical choices and systematically develop their classroom and school.

Establishing a shared vision

To achieve a coherent ITE, central ideas regarding teaching and learning must be shared by all the individuals involved in the program (Grossman et al. 2008). That includes the student teachers, the teacher educators, and the practicum teachers (mentors). We have used three approaches to create such a shared vision for our program. First, we have developed joint R&D courses where the teacher educators from all the different subjects must cooperate in connection to practicum. As a result, teacher educators from different subjects learn about and from each other. Second, the R&D courses are organized with lectures for all student teachers and with seminars within each subject. This enables us to select the experts to present methods and theories relevant to all student teachers and allocate time for seminar work that is specific and relevant to each subject. To make this work, all teacher educators teaching the course meet at the lectures to learn from each other, align with each other, and further develop a shared vision for our TE. Third, we arrange dialogue seminars where student teachers, teacher educators, and practicum teachers meet. These seminars are created to connect the theory and research focus from campus to practice, and the student teachers, in cooperation with their teachers from both campus and school, plan and evaluate R&D tasks that they implement in their practicum. One example is when the student teachers in the third-year course present their findings from action learning (see, e.g., Bakken & Sollid, 2014).

Coherence between R&D, theoretical knowledge, and practicum in school

In this section, we present in detail how R&D has been used to align coursework with theoretically based knowledge and experienced-based knowledge. The UiT R&D Stairway model (Figure 6.1) details how student teachers, each year, typically have one course in R&D, one course in general pedagogy, and two or three courses in different subjects, that includes subject-specific didactics. Each year corresponds to one step in the stairway.

Figure 6.1 illustrates that in the first year, the focus of the R&D, pedagogy course, and practicum is on teacher proficiency in the form of the teacher's tasks, role as a leader, and on developing an ability to facilitate learning. During the R&D course, student teachers learn about and prepare for observation and interviews. During practicum, they observe their practicum teacher teaching one lesson. Based on the data collected and a study of academic literature, the

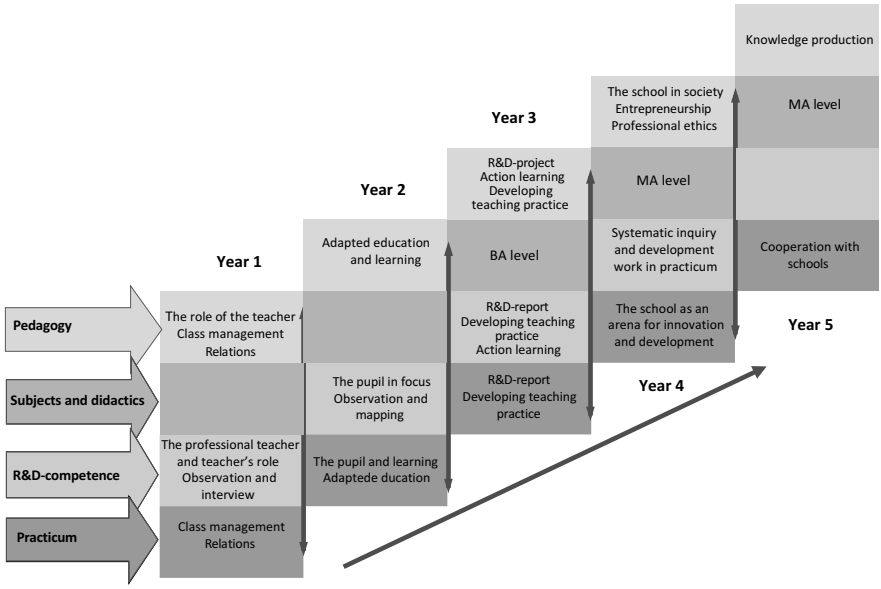

Figure 6.1 The UiT R&D Stairway – progression and coherence in learning content.

student teachers write a text that is a portrait of the teacher's work including theory from the pedagogy course. The learning objectives are to develop basic competence in systematic data collection, to learn to distinguish between description and interpretation, and to learn basic academic argumentation.

In the second year, the focus on the R&D, pedagogy course, and practicum are on student teachers learning and development, both individually and collectively. During the R&D course, the student teachers learn to observe pupils and to systematically collect data from their work (such as written texts, tests, and artworks). The learning objectives are to learn how to use a systematic collection of data to plan for teaching and adapt to different student needs. To achieve this, each student teacher chooses a focus pupil to study during practicum (separated into two periods of three weeks). During the first practicum period, student teachers observe and collect data to give a broad description of the competence of the focus pupil (cognitive, social, motoric, language, writing, and reading). In the second period, four months later, student teachers investigate the development of the focus pupil's competency, particularly related to subject matter knowledge in one subject. Based on the data collected, the student teachers participate in a writing workshop where they share their own texts and respond to other texts, and then produce an academic text where the findings are connected to and explained by academic literature.

In the third year, there are two R&D courses: a small one early in the first semester laying the foundation for the larger course starting mid-way through the first semester. The first R&D course is about reviewing a limited research field, which is a competency needed for the second course. This course is

aligned with the other subjects and organized with lectures for all about how to do a literature review (how to search, how to write) and a planned process in subject-specific seminars. The first step of this process is that the seminar leader shares 3–5 carefully selected articles, with the student teachers choosing one to read. During the seminars, those who selected the same articles work on finding and presenting connected articles as a base for a review article that each of them must write based on at least four articles.

The second R&D course of the third year focused on a critical evaluation of one's own and other's practice and the development of teacher identity. The R&D course includes qualitative and quantitative methods that are appropriate for exploring one's own practice and using this to conduct a small development project. The learning objectives of this work are to learn to do R&D as part of the teaching profession, not only as part of the initial TE. Also in this year, the practicum is divided into two periods. During the first period, the student teachers observe and explore their practice in the actual classroom to identify themes or challenges to further explore and affect. Between the periods, the student teachers work to define a research question and plan a development project inspired by action learning (Zuber-Skerritt, 2018). This includes identifying which data needs to be collected to answer the research question and planning the actual data collection. During the second practicum period, 3–4 months after the first practicum period, the student teachers conduct the planned action and gather the needed data. After the practicum, they work in groups to write a report of approximately 20 pages (8000 words) that needs to include research literature, a methods section describing the data collection and analysis, and then present and discuss the findings related to research literature.

In the fourth year, there is no dedicated R&D course as the student teachers follow master courses in the subject of their master thesis, focusing on reading research literature as a basis for the work with the master thesis. The fifth year consists of two courses: methods and a master's thesis. The methods course is organized in the same way as the other R&D courses, where all subjects cooperate. Teacher educators present methods in lectures and lead workshops, while student teachers work within their master subject in seminars. The seminars create a process where student teachers in the same subject develop ideas for their master projects, present their ideas, and respond to other student teachers' ideas.

This integrated focus on R&D creates coherence between practicum, pedagogy, and subjects in the program to prepare the student teachers for professional work, and a more research-based and critical approach is an important part of strengthening coherence.

Student evaluation

The new curriculum with R&D courses started in 2017, and we have evaluations from the end of the third year for the first two cohorts. These are surveys

with both Likert-scale and open-box questions, with anonymous respondents. The surveys are limited in scope and number of respondents (98 of 197 answered), but still illustrative of a promising development. Figure 6.2 shows the results of the student teachers' answers on four items in the survey completed after finishing the third year with R&D subjects in 2020 and 2021.

Figure 6.2 illustrates that results regarding the first item confirm that the R&D courses have enabled most student teachers with a greater understanding of how the different parts of the program are linked together, which indicates that the R&D courses develop conceptual coherence. In addition, the results indicate that the R&D courses have enabled most student teachers with better insight into how to develop teaching practices in a systematic way, which is about developing student teachers' ability to use their knowledge in future work, or contextual coherence (third item). Furthermore, the results indicate that most student teachers have learned research methods (second item) and have gained the ability to connect the use of methods to practice (fourth item), which indicates contextual coherence.

The student teachers also evaluated the R&D courses in an open text box. We identified three areas the student teachers commented on: gradual development, view on the teaching profession, and tensions. The first area, gradual development of R&D competence, is addressed by statements like "I am very glad that we have R&D all years [throughout the program] so that we can gradually develop the knowledge we need." Also, the gradual development from smaller to larger projects is mentioned. At the same time, some student teachers state that they do not see the need for these courses at the start, but rather should come gradually or during work with the third-year courses. An integral part of this gradual development is the writing process (writing weeks) where the student teachers organize findings, present ideas, and give and receive responses. The second area, the view on the teaching profession, is addressed by stating that they now have tools to try out new methods and collect data to reflect on these. One student stated that "By using different research methods, I have developed a new view on how to explore and develop my, and others', teaching practice." The third area, tensions, relates to several challenges that the student teachers emphasized in their feedback. One such tension is between research and development, where student teachers mentioned that while learning about research is useful, they will not be researchers as teachers but instead work with development in their classroom and in their school. A second tension is related to the use of time, where the student teachers are given R&D tasks during their practicum while their practicum teachers expect them to use more time on teaching (classroom management, preparing and conducting lessons, observing each other's teaching). This tension between the priority from campus and the priority of the practicum teachers might also indicate the changing teacher role. A third tension is related to challenges with organizing courses that involve several subjects, pedagogy, and practicum. Different teacher educators might give different messages, and different subjects might have different needs, and this sometimes creates a

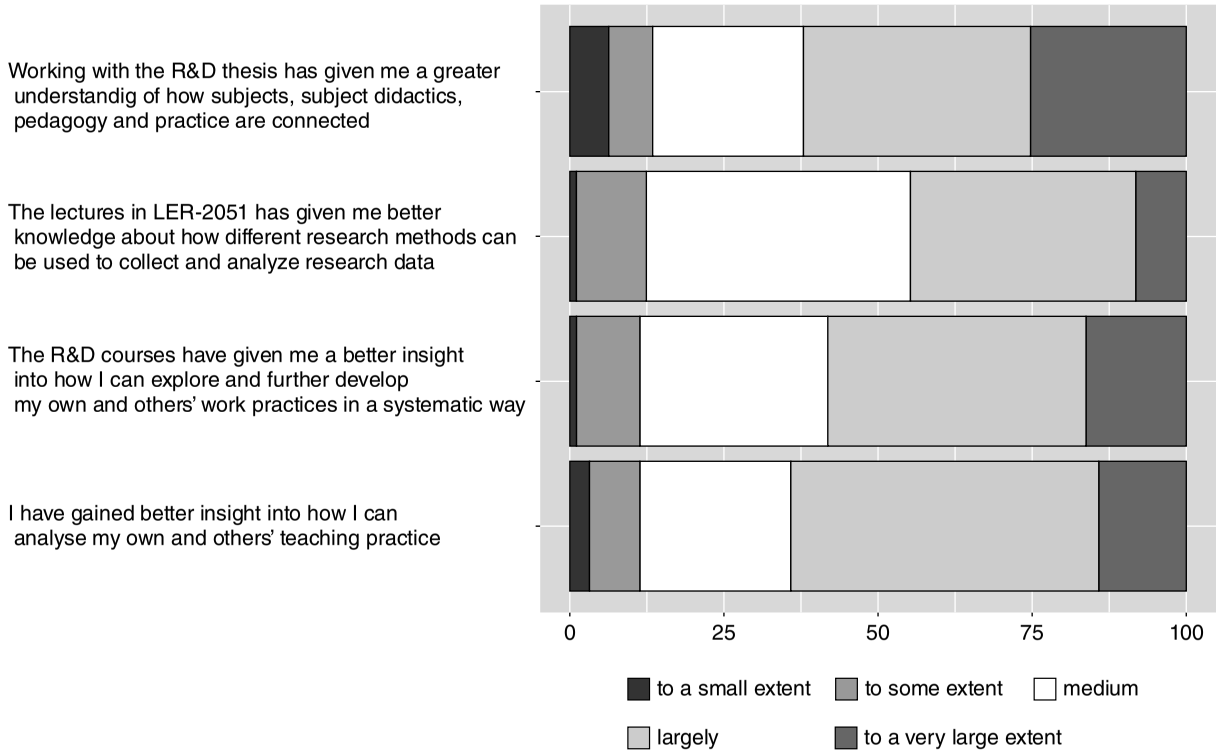

Figure 6.2 Results from a survey among student teachers after finishing the third year with R&D subjects in 2020 and 2021 (LER-2051 is the second R&D course in the third year).

confusing environment for student teachers. This is particularly pointed out related to the R&D courses in the first two years.

Overall, the evaluation shows that the R&D courses in the first three years develop conceptual coherence by linking different parts of the program together (item 1), contributing to developing a new view of the teaching profession where research literacy is a vital part of the work of teaching (item 2, item 4), and having a clear progression (item 3).

Discussion and concluding remarks

We have explored the UiT R&D Stairway to understand how it contributes to coherence between education and professional practice for student teachers. The UiT R&D Stairway builds on the ideas that undergraduate student teachers in their first three years of education need to know research methods promoting practice orientation to prepare them for their professional work, as claimed by Smith (2015). The intention with the three first years is also that the student teachers should be prepared for their work with the master thesis. At the master level, the student teachers need to learn research methods and methodologies that also involve reading research literature, in line with previous research (Eklund et al., 2019; Furlong et al., 2014; Munthe & Rogne, 2015). As such, the objective of education is that student teachers' inquiry-based knowledge is developed in combination with theoretical knowledge about teaching as well as practice-oriented research (Smith, 2015). We also claim that the UiT R&D Stairway could contribute to the student teacher's development of a positive attitude toward carrying out development work and using research in their work as teachers, as claimed by Toom et al. (2010).

The detailed description of the UiT R&D Stairway shows a consistent focus on different aspects of coherence. Structural coherence or alignment (Hammerness, 2006) is evident as coursework and practicum are closely placed in the calendar, and each year builds on the prior to developing an autonomous R&D competence step by step. Also, courses such as subject matter and pedagogy are linked together and linked to practicum by the R&D courses to create conceptual coherence. This means that concepts and ideas learned in courses, such as in methods, pedagogy, and subject matter, are coordinated between courses and used to understand classrooms and analyze data collected during practicum. Finally, including practicum in R&D also creates contextual coherence between what student teachers learn on campus and in practicum.

Together, the three core ideas, academic literacy, research literacy, and teacher proficiency, contribute to conceptual coherence and to developing a shared vision. In addition, the collective work on developing, teaching, and learning from each other across subjects is key to our development of a shared vision. Here, teacher educators from different backgrounds had to cooperate related to subjects, pedagogy, and practicum to improve each other's competence and understanding. In our case, creating dedicated R&D courses,

connected to practicum, and based on cooperation and core ideas, has contributed strongly to moving us forward toward a shared vision, coherence, and a strong core curriculum, which, according to Hammerness (2012), characterizes powerful TE programs.

According to the shared vision, undoubtedly the integration of R&D into theory and practice in the program has made us, as scholars, rethink our practicum as teacher educators. However, it would be a stretch to say that all scholars would be on the same page, and neither should we. Discussions about innovations and approaches to continue working for improving TE programs as well as supporting ongoing processes that have given good results would be what should lead when it comes to this matter. The tensions notified by the student teachers indicate that there are challenges we need to bring forward in the further development of the program. It is important that the research methods brought forward help student teachers to become professional teachers and that the education programs do not end up training student teachers for being researchers. There is always a continual challenge of involving the practicum teachers in this process and this work must be ongoing, also because most practicum teachers do not have a master's degree themselves. Here our model has limitations, especially as the student teachers would benefit from developing agency in collaboration with practicum and their practicum teachers (Cochran-Smith et al., 2022).

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7 Relevance of the master's thesis for becoming a professional teacher

Kari-Anne Sæther, Yngve Antonsen and Ove Gunnar Drageset

Introduction

In 2010, UiT The Arctic University of Norway (UiT) piloted two five-year master programs for teacher education (TE) (see Chapter 5) for teaching in primary school and upper primary and lower secondary school, and for the first time in Norway, student teachers completed a master thesis to graduate. Based on the experience with this pilot, all Norwegian TE was extended to a five-year master's degree in 2017, with a master thesis as a mandatory part of this degree (Jakhelln et al., 2019). The three motives for reforming the Norwegian TE into a more research-oriented approach were: 1) to enhance a more research-based approach in the teacher profession and thereby increase capacity for continuous professional development; 2) to stimulate the teachers to a developmental based and inquiry approach to their own teaching; and 3) to ensure that teachers develop updated research-based knowledge in their teaching subjects and research-based knowledge about how to teach these subjects (St.meld. nr. 11, 2008–2009). In this chapter, we analyze the focus of the submitted master theses and the contribution of the work with the master when having started working as teachers.

The reform of the Norwegian TE is inspired by Finland (Jakhelln et al., 2019), which for decades has had a research-based TE that includes writing a master thesis and which has been promoted as a future new model for TE (Darling-Hammond, 2017; Toom et al., 2010). The purpose of doing research in TE is to develop teachers with an inquiry-oriented attitude and with the capacity to observe, analyze and develop their teaching (Toom et al., 2010). The student teachers' research in a research-based TE is intended to support learning to analyze and improve teaching and learning or their practice in school. This is in line with the master program's strong emphasis on cultivating pedagogical thinking and a reflective approach toward teaching and systematically linking theoretical and practical aspects of teaching (Toom et al., 2010). In addition, student teachers' research knowledge and skills acquired during TE are important to be able to investigate and produce knowledge about their own practice (Smith, 2015). Therefore, Smith advocates that student teachers

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do practice-oriented research that is relevant to the practice field. The argument is that doing research contributes to making better judgments or brings new knowledge to solve practical problems. These arguments are in line with recent research in teaching and TE and the emphasis on teachers as being research literate (Eriksen & Brevik, 2022; Menter & Flores 2021; Munthe & Rogne, 2015). In the BERA-RSA report (Furlong et al., 2014), being research literate is understood as knowing research methods, having a critical mindset, being updated on research findings, and understanding its implications for practice. These capabilities are intended to be developed throughout the five-year master programs, with work on the master thesis as one of the main elements. While research literacy can be seen as a basis, the question is how this research capability is meant to be used by the newly qualified teachers in their practice. The BERA-RSA report also suggests distinguishing between teachers who conduct research to publish articles and develop the academic field and teachers who conduct research to develop their practice. While research literacy is the basis for both, the distinction between traditional academic and more practice-oriented research is related to the capability needed to use the research literacy basis for different purposes. How TE is supposed to link research approaches and practice in master thesis makes an important grounding for the development of research-literate teachers.

Previous research on the contribution from the work with the master thesis for newly qualified teachers in research-based TE has been limited (Aspfors & Eklund, 2017). A Finnish study of the new teacher's experiences with the master thesis found that a group of teachers could utilize the subject knowledge from the work into their teaching, while others could not utilize their subject-specific themes (Eklund et al., 2019). Jakhelln et al. (2016) found that before entering the school, the first graduated student teachers with a master's degree from UiT expressed that the work had given them in-depth knowledge about a topic that they perceived as relevant to their work and it strengthened their professional confidence. Previous research put forward that the master theses in the TE master's program required continued attention from teachers, school leaders and researchers (Eklund et al., 2019; Jakhelln et al., 2019).

In this chapter, we present two studies that investigate the first cohorts of student teachers who wrote a master thesis and graduated in the UiT pilot. We analyze the focus of the submitted master theses and the contribution of the work with the master thesis for the same cohorts having started working as teachers. First, in study 1, *Master thesis*, we investigate the methods, themes and research approaches used in the master theses. Then we present findings from study 2, *Relevant Master Education for Teachers (RELEMAST)*, exploring how the teachers view the contribution of their work with the master thesis for their professional work. Finally, we discuss how the findings are connected. We discuss the learning potential of writing the master thesis and suggest a new action research model for writing the master thesis to make it more relevant for professional work.

Study 1 Master thesis – methods, themes and approaches

We investigated themes and approaches from all the master theses from the first five years (2015–2019, N=236). First, we registered methods used for data collection including standard categories such as interview, observation, text analysis, action research and survey. Second, a thematic analysis was conducted to describe different approaches to research (Cohen et al., 2011). The analysis revealed a need to separate general approaches from thematic focus. The result is a framework which can be used to describe and compare choice of research approaches, thematic focus and thematic approaches, shedding light on the relevance of the master thesis for the teaching profession.

Variation in methods

A wide range of methods were used for collecting data. Half of the theses used only one method for data collection, whereas half used two (36%) or three (14%) methods. The method which is clearly dominant is interview (82%). Half of those using interviews combined data collection with other methods. Also, there was variation in how interviews were conducted. While the most frequent type was to interview a single person, group interviews and task-based interviews were also used. The informants in interviews were mainly teachers (76%) and students (32%), and some used multiple informants. Observation was the second most dominant method for data collection (31%), almost always used together with at least one additional method. The informants were mainly teachers (66%) and students (64%), with many observing both teachers and students. Other methods for data collection included text analysis (19%), action research (14%), survey (10%) and data from national surveys (2%). This analysis of method for data collection reveals that interview dominates with teachers as the main informants. However, there is variation within the interview category and how interviews are combined with other methods.

Variation in thematic focus

We developed seven categories describing types of themes. The first, *subject-specific*, described themes focusing on single school subject issues like "What characterizes the generalization process for lower secondary students work with figure patterns in mathematics". The second, *subject-general*, described themes focusing on issues which are relevant to different subjects, such as assessment and equity issues. These are typically investigated in the context of one school subject but are also relevant to other subjects. The third, *basic skills*, is seen as a subject-general theme but with a special position in the Norwegian curriculum. One example of this category is "How is the concept of oral skills described in research, and how do teachers understand it?". The fourth, *alternative teaching*, describes themes focusing on teaching beyond

traditional and teacher-dominated practice such as digital, drama-based, play-based, aesthetic, dialogic or explorative teaching. The fifth, *context of teaching*, describes themes such as teacher competency, curriculum, school-home cooperation and class sizes. The sixth, *learning environment*, describes themes such as motivation, social relations, behavioral challenges and classroom management. The seventh, *linguistic and cultural diversity*, describes themes focused on diversity such as "How do teachers in Norwegian use multi-language students as a resource in their teaching?". Together, these seven categories describe variety and manifold in thematic focus in the master theses, illustrating the complexity of the teaching profession.

Variation in approaches

Further, we developed five categories describing distinct types of approaches found in the master theses. The first type is to *study practice as it* is, a category containing approaches focused on describing issues such as how teachers do something, what students know and do, how students think, what schools do and how schools are part of society. This approach is distinct with its focus on describing first, then involving literature and analysis later. The second type is *teacher insight*, describing approaches focused on describing the teachers, focusing on either beliefs and opinion, reflection and understanding, competency and experience, or justification and choices. The third type is *theory and synthesis with practice*, describing approaches that start with theory or theoretical concepts, and use this to explore or understand practice. The fourth type is to *decompose*, which means to study a complex phenomenon by separating it into smaller parts. Examples of this are to look for challenges and opportunities with a particular practice, to characterize the different parts of a phenomenon, or to investigate what, how and in which ways. The fifth type includes approaches focusing on trying something new and evaluating it, describing how something can be done or how to contribute to better learning. This also includes approaches focusing on discussing new ways of practice rather than trying them out. We choose to call this the *action research approach* because of the obvious similarities with action research processes, although most examples do not include repeated action research cycles or an action research spiral (Kemmis & McTaggart 2000). Together, these five approaches describe a wide variety of approaches in the master theses.

Study 2 Relevant Master Education for Teachers (RELEMAST)

The RELEMAST study followed the first three cohorts graduating from the piloted five-year TE programs between 2015 and 2017 (see Chapter 5). The study consists of 42 qualitative interviews with teachers after one and two years in service as teachers in schools. In addition, we interviewed nine teachers from the 2017 cohort after five years in service. The study was based on purposive sampling of informants who have strategic qualifications to provide

accurate data regarding the research question (Maxwell, 2013). The selection was carried out through self-selection after a written invitation containing a thorough description of the study, with informants providing written consent to participate. We developed an open-ended semi-structured interview guide (Kvale, 2008) asking about the contribution of the master thesis to their work as teachers. We also questioned teachers about the interest for their master thesis from their leaders and colleagues. During the interviews, the informants were given opportunities to talk freely about problems and solutions. The interviews lasted around 60 minutes and were audio recorded and transcribed verbatim. A thematic analysis was conducted using NVivo. Two categories were first identified to describe how the teachers found the thesis work relevant for their own professional work in school: 1) relevant; 2) less relevant. To capture different aspects of relevance, we then recorded these categories and found six themes that we commented on in the result section. These are: inquiry orientation, subject-specific thesis, basic themes, alternative teaching, school development and less relevant.

Inquiry orientation

The teachers themselves act and find support for new actions in what they have learned from their education. Here some teachers expressed that they must remind themselves to do more of the teaching they learned during the master process. Some teachers even used their thesis as an encyclopedia related to their teaching. The work with the master thesis in general seemed to promote an inquiry-oriented attitude from the teachers, also after five years of practice.

Few of the teachers mentioned the value of the research methods used. However, some exceptions were found as exemplified by Ingrid who, after five years in practice, mentioned the usefulness of action research in helping to evaluate and improve her teaching. These teachers expressed that they developed a new competence that was relevant for improving their own work and for collaboration with their colleagues for school improvement. Some teachers also claimed that writing their master's thesis had led to combining the work of practice with theory, which was transferable to their work as teachers, as expressed by Ada:

> When I wrote my master's thesis, I had to delve into the theory and how to work with it. And I've needed that when I wanted to work on it here at school.
>
> (Ada after one year in practice as a teacher)

Other teachers also highlighted the fact that writing the master thesis provided them with general competence related to reading new theory, academic and argumentative writing, and the use of references as exemplified by Lone teaching in the eighth grade:

> But in terms of method and in terms of sourcing and writing an academic text and stuff, we've used that a lot, we've grilled the students in APA style.
>
> (Lone after five years in practice as a teacher)

Subject-specific thesis

Teachers who had written a subject-specific thesis experienced that their competence could be used directly when teaching in the same subjects. Especially teachers writing about the combination of subject and subject didactics benefited if they were assigned to teach their master subject in their school. Kenneth describes the value gained from writing a master thesis in mathematics and how it influenced him as a teacher:

> It felt like a slightly different level then, that it was lifted, which was interesting and really went in, I was about to say both the depth and breadth of math didactics and … I don't think we've learned as much as we did in that year there, so it was intense, it was educational, and I think it shaped us so much as teachers.
>
> (Kenneth after five years in practice as a teacher)

Here Kenneth explains that he makes use of the work with literature and theory from the thesis and transfers the didactical knowledge into teaching. Kenneth also indirectly describes how writing a master thesis was demanding and a learning experience. Also, subject-specific themes from the master, for example, in Norwegian, have transfer value into similar language subjects and could be utilized in teaching English.

Basic themes thesis

The teachers also describe how different basic themes could become relevant for their professional work. For example, Anne and Chris describe how the work with the master thesis on how to work faster with letter learning was relevant for their general teaching of students. Here, Anne expressed after one year in service that "the work that we did with it has been very useful to me". Five years later, she still agrees it is important for her work, but she expresses the need to update her knowledge.

> Just in concrete terms. It dealt a lot with beginner training and with letter progression in first grade. How many letters you learn and how to learn them … But there I have …received a lot of new input in the years I have worked then… there's a lot of research and stuff you read about… the development of reading and writing in children.
>
> (Anne after five years in practice as a teacher)

Anne describes how she reads popular science publications to continue to be up to date. That is also natural, as teachers in schools often lack access to updated research literature.

Alternative teaching thesis

Several teachers highlight that the masterwork has helped them to plan alternative teaching that empowers their students and promotes their creativity in accordance with recent literature (Sawyer, 2019). For example, Aleksander improved the classroom conversation based on the investigation in his master.

> Yes, I wrote about educational entrepreneurship and it's very much like using more open tasks and inter-disciplinarity and creative tasks, with participation. I feel like I've needed that. I've done that several times.
>
> (Aleksander after one year in practice as a teacher)

In another example from Amy, the work with the master thesis had laid a foundation for using collected data and introduced student-centered creative teaching to increase motivation.

> But now in recent years, I've had a much greater focus on the bit from the master's that I've taken with me then. In other words, this is the case with teaching methods, especially with the subjects that the students themselves say are boring. We often have surveys and use new surveys in the classes where we get a picture of what subject the students like and don't like… And then that master's thesis often comes in and I've relied on it a bit in recent years where we've been thinking more creatively about the teaching.
>
> (Amy after five years in practice as a teacher)

Here the teachers highlight that the work of the master was something that made them conscious of issues they tried to initiate in their teaching, if possible, also several years after writing the thesis.

School development thesis

A few teachers also mentioned how the work with the master thesis based on their own interest provided them with positions in school development based on their specialized knowledge. Lars received a position and contributed to the implementation of tools for ICT for the school and for promoting and implementing the use of games in teaching for students. He claimed: "I would not have had the positions I have today, I think, if I hadn't gone down that path with a master's degree" (Lars after five years in practice as a teacher). As such, the competence from writing the master thesis can be relevant even for

school development if it matches the schools' needs and the teachers are given the possibilities to contribute at the school.

The not-yet-relevant thesis

The teachers that could not use their master thesis directly in their teaching said that this was because they had not yet been teaching in their master subject, they were teaching another level than their master thesis focused on, or that they had written about new technologies that are not available in their new school. In these cases, the management of the school and their distribution of subjects and competency did not align with the competence of the teachers related to the themes and subjects of the master thesis. Other teachers expressed that they have not yet been in the position to use their master work directly in their teaching, but they plan to do so in the future when they have better time or more experience. Another reason was that the teachers had written a thesis that was not subject related or in another way relevant to their teaching, as expressed by Ole hesitantly:

> No, it is very difficult to take that master's thesis against what I have done in work, since the master's thesis was about the teacher education.
>
> (Ole after five years in practice as a teacher)

Others, like Lena, had also written about more specific topics such as inclusive education for gifted students, finding this theme more limited for her current teaching practice. However, she could brief other colleagues about how to handle the challenges within this topic. Further, the teachers expressed that some master theses, such as interview studies about stress or other theoretical themes not directly connected to teaching, were perceived as less transferable to their work as a teacher. Here Julia describes how she, in retrospect, would have taken another choice of subject than studying experienced teachers and their digital skills so it could be more easily transferred to her teaching.

> I would like to do my master's thesis differently… Simplified or done in a different way so that I could use the six months I wrote, use it in my teaching, use it in my work situation.
>
> (Julia after one year in practice as a teacher)

Discussion and concluding remarks

The results from the two studies contribute to an expanded understanding of the focus and contribution of the master thesis for professional work as teachers. The main finding from study 1 shows a dominant use of interview studies in the master theses but with a considerable variety in themes and approaches. Master students researched practice, but mainly as spectators, and not as participants in improving practice. Several of the teachers in study 2 after one and

five years of practice are positive for the contribution of the thesis, especially if they can use the competence in teaching or other tasks related to their positions. Here, the teachers also reveal that a variety of themes such as subject-specific, basic or alternative teaching may be relevant for their professional work in schools from, for example, specific mathematical (subject) knowledge, creative teaching, beginners learning, homework and ICT. Some had the possibility to work further in their school based on their specialization, while for others it took more time to get in a position to use their competence from writing the master. As such the experience of relevance may take longer than anticipated for new teachers and this connects to their tasks in the school. The teachers who have investigated practices that are close to teaching or teachers work benefit from the master thesis and claim relevance, while teachers who have studied phenomena that do not occur in professional work naturally experience less relevance. However, in our results, we found teachers who after a while got a dedicated position in their school based upon the subject of their master work. In general, the writing of the master thesis helps the teachers develop an inquiry orientation for improving their professional work. These teachers have developed research literacy, using their background from the work with the master thesis, and they seem to have a critical mindset, using research in their practice, as described by Furlong et al. (2014).

The results indicate that the work with the master thesis seems even more relevant after five years of work than after the first year. This might be explained by novice teachers having to focus on acquiring the new routines and practices as well as getting to know their pupils and colleagues in a hectic period, also described as the induction period (Ingersoll & Strong, 2011). After five years in the teaching profession, more of the experienced teachers seemed to be teaching in their master subjects or have work tasks better correlating with the themes from their master thesis.

A reason for the benefit of the work with the master thesis may be related to the fact that such a project involves the student teachers taking control and responsibility for their own learning, and also involves learning new research knowledge and being reflexive about their use of literature and methods (Holmes, 2020). Such knowledge may contribute to research knowledge that is beneficial in the new teacher's professional work both related to teaching and in handling of new school development projects. However, even if the teachers in study 2 argue that the work with the master thesis was useful both for teaching and other tasks, few highlight their methodological competence and as such there is room for improvement. As shown in study 1, there is an emphasis on interviews as a method for data collection, and teachers are the main informants in the thesis. Arguably, interview is a method that is useful for a teacher, particularly for getting insight into student thinking, but the informants are mainly teachers, which might hinder insight into the development of practice and as such be a less useful competence. Other methods like observation of teachers and students could provide more relevant knowledge for use as a teacher. Learning tools for systematic

observation of teachers (colleagues) and students seem to be more relevant for the teaching profession, as this can be part of a continual development of one's practice. Further, the variation of approaches also highlights limitations, as most master students conduct research on practice, but mainly as spectators, and not as participants in improving practice (Kemmis, 2012). As such they only to a limited degree become part of the collegium in school during their practice period and data collection. These challenges would demand supervision that guides the writing of the master thesis more related to the usefulness of practice and make it more practice-oriented (Smith, 2015), as investigated in the LAB-TED project (see Chapter 10).

Our results also indicate recommendations for further development of TE. Leaning on study 1 we may find solutions for improving the focus and contribution from the master thesis for the professional work. Especially as many master theses are built upon interview studies and as informants in study 2 highlighted the use of their method knowledge for teaching. The five approaches in the master thesis are all focused on the teacher profession but include a crucial difference. The first four (*study practice as it is, teacher insight, theory, and synthesis with practice, decompose*) all describe approaches of researching practice from the outside, describing and seeking to understand complex phenomena related to the teaching profession. This is a descriptive approach to research that is important, but arguably also insufficient as an inquiry-based teacher would not stop after describing and analyzing but instead would go on to try to develop or change practice, based on the findings. The fifth approach, *the action research approach*, is practice-oriented (Smith, 2015) and closer to the work of improving teaching and more closely related to how school development is done (Smith & Sela, 2007). However, this approach is also a limited approach if it is based on insufficient data or participation (Smith & Sela, 2007) and could lead to random changes. To develop a practice systematically, there is a need for descriptive approaches to create a solid base for action research and professional development of practice and schools (Kemmis, 2012). Consequently, to develop the relevance of the master thesis for the teachers' capability to improve practice, as asked from Toom et al. (2010), we argue that the ideal for a master thesis should be to think of it as a two-step process.

The first step in the two-step process is to use descriptive approaches (one or more of the first four approaches) and then use an action research approach as step number two. This may lead to a more complete and relevant approach for students working with their master thesis. Such an approach is a further development of the positive experiences that the teachers got from doing action learning in their R&D thesis (Antonsen et al., 2022). This may improve the relevance of the master thesis as it can contribute to developing a critical inquiry-oriented attitude among teachers for improving their own teaching and other tasks, as well as their work related to implementing national and local curriculums. In promoting more action research approaches, we need to involve schools and practice teachers as active

participants in developing the work with the master theses in ITE, particularly involving the newly educated research-literate teachers.

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8 Student teachers as co-researchers

Connecting research and education in the Co-research model

Lisbeth M. Brevik

Introduction

'Student teachers as co-researchers' is an innovation that connects education and research by inviting student teachers into ongoing research projects as part of their education. The Co-research model was developed at the University of Oslo (UiO) in response to UiO's Strategy 2030, which emphasizes the importance of creating stronger links between education and research. The Co-research model is targeted at master's (MA) students in the five-year integrated teacher education (TE) program at UiO. The innovation was piloted in 2015–2017 and implemented since 2018. This chapter presents the Co-research model, drawing on the voices and perspectives of co-researchers from cohorts across seven years (2016–2023). Student teachers who have been co-researchers during their TE are highly sought-after in working life, both in school and in academia (Christensen, 2020).

The 'Student teachers as co-researchers' innovation was first presented in a lecture for the Education Prize 2020 at UiO (Brevik, 2020) and later published as a popular article in *Bedre Skole* (Brevik, 2022) and a scientific article in *The Palgrave Handbook of Teacher Education Research* (Eriksen & Brevik, 2022). This chapter presents a longitudinal study on the Co-research model in TE, drawing on the voices and perspectives of co-researchers through analysis of course evaluations, written reflective quotes, seminar and conference presentations, trial lectures, project meetings, interviews, and podcasts.

'Student teachers as co-researchers' versus 'participants as co-researchers'

The distinction between 'student teachers as co-researchers' and 'participants as co-researchers' is important. Whereas the former involves student teachers doing research in ongoing research projects alongside other researchers, providing an outsider perspective (Eriksen & Brevik, 2022; Garmann et al., 2021; Kulbrandstad, 2009), the latter refers to participatory research, where research participants provide an insider perspective, including own experiences (Askheim, 2019; Casamassima et al., 2022; Clark et al., 2022).

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A few Norwegian studies exist where student teachers have been engaged as co-researchers during TE. An early example is Kulbrandstad (2009), who conducted a pilot concerning multilingual attitudes among lower secondary school students. In kindergarten TE, researchers involved student teachers as co-researchers in observation studies to ensure research-based education; one study involved 280 bachelor's students in collecting and analyzing research data (Skaug & Osnes, 2019) and a second study, 'Multiple Languages in Early Childhood Education and Care', involved 300 student teachers on the bachelor's and MA levels across four years in data collection and analysis (Garmann et al., 2021).

While the student teachers were engaged in research, the initiatives varied concerning *how* they connected research and education. Some student teachers gained study points for their research engagement (Kulbrandstad, 2009), some presented research findings in bachelor's and MA seminars (Garmann et al., 2021), and some were provided access to use research data in course papers (Skaug & Osnes, 2019).

'Consumption of research' versus 'engagement with and in research'

Considering *how* to connect research and education, a useful distinction is that of consumption *of* research versus engagement *with* and *in* research. Whereas consumption *of* research mainly involves the reading of research articles as input, engagement *with* research involves 'getting' research by using research articles to understand how it is conducted and how research arguments are constructed, to be able to use the research in own practices (BERA-RSA, 2014).

Conversely, engagement *in* research involves 'doing' research in terms of collecting, processing, or analyzing data alongside other researchers and taking part in the interpretation, presentation, and discussion of findings before publication (Groß Ophoff & Rott, 2017; Gutman & Genser, 2017). In the TE field, this distinction can be attributed to Borg (2010), who stated that 'the term "research engagement" here covers both engagement IN teacher research (i.e., by doing it) as well as engagement WITH research (i.e., by reading and using it)' (p. 391). Based on this distinction, engagement *in* research underlines a more agentive research engagement (Eriksen & Brevik, 2022).

Thus, to create stronger links between research and education, there is a need to provide opportunities not only for student teachers' consumption *of* research or engagement *with* research but also to actively engage *in* research (Eriksen & Brevik, 2022). However, Angouri (2021) argued that, although research-led education involves research activity, it is frequently differentiated from research that is embedded in the curriculum, indicating a disconnect between research and education.

Connecting research and education

Over the past 20 years, the use of research in education has increased in popularity (Angouri, 2021; BERA-RSA, 2014; Munthe, 2019). Despite the emphasis on and significance of research in education, there is relatively little discussion on what exactly is meant by the term. Munthe (2019) argued that paradoxically, there is a lack of research on what research-based TE actually implies. Angouri (2021) addressed the terminological vagueness within the field, which includes the terms 'research-based' and 'research-led'. She stated that despite terminological variation, students' research opportunities range from coming into contact with research through readings, to research methods training and partial engagement in research activity, and designing and carrying out own research projects.

Munthe (2019) suggested that student teachers enrolled in research-based TE should 'take an active part in research through engaging in research discussions, learning necessary skills, and developing and conducting research and inquiry' (p. 5). Building on and extending these perspectives, connecting research and education requires more than the traditional notion of research-based education (Brevik, 2020, 2022; Eriksen & Brevik, 2022).

The Co-research model

The Co-research model suggests that student teachers should be invited as co-researchers in ongoing projects alongside other researchers, that co-research should be embedded in their course curriculum, and that their research engagement is actively used in university seminars (Brevik, 2020, 2022; Eriksen & Brevik, 2022). As co-researchers, student teachers are introduced to the research world and gain experience with how research is conducted before findings are published in scientific articles and find the way into the curriculum. In doing so, the emphasis is changed from the consumption of research, toward student teachers' active engagement with and in research.

In the TE program at UiO, the MA specialization comprises three semesters. During this time, student teachers participate in two MA courses before writing their thesis, and they may be co-researchers in one, two, or three semesters. Some co-researchers participate in data collection, whereas all of them prepare and analyze data alongside researchers in the project team and engineers at the Teaching Learning Video Lab (TLVlab) at UiO:

> **Reflection #1. Collaboration with the TLVlab**
>
> Collaboration regarding data organization, contribution in data collection, and training of co-researchers, can lead to a better understanding of the research process for MA students in a short time and in a practical manner. The collaboration contributes to organizing and structuring data effectively, while also giving MA students the opportunity to contribute to

> the data collection process and receive training in tools that can be used for inductive and deductive analysis and transcription. This approach provides MA students a unique opportunity to learn from both professors and data managers and can help improve their understanding of the research process.
>
> (Bjørn Gulheim, head engineer and data manager, TLVlab)

Model 1: Co-research in university seminars

Co-research integrated into university seminars started in 2018 within the English didactics MA program specialization. It was implemented in the eighth semester and involved the MA course Quality English Teaching, developed by Lisbeth M Brevik and Ulrikke Rindal. Since 2018, student teachers in this course have been invited into the research project *Linking Instruction and Student Experiences* (LISE). The LISE project collected video and survey data longitudinally (2015–2023) through video-recorded classroom observations, student and teacher interviews, and students' surveyed experiences of the teaching.

As part of the MA course, student teachers were invited as co-researchers in the LISE project. After signing a declaration of confidentiality, they were provided access to a portion of the research data that were already collected (i.e., secondary data). The TLVlab ensured access only to data that research participants had explicitly consented to being used by MA students (NESH, 2021):

> **Reflection #2. The benefits of being a secondary researcher**
>
> I wanted to study something that I hoped would be relevant for the job I was going to do as a teacher, and hopefully something that others might learn from as well. However, I soon realized that my goals were too ambitious within the time frame of an MA thesis. I understood that I would not be able to visit nor video-record enough lessons for me to deem my findings valid. Therefore, I was very grateful to be included in the ongoing LISE research project where all the data material was gathered and made available for me to study at the very beginning of my work. It made it possible for me to process a lot more data than would have been possible as a single MA student. The methodology of my master thesis became stronger through participation in a big research project. I was able to discuss with and build on reflections done by more experienced researchers within my field, and make more informed choices in how I decided to conduct my project. Being able to discuss proper cases relevant for my thesis made me more motivated and invested in learning what these new terms and procedures were all about. Using data as a secondary researcher also enabled me to build on analyses done by others. When professors I looked up to deemed my project relevant and worthy of inclusion in a proper research project, I wanted to prove

> them right, and believed more in myself and my own project. All these experiences as a co-researcher, sparked my interest for conducting my own research, which is the main reason why I have now started my PhD journey. When someone believed in me, it was easier for me to believe in myself too.
>
> (Ingrid Evertsen, cohort 2019–20)

The MA course was organized as four-hour seminars seven times during the semester. Each seminar offered the opportunity to connect research and education. Research articles were included in the curriculum to highlight and explain the data, emphasizing classroom observation methodology, video, and survey data. In addition, the TLVlab offered voluntary workshops to provide necessary training in research methods, equipment and programs used for school research as well as the general data protection regulations (GDPR), including the importance of voluntary informed consent and the right to say no to participation and withdraw from research (NESH, 2021).

Student teachers' research engagement involved four mandatory tasks: (a) data preparation, such as transcription of video data or organization of survey data, (b) presentation of research analysis and findings in a seminar, in light of curriculum literature, and (c) providing feedback to a peer in light of curriculum literature. When co-researchers presented their analyses, it was new information to their peers. Thus, co-researchers became experts on 'their' data and learnt how to give presentations that were understandable to student teachers who were not familiar with the data. For the final exam, they revised their presentations based on peer and teacher feedback, and (d) gave a trial lecture resembling a conference paper presentation. The conference was open to researchers, lecturers, and student teachers in the cohort below (Figure 8.1).

In sum, student teacher's research engagement in the MA course ranged from engagement with research through reading research articles as curriculum literature and using them in their data analysis and for providing feedback to peers during seminars. Their engagement *in* research concerned learning the necessary skills in research methods training workshops and data analysis. Student teachers actively engaged in research discussions in the seminars, developing and conducting their secondary research and inquiry.

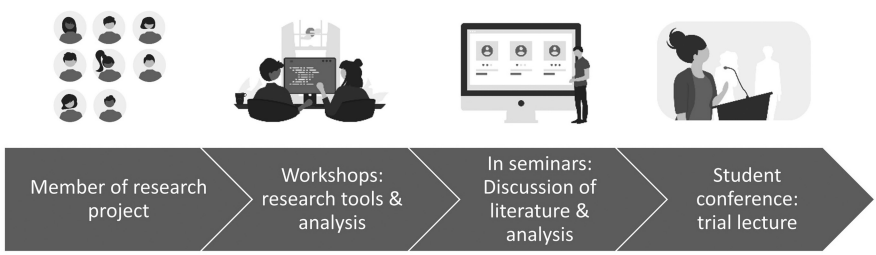

Figure 8.1 Co-research in university seminars (Eriksen & Brevik, 2022, p. 17).

Model 2: Co-research as formative assessment

When the Co-research model was introduced in 2018, mandatory tasks comprised the basis for formative assessment throughout the semester, with each assessment situation building on the previous one. To ensure that assessment was used for more than getting a grade, both formative and summative assessments were included.

First, the transcription of video data or spreadsheet organization of survey data was submitted for formative assessment (pass/fail). Once it was approved by the lecturer, the co-researchers created a research question (RQ), used course literature to choose analytical angle and analyzed the transcription or spreadsheet. The presentation itself was filmed with informed consent from the co-researcher and considered for formative assessment (pass/fail). The film was uploaded to a closed YouTube channel. Each co-researcher used the film and feedback from the lecturer and peers (pass/fail) to improve their presentation toward the exam.

The exam in the form of a trial lecture in an auditorium was inspired by research conferences and assessed summatively by a grade. Two examiners and around 70 student teachers from the cohort below comprised the audience. In contrast to exams where student teachers had to answer questions related to the syllabus, co-research put them in an authentic learning situation, where they presented their analyses and research findings to other student teachers. The co-researchers reported that because they knew throughout the semester what was expected of them and had been able to improve their presentation, they found the trial lecture useful, and since they presented something they had worked with throughout the semester, they experienced ownership to the analysis when presenting it to the audience (Figure 8.2).

In the spring of 2020, the trial lecture was moved from the auditorium to Zoom, with two examiners and 70 student teachers as audience. Although the medium and the context were different, and there was no physical contact due to COVID-19, the exam format was largely kept. According to the student teachers, it felt like a regular exam, since they had prepared throughout the semester, suggesting the trial lecture was perceived as a good form of examination even digitally.

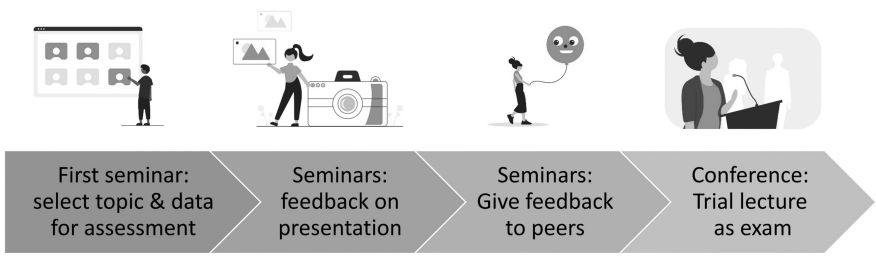

Figure 8.2 Co-research as formative assessment (Eriksen & Brevik, 2022, p. 17).

In an interview, journalists in the NOKUT (Norwegian Agency for Quality Assurance in Education) podcast expressed the view that the Co-research model has created an 'assessment revolution' (Bore & Kristiansen, 2019). They emphasized the connection between research and education as it extended over an entire semester with several mandatory tasks building on each other, including formative feedback, with room for improvement of their own presentations toward the exam. To provide ecological validity for the individual student and for society, we must ensure that students benefit from a practice that is also relevant for their future:

Reflection #3. Helped shape my future

> Being part of the VOGUE project helped shape my future both as a teacher and as a PhD candidate, because I was able to collect and analyze classroom data, which allowed me to get a better understanding of teaching and research. I think the most essential aspect, however, was learning about the importance of maintaining the participants' privacy [and] analyzing and discussing the data along with other co-researchers.
>
> (Shilan Ahmadian, cohort 2017–18)

Model 3: Co-research as data collection

In the autumn of 2019, the Co-research model was further developed within the English didactics MA program specialization, for the ninth semester. Student evaluations from the eighth semester indicated that the student teachers wanted to continue as co-researchers, by taking part in primary data collection. In response, the MA course *English in and out of school* was developed by Lisbeth M Brevik. Since 2019, students in this course have been invited to various research projects, including *Evaluation of Bilingual Education in the School* (ETOS) and *Vocational and General students' Use of English in and out of school* (VOGUE).

After signing a declaration of confidentiality, they were invited to collect data in lower or upper secondary school alongside other researchers in one of the projects. In the information sheet and consent forms (NESH, 2021), research participants were asked explicitly if they consented to any data material being used in MA theses. The TLVlab created a separate student level in these projects' storage spaces, which provided student teachers access to store the data they collected and to prepare for analysis alongside other project members:

Reflection #4. Contributing to the research project

> To get the opportunity to become a co-researcher opened up a whole new world to me. Not only did I understand what I had been taught during my TE on a deeper and more personal level because I was doing

> research myself, but I was also given the opportunity to actively use the research competence in my MA thesis, and later in my work as a teacher and researcher.
>
> (Rebecca Barreng, cohort 2020–21)

This MA course was also organized as four-hour seminars seven times during the semester. These seminars were designed to offer opportunities for co-researchers to take part in detailed planning of the data collection, creation of procedures, and processing of data. A combination of research and methods articles was included in the curriculum to highlight how and why to collect research data, emphasizing theoretical aspects of connecting English language use in and outside the school context. The TLVlab offered voluntary workshops to provide training and procedures for video and screen recording equipment. In line with GDPR, co-researchers were trained in creating so-called blind zones for non-consenting students to be placed outside the camera angle and in using relevant programs for editing videos (e.g., Shortcut), should a non-consenting student be captured on video or personal information be captured on the recorded computer screen (NESH, 2021). Co-researchers reported the relevance of such experiences:

> **Reflection #5. Steep learning curve**
>
> My experience as a co-researcher in the LANGUAGES project has been valuable. Although the learning curve is steep, the opportunity to see a multitude of classrooms is worth the effort. It has provided insight into how different teachers affect classroom teaching, therefore influencing how I want to teach as a future educator myself. I have also gained a deeper understanding of how classroom research works, relates to, and potentially shapes educational policy and classroom teaching.
>
> (Simen Grung, 2022–23 cohort)

Student teachers' research engagement involved four mandatory tasks: (a) the responsibility for collecting one type of data in school, including entering and updating information on Canvas as a project management tool, (b) presentation of their data collection experience in a seminar in light of curriculum literature, and (c) providing feedback to a peer on their presentation, according to given criteria. When they presented their data collection experiences, it became clear how different data sources required different procedures, which provided rich insight for their peers. Thus, co-researchers became experts on 'their' data sources and learnt how to give a presentation that was understandable to peers who were not familiar with these procedures. They had an oral exam, (d) where they reflected on their experiences and the role of research in their education and future teaching profession (Figure 8.3).

Figure 8.3 Co-research as data collection (Eriksen & Brevik, 2022, p. 17).

The student teachers got to carry out their own data analyses, which in turn became part of the research project and shared with all researchers in the project team. When student teacher Thea Holm was interviewed by the newspaper *Forskerforum* about her role as co-researcher during data collection (Christensen, 2020), she emphasized the importance of being trained in the general data protection regulations:

> **Reflection #6. The value of GDPR training**
>
> Among other things, I have gained great insight into GDPR, privacy and research ethics. The students in school have a right to education, but not all of them wanted to take part in the filming. We had to ensure the students' right to privacy and anonymity. There is a big difference between processing data that others have collected, and being in the field yourself and making ethical considerations in situations that arise there and then.
>
> (Thea Holm, cohort 2019–20)

In sum, student teachers' engagement in this MA course involved engagement *with* research through articles as curriculum literature and using them in their data collection. Their engagement *in* research concerned learning the necessary skills in research methods training workshops. They planned data collection and received training in equipment and procedures. They learnt to process the data in line with the procedures in the research project, including pseudonymization (NESH, 2021). This way, the student teachers gained experience with practical research engagement by 'doing' it themselves, before making a choice for their own MA thesis and before starting their work as teachers in school. Student teachers actively engaged in discussions in the seminars, developing a sense of the connection between research engagement and their TE.

Model 4: Co-research in MA theses

In the tenth semester, co-researchers are invited to use data from research projects for their MA theses, using primary or secondary data. Since 2015, student

teachers have been invited into several projects, including LISE, ETOS, VOGUE, EDUCATE, and LANGUAGES. While some student teachers had participated in the collection of primary data, others were engaged as co-researchers for their MA thesis only and used secondary data collected by the research team. Two co-researchers reflected on the relevance of this experience:

Reflection #7. Being part of something bigger

> To be a co-researcher in the VOGUE project made it possible for me as an MA student to get access to a larger amount of data than I would have been able to collect and process myself within one year. The project enabled me to be part of a research environment that studied vocational and general students. Also, it gave me the sense that my research was important and that I was part of something "bigger" and greater than myself. I feel that being a co-researcher has given me a research network, and in addition, it has been a motivational factor to begin as a PhD candidate in the research project EDUCATE.
>
> (Anja Ramfjord Isaksen, cohort 2017–18)

Reflection #8. Opportunities and challenges

> Being a co-researcher has greatly benefited my academic development. The arrangement has also helped the quality of my MA thesis. Co-researchers in the EDUCATE project are part of regular project meetings and subject didactic work groups, all of which determine the project's direction and further development, effectively raising the value of our role as co-researchers. Furthermore, the research team discussions and the work culture in EDUCATE functions as a stimulus for my own thesis. They display that my ideas, notions or challenges are not out of the ordinary. Being part of a research project like EDUCATE is an opportunity I cannot recommend highly enough, and an arrangement the University of Oslo should keep and further develop throughout all faculties where possible.
>
> (Bård Nordli Nilsen, cohort 2022–23)

Thus, there was potential not only for engagement *with* and *in* research but also for co-researchers' part of the MA thesis, whether using primary or secondary data (Figure 8.4).

In sum, student teacher's research engagement during their MA thesis writing ranged from engagement *with* research, which involved 'getting' research by using research articles to understand prior research and how to build on research arguments to use the research in their own thesis and suggest implications of their MA study (BERA-RSA, 2014; Munthe, 2019). Conversely, engagement *in* research involved 'doing' research in terms of collecting, processing, or analyzing data alongside other researchers and conducting

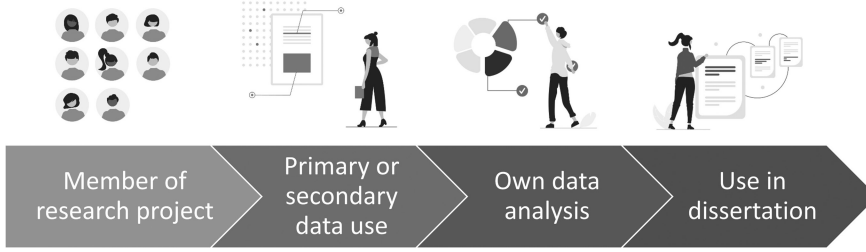

Figure 8.4 The use of research data for MA theses (Eriksen & Brevik, 2022, p. 17).

interpretation, presentation, and discussion of findings (Angouri, 2021; Eriksen & Brevik, 2022; Groß Ophoff & Rott, 2017).

Co-researchers' reflections on the learning environment

Since literature indicates a lack of research on what research-led or research-based education implies (Angouri, 2021; Munthe, 2019), there is an urgent need to learn about student teachers' views on the relevance of co-research for their future work as teachers in school or researchers in academia. In course evaluations, co-researchers reported being taken seriously both in university seminars and in school, that they learnt a lot from student-active teaching and learning approaches, and that it helped them see the working life relevance of research. They emphasized that the co-researchers came prepared and committed to the seminars, suggesting that engagement spread in the group, and everyone wanted to contribute. During COVID-19, student teachers found it difficult to be outside the university environment, indicating the importance of such a community (Christensen, 2020). The closing of the university underlined how important it is to facilitate inclusion, as expressed by these co-researchers:

Reflection #9. Confidence as a co-researcher

> I am grateful for the confidence given to me, not just as an MA student, but also as an actual part of the LISE research team. The role of co-researcher offered me a realistic and complex understanding of what doing research and being a researcher entails. I also got invaluable experiences with cooperative research activities that are still consequential for how I think and work as a PhD candidate today.
>
> (Peter Aashamar, cohort 2016–17)

Reflection #10. Experiencing international research collaboration

> As co-researchers, we were immediately welcomed as part of the LANGUAGES research team. Working closely with fellow MA students, PhD candidates, and professors, I truly felt included in the team.

> Throughout my involvement in the project, I not only received guidance for my MA thesis, but I also had the opportunity to contribute to the research project. As a co-researcher in a large research project, I was actively involved in data collection, which provided invaluable insight into the methodology and the data collected. I had the opportunity to observe numerous classrooms and got first-hand experience of what it means to collect data, from ethical considerations to project management. By working closely with the data, I was able to gain a deeper understanding of the different components involved in the research process, which has truly been a priceless experience for my MA thesis. The overall experience has strengthened my desire to work as a teacher, but also made me eager to pursue a doctoral degree in the future, as I truly developed an interest in research.
>
> (Adéla Funova, 2022–23 cohort)

As co-researchers, student teachers have been invited to disseminate findings alongside other researchers. Some were invited to interviews with the NOKUT podcast (Bore & Kristiansen, 2019), the Vocational Podcast (Grydeland, 2019), the newspaper *Dag og Tid* (Larsen, 2020), and to participate in a debate with the Norwegian Directorate of Education and Training (Brevik et al., 2020). Some were invited as co-authors of articles (Brevik & Holm, 2022; Brevik & Rindal, 2020), conference papers, or popular articles in the magazine *Bedre Skole*. By involving co-researchers in dissemination, they get the opportunity to contribute their perspectives on the connection between research and education.

Summary and conclusion

This chapter has presented the Co-research model, which combines research and education by inviting student teachers as co-researchers into ongoing research projects. After joining a research team, they gain access to data in the project and participate in data collection and analysis alongside other researchers. Such connections between research and education must benefit not only the research project but also the student teachers. Through MA courses and workshops, student teachers receive research training and opportunities to reflect on their positions as future teachers. In this sense, they are assessed as co-researchers as well as MA students. The fact that they can choose research engagement reinforces their belief that they can contribute to research and education at the university rather than just receive an education and that they have indeed learned and engaged in something that matters to them and to the university. Becoming experts in their chosen research topic and sharing their knowledge with other student teachers who are not experts in this topic results in a truly collaborative learning environment. By inviting student teachers to be co-researchers in ongoing research projects, they experience that we make research expertise available and relevant to them – there and

then – and for the future. In turn, the research project gains student teachers as active members, who not only contribute as secondary researchers who reuse research data beyond what the researchers themselves have the capacity for, but who also bring new perspectives to the analysis of the data they gain access to.

Overall, co-researchers seem to perceive engagement *with* and *in* research as a resource for future teaching and research. They report on the value of being part of a research community, which offers opportunities for reflection and gives confidence that they are contributing important knowledge to meet the needs of the schools of the future. The Co-research model provides collaboration between student teachers, lecturers, researchers, and engineers for a joint investigation of classroom research that are highly relevant for future practices both as teachers in school and researchers in academia. The Co-research model has already been adopted at other institutions and study programs (Garmann et al., 2021) and in the European university alliance Circle U (Cini et al., 2023). Hopefully, co-research will spread to more programs in higher education that are interested in strengthening the link between research and education. The expertise that co-researchers develop is in demand by school leaders (Christensen, 2020). This harmonizes with the vision of educating teachers as learners. Including student teachers in ongoing research thus contributes to a sustainable link between research and education.

The Co-research model has conceptually redefined TE. Hence, there can be co-research in research-based TE, but not all research-based TE includes co-research. So far, more than 50 MA theses have been written as part of the Co-research model. The majority is part of the English specialization, with one-third comprising the Nordic specialization, the foreign language specialization, and the culture and social science specialization. Two MA theses are interdisciplinary, across English didactics and social studies didactics or German didactics. In addition, five former co-researchers work as researchers or PhD candidates, including public sector PhDs (i.e., combining the PhD work at UiO with teaching in school).

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9 Multilingualism as a theme for the master's thesis investigation

Joke Dewilde

Introduction

Mi Lenga[1] is a research and development program under the five-year Master of Education program for lower and upper secondary school at the University of Oslo (UiO) that will be central to the design of the multilingual school of the future.[2] The ambition is to train teachers to be highly competent with multilingualism in education and thus equip them with crucial expertise to meet the needs of increasingly linguistically diverse schools. Since 2019, students have written their master's (MA) theses in connection to the program, investigating different aspects of multilingualism in education across school subjects. In line with international trends, classrooms across Norway are characterized by an increasingly linguistically and culturally diverse student body. In addition to the traditional linguistic diversity based on the indigenous Sámi languages, Norwegian Sign Language, and national minority languages Kven, Rom, and Romani, there is diversity among students in all municipalities in Norway due to more recent immigration. Schools in Oslo have the greatest student diversity where over 120 different languages are spoken (Ipsos, 2015). Seven percent of all students receive training in basic Norwegian because they speak another first language than Norwegian, and in Oslo, this is one in five students (The Language Council of Norway, 2018). The national core curriculum states that "all students shall experience that being proficient in a number of languages is a resource, both in school and in society at large" (Norwegian Directorate for Education and Training, 2017). However, while multilingual classrooms offer plentiful opportunities for effective language learning and intercultural understanding, these opportunities are often lost, as teachers may underestimate the complexities of the multilingual classroom or struggle to exploit their potential (Ipsos, 2015; Pulinx et al., 2015). These struggles may be detrimental for emergent bilingual students. Encouraging them to draw on their larger communicative repertoires and previous knowledge in educational settings is beneficial for both learning and identity work (García & Wei, 2014). Until recently, international teacher education (TE) and professional development have not focused on preparing future teachers for what is at stake in multilingual classrooms; in fact, this lack of focus has reproduced

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social inequalities and power relationships (Kulbrandstad, 2018; Thomassen & Munthe, 2021). The Mi Lenga program not only creates an important space in TE for students to become experts in the field of multilingualism in education, but it also stimulates them to disseminate their findings in podcasts, blog posts, and seminars for students and teachers, thereby contributing to the wider community and building the schools of the future.

Over the past 15 years, there has been a growing interest in (student) teachers' beliefs about language learning and teaching (Borg, 2006). The assumption is that teacher beliefs originate from previous learning or teaching experiences and play an important role in how teachers perceive the language classroom with its challenges and opportunities (Barcelos & Kalaja, 2013; Pettit, 2011). Researchers have claimed that these beliefs are contextual, personal, experiential, social, cognitive, and constructed in discursive practices. Furthermore, these beliefs are dynamic and variable from one situation to another, intrinsically related to actions, and they are part of a teacher's interpretative ability to make sense of and act upon challenges and opportunities in the world around them. Such beliefs are organized in clusters where earlier beliefs are more difficult to change, as they are related to the teacher's emotions and sense of self, and they are important in helping teachers understand themselves and others adapt to the world (Barcelos & Kalaja, 2013). Only limited research has examined (student) teachers' beliefs about multilingualism and the use of multilingual pedagogy for the teaching of emergent bilingual students (for an overview, see Kulbrandstad et al., 2020). Studies report that teachers generally have positive beliefs about multilingualism, but that they do not always approve of language-minoritized students' use of other languages for learning, thus adhering to a monolingual approach to teaching and learning (Haukås, 2015; Lundberg, 2019). Moreover, the beliefs of teachers who have little knowledge about minoritized multilingualism and the teaching and learning of newly arrived students are characterized by deficit views (Pettit, 2011; Vikøy & Haukås, 2021). Teachers responsible for mother tongue instruction and bilingual subject teaching have expressed a constant struggle for legitimacy (Dewilde, 2013; Ganuza & Hedman, 2015). Studies on student teachers' beliefs document that most students are positive toward minoritized multilingualism but that they are insecure and unaware of how to use multilingualism as a resource in practice (Hegna & Speitz, 2020; Iversen, 2020). TE is one of the most consistent factors influencing teacher beliefs (Gilham & Fürstenau, 2020; Pettit, 2011), and many researchers suggest that it is an important way forward to increase student teachers' awareness and knowledge about the possibilities of multilingual pedagogies (Fernández, 2019; Lundberg, 2019).

In this chapter, I analyze the beliefs of students enrolled in the Mi Lenga program who have submitted their thesis about teaching and learning in the multilingual classroom. Since previous research shows that (student) teachers are uncertain about the value of minoritized multilingualism in education or how to use multilingualism as a resource, I am particularly concerned with

Mi Lenga students' beliefs about the use of multilingualism for teaching and learning. In addition, I am interested in their beliefs related to becoming part of a larger practice and research community through the program.

Development, design, and content of Mi Lenga

Building a community of highly qualified future teachers to meet the needs of an increasingly linguistically and culturally diversified student body while moving the field of practice forward requires a long-term and strategic approach. As Professor of Multilingualism in Education at the Department of Teacher Education and School Research, I am responsible for teaching multilingualism across TE programs in the department. In response to the need to educate teachers with the qualifications to teach in multilingual classrooms, the Mi Lenga program was developed.[3] Mi Lenga's strategy is to recruit motivated MA students and enculturate them into the research and practice community of multilingualism in education, leading to high-quality MA theses on multilingualism in education and, thus, competent teachers who will contribute to building more inclusive schools. I have designed a program where students are guided through seminars with central international researchers in the field, giving them resources and guidelines to make sure they succeed, socializing them into the practice and research community, encouraging them to interact with peers and former students and helping them disseminate through co-writing articles and more innovative methods.

Commonly, MA students write an independent thesis or connect themselves to larger ongoing research projects where the design is pre-defined, and the data are pre-collected (see also Chapter 8). Mi Lenga students are responsible for their own projects from start to finish, while collectively contributing to a larger whole by intentionally building on each other's work. They write their 30 ECTS[4] thesis on multilingualism in education in their specific subjects, design their project in close collaboration with others in the field (e.g., teachers and advisors), and draw on their own or others' linguistic repertoires to access different experiences in school.

Mi Lenga students form a student community with their peers and former Mi Lenga students. A cornerstone of this process is the three seminars that I developed in collaboration with Dr. Line Møller Daugaard (VIA University College, Denmark). The following list has a brief description of each seminar:

- *Inspiration seminar*: Daugaard and I get to know the students' backgrounds, interests, present research needs (based on recent research and areas identified by schools) and possible creative designs. Based on this information, we design a study with them.
- *Analysis seminar*: Each student brings a piece of data from the studies they previously designed to be discussed and analyzed.
- *Writing seminar*: Students share selected text from their MA theses that they wish to improve. We model how to give feedback by asking questions.

The students are socialized into the research community by attending national and international conferences and seminars, as well as a seminar series where they get to share and reflect upon early findings with peers, teachers, researchers, and advisors from the National Centre of Multicultural Education (NAFO, https://nafo.oslomet.no/).

Traditionally, most MA theses on multilingualism in Norway are connected to the subject of Norwegian (Opsahl & Aarsæther, 2015; Svendsen et al., 2020). In contrast, the theses written by Mi Lenga students are much more diverse, including the didactics of English, mathematics, natural science, and social science, which is a much-needed contribution to further develop the field and to prepare students across the disciplines for becoming teachers in multilingual classrooms. In their theses, Mi Lenga students are encouraged to draw upon their minor subject (e.g., a common combination is Norwegian (major) and social sciences (minor)) and to learn from each other in the above-mentioned seminars, grounded in the argument that many major societal challenges require interdisciplinary collaboration to find new solutions (Rampton et al., 2015). Raising students' awareness of the interdisciplinary nature of multilingualism in education is crucial for their future work as teachers.

Research on Mi Lenga

The Mi Lenga program recruits students from multiple backgrounds. Most of the students are born in Norway. One-third of them have grown up in Norwegian-speaking families, while the others have grown up speaking other languages at home, including Albanian, Arabic, Bosnian, Dari, Farsi, Kurmanji Kurdish, Mandarin Chinese, Turkish, Sorani Kurdish, Urdu, and Uzbek.

To investigate Mi Lenga students' beliefs about multilingualism in education and emergent bilingual students, I conducted a study that was approved by the Norwegian Centre for Research Data. I have collected different types of data since 2019. First, I analyzed transcripts from interviews with seven students who were guests on the Mi Lenga podcast, where they presented and reflected on the findings in their theses, as well as on multilingualism in TE and their future roles as expert teachers in multilingualism. Second, I conducted semi-structured interviews with 12 students who were asked to look back at their journey from deciding on multilingualism as the topic of their theses until submission. Third, I collected written feedback from students after seminars with the broader practice and research community. Finally, I analyzed two blog posts. One was written by three students in collaboration with a communication advisor at the department after attending a conference on multilingualism in education in Denmark. The other was written by a Mi Lenga student who had joined a team that developed multilingual materials for newly arrived young people. In her post, she reflected on her journey from Mi Lenga to her current work. I analyzed the data by looking for recurrent patterns across the different data sources.

Presentation of relevant data and analysis

In the following, I report on the Mi Lenga students' beliefs related to multilingual pedagogies and the teaching of emergent bilingual students, and the value of a broader practice and research community for critical reflection.

Beliefs about multilingualism as a potential resource for teaching and learning

Multilingualism as a resource – that is, using the learners' languages as a strategy for learning in school – is at the core of the Mi Lenga program (see García & Wei, 2014; Hélot et al., 2011). Since Mi Lenga students apply to enroll in the program, it is not surprising that they generally hold positive beliefs about minoritized multilingualism for teaching and learning (Cf. Haukås, 2015; Lundberg, 2019; Vikøy & Haukås, 2021). For example, Mi Linga participant Fariba shared, "I think that the reason I wrote this MA is because I always see multilingualism as a resource."[5] What is more interesting, however, is the journey they described from deciding to write their MA thesis on multilingualism with a vague understanding of the phenomenon to a more complex and situated understanding related to their specific school subject and to Norwegian school.

Mi Lenga students must reflect on their increased understanding of multilingualism as a phenomenon and in relation to their MA subject. Ingrid shared that she did not quite know what multilingualism was before writing her thesis: "I remember when I started the project, it was more like- so I don't think I really knew how I understood multilingualism, but I knew that the curriculum emphasized it." After writing her thesis about the use of translated texts in social science, Ulrikke explained how her understanding of multilingualism has changed from bounded and stable entities to more dynamic: "Yes, maybe I have a better understanding that it [multilingualism] is dynamic, yes, fluid. That there are not such limited and rigid systems then, as I may have thought. Yes, there has been a change." At the beginning, Aliye was not aware that multilingualism was relevant to her subject: "I didn't think that it [multilingualism] could be included in social studies, or that we could think about them [multilingualism and social studies] at the same time." In her thesis, she worked with Turkish students defining concepts in both Norwegian and Turkish. Similarly, Natalie recounted not knowing how to integrate multilingualism in the Norwegian subject: "Yes, it [the understanding of multilingualism] has changed. Mostly because I didn't – because it was completely intangible to me before. Like how should – how should I incorporate it [multilingualism] in the subject? And I think I understand that better now." She investigated how 14-year-old students approached multilingual song texts. These extracts illustrate that what Mi Lenga students knew, thought, or believed about multilingualism when enrolling in the program was rather reductionist in relation to the complexity and relevance of the phenomenon in education.

Collecting their own data related to multilingualism gives Mi Lenga students the opportunity to reflect on and develop more nuanced understandings. Participants noted that observing first-hand how multilingualism was used in the classroom helped to nuance research literature they had previously read. Hiba noted, "I got a different view because then I got to observe, yes, what it's like at school. Not only what is written in research articles, and being close to the practice field shows- creates a different understanding of how multilingualism can be used in the classroom, than what one starts with." Others mentioned the value of trying out multilingual pedagogy themselves for data collection. Ulrikke argued:

> I learned once again that it is not dangerous to try something new. It's actually what you have to do, and especially as a new graduate, there will be a lot of trial and error, and I think it's only good to experience that. Yes, it is perhaps also something I will take with me further, that it is not dangerous to try something new.

These extracts show how observing and trying out multilingual pedagogies in the classroom contribute to shaping the students' beliefs through interaction with other factors, such as pedagogical principles and their personal beliefs.

Finally, Mi Lenga students also reported how their beliefs were shaped by the institutional contexts in which they collected data. As I will elaborate on in the next section, the fact that many Mi Lenga students collaborated with teachers who were favorable toward multilingual pedagogies strengthened their initial beliefs about multilingualism as a resource. However, emergent bilingual students in the field sometimes challenged these multilingual pedagogies. Working together with a teacher and trying out multilingual poetry writing in the subject Norwegian, Fariba shared the following:

> This teacher planned for the classroom to be multilingual, but still the products [poems] were not particularly multilingual. Even though the students spoke freely in their mother tongue in class and helped each other in class in their mother tongue, it was still the case that the products they wrote at school remained in Norwegian.

Ulrikke reported on similar experiences:

> And the last thing I found out, which actually also surprised me, I have to be honest about that, both the social studies teacher and the students, they were very ambivalent about the teaching plan. And they showed contradictions in both what they said and what they did.

This resistance from students serves as an important reminder that future school leaders, colleagues, guardians, and students may not hold the same

beliefs toward multilingual pedagogies. In fact, actively recruiting schools with limited experience with multilingualism as a resource could also give Mi Lenga students valuable experiences and reflections. The student excerpts in this section provide insight into how some of their initial beliefs about multilingual pedagogies and emergent bilingual students developed through interacting with the field of practice. The next section will show how the practice and research community had an impact on the development of their beliefs.

The impact of practice and the research community on student teachers' beliefs

For Mi Lenga students, the program serves as an introduction to a larger practice and research community, including fellow students, teachers, researchers, and advisors, which is important for their agency (see Chapter 3). Researchers have previously paid little attention to the impact of practice and the research community on student teachers' beliefs (see exceptions Danbolt & Kulbrandstad, 2008; Khokhotva & Albizuri, 2020). I argue that this research community is especially important given the fact that minoritized multilingualism is not a school subject in its own right, but rather relates to complex issues across subjects and requires teachers and other members of staff to collaborate to cater to the academic and social needs of emergent bilingual students (Dewilde, 2013; Ganuza & Hedman, 2015). Moreover, minoritized multilingualism also relates to larger societal challenges of equity and democratic participation (see Kulbrandstad et al., 2020 for similar reflections related to Norwegian as a second language).

As noted above, Mi Lenga students form a community while in the program through the seminar series. Fariba described this student community as follows:

> So, first of all, I think it's very nice to-so it's a bit about the network as well. You know, I've gotten to know the other students much better, and we write about the same topic. And then it's a bit about the sharing of different teaching activities with each other. So, if we look at it that way, we write in a way about different teaching activities that can work in a multilingual context. So, I think that's quite nice, and in a way it has given me much greater insight into the field of multilingualism, which is not so well known. So for me, I think that the multilingualism part is going to increase drastically over the years, and then it is very nice to have a project that brings this together in a way that contributes to future teachers having the opportunity to look at different activities that have worked in different classrooms.

Two points are worth commenting on in the above-mentioned extract. First, Fariba expressed the belief that it is valuable for Mi Lenga students to form a

network and learn from each other's theses. Second, the theses and the topics have a value beyond Mi Lenga, which highlights the value of collaborating with the larger field as discussed in the following paragraphs.

Collaborating with other actors in the field in connection with data collection is one way of engaging with the community while writing the thesis. Ulrikke collaborated with both NAFO and a social science teacher for her project on the use of multilingual texts in a transition class for late arrivals in Norway. She noted:

> After all, NAFO willingly contributed its resources and expertise. And they also thought that what I was going to do seemed very exciting, and they would like feedback on how it went. Yes, then, I think it's very positive then to feel that they were also somehow appreciative and supportive of my initiative and what I wanted to carry out. And the social studies teacher, he was very engaged and very willing to try out new things.

The above-mentioned extract shows the value Ulrikke attributed to the program and the academic and emotional support she had when trying out something new for her MA project. It also illustrates how NAFO was interested in her findings, thus treating her as a legitimate contributor to the field. Natalie, Ingrid, and Ulrikke who attended their first conference also commented on the feeling that their topic was of importance: "we went home as new multilingualism activists and convinced that multilingualism must be allowed to be part of everything we work with in school, and not function as something ad hoc." In addition, they commented explicitly on the value of community: "meeting new people with the same professional interest creates unity and gave us all a reminder of the importance of what we are going to write about." In other words, being part of a larger community strengthened Mi Lenga students' beliefs and gave them confidence that what they wrote about was important for building the schools of the future.

Finally, students have expressed that the seminar series where Mi Lenga students, NAFO, and teachers from the university schools (see Chapter 11) share reflections from the field was an important arena for reflexivity. Mia commented:

> It was very useful to hear the other schools present themselves and their challenges and objectives, as it made me aware of relatively small things that are very important to have written up and reflected on, both in the MA thesis itself and in connection with data collection. It was not least useful to get feedback from teachers who work with this group of students. In addition, it was useful to hear the other MA students present their projects, both to gain insight into what the other students in Mi Lenga are investigating, but also elements emerged in the others' presentations that may be relevant to my thesis without my having thought about it before now.

The above-mentioned extract illustrates Mia's reflective practitioner beliefs and collaboration with the field, giving her plentiful opportunities for critical thinking and reflection (see Khokhotva & Albizuri, 2020).

In sum, I would argue that the above-mentioned extracts illustrate that Mi Lenga students are socialized into a broader practice and research community, which creates a safe space and an extended context for them to critically reflect on their beliefs and practices related to multilingualism and multilingual pedagogies (Borg, 2006; Khokhotva & Albizuri, 2020).

Summary and conclusion

This chapter has presented beliefs from students who went through the Mi Lenga program at UiO, where they wrote their MA thesis on multilingualism in education. Overall, Mi Lenga students' beliefs become more nuanced as they learn more about the phenomenon in dialogue with the broader practice and research community. In contrast to (student) teachers with little knowledge about multilingual pedagogies (Haukås, 2015; Lundberg, 2019), Mi Lenga students view multilingualism as a resource for teaching and learning. Having observed and tried out multilingual pedagogies in linguistically diverse classrooms, they feel more secure about how to use multilingualism as a resource in practice (Hegna & Speitz, 2020; Iversen, 2020). Moreover, they report on the value of being part of a practice and research community, which offers opportunities for reflection and gives confidence that they are contributing important knowledge to meet the needs of the linguistically and culturally diverse schools of the future (Khokhotva & Albizuri, 2020).

When reflecting upon the value of a program such as Mi Lenga, I believe two cautions are in order. First, observing and trying out multilingual pedagogies in a friendly environment in connection with a 30 ECTs MA thesis will necessarily be different than doing so when working as novice in-service teachers. For example, studies on teacher beliefs in less favorable circumstances document how novice teachers spend a lot of time addressing problem behavior and how they sometimes make decisions that go against their beliefs (e.g., Johnson, 1996). Mi Lenga students will continue to develop as in-service teachers, and contextual factors will play a role in how their beliefs and practices evolve over time. Longitudinal inquiries into how they change are important in this respect (see also Borg, 2006). Second, the students entering the Mi Lenga program hold positive beliefs about multilingual pedagogies and emergent bilingual students. However, monolingual approaches continue to dominate education in Norway and internationally, ensuring that some students in TE have negative beliefs about minoritized multilingualism. These students may not apply to be enrolled in a program like Mi Lenga. It is thus of utmost importance that general TE also integrates perspectives on multilingualism in teaching and learning (see Hélot et al., 2011; Thomassen & Munthe, 2021).

Notes

1 "Mi Lenga" means "my language" in Papiamento, which is a Creole language spoken primarily in Aruba, Bonaire, and Curaçao in the Caribbean. The origin of the language is unknown, but it has common features with Portuguese, Spanish, Dutch, and West African languages. For many, therefore, the word feels both known and unknown at the same time. It is also the title of the poem "Mi Lenga Papiamentu" ("My language Papiamento") by Philip A. Rademaker, in which he describes the meaning of language for the individual.
2 https://www.uv.uio.no/ils/english/research/projects/milenga/index.html
3 The Department of Teacher Training and School Research has previously been responsible for a course especially designed for multilingual student teachers (see Hvistendahl, 2009).
4 European Credit Transfer and Accumulation System.
5 All names are pseudonyms.

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10 Master thesis as boundary crossing mediating artifacts

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Introduction

Throughout the field of educational research, there is a growing emphasis on the significance of theory and practice integration in teacher education (TE) (Jenset et al., 2018). The separate fields responsible for TE, the theory field (university campus) and practice field (schools), are sought to be brought together as an integrated field for developing student teachers' teaching competence with knowledge and experiences constructed from both fields. The student teachers' development as teachers depends on crossing the boundary between the two knowledge fields of school and university (Zeichner et al., 2015).

In Norway, the Ministry of Education and Research (2016) emphasizes this integration by stating that practice should be "an integrated element in all subjects forming part of the program …and help the student teachers develop the ability to reflect on and develop their teaching practices" (p. 5). Thus, Norwegian TE constitutes master's degree programs that aim at an increased focus on practice-based teaching and learning (2016). However, the Norwegian TE programs have been criticized for not being sufficiently grounded in the context of classroom instruction (Jakhelln & Postholm, 2022; Jenset et al., 2018).

In this chapter, we inquire into the relationship between theory and practice within TE at the master's degree level. We investigate how a group of teacher educators, mentors, and student teachers in the subject, English as a foreign language (EFL), cooperated to develop partnerships in working with the student teachers' master's theses. We studied examples of boundary crossing between their respective knowledge bases and tried to assess the outcome for the three groups of participants, the student teachers, the mentors, and the teacher educators, of the supervision of the student teachers' master's theses.

Establishing a tripartite collaboration in which teacher educators, mentors, and student teachers cross boundaries (Daza et al., 2021), by working across their established domains at university or in school, has the potential to bring about a "stronger connection between theory and practice, which would facilitate student teachers' understanding of theory and the important interplay

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between theory and practice" (Holmbukt & Son, 2020). Molander and Terum (2008) claim that professional groups share a theoretical basis through specific connections to tertiary education and research. Professionals apply their knowledge in practice, which means the professional must connect theory and practice. Knowledge that appears during practice could influence the theoretical aspects of the profession.

The tripartite collaboration would also contribute to the capacity for practice-based, professionally oriented research in master's theses and in TE in general. For the English subject in TE, we have experienced that student teachers seem to grapple with transforming their academic English subject knowledge into classroom practice. Student teachers seem to prefer more practice-based course content since this is perceived as being more relevant to their future careers as English teachers (Holmbukt & Son, 2020). This might be due not only to the theorization of central concepts in their campus courses but also to possible limitations of the formal school placement periods, which may not provide sufficient opportunities for trying out academic content knowledge in an authentic classroom situation (Holmbukt, Son & Larsen, 2023).

Discussion of context and theoretical approach

The present qualitative study was situated in the project Learning, Assessment and Boundary crossing in Teacher Education (LAB-TEd), an international collaborative research project. LAB-TEd focused on university–school partnerships and the student teachers' work with research and development (R&D) while working with the master's degree thesis (Jakhelln & Postholm, 2022). The project has looked specifically at the boundary crossing student teachers' experience as they integrate the two knowledge fields of school practice and university courses during the construction of the master's thesis.

Framed by Cultural Historical Activity Theory (CHAT) (Engeström, 1987/2015), participatory data analysis workshops, known as Change Laboratories (Engeström et al., 1996), were used to study the connection between theory and practice. In the LAB-TEd project, research and development (R&D) was conceptualized in the tradition of formative interventions, elaborated by Yrjö Engeström (1987/2015), and had a twofold aim. The first was to develop collaboration between universities (teacher educators), schools (teachers/practice mentors and school leaders), and student teachers to build capacity for practice-based, professionally oriented research. The second aim was to research these processes using the change laboratory, which could uncover obstacles and barriers to change. The change laboratories served as a shared meeting ground for the participants in LAB-TEd, aiming to move the practice toward a partially shared object (Engeström, 1987/2015).

CHAT has been developed over decades; from Vygotsky's ideas about personal development through social interaction to Engeström's activity system model for developing collective processes and cooperation between two or more activity systems which forms networks of interacting systems. A network

between student teachers, school-based mentors, and university teachers links the systems together and provides direction for the participants' actions and a partially shared object. In CHAT, the unit of analysis is the activity system. The activity system includes subject, mediating artifacts, object/outcome, rules, community, and division of labor (Engeström, 2001). In an activity system, human activity is visualized by triadic relations, coexisting, and working in relation to each other. The term "subject" refers to the participants of the activity, in this context, the student teachers, the mentors, and the university teachers. The position of these three groups of subjects is different for the three groups participating in the activity. The subject's action is influenced by the other elements in the activity system, such as a) the rules, communities, and division of labor which include conventions and norms regulating the activity in the workplace; b) the mediating artifacts, that is, tools, such as course plans (Holmbukt et al., 2023). The mediating artifacts, such as the master's theses in this project, function as intermediary aids used by the subject in the process of achieving c) the object or the desired outcome of the activity (Engeström, 1999), in this case, theory–practice integration. The activity system shows how human activity takes place within d) a community, and which is governed by a specific e) division of labor among the members of the community in question (Engeström, 1987/2015).

Design, content, and development

In LAB-TEd, the three participant groups involved, student teachers, their mentors, and the university teachers in EFL, had participated in homogenous and heterogenous change laboratories and were thus familiar with discussing the matters of the three roles. This training enabled the participants to acknowledge the contributions of the different stakeholders, that is, the three different subjects in the activity systems, the student teachers, their mentors in schools, and the university teachers.

The university–school partnerships in LAB-TEd provided the circa 40 student teacher participants in the project with an additional authentic arena for enquiry-based teaching where academic concepts could be tried out in practice. The change laboratories played an important part in this endeavor (Virkkunen & Newnham, 2013). In the change laboratories, the student teachers, their mentors, and the university teachers met regularly in homogenous and heterogenous groups and discussed the objectives of the activity in accordance with the activity system model.

The close collaboration between school and university served as a foundation for student teachers' work with their master's theses, and we argue that these theses can be seen as mediating artifacts between the domains of theory and practice (Engeström, 1987/2015). Our work within the school–university partnerships focused on a higher degree of involvement of the parties responsible for TE, teacher educators at the university, mentors in schools, and student teachers, collaborating in tripartite meetings. The change laboratories

may create new structures of relationships between participants which inform new and diverse ways of working (Dracup et al., 2020; Engeström, 2001; Virkkunen & Newnham, 2013). Engeström (2001) calls such qualitative changes "expansive transformations in activity systems" (p. 137). The transformations are caused by participants who, in collective processes, analyze and discuss their work practices, considering activity system models and may, through the cycles of analysis, reconceptualize the object and outcome of the activity. Reconceptualization thus involves constructing a new form of activity by expanding "beyond the boundaries of the previous form of the activity" (Virkkunen & Newnham, 2013, p. 11) and embracing "a radically wider horizon of possibilities than in the previous mode of the activity" (Engeström, 2001, p. 137).

How we collected our data

In this chapter, we draw on data from meetings organized over three years of tripartite meetings and collaboration between student teachers, mentors, and university teachers. Three university teachers and the two mentors together supervised ten English master's theses whereof eight were written by two student teachers jointly. The student teachers were enrolled in the program Master of Education, specializing in teaching English to students in upper primary and lower secondary schools.

We have gathered data consisting of audio recordings and transcripts thereof from four change laboratories where discussions about the master's projects were in focus. In addition, we have studied transcripts from physical tripartite supervision sessions and observation forms and recordings from student teachers' practice and interviews with mentors, in the English subject. We apply these sources as data for the present enquiry. We have further studied two of the tripartite supervision meetings in more detail. These meetings are seen as representative of the tripartite meetings in which the student teachers, their mentors in school, and the university teachers involved in each master's project discuss the contents of the master's thesis in question. They are about one hour's length each and comprise collaborative tripartite meetings involving two separate groups of supervision teams, each containing two student teachers, one mentor, and one university teacher, eight people in total.

Tripartite meetings and results

The master's theses, in most cases written by two student teachers together, were the mediating artifacts (Engeström, 1999) on which the participants involved – two student teachers and two teacher educators (one school-based mentor and one university teacher) – collaborated. Participants met regularly for joint meetings on matters relevant to all the English student teachers and their mentors and university teachers, as well as in change laboratories with LAB-TEd participants with backgrounds from other school subjects such as

Mathematics and Science. Student teachers had separate meetings in addition with their mentor during teaching sequences related to the master's thesis and had separate supervision meetings with the university teachers.

The student teachers tried out teaching schemes they had designed in cooperation with the mentor and the university teacher in the mentor's classrooms at two different lower secondary schools. The teaching sequences and the observations therefrom provided results that constituted part of the empirical data for their master's theses together with student and teacher interviews and various surveys.

The first transcript of the supervision meetings represented a discussion taking place halfway through the master's thesis project. The role of assessment in the teaching scheme was discussed. The student teachers carried out teaching sequences in the mentor's school as part of the collection of empirical data for their master's thesis. The student teacher, the mentor, and the university teacher all saw the necessity for including assessment of students in the teaching sequences in the classroom. This view was however introduced and most clearly voiced by the mentor: "You have to make room for assessment in a project like this". Whether the master's thesis should focus on the concept of assessment or just make assessment methods part of the classroom trial was a matter of some disagreement between the student teacher and the mentor. From the mentor's point of view, assessment was central; the student teacher and the university teacher did not disagree, but considered the focus on reading to be more central in this context and feared it could be overshadowed by an equally important topic of assessment, and that a choice between the two had to be made.

One of the transcripts represented a discussion which took place early in the master's thesis project, even before the setup of the various supervisor teams (one mentor + one university teacher per thesis) had been formally introduced to the student teachers. In this case, the mentor and the university teacher (who were engaged in LAB-TEd) expressed enthusiasm toward the student teachers' master project but voiced critical counterarguments to some of their ideas, for instance, saying that it was too ambitious to expect the students to be able to read an advanced novel in such a brief time span. This was clearly communicated to the student teachers in this early phase. Notwithstanding, when the student teachers got the confirmation about who their supervisors would be and what school they would cooperate with, they expressed contentment: "That's great, very nice", says one student teacher; the other student teacher continues: "Just to get that question settled, it's so nice". The two student teachers expressed contentment of having the two supervisors (one mentor and one university) assigned to their thesis, even though these two supervisors had been critical toward their project's design. Later in the transcript, it was evident that the two student teachers might have had different opinions about the choice of literary text for their project on reading in lower secondary school. One of them said: "I'm sitting here thinking that we can't use novels… we can read short stories instead". The other student teacher

argued in favor of trying out full-length novels. Especially for those writing in pairs, having two supervisors – instead of just one – present in the same supervision meeting, may create a forum for discussions and reflection on theoretical and didactical questions that may otherwise be less debated. Having both the university teacher and the mentor present in their discussions may shed light on questions where the student teacher pair may hold different views. In this example, the student teachers finally agreed and chose a short novel for classroom purposes to meet the supervisors' criticism.

Another topic discussed in this supervision team was how literature is often used in English teaching in Norway (Brevik & Lyngstad, 2020) and how to allow "different reading and learning abilities and preferences, without infringing on learner dignity" (Williams 2021, p. 162). In discussions in the supervision team about different multimodal approaches to reading, the term immersion, which is often used when discussing didactics and gaming, was brought up. Having the readers use their own imagination and fantasy as tools for obtaining immersion (Mangen, 2008) was an important objective. Both supervisors, the university teacher and the mentor, benefitted from the student teachers' adaptation of this concept into literature didactics, which traditionally deals with narratological questions and critical reading (Williams & Normann, 2021). Having immersion as an aim for the reading sequences the student teachers arranged was approved by both the mentor and the university teacher. This example shows that mediation was easier on topics where none of the supervisors, neither the university teacher nor the mentor, had special knowledge. The discussion and the possibility for wandering in and out of the traditional knowledge bases held by the two professions, lower secondary school practice and English didactics, respectively, was made possible by the joint supervision.

The possible outcome of tripartite supervision

When assessing the outcome for the three groups of participants, the student teachers, the mentors, and the university teachers, respectively, we draw on interviews, change laboratories, tripartite supervision meetings in which student teacher and mentor perspectives are voiced directly, as well as the ten master's theses.

To discuss how the mentors may have benefitted from having master students trying out their projects in their class or at their school and participating in joint supervision in tripartite meetings warrants a closer study. In the cases presented here, however, both mentors expressed enthusiasm toward the student teachers' projects. The topic of one master's thesis concerns the question of developing intercultural competence (Dypedahl & Bøhn, 2018) among students, an important competence area in the English subject. The topic of another master's thesis concerns the highly relevant question of English reading competence and the development of reading skills among students via the use of various multimodal prompts.

The mentor finds the master's project on intercultural competence inspiring since it enhances his awareness of the different cultures represented in the class and reports getting ideas about how to empower students with multicultural backgrounds and make them into resource persons in the class in relation to their language and culture expertise.

In the case of the master's thesis on reading, the mentor reports an increase in awareness about the different comprehension levels in class. During the student teachers' teaching sequences, the mentor observed that the students benefitted in different ways. The students were proud when they could report to other teachers that they had managed to read an entire English book. Both these examples were highlighted in the tripartite discussions involving student teachers, mentors, and university teachers, in relation to teaching sequences held by the student teachers in the practice schools.

When we consider how the student teachers might have benefitted from trying out their ideas in lower secondary classrooms and getting joint supervision, the student teachers' responses are genuinely positive; many appreciated the increase in time set aside for supervision. The student teachers get a chance to try out and subsequently discuss their projects with the mentors, who were present during the classroom trials, and the university teachers, who supervised their planning. The student teachers report that the joint tripartite meeting structure made it "more natural" to concentrate on the learning objectives relevant for their English subject curriculum since the ordinary practicum in the school situation makes little room for the inclusion of student teachers' subject learning objectives.

When we turn to the question of how the university teachers have benefitted from the close collaboration with the mentor and the student teachers in joint supervision the results are generally positive. Getting a closer connection to the practice field was seen as beneficial. From the university teacher perspective, one may, on the one hand, observe that local traits are taken into consideration to the extent that general principles, for example, regarding learning objectives for reading, are overshadowed. In the case of the reading of full-length authentic novels, for instance, the local adjustments may cloud the didactical approach if, for instance, a less ambitious view from the school vantage point deems such reading unachievable for the students in question, as in the case with one of the master's projects. On the other hand, the local adjustments must be taken into consideration in any didactical approach to make the task fit the individual students in class; "in situations where we thought that the book was too difficult for some students, we discussed this with her (the mentor)", two student teachers state in their master's thesis on reading. The student teachers omitted parts of the text to meet the need for differentiation. The university teacher in this case held the conventional literature researcher view that authentic literature should not be tampered with and that we should avoid using excerpt (Sacks, 2014). In this case, the literary text was not altered, but parts of the literary text were omitted. A compromise. However, the university teacher reported having some difficulties giving feedback to student

teachers when there was also a mentor involved in the supervision and who might in some cases articulate opposite views in separate meetings between student teachers and mentors. In the case mentioned here, a compromise was found, and the student teachers and their supervisors reached an understanding on how to adjust the literary text to this particular lower secondary class.

Reflections

From the two transcripts used as examples here, it is noticeable that the two supervisors, the mentor and the university teacher, cooperated and supported each other. For example, the university teacher in the second transcript repeats and elaborates on statements made by the mentor. The student teachers then get simultaneous and corroborated response from the two supervisors. One may ask whether this is wise or whether it could camouflage authentic controversy by masking disagreements the student teachers need to be aware of in their future professional careers as English teachers. The same tendency toward consensus can be observed in the first transcript. It may be difficult to see how such concealment of underlying professional variance could improve the quality of the master's projects even if the student teachers can adjust their texts and their teaching schemes without getting conflicting feedback on their work.

The joint supervision may thus affect the quality of the master's theses. In most cases, we have observed that the discussions continue in subsequent meetings, so that possible professional divergence is clearly visible and something the participants can discuss openly. The master's theses become the mediating artifact between the participants involved together in activity systems (Engeström, 1987/2015). The importance of the process the student teachers are involved in while working with their master's theses becomes even more conspicuous when having joint tripartite supervision; the reconceptualization that takes place within and outside the joint meetings contributes to constructing a new form of activity, a wider horizon for the participants involved (Virkkunen & Newnham, 2013). For example, the concept of immersion was discussed in an innovative way, resulting in creative modeling of deep reading. The students, as well as the university teachers and mentors, may benefit from specializing in the contents of the master's theses, as in these examples, from trying out and discussing different methods for authentic reading. Another example from the teaching scheme implemented by the students in the mentors' school involves the concept of "intercultural competence" (Dypedahl & Bøhn 2018, p. 158) and from developing their own intercultural competence and their understanding of this concept.

Summary and conclusion

This chapter argues that student teachers' master's theses can function as mediating artifacts between three important stakeholders in the development of theory–practice integrated English master's theses in TE. The student

teachers, the mentors, and the university teachers worked jointly with English master's thesis supervision in LAB-TEd. Data from change laboratories (Engeström, 1987/2015; Virkkunen & Newnham, 2013), English master's theses, tripartite supervision sessions, interviews, and teaching sequences in schools in relation to the master's theses have been studied and discussed. The university–school partnership, in which student teachers, teacher educators at campus, and mentors at schools were obliged to work in close collaboration, has been a valued incentive in terms of outlining a more practice-based research design regarding the English master's thesis and reducing the gap. Although there might be tensions in the tripartite collaboration, the master's projects mediate between the domains of practice and theory. Establishing a tripartite collaboration in which the participants work across their established domains (i.e., campus or schools) has the potential to bring about a more solid theory–practice connection, which would facilitate student teachers' understanding of theoretical concepts and the important interplay between theory and practice in their professional training.

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Part III

Bridging the gap between campus and schools (theory and practice)

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11 Transformative partnerships with university schools

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Introduction

In 2015, an international expert committee evaluated the work of the Center for Professional Learning in Teacher Education (ProTed) after it had served as a Centre for Excellence in Higher Education for five years. The committee described the development of ProTed's "university school" concept as "the jewel in ProTed's crown." The committee also emphasized that university schools play a crucial role in the curriculum design and practice of research-informed integration in teacher education (TE) at the University of Oslo (UiO) and UiT The Arctic University of Norway (UiT) (Lawson et al., 2015, p. ii). Partnerships with university schools have become common in recent years and can consist of somewhat different arrangements, from small-scale and individual-oriented projects to larger system-level collaborations (Farrell, 2021; Green et al., 2020; Smith, 2016). Despite decades of testing and research on different partnership models, the education field still requires more research on innovations and genuine partnerships (Zeichner, 2021).

Jones et al. (2016) distinguish between connective, generative, and transformative partnerships. The ProTed model follows the third approach, which features collaboration and the "active involvement of all partner members in the planning and delivery of curriculum for the purpose of professional learning"; such an approach should also be "ongoing and embedded in the programs of the collaborating institutions" (Jones et al., 2016, p. 115).

Within ProTed's model for transformative partnerships with university schools, a small number of schools are chosen from a wider pool of partner schools (based on applications from the interested schools) in order to collaborate on research/development and student teachers' practice. Currently, UiO has 130 partner schools, of which 18 have a designated status as university schools, while UiT has 40 partner schools, of which 13 are university schools. University schools undertake an extended, binding, and mutual agreement with the TE institution and are thus included in a close and committed partnership. University schools are carefully selected due to their interest in cooperating in the development of TE and in taking a systematic approach to research and development (R&D) work.

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The aim of this chapter is to describe ProTed's model for transformative partnerships between TE institutions and a few selected university schools and their owners (typically counties and municipalities in Norway). We also wish to call attention to important findings from research on various activities that have emerged from this type of collaboration.

Previous research on TE has guided the development of ProTed's model for partnerships with university schools, stressing the need to anchor TE in practice to a greater extent than has previously been the case (Darling-Hammond & Bransford, 2005; Finne et al., 2014; Lid, 2013). Other goals are to develop and use practice-oriented and practice-relevant forms of learning and teaching in on-campus teaching (Forzani, 2014; Jenset et al., 2018; McDonald et al., 2013). The results from each of our local student evaluations and findings in a report on practical training in professional education in Norway (NOKUT, 2018) have indicated great variation in the quality of student teachers' experiences from practical training in schools. A need thus exists to ensure and develop the quality of student teachers' practical training and mentoring in schools. At the same time, TE institutions must collaborate with schools on R&D in schools.

Research has highlighted partnerships between TE institutions and schools as a prerequisite for good TE (Darling-Hammond, 2006; Lillejord & Børte, 2014). The existence of close and committed partnerships between a TE institution and university schools is one way to link TE more closely to the practice in schools. In the white paper "Teacher Education 2025: National Strategy for Quality and Cooperation in Teacher Education," the Norwegian Ministry of Education and Research (2018) recognized the establishment of close and committed partnership models between TE institutions, a few selected university schools, and school owners as a strategy to ensure ongoing quality development of TE programs and to increase research-based development in schools. ProTed's work with university schools led to this national plan for partnerships with university schools. Since 2010, the national strategy has acknowledged the ProTed model for various partnership experiences. Similar partnership arrangements have been established in every TE institution in Norway.

In the following, we explain ProTed's model for transformative partnerships with university schools by describing how close cooperation with university schools has contributed to the management, development, and implementation of TE programs at UiO and UiT as well as R&D collaboration with schools. The authors of this chapter have all been engaged in various activities in the partnerships at the two TE institutions, and some of us have been responsible for management. As the basis for the description of the ProTed model, we use our own firsthand knowledge of the university school collaboration as well as using records found in previous reports and research publications. Several previous publications have discussed experiences from partnerships with university schools (Andreassen, 2015; Engelien et al., 2015; Hatlevik, Engelien, & Jorde, 2020a; Hatlevik, Hunskaar, & Eriksen, 2020b; Hatlevik & Lejonberg, 2019; Hunskaar & Borge, 2015; Hunskaar & Eriksen, 2019;

Jakhelln, 2015; Rørnes, 2013; Andreassen, 2015; Jakhelln et al., 2017; Klemp & Nedberg, 2016; Lejonberg et al., 2017; Lejonberg & Hatlevik, 2022; Lund & Eriksen, 2016; Olsen, 2020, 2021; Steele, 2017, 2018a, 2018b; Sørensen, 2019; Vedeler, 2013, 2022; Vedeler & Reimer, 2023; Vestøl et al., 2015). In line with a design-based research method (Anderson & Shattuck, 2012), our purpose with this chapter is to improve practice by identifying how university schools can contribute to high-quality development of TE programs and ensure the relevance of research for practice. This knowledge will be useful both for further development of UiO's and UiT's own university school partnerships and for other TE institutions.

ProTed's research-based model for transformative partnerships with university schools

Like most TE institutions, UiO and UiT have extensive experience with partnerships with schools about agreements for student teachers' practice placement in school as part of the TE programs. As the first two TE institutions in Norway, UiO and UiT established (in 2009 and 2010, respectively) close and committed partnerships with a few carefully selected schools with a designated status as university schools for a limited period of time. Since the establishment of ProTed in 2011, UiO and UiT have exchanged ideas and inspired each other, forming a common ProTed model for transformative partnerships with university schools.

ProTed's model for university school partnerships was originally inspired by the arrangement of university hospitals, which, together with the university, are responsible for medical education. But unlike medical education, the financial framework dedicated to university school partnerships is very modest. A key challenge for the partnerships is therefore how to create sustainable forms of cooperation with minimal costs and how to design meeting places suitable for collaboration on student teachers' learning and cooperation between schools and universities on R&D work (Hunskaar & Eriksen, 2019).

A key feature of ProTed's work has been the development of research-based TE. In 2013, a systematic review on behalf of ProTed was commissioned for partnerships in TE from the Knowledge Centre for Education in Norway. This review highlighted a range of preconditions and elements of successful partnerships between TE institutions and schools (Lillejord & Børte, 2014, 2016), as also discussed in Chapter 2. These preconditions and elements of success include having:

1. strong and engaged leadership/coordination and sufficient resources
2. symmetry and equality
3. continuous dialogue in how the collaboration should be formulated and implemented
4. exchanges of services that are meaningful and useful for both schools' and TE institutions' primary social missions

5. mutual and realistic expectations
6. concrete collaborative projects
7. a partnership that is viewed as a dynamic and continuous project
8. the appearance of a "third space".

Similar descriptions of conditions for successful partnerships may also be found in Jones et al. (2016) and Green et al. (2020). ProTed's model for transformative partnerships aims to facilitate these preconditions for and elements of success.

A large proportion of partnerships focus on cooperation over students' practical training and mentoring provision in schools. The overall purpose of ProTed's transformative model for university school partnerships is to develop quality in both schools and TEs in order to strengthen students' learning in school and student teachers' learning in practical training in schools and on campus (Hatlevik, Engelien, & Jorde, 2020a). The transformative model thus aims to alter both schools and TE programs at the university through critical reflection on existing practices and by entering into a mutual collaboration, where the active contributions of both parties are crucial to success. In addition, Jones et al. (2016) have pointed out that long-term transformative partnerships involve joint collaboration on the planning and implementation of TE programs; such programs also facilitate professional development among both student teachers and teacher educators in schools and at the university. Jones et al. have noted that transformative partnerships are generally characterized by long-term "partner involvement based on active professional learning", where the "partnerships are embedded in the ongoing structures and practices of the institutions", and where "partners take joint responsibility for mutually agreed practices and outcomes that are embedded in their respective core outcomes" (p. 116).

Figure 11.1 provides a visual overview of the aspects of collaboration in ProTed's transformative model for partnerships with university schools regarding collaboration on the management, development, and implementation of TE, both in schools and on campus and for R&D in schools.

In the following, we explain and elaborate on Figure 11.1 by presenting a few examples of collaboration approaches. The description of the model has a special focus on collaboration regarding the management, development, and implementation of TE programs and collaboration on R&D projects.

Collaboration on the management of teacher education programs

The establishment of partnerships with university schools involves fixed structures for collaboration with the administration and leadership of TE. For example, at UiO, the university schools are represented in the department board and program board for the five-year integrated TE. They are also involved in various development projects by participating in temporary

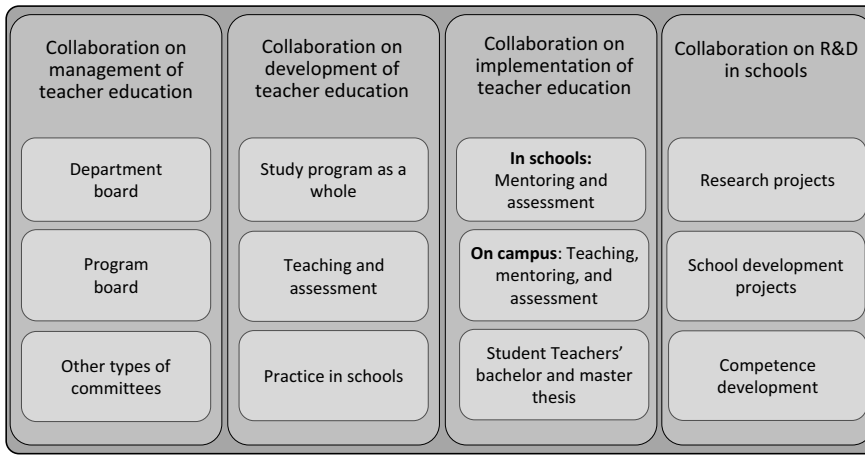

Figure 11.1 Overview of various aspects of collaboration in ProTed's model for transformative partnerships with university schools.

committees established in connection with the development and revision of the five-year integrated TE program as a whole, in addition to course plans, forms of teaching and assessment, and new forms of practice in schools. In these arenas, representatives of the university schools, student teachers, and members of the TE institution can discuss and provide recommendations about measures for further development of the TE.

Three joint-management initiatives have been co-created at UiT in conjunction with developing the "university school" concept. The first is the Principals' Forum, where the principals at each university school and the university's manager of the university school project meet several times each semester, often inviting staff from either the schools or the university. The second is the practicum teams at each school, where practicum teachers, school leadership, and the university's manager of the university school project meet regularly to prepare for the students' placement periods, to develop the receiving facilities, to plan the students' participation in the school, and to give teachers the opportunity to share experiences related to supervising student teachers. Third, long-term collaboration between the school owners (generally Norwegian municipalities) and UiT's Department of Teacher Education has resulted in joint-management meetings once every semester to plan and continue to develop substantive collaboration on TE and educational research. These collaborations have been influential at the national level and are important to be continuously developed, both for the potential to improve TE and for the chance to implement R&D efforts in schools.

In sum, these management initiatives show how key personnel involved appear across the university and school arena to engage in the operations and development elements in the TE programs that are conducted both in schools and at the university campus. In this way, different people involved in TE can

contribute to "quality work" (Elken & Stensaker, 2018; see also Chapter 2) in different arenas of TE where strategically important decisions are made. Our experience also indicates that coordinating work with researchers and classroom teachers is important, with student teachers also benefiting from this arrangement. Having a designated position for coordinated work with university schools is thus essential for success. This designated position should be held by an administrative employee who knows TE well and who is responsible for coordinating everything that takes place in the collaboration, such as contact with schools, student teachers, and teacher educators.

Another important factor is for many (preferably most) teacher educators at the university to see the benefit of and engage in collaboration with schools. A designated academic leader of the transformative partnership can contribute by conducting research on the collaborations within the partnership and by providing advice to the TE management. Such advice might include which challenges in TE should be prioritized for R&D work in collaboration with university schools. The purpose of the transformative partnerships with university schools (and their activities) also needs to be incorporated into management's priorities; in this way, the collaboration will be a comprehensive initiative and not just something a few teacher educators at the university have seen the benefit of and are conducting.

Collaboration on the development and implementation of teacher education programs

Representatives from university schools may contribute to making TE programs professionally relevant by taking an active and important role in developing and implementing integrated TE programs. At both UiO and UiT, representatives from university schools have played an important role in the current design of TE programs (described in Chapters 3 and 5), in the development of professional study courses (Chapter 4), and in profession-specific mentoring programs (Chapter 13). At UiO, experienced practicing schoolteachers who have undergone mentoring education and are employed at university schools also have a central function as seminar leaders in the third semester of the teacher program at UiO (see Chapter 3, Figure 3.4). The seminar leaders are hybrid educators who build bridges in TE (Risan, 2022) and may be described as the extended arm of the school into campus, as well as the extended arm of on-campus teaching programs in schools. For the student teachers, this setup means that the seminar teaching becomes relevant to practice, both by the seminar leaders being active teachers who can use examples from their own teaching to actualize the syllabi, and by seminar leaders having close knowledge of parts of the students' experiences from practice in schools (Hatlevik, Hunskaar, & Eriksen, 2020b).

In collaboration with university schools, UiO has also developed and piloted practice cards in 2022 that specify what should be the focus of the learning process in the various practical training courses. The practice cards

provide a description of assorted topics and activities that students are expected to gain experience with during each practice period in school. The aim of the practice cards is to facilitate a better understanding between schools and the university of what practice should contain in the various phases of the student teachers' learning courses. Research is ongoing on mentors, as well as student teachers' experiences with their usage.

At UiT, representatives of university schools have participated in the development of new forms of student teachers' practice courses in schools, procedural and action-oriented bachelor's theses, the initial master "gathering" where student teachers meet with school representatives to discuss and choose topics for their master's theses, and the final master's conference, where student teachers present their master's theses to the public. The "Focus-Child Project" at UiT is another example of how cooperation with university schools has contributed to strengthening student teachers' learning by creating a new model for combining experience-based knowledge from practical training with the pedagogical theory taught at the university. The purpose of the project was to develop stronger connections between theory and practice and to strengthen the role of practical training in TE (Klemp & Nedberg, 2016). The project was carried out in the second year of the TE program. Each student teacher followed a chosen pupil (focus-child) in school during their practice periods. The close observation of the pupil in different situations was the preparation for a formal written assignment where the student teacher discussed the child's competence and development within different developmental areas. While the project was initially developed by the teacher educators at the university, it was carried out, evaluated, and further developed in cooperation with the school-based mentors and the student teachers through "dialogue seminars" with all three parties, a "dialogue café" with the student teachers after each practice period, various evaluation meetings, and written evaluations.

In the following, we exemplify how collaborations between representatives from university schools have helped to develop and implement dialogue seminars, which have contributed to the appearance of a "third space" (Daza et al., 2021).

Dialogue seminar

Inspired by the idea of the third space (Zeichner, 2010), UiT developed dialogue seminars in collaboration with university schools. Dialogue seminars (Rørnes, 2013; Steele & Danielsen, 2014) are pedagogical meeting places among three parties: student teachers, school-based mentors (schoolteachers with mentoring responsibilities), and university teacher educators (academic staff with teaching responsibilities). These seminars are important collaborative tools that have joined efforts between the university and partner schools when piloting the five-year master's programs for TE at UiT, where relevant topics have been discussed by means of lectures, practice narratives, and group

dialogues (Vedeler, 2013, p. 18). Dialogue seminars, first established in the third year of the TE programs for primary- and lower-secondary schools, were initially allocated for mentors, university teacher educators, and student teachers to follow up on the student teachers' progress with their bachelor's thesis (Steele & Danielsen, 2014).

Together with university schools, UiO has adapted and incorporated dialogue seminars in the sixth semester, midway through a four-week continuous practice period in the integrated TE program for teaching in secondary schools. In this version of the dialogue seminar, student teachers are divided into groups of 4–6 student teachers, a school-based mentor, and a university teacher educator. The student teachers, in turn, present a case from practice about a situation they find particularly challenging, such that others in the group may provide feedback (Hatlevik, Hunskaar, & Eriksen, 2020b). This form of dialogue can be described as a "transformative learning activity" (Mezirow, 2009) that provides the opportunity for critical reflection on practice; during such sessions, students can discuss specific challenges they experience using practical knowledge, theoretical perspectives, and previous research findings. The aim of transformative learning activities is to give student teachers a new and deeper understanding of various phenomena by looking at them from different angles, using both practical and scientific knowledge (see Chapter 9).

Collaboration on research and development

Collaboration on R&D projects within partnerships with university schools may take several forms and can contribute to innovative practices. One way is to offer joint R&D projects between several schools and the TE institution. Such projects can feature elements of professional development and guidance related to specific topics based on an analysis of developmental areas that university schools have reported as being particularly interesting for the individual school. At UiT, starting in 2014, a PhD candidate examined joint mentoring practices between university- and school-based teachers, concentrating on those student teachers' bachelor's projects where the intention was to establish tripartite collaborative research projects (Steele, 2018a).

Examples of completed joint projects at UiO include "Do You Want to Develop Your Mathematics Teaching?" (Hunskaar & Borge, 2015) and "Lesson Study as a Method of Professional Development" (Eriksen, 2016), both inspired by action learning. Another way of facilitating collaboration on R&D work involves the announcement of seed funding once a year, with the aim of encouraging schools and scientific staff at the TE institution to collaborate on developing ideas for R&D projects with schools. The criteria for receiving seed funding are that the R&D project must be relevant to TE and support the development of schools and the university school partnership. For university teacher educators, the seed announcements provide the opportunity to receive funding to prepare larger project applications and to

establish meeting places with university schools in order to plan collaborative projects. Several of the seed projects have become an arena for the development of master's projects for student teachers (Hatlevik, Hunskaar, & Eriksen, 2020b).

In the following, we exemplify collaboration on R&D work by presenting two cases: R&D circles and the dialogue café.

Research and development (R&D) circles

R&D circles connect teachers' development work and student teachers' master's assignments. They involve both an institutionalized collaboration between campus and school on R&D work, which represents a new practice form for the ninth semester of the TE related to the master's thesis at UiO. R&D circles typically have 10–12 participants consisting of 1–2 teacher educators at the university, 2–3 student teachers in their ninth semester who will collect data for their master's theses, and 6–8 schoolteachers at university schools. The activities in an R&D circle recognize that teachers in schools, researchers on campus, and student teachers all have varying needs yet are able to contribute to the R&D circle with their specific expertise.

An R&D circle lasts one year and consists of three phases. The first phase consists of knowledge gathering, with participants meeting 5–6 times to read and discuss research literature on a predetermined topic. The second phase includes 2–3 meetings and involves developmental work in which the R&D circle's knowledge is converted into concrete ideas for teaching sequences. The planned teaching is implemented in the third phase, where the master's students carry out research projects on the implementation. After implementation, the participants engage in joint reflection on their experiences from the implementation project. Ongoing research into the participants' experience with the initial implementation of an R&D circle in 2021–2022 on the topic "Power and Sustainability" has provided encouraging results for this type of collaboration. In the future, R&D circles are planned with other topics such as "Democratic Preparedness Against Racism and Antisemitism," "Multilingualism, Citizenship, and Democracy," and "Sustainability and Local Ecosystems."

Dialogue café

The dialogue café is an innovative method of dialogic research that allows for the involvement of large groups of participants in exploratory conversations in order to uncover and verify the phenomenon being studied (Löhr et al., 2020). This method, also called the "world café" (Brown, 2010), is conducted through seven principles:

1. clarify the theme and context
2. create a hospitable and safe environment

3. explore issues that are important to the participants
4. encourage sharing and involvement
5. connect different perspectives
6. listen together to create insight, and
7. share collective findings.

Vedeler (2022) used the dialogue café as a research method as part of a PhD project at UiT, with six schools engaged to explore, unfold, and discuss the practice of school–home collaboration in upper-secondary school. The aim of the partnership effort between the university and schools was to facilitate dialogues of discovery and to create a democratic ethos for a deeper dive into understanding real school-life experiences (Vedeler & Reimer, 2023). Four dialogue cafés were held during the project. Three cafés involved participants from upper-secondary schools, and one involved former students from the participating schools. The dialogic data material was recorded, analyzed, and followed by literature studies to better understand and justify school–home collaboration as a practice in upper-secondary school (Vedeler, 2022). In this way, by including various stakeholders' experiences and reflections in theorizing work, and by challenging established theory, the concept of "collaborative autonomy support" was developed and introduced as a core purpose of conducting school–home collaboration in upper-secondary school. Due to the dialogic and theorizing approaches used in this project, its innovations were both methodological and theoretical in nature.

Concluding remarks

ProTed's model for transformative partnership with university schools and examples from the innovations derived from the collaboration show that university schools can contribute to "quality work" in teacher education related to the management, development, and implementation of TE. In addition, collaboration can help to promote practice-relevant R&D in schools. These aspects of the collaboration process are part of a mutually influential relationship and mean that the participation of schools is not reduced to individual contributions; instead, systematic and targeted collaboration promotes quality in TE and in schools. The premise for establishing transformative partnerships is that the TE institution and schools consider each other to be important contributors to TE and school development (respectively), in that they represent different but complementary knowledge. Common features of the various collaborations include using a dialogic approach, having a desire to create coherence between theory and practice, and using relational support in professional development and research. In addition, a stated aim is that knowledge acquired through transformative partnerships with university schools should be continuously disseminated to other partner schools.

Acknowledgments

The examples of collaborative projects described in this chapter are far from exhaustive in showing all the work that has been done in these partnerships. The development of a transformative partnership between universities, schools, and school owners is only possible with the contribution, involvement, enthusiasm, and dedicated efforts of several different individual people and groups. We would like to thank all teachers, school owners, student teachers, and academic and administrative staff in the teacher education programs for their involvement.

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12 School-based mentoring tools combining research knowledge, student teachers' needs, and mentors' professional judgment

Eli Lejonberg, Katrine Nesje, Tove Seiness Hunskaar and Eyvind Elstad

Introduction

Mentoring is seen as a pillar for developing student teachers' competencies in the integrated teacher education (TE) model described in this book. Studies indicate that mentoring in practicum is characterized by diversity (NOKUT, 2019). Underprepared mentors and diverse opinions on how to contribute could hamper the potential of professional development in mentoring, indicating that TE institutions should engage for quality in mentoring (Hoffman et al., 2015). Research indicates that the use of tools in mentoring student teachers has the potential to drive student teachers' professional development. However, findings also show that the use of tools for mentoring is individual and dispersed, and the importance of more structured and holistic approaches to mentoring student teachers has been stressed (Nesje & Lejonberg, 2022).

In the ongoing research project reported in this chapter, tools are developed to ground mentoring in 1) research-based knowledge, 2) student teachers' individual needs, and 3) mentors' professional judgment. Such tools facilitate novel interactions between mentors and student teachers in order to enhance professional development. In this contribution, we elaborate on TE institutions' efforts to contribute to quality in mentoring through the innovation and implementation of research-based tools to be used in school-based mentoring. We illuminate how tools can contribute to the mentoring of student teachers and how researchers and actors from the practical field can co-construct innovative tools for mentoring for the TE practicum. We elaborate on the first by describing our theoretical framework and three different packages of tools, which are then tied together in a holistic approach to mentoring. We also present findings related to experiences with the use of such tools. Further, we elaborate on how researchers from mentor education and initial TE, together with school-based mentors, can co-construct innovative tools for mentoring. We argue that the development and implementation of packages of tools related to 1) a decision simulator, 2) responses from students and self-evaluation, and 3) practice videos can define a holistic approach to mentoring in practicum, leading to enhanced quality in mentoring in TE.

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Ellis et al. (2019) argue that "many 'innovations' merely reproduce unequal and unjust situations, educationally and more socially" (p. 3). Therefore, Ellis et al. (2019) argue that "technology-based claims of innovation in teacher education […] must be viewed critically" (p. 8). Such investigation of innovations based on fundamental questions has the potential to challenge innovators (Mishra, 2020; Siritnik, 1999). In this work, we strive to innovate tools for use in practice that are based on research evidence and pedagogical theory and guided by ideas of "principled innovation" (Mishra, 2020; Siritnik, 1999). The principled innovations framework challenges innovation processes to do the following: 1) innovate for uniqueness by developing flexible designs that acknowledge the uniqueness of individuals, 2) innovate with care by keeping the needs, wellbeing, and motivations of actors and communities in mind during the innovation processes, and 3) innovate for problem solving by taking a stance with regard to pressing problems to provide creative solutions for positive change. We argue that the presented tools are flexible innovations that can contribute to the quality of mentoring without hampering mentors' ability to adapt and adjust their practice to individual and contextual diversity. Contextual insight and collaboration with potential users of tools are pillars in such innovative work. As such, piloting and co-construction occur alongside each other, driving tool innovations.

Tools for Mentoring: Presentation of innovations and grounding evidence

The tools from the Tools for Mentoring project were developed for flexible use in practicum and campus-based activities. However, the three tool packages were also developed to follow up on each other in a holistic structure across the eight-week practicum period that the student teachers undergo in the seventh of ten semesters (see Table 12.1). The tools developed all consist of a data gathering tool, visualization tools, and related guides for the use of data in mentoring, as well as theoretical contributions for further reading and elaboration on evidence grounding the different tool packages. The decision simulator, response tools and app for recording, and use of practice videos serve as the data gathering tools that ground each tool package. Student teachers can start their practicum by exploring values and beliefs related to the teacher role using the decision simulator and accompanying guides for reflection in different mentoring settings. Around halfway through the practicum, when the student teachers and students have had time to develop a relationship, the second package of tools invites students to provide feedback on student teachers' teaching. Additionally, for this package, accompanying guides facilitate interpretation and reflection on the data-gathering tools, encouraging student teachers and mentors to develop individual learning goals to be further explored with video. The last package of tools uses video to gather data from student teachers' teaching during the last part of their practicum. The video tools also provide guides for planning, editing, and the use of

Table 12.1 Illustration of tools as interrelated but independent packages of sub-tools with different purposes

Tool package number	*Theoretical grounding/ evidence*	*Data gather tools*	*Analytical approach*	*Visualization tools*	*Tools for data use*
1	Theory of classroom leadership styles	Decision simulator	Student teachers' choices are related to theory of four approaches to the teacher role	- Bar graph - Flow diagram	- Guide for interpretation of results and theory - Guide for student teachers' self-reflection - Guide for student teachers' peer mentoring - Guide for one-to-one mentor conversations
2	Theory of teaching competences	- Student response tool - Self-assessment tool	Data from the two data -gathering tools are compiled and related to seven aspects of teaching	- Spider chart - Lollipop chart	- Guide for interpretation of results and theory - Guide for student teachers' self-reflection - Guide for student teachers' peer mentoring - Guide for one-to-one mentor conversations
3	Theory of video use for professional development	- App used to film in accordance with GDPR - Guide for planning of filming	Guide for editing and presenting video sequence	- Technical solutions for sharing video sequence	- Guide for student teachers' self-reflection - Guide for student teachers' peer mentoring - Guide for one-to-one mentor conversations

practice videos in mentoring. As such, the tools relate to each other as connected but simultaneously independent packages for tools.

Decision simulator

The decision simulator consists of sound files, pictures, and written text that present various scenarios related to approaches to the teacher role (see Figure 12.1). It enables the user to identify as a teacher and make choices

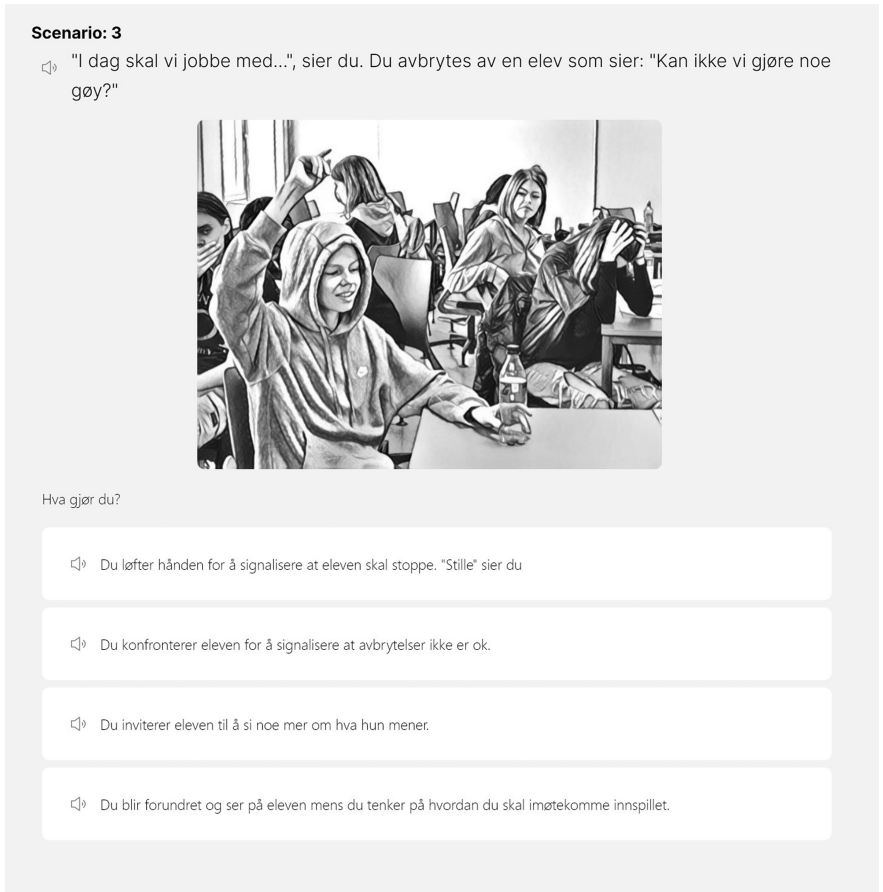
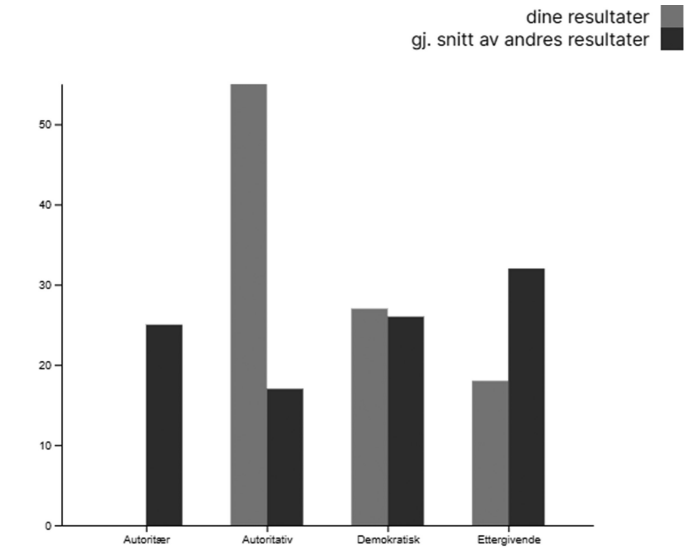


Figure 12.1 A snapshot illustrating how the simulator presents challenging scenarios in the form of sound files and pictures and by presenting alternative actions related to the theoretical framework. Translation of Norwegian text in Scenario 3: "Today we will work on…" you say. You are interrupted by a student who says, "Can we do something fun?" What do you do? 1) You lift your hand to signal that the student should stop. "Quiet," you say. 2) You confront the student to signal that interruptions are not okay. 3) You invite the student to elaborate on her opinion. 4) You get puzzled and look at the student while wondering how to accommodate the input.

based on student behavior. In the simulator, student teachers are challenged in demanding but quite common scenarios that teachers experience in their daily work. The decisions student teachers make in the simulator are grounded in theory related to the teacher role, describing the following four approaches: authoritarian, authoritative, democratic, and permissive (Arvola et al., 2018; Baumrind, 1971/1991; Ragnemalm & Samuelsson, 2016). A visualization tool to compile data is used as a starting point when the student teachers' experiences working in the simulator are followed up with guides for self-reflection, one-to-one mentoring, and peer mentoring. Such a design is based on evidence indicating that a theoretical grounding of mentoring can be useful for promoting reflection and professional development for student teachers (Garrigan & Pearce, 1996; Hoffman et al., 2015; Rehak et al., 2016; Toom et al., 2015), as well as evidence indicating that teacher group reflection can challenge values and beliefs that are relevant to teaching and professional identity (Garrison & Akyol, 2015; Sutherland & Markauskaite, 2012; Aas & Flückiger, 2016).

When student teachers complete the decision simulator, a visualization is generated of how their decisions relate to preferences particular to different approaches to the teacher role, as provided by the theoretical framework (see Figure 12.2).

The results are then explored in conversations with mentors and peers and through self-reflection. The guides for mentors, peers, and the student teachers themselves are resources that are used to elaborate on values, beliefs, and challenges related to the teacher role on their own and with others. For instance, the guides encourage student teachers to reflect on how they would like to develop as teachers. Although pilot findings indicate that conversations related to the decision simulator have the potential to make student teachers aware of their own approaches to the teacher role in different situations and how their choices can influence interactions with student teachers (Jøssang, 2022), other investigations indicate the essential role of mentors' professional judgment and experience to accompany the use of tools. For instance, a pilot study indicates that student teachers perceive peer mentoring based on the use of the decision simulator relevant to challenge thinking about the teacher role. However, we also have indications that exploration in peer groups could benefit from mentor facilitation. Findings from other studies using the same simulator indicate that exploration of topics presented by the tools in conjunction with mentors has the potential to challenge student teachers' reflection. For instance, findings indicate that mentors can assist student teachers' reflections related to their perception of teacher role ideals and how to develop toward such ideals (Flatum, 2022). Moreover, our pilots also indicate that individual characteristics, such as affective commitment and motivation, can affect how student teachers perceive the use of tools (Lejonberg, Nesje, Elstad, & Christophersen, in press).



Figuren under viser hvordan du har utforsket ulike valg i simulatoren.

Gruppe	Scenario-1	Scenario-2	Scenario-3	Scenario-4	Scenario-5	Scenario-6
Autoritær						
Autoritativ		✓		✓	✓	
Demokratisk			✓			✓
Ettergivende	✓					

Figure 12.2 A snapshot of how results from the simulator are presented to the student teacher. The green bars indicate the degree to which the student teacher's choices in the simulator align with the different approaches to the teacher role provided by the theoretical framework. The blue bars visualize other student teachers' answers. The table under visualizes which approach to the teacher role (authoritarian, authoritative, democratic, and permissive) answers relate to for each of the six scenarios presented by the simulator.

Response tools

The response tools consist of two aligned questionnaires that gather student teachers' self-reported evaluations and students' feedback on student teachers' teaching related to the competencies that the teachers need to master. These competencies are provided by the Tripod 7Cs framework, which comprises showing *care* for students, *conferring* with students' ideas and opinions, *captivating* students by making learning interesting, *clarifying* learning content,

consolidating to synthesize knowledge, *challenging* students, and *classroom management* (Ferguson & Danielson, 2015; Kuhfeld, 2017; Wallace et al., 2016). From the results, a visualization is made of the overlap and divergence between the report of the students and the self-report of the student teacher (see Figure 12.3). As for the simulator-based tools, also these tools are provided in the form of guides for the exploration of results in conversations with mentors and peers and through self-reflection. In the self-reflection tool, the student teachers are encouraged to reflect on their own development and teacher competence. Conversation guides are developed to ground discussions related to aspects such as what teachers need to master, how the seven competencies can be interpreted, and how teachers can get information about their own competencies.

With the two aligned questionnaires, student teachers gather responses from students and self-report on the same items. The results are aligned, visualized, and made the object of exploration with guides for self-reflection and in dialogues with peers and mentors about core competencies that teachers need to master. These tools are based on evidence indicating that student responses to student teachers' teaching have the potential to drive professional reflection and development (Eriksen et al., 2020; Lejonberg et al., 2016/2022). Pettersen and Lejonberg (2022) investigate how the use of elements from these response tools in mentoring contributes to theoretical grounding and

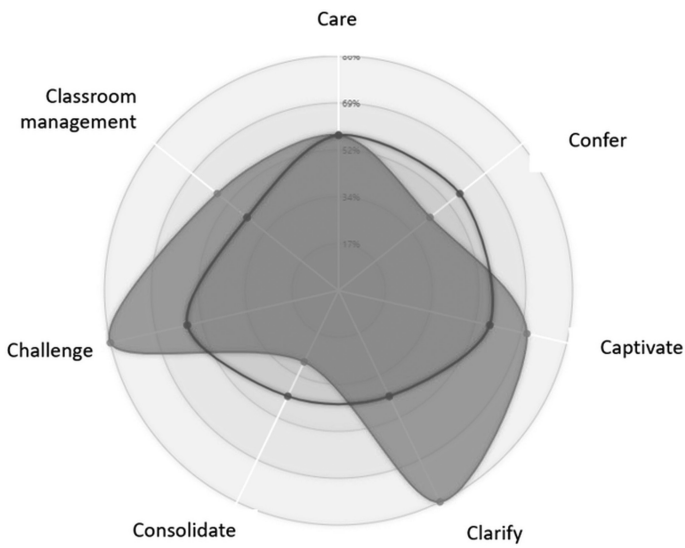


Figure 12.3 A spider web diagram illustrating how results from self-evaluation and feedback from students are presented to student teachers based on the seven following categories: care for students, conferring with students' ideas and opinions, captivating students by making learning interesting, clarifying learning content, consolidating to synthesize knowledge, challenging students, and classroom management.

reflection. In this study, students' responses were used as a starting point for mentoring conversations. Findings indicate that the use of such tools in mentoring can contribute to theoretically grounded reflection related to competencies teachers need to master while simultaneously challenging and supporting student teachers. Four types of use are highlighted. First, results from student answers are used by mentors supportively to highlight mentees' successes, for instance, by relating high student scores to mentors' own observations of what mentees master. Second, mentors use results to challenge student teachers to think about how they can improve on certain aspects. However, in the third type of use, experiences and theory from the response tool are often used independent of student response by bringing theory-based terms from the tool into conversations to ground exploration on essential teacher competencies. Lastly, experiences from the use of the tool are used as a stepping stone for reflection, for instance, by challenging mentees to elaborate on what they found familiar in the responses or what they learned from using the tool.

Practice videos

The capture and use of a practice video are guided by tools for preparing and recording classroom video and then processing it for use with mentors and peers and to guide self-reflection and discussions. Practice videos display aspects of one's own practice. The tools related to the use of practice videos utilize student teachers' learning goals as a starting point to plan and conduct teaching and to use clips to elaborate on one's own practice in mentoring. To capture the video, an app developed to ensure compliance with the General Data Protection Regulation (GDPR) is used (UiO, 2020, see also Chapter 16). The video tool is based on evidence indicating that the use of practice videos of student teachers' teaching has the potential to promote professional development (Bjørndal, Mathisen, Wennergren, & Thornberg, 2023; Santagata, Zannoni, & Stigler, 2007) and reflection (Körkkö, Morales Rios, & Kyrö-Ämmälä, 2019; Toom, Husu, & Patrikainen, 2015). Nesje and Lejonberg (2022) found that the use of video can make connections between teaching, observation, and mentoring. However, to elicit the potential of video clips, something more than just a video is needed (Körkkö et al., 2019; Siry & Martin, 2014). Evidence indicates that additional tools can aid in the eliciting of video-driven reflection in mentoring conversations (Bjørndal et al., 2023; Rich & Hannafin, 2008; Siry & Martin, 2014). Hence, the video-based tools used in the current project, as with the other packages of tools, include discursive tools from a guide for self-reflection, one-to-one mentoring, and peer mentoring. Together with data generated from tool packages 1 and 2, elaborated on through self-reflection and in mentoring conversations, the findings from the project indicate that the combination of video and guides for planning, editing, and use of clips enables individualization of and development in mentoring conversations with practice videos. Thus, paving the way toward mentoring conversations

where student teachers access and choose the video clip can empower them as leaders of their own developmental processes in mentoring (Hunskaar & Gudmundsdottir, 2023).

Discussions and implications

In the current work, we argue that innovations of tools for mentoring have the potential to enhance the quality of TE by integrating research-based knowledge and pedagogical theory in practicum mentoring. As visualized by the presentation of the tools and experiences related to their use, the value added by using such tools can be related to the following:

- Theoretical grounding of topics elaborated on in mentoring conversations enabling actors to spend time on topics that research indicates as essential for student teachers.
- A common and precise language in mentoring conversations provided by the theoretical grounding of the tools.
- Student teachers' reflections, as they are encouraged to use theory to anchor investigation of their own practice.
- Empowering student teachers' teachers in mentoring relationships and enabling them to lead their own developmental processes.
- Enabling mentors to use evidence-based approaches to mentoring through means such as providing guides that are relevant to triggering mentees' reflection.
- Enabling mentors to adjust mentoring to the challenges faced by the student teachers from the grounding of activities in individual learning goals as encouraged by the tools.

In our efforts to investigate how researchers and actors from the practical field can co-construct tools similar to those elaborated in this paper, the principled innovations framework has been a stepping stone. As visualized, the framework can guide innovation processes, underlining the importance of continuously testing and critically assessing innovations as part of the process. As such, several pilots and tests were included in the project. Data collection as part of such testing has led to insights into how the tools can play out in mentoring, as well as how these tools can be adjusted.

As mentioned, the investigated tools can be used separately in diverse contexts to drive reflection and conversations related to certain aspects of becoming a teacher. However, as other studies on the use of tools in mentoring have indicated, there is reason to believe that a holistic approach to mentoring in practicum can enhance quality processes in this matter (Hunskaar & Gudmundsdottir, 2023; Nesje & Lejonberg, 2022). Piloting has indicated that student teachers who used all three tool packages see a trajectory in the development of their teaching throughout the practicum and that the tools can stimulate rich conversations where participants are enabled to go deep

into relevant issues. Such features can be related to the fact that the tools provide a theoretical grounding and, consequently, a common language consisting of relevant terms for exploration and elaboration of the essential aspects of becoming a teacher, such as approaches to the teacher role and core competencies for teachers. However, the tools also challenge participants, as they demand adaptation to new ways of grounding and interaction in conversations (Hunskaar & Gudmundsdottir, 2023). Our investigations of mentoring with the use of tools visualize diversity in their use, in contrast to the standardization of mentoring or simplified approaches. Findings indicate that anchoring in tools can potentially drive the common exploration of complex features related to the teacher role, for instance, by introducing theory about teacher competence related to exploratory questions such as "What does it mean to provide care for students?" (taken from the guide for one-to-one mentoring based on student responses). The presented tools can empower student teachers, given that the tools are provided by the student teachers, and can establish student teachers as owners and providers of the gathered data. The tools put student teachers in control and allow them to choose how and what to share with mentors, thereby encouraging mentees to take responsibility in the conversations.

We argue that theory and research play essential, but not sufficient, roles in providing actors in the practice field with relevant knowledge in accessible wrapping. The idea of principled innovations can guide processes that innovate for uniqueness and are based on insights and knowledge about relevant actors and contexts (Mishra, 2020; Siritnik, 1999). Such approaches can contribute to innovations where flexibility and adaptation to uniqueness are embedded within the innovations. As described, the innovation of the tools presented in this text is developed in close collaboration with relevant actors in the field. We also involved mentors themselves in all phases of innovation to enhance flexible and relevant innovation designs. In many cases, researchers from the field of education, innovating together with actors such as teachers, mentors, and school leaders, have the same background as the practitioners and are involved with the actors in institutionalized partnerships (Lejonberg et al., 2017). Such common knowledge can provide a fruitful starting point for relating to relevant contexts while simultaneously exploring problem solving. On the contrary, one could also imagine the opposite: researchers assuming they already know the essentials of practitioners and contexts could hamper their willingness to strive to understand challenges in the given context. By co-constructing tools we seek open processes where both experience-based and theory-based knowledge drive flexible innovations. Flexibility is essential to providing mentors with tools suitable for integration with professional judgment and to adapt the use of tools in practice to the given context and actors.

Experiences related to the presented tools also indicate the potential for a wider range of use. Given the indicated relevance for student teachers' professional development and the tools that affect mentoring, a new project works

to further develop the tools for use with other groups of newly qualified teachers, as well as with experienced teachers (UiO, 2022). In addition, there seems to be a potential to develop tools to enhance actors' awareness and facilitate the integration of newly qualified teachers as resources in professional communities (Jacobsen et al., 2023; Lejonberg et al., 2022).

Concluding remarks

Based on the findings from pilots and innovation processes, we argue that the development and innovation of the described tools have the potential to strengthen mentoring in TE. These tools can enable research-based mentoring and allow the tailoring of mentoring to individual needs. The described tools integrate knowledge about essential aspects of teacher roles, competencies, reflection, and mentoring strategies. However, there is reason to continuously question and critically examine innovation processes in TE (Ellis et al., 2019). A theoretical framework for guiding and challenging innovation processes can therefore be essential (Mishra, 2020; Siritnik, 1999).

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Part IV

Development of professional identity

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13 Promoting professional identity development

Teachers as mentors on campus

Ida K. Riksaasen Hatlevik and Eli Lejonberg

Introduction

In this chapter, we examine a voluntary profession-oriented mentoring program for student teachers participating in a five-year integrated teacher education (TE) program, based at the University of Oslo (UiO) campus and a part of the Centre for Professional Learning in Teacher Education (ProTed). In the following sections, we will outline the characteristics of the mentoring program and examine how it can accommodate some of the challenges student teachers often face.

Previous research shows that student teachers' experience of social and academic integration and belonging to a study community is a significant factor for their study engagement, learning, well-being, and completion of their education (Kuh et al., 2014). As mentioned in Chapter 3, first-year student teachers at UiO do not have joint teaching among the entire cohort. Instead, they start their studies by taking academic subject studies at other departments, and many student teachers experience problems in identifying which other students are also student teachers.

Another challenge student teachers may face is related to the development of a teacher identity. Identifying oneself as a future professional practitioner is a key part of the qualification process (Heggen, 2010). Previous research indicates that developing a sense of professional identity is related to teachers' self-efficacy, motivation, commitment, and job satisfaction—and thus is essential in becoming and being an effective teacher (Flores & Day, 2006). Even though no consensus exists among researchers on the precise definition of teachers' professional identity, researchers agree that teacher identity is not a fixed personal attribute but rather a relational phenomenon and an ongoing dynamic process that develops over time (Beijaard et al., 2004). Beijaard et al. (2004) note that student teachers need to be made aware of and reflect critically on deficiencies in their own preconceptions of what characterizes a professional teacher. The development of a professional teacher identity is thus a vital component in the process of learning to become a teacher. Previous research also highlights the need to address teacher identity effectively as a component in TE (Beauchamp & Thomas, 2009).

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A third challenge identified in the research literature on professional education, especially as it concerns TE, is related to perceived coherence (Canrinus et al., 2017; Hammerness, 2013; Hatlevik & Smeby, 2015). Many student teachers experience difficulties in seeing the connection between what they learn on campus and what they learn at the various schools during practicum. Some student teachers also find TE to be somewhat irrelevant to their later professional practice (Grossman et al., 2008).

The profession-oriented mentoring program is a quality innovation that is designed to address these challenges. The purpose of the mentoring program is to enhance the quality of the TE program by promoting student teachers' social and academic integration, helping them to develop a teacher identity, and creating a sense of coherence between the content in TE and professional practice. A longer-term goal is to prevent student dropout. The development of the mentoring program is an example of "quality work" (Elken & Stensaker, 2018) in TE, where the intention is to find solutions to specific problems together with representatives of "university schools" (see Chapter 11 for more on this concept). In this chapter, we describe the development, design, and content of the mentoring program. We also present the primary findings from a longitudinal study on the mentoring program's enhancement of the quality of TE programs at UiO and its outlining of transferable value to other professional programs.

Development, design, and content of the mentoring program

The mentoring program, which was developed and is operated in collaboration with university schools, is based on experience from a 2014 pilot program. In spring 2016, a project group that included representatives from the teaching management of UiO's five-year integrated TE, university schools, and administrative and academic staff (the authors of this chapter) developed the main ideas and organization of the mentoring program, which is offered as a supplement to the ordinary study provided at UiO. The mentoring program is offered as an addition to traditional teaching on the campus (which is led by teaching staff at the university) and placement learning in practice schools mentored by schoolteachers.

The mentoring program was specifically designed to accommodate the challenges faced by student teachers at a large university in which, after the opening week of the first semester, almost no communal teaching takes place during the first academic year. The mentoring program is offered to over 1,000 student teachers, divided into 5 study cohorts and 48 combinations of subjects. The student teachers take 180 credits in one academic subject and 60 credits in another, for instance, English and Norwegian. The teaching-profession subjects (pedagogy, subject didactics, and teaching practice in schools) account for only 60 ECTS (referring to the European Credit Transfer and Accumulation System) out of the 300 ECTS that make up the master's programs and are taught in the third, sixth, and seventh semesters (see Table 3.4 in Chapter 3 for details). The student teachers' first year in the mentoring program thus constitutes a structured relation to the TE program.

The mentors are assumed to possess favorable attributes to assist student teachers as they navigate among different learning arenas. The mentors primarily work as teachers in lower- or upper-secondary schools and have undergone mentor education (Lejonberg et al., 2015) at the university level—15 or 30 ECTS—and are paid by the university for the hours they work in the program. When student teachers begin their five-year TE program, they are divided into groups of 10–20, based on subject specialty, and are matched with a mentor who teaches the same subjects at the same level that the student teachers are studying. Such matching based on grade level and subject area is in accordance with research findings that indicate that a fit of mentor–student teacher similarities can affect the mentoring relationship and, eventually, teacher outcomes (Kwok et al., 2021). Previous research indicates that quality mentor relationships can contribute to preservice teachers' well-being and professional development (Burns et al., 2016; Sørensen & Bjørndal, 2021). Dreer (2021) argues that mentor–student teacher relationships should be established early and nurtured over time by continuously working on stable student teacher–mentor pairings over time. Each mentoring group (and the relationship with the mentor) should remain stable throughout the entire five-year TE program.

The mentoring program is offered during the entire study period, and a course plan for each semester is developed by the project group. The mentoring program consists of ten courses—one per semester—with content that aligns with where the student teachers are in the regular TE program (see Table 13.1).

Each course has a course plan and a web page, and the student teachers sign up for the mentoring course online in the same way as other courses. Schedules are generated so that student teachers have the times of the mentoring sessions

Table 13.1 List of topics in focus in the various mentoring courses

Semester	*Short focal topic description*
1	Perspective change—from pupil perspective to teacher perspective; core practices, the classroom environment, relationship building
2	Teacher professionalism, professional development, the teacher's role and tasks
3	The many faces of the classroom: different ways pupils learn
4	Academic versus educational: how the academic subject translates into curriculum
5	Challenges and opportunities with academic subjects and school teaching: different learning arenas
6	Being an active mentee: the use of assessment criteria in practicum
7	Self-assessment and professional learning goals
8	Teacher leadership—what kind of teacher do I want to become?
9	Newly qualified teachers as resources: my professional interests
10	Job employment: showing my competence

registered in their study calendar, along with teaching in other study courses. Because the mentoring courses are organized in the same way as other course operations at UiO, it is easy for the student teachers to inform themselves and for the study program administrators to run the mentoring program.

Each mentoring course consists of 2–3 three-hour sessions. During the beginning of every semester, the mentors, with support from the project group, continuously devise plans for the sessions with the student teachers. The mentors then use these plans as the basis for their detailed scheduling and running of the sessions. Most of the learning activities physically take place on campus, although they also involve school visits. While mentoring courses do not yield study credits, there is no exam, and participation is voluntary, student teachers who participate in at least two of the three meetings for each course receive a certificate upon graduation that describes which mentoring courses they have participated in.

Research on the mentoring program

Hatlevik and Lejonberg conducted a longitudinal study on the mentoring program from 2016 to 2022 (Hatlevik & Lejonberg, 2019; Lejonberg & Hatlevik, 2022). The study was approved by the Norwegian National Research Ethics Committees. In this chapter, we report on the main findings from our research, based on data from both focus-group interviews and surveys among student teachers and mentors. The stated goals of our study were to determine whether the mentoring program had fulfilled its intentions and to identify potential areas for improvement.

The interviews were conducted in the spring of 2017 with a group of four mentors and four groups of first-year student teachers who had attended courses in semesters 1 and 2. The interviews were what Maxwell (2013) would describe as "semi-structured," that is, thematically structured but open in form. "Open in form" means that the interviewer followed up interviewee responses to reveal underlying explanations. The four key issues raised during the interviews were (1) challenges the student teachers perceived in their first year in that role, (2) the content of the mentoring program, (3) the way in which courses were run, and (4) mentor characteristics. Both authors of this chapter participated in the interviews. Recordings of the interviews were transcribed to extract word-for-word quotes from the interviews. The quotes in this chapter have been lightly edited for clarity in English. Participants were informed that their statements would be anonymized in the publications to follow. The surveys were conducted among student teachers at the end of each semester from 2016 to 2021 and among mentors in January 2022. The surveys contained both checkbox and open-ended questions.

This chapter uses data and quotes (from both student teachers and mentors) that are illustrative of how a mentoring program on campus can enhance student teachers' social and academic integration, help them to develop their teacher identity, and facilitate a sense of coherence between the content in TE

and professional practice. In addition, we have included information about the administrative running of the mentoring courses, reported by representatives from the study administrators. Our analyses are based on comparisons across various sources and may be described as "horizontal" and "vertical" analyses (Miles & Huberman, 1994).

Presentation of relevant data and analysis

In the following, we report on the primary findings from the research on the mentoring program related to the enhancement of quality in the five-year integrated teacher education at UiO. These findings may have transferable value to other teacher- and professional-based programs.

Learning activities with professionally relevant content facilitating social integration

The findings indicate that the content of the sessions accommodated the first-year student teachers' need to both become part of a community of student teachers and to learn more about the teaching profession, and that this combination had a positive effect on the student teachers' social and academic integration, as well as their agency and study engagement. A representative quote for this finding is expressed by Lise:

> The mentoring program was especially important to me at the start of the education course, because that's where I got to know my fellow student teachers who were taking the same combination of subjects as me. I've enjoyed following many of the student teachers I got to know through the first mentoring course, both socially and professionally.

In the mentoring program, the mentors model student active-learning activities that the student teachers themselves can use later. The student teachers were able to observe and discuss the meaning of being a teacher and what implications this meaning had for what they needed to develop to achieve professional competence. The findings suggest that the link between meeting both a social need and the need to gain more in-depth knowledge of what characterizes the teaching profession was an important reason that the student teachers who participated in our study were very satisfied with the mentoring program. The program had helped them get to know others who were enrolled in the same course of study and to feel connected to the teacher program; the program had also helped them to identify themselves as prospective teachers.

Trine described how the program's learning activities had helped her become more confident in her choice of profession:

> The mentor initiated several different activities, which both allowed us to get to know our fellow student teachers better and to reflect on and talk together about what it means to be a teacher and what the teaching

> profession might look like. I was a little unsure about whether the teaching profession was really for me, but after participating in the first year of the mentoring program, I've become more sure! Now, I really think it'll be nice [to be a teacher].

Student-active and transformative learning activities promoting teacher identity development

The student teachers especially highlighted the school visits and discussions with peers and their mentors as inspiring eye-openers that had given them a new understanding of a teacher's tasks, role, and competence needs. The school visits included observing lessons from a teacher's perspective and having subsequent discussions about the observations among the student teachers and with the mentor. During the on-campus mentoring sessions, the student teachers were given several discussion-based tasks; for example, they were asked to discuss the characteristics of a good teacher, the nature of teacher professionalism, and what qualities indicate skilled professional practice. This type of learning activity may be described as "transformative" (Mezirow, 2009) and helps to promote teacher identity development among student teachers (Beijaard et al., 2004; Illeris, 2014).

The findings from interviews with first-year student teachers indicate that through their participation in the mentoring program, they had become more aware of what a teacher's role involves, the teaching profession's complexity, and what is required in terms of various types of professional knowledge and skills. The findings also suggest that the student teachers had embarked on a change in perspective by moving from observing and assessing teaching through a student's eyes toward viewing the profession from a teacher's perspective. Mentoring thus can start student teachers on the process of gaining an expanded and partially new view of what being a professional teacher means. Peter had the following comment on his experiences of the mentoring program.

> I really liked the opportunity to meet a teacher and see her in action. It was interesting to observe [her at work] in a classroom. In addition, we reviewed what it takes to become a good teacher, both as a person and educationally. I've learned a lot. The program has also made our minds buzz about what it's like to be a teacher, in a completely unique way compared to before.

The findings further indicate that through the use of transformative learning activities, the mentoring may increase student teachers' study motivation and engagement by making them aware of the relevance of the TE program's subject-related and pedagogical content toward their future professional practice as schoolteachers. Experiencing the content as relevant and meaningful for later professional practice reflected an experience of coherence among professional programs. Andres stated the following:

> What's helped a lot with the mentoring program, for me at least, is that you get a lot more motivation when you see what…you're working toward. You may have a clear thought in your head about what you're working toward, but you get that reminder throughout the year in meetings, where you talk about what expectations you have of being a teacher, what expectations the school has about how you should be as a newly trained teacher, and how to develop teacher identity. It's been very motivating for me, even though I have a few years left.

In addition, Nina pointed out how the mentoring program had motivated her to study various academic subjects:

> With the mentoring program, I've come to understand that if I want to be a really good teacher, I have to have good insights and a lot of knowledge about the subject I'm teaching—preferably beyond the curriculum in upper-secondary school. This [understanding] has motivated me to work harder with the academic subjects… This isn't the kind of thing I do just to pass exams. This is knowledge I need to be able to teach in five years… And so, I think it gives me confidence as a teacher to have good knowledge of the teaching subject.

Experienced and mentor educated teachers serve as role models

The findings from the interviews and surveys show that most student teachers were incredibly pleased with their mentor and that they appreciated getting to know and have discussions with someone who worked as a teacher in school on a daily basis. Anne shared the following about her experience:

> We could ask her about everything. I asked her something I've been wondering a lot about: "Do I have to know the foreign language fluently?" Another student teacher asked our mentor, "What do I do if I can't answer students' questions?"

The teachers who were chosen as mentors had completed 15 or 30 ECTS courses in mentoring and had a strong commitment to their role as mentors. The findings suggest that mentors act as role models with whom student teachers can identify and with whom they can discuss professional topics, thereby helping student teachers in the development of a teacher identity. Academic staff at the university who lack recent teaching experience from the school cannot fulfill this role in the same way.

Mentors' professional development

The mentors reported that by being mentors, they were able to have a critical look at their own practice; they perceived it as evolving to be able to reflect on

their own experiences from practice with student teachers. They also felt that their own professionalism was increasingly challenged in accordance with how far the student teachers had come in the TE program. By being a mentor, they had gained a greater understanding of the student teachers' learning progression, how they experienced their studies, and what their reflections and development were toward being a teacher.

The mentors emphasized that being a mentor also provided the opportunity to be updated on new research that included the TE curriculum, which contributed to both their own and their school's competence development. In the following quote, Catherine expressed how being a mentor had contributed positively not only to her own teaching but also to that of her colleagues:

> We are "forced" to keep ourselves up to date on research didactics as well as on literature and topics taught at UiO in the different academic subjects that student teachers take. Both undoubtedly strengthen our own professionalism and how we relate these ideas to our teacher colleagues.

Clear dissemination of the mentorship program's contributions beyond the ordinary study program

The mentoring program requires student teachers to actively choose to participate. The fact that the program is voluntary may provide more room for the student teachers to have conversations on topics they themselves wish to discuss than would be the case in mandatory seminar teaching, as in the regular professional courses taught in the TE program. Voluntary participation can contribute to accountability among the student teachers for their own learning and learning identity development, since they find that participation is something they actively choose for themselves.

The findings do show, however, that voluntary participation can lead to non-binding attendance. Both student teachers and mentors pointed out that, unfortunately, how many people would show up for meetings and other events was unpredictable. How this problem could be solved organizationally remains unknown, beyond informing the student teachers about what the mentoring program offers. The findings show the importance of highlighting the relevance of the program's components and ensuring that the topics of the various mentoring courses are not too similar. Any overlap that occurs between topics in the mentoring program and the regular teaching in the ordinary study program should be clarified by highlighting how mentoring contributes in ways that differ from ordinary teaching. The plan and content of each session should also be presented to the student teachers in advance.

Summary and concluding remarks

This chapter provides knowledge of how mentoring can give student teachers a head start in their teacher education by allowing them to get to know other first-year student teachers who are taking the same subjects, by broadening

their insights into the teaching profession, and by enabling them to begin developing a teacher identity; the program can also help to clarify the relevance of the educational content early on. The findings indicate that student teachers found the mentoring program to be particularly valuable in the initial years of study, when they only had subject studies and had no regular teaching duties in profession-specific subjects. The importance of the mentoring program was especially linked to experiencing belonging to a study community and to the development of student teachers' professional identity during the five-year TE program.

Based on the longitudinal study, we have identified the following six critical factors that have transfer value to other TE programs that plan to have similar mentoring programs:

1. Plan for learning activities that both aim to promote social integration among student teachers and that they will perceive as being professionally relevant.
2. Engage student teachers in various student active- and transformative learning activities that promote professional identity development.
3. Engage dedicated mentors who are teachers in schools that feature mentor education.
4. Communicate clearly to student teachers what the mentorship program contributes beyond the teaching offered in the obligatory subjects in the TE program.
5. Plan thoroughly and conduct regular evaluations of courses and sessions.
6. Provide good administrative solutions for the operation of the mentoring program.

Compared to regular on-campus seminar teaching, a distinguishing feature of the on-campus mentoring program described in this chapter is that sessions are led by mentors who do their primary work in schools. The fact that the mentors are teachers in school provides the student teachers with role models with whom they can identify and who can help the student teachers initiate the process of developing a teacher identity. The mentor program also promotes the mentors' own professional development.

To conclude, the innovative mentoring program has enhanced the quality of the five-year integrated TE program at UiO by promoting student teachers' social and academic integration and their development of a teacher identity, and it has created a sense of coherence between learning on campus and in schools.

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14 Shaping professional identity in the early days of teacher education

Anne Eriksen, Tove Leming and Siw Skrøvset

Introduction

What can create a desire for learning and strengthen learning needs and motivation among new student teachers? Previous research indicates that identifying with the profession and seeing oneself as a future teacher are key elements in achieving professional qualification and have an impact on student teachers' motivation and coping expectations in relation to their own education (Flores & Day, 2006). In an international review, Izadinia (2013) showed that students' ability to reflect on their own values, beliefs, and feelings, as well as their experiences from their own teaching practice, can help shape their professional identity, and Friesen and Besley (2013) stressed the need for teacher educators to challenge students' pre-conceived notions of what it means to be a teacher. These research findings inspired us to undertake a project on teacher education (TE) with the aim of developing an introductory program, "Learning desire and learning needs," focusing on the student teachers' study motivation, understood as desire to learn and their learning needs, by building awareness of what is required in a professional role as a teacher and conducting research in connection with this program.

In this chapter, we describe and discuss this introductory program, presenting and discussing some findings from research conducted in 2018 of a selected part of the program. The program was mandatory for all new student teachers in a five-year integrated program at UiT The Arctic University of Norway (UiT). The program was designed to focus on the student teachers' motivation for becoming teachers and to stimulate their desire and motivation to learn. The program lasted for one week and consisted of various workshops, discussions, subject presentations, school visits, and social activities. The main idea was for student teachers to get a first impression of the TE program, including its different subjects, and to get to know the teaching profession, students in classrooms, and fellow student teachers. The chapter contributes new knowledge about how to establish a process of developing a teacher identity already in the first week of the TE program. Our findings suggest that an introductory program for new student teachers may contribute to raising awareness of the teaching profession.

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Development and design of the introductory program

The introductory program was developed by a project group (the authors) in collaboration with other academic and administrative staff members and was first implemented in 2017. When developing the program, we were inspired by learning theories focusing on how collective learning processes interact with individual processes of awareness and reflection. We also wanted to expand the concept of learning to include more than cognitive aspects of learning. In his research, Illeris (2009) presents dimensions of learning taking place in a social context between the individual and the environment and can be studied through three dimensions: *the content of learning*, *interaction*, and *incentive*.

Applying these in our program, the first dimension: *the content of learning*, included information about the study program they were about to embark on. We focused ideas on questions like, what does a teacher do? Which subjects are possible to study and teach? When and how do I learn about the role of being a teacher? Illeris' second dimension of learning focuses on the *interaction* and the relational and social aspects of learning. Learning takes place in a social context and in interactions with others. How the social community is constructed and which relationships the learner has with others are factors that are important for how individuals acquire knowledge. In the program, we focused on how student teachers should become aware that collaboration with others, such as fellow student teachers, practice teachers, parents, or other actors, is an important part of being a teacher. We believe this awareness can be achieved when student teachers enter collaborative relationships during their first week of study.

The third learning dimension is about the *incentive* of learning: the driving force for learning or the affective side of learning. Illeris (2009) described this as the mental energy that forms the basis of learning, namely the motivation for learning, willingness to learn, and emotional aspects of learning. In the general discourse related to research and learning, less attention has been given to how emotions influence us, so that clarifying the importance of emotions in learning processes is important (Jakhelln et al., 2009). We wanted the activities in the program to challenge student teachers emotionally and our goal was to make them aware of the meaning of emotion in their learning processes and their reflections on the role as a teacher. Thus, the purpose of this introductory program was to stimulate student teachers' motivation (desire for learning) in their first week of the TE program and to raise awareness that studying to become a good teacher (learning needs) requires hard work; in other words, to create awareness of their coming professional identity as a teacher.

Content of the introductory program

The introductory program consisted of various activities focusing on practical relevance and identity building, which will now be described and later exemplified with findings. The program was mostly identical for the two TE

programs – for teaching in primary school and for teaching in upper primary and lower secondary school – at our institution.

Dialogue café

The introductory program started on the first day, right after the welcome speeches, with a dialogue café. Dialogue café is inspired by the world café method[1]: a method to host group dialogues in a setting modeled as a café. Each café table has a host who organizes the discussion between 5 and 6 student teachers and presents questions to be discussed. These questions were reflected on and discussed in groups: 1) Why do you want to become a teacher? 2) What kind of teacher do you want to be? 3) What will it take for you to become such a teacher? The conversations around the "café tables" were led by a teacher educator, and the new student teachers wrote their answers to the questions on tablecloths. These answers represent some of the findings in our research. The answers to the first question documented the participants' various reasons for becoming teachers, such as a genuine desire to make a difference for children and to engage and inspire children and young people in their learning processes. The second question brought several different answers, and some students wrote that they wanted to become teachers who respected the students and could make education meaningful for them. When the student teachers reflected on the last question, they were convinced that it would take a lot of effort to gain knowledge and skills to become a good teacher and that they would be challenged to step out of their "comfort zones."

Workshops in communication

All teachers must be able to communicate, regardless of the subjects they teach. Thus, we created workshops in communication and classroom management inspired by the views of Illeris (2009) regarding the importance of the teacher's ability to collaborate with others. The communication workshops consisted of activities requiring engagement and interaction, where some of the activities would be used in the school visits at the end of the program. Some exercises focused on nonverbal communication and illustrated the importance of body language (Eriksen & Leming, 2020). The student teachers participated actively in the various exercises to illustrate how difficult it can be to explain something when we cannot see the person we are communicating with. With the help of different role play the student teachers gained insight into how to capture the attention of a class. In one role play, they were divided into groups, with each group member being given a role card with instructions on how to behave and listen/not listen. The role play was intended to make them aware of listening as an important part of communication. Another exercise was image theater, in which students formed visual images with themselves as objects. The student teachers created images (without words and gestures) to illustrate a situation where a class leader did not master communication with

the class, and then afterward created an image of an ideal situation. The groups showed the images to other groups, and this became the starting point for a discussion about the importance and challenges in developing good classroom management.

Subject presentations

The student teachers in the TE program for teaching in upper primary and lower secondary schools took part in a presentation of all nine selectable subjects before they made their final choice of the three subjects in their teacher training program. The selectable subjects are Norwegian, Mathematics, Social Studies, English, Natural Science, Arts and Crafts, Food and Health, CREE (Christian and other religious and ethical education), Physical Education, and Music. We stressed the importance of choosing based on the knowledge of the various subjects' content and purpose in school. The presentations by teacher educators included practical, relevant, and challenging forms of learning. The student teachers reported that these sessions were very important for making them more confident in choosing their subjects.

School visits

During the first week, the students visited a school. The idea was to let the student teachers have a first-hand experience of being a teacher. Prior to the visit, the student teachers planned and prepared a session that they conducted in the classroom, such as some simple activities, songs, and games. They also interviewed pupils to get their opinions on what characterizes a good teacher.

Social activities

An important part of the program was that student teachers should get to know each other, so as to create a safe study environment and a good basis for studying. Student teachers (third-year student teachers) created and led a tour around the campus, organized as a puzzle. Some of the academic staff arranged a walk in the woods and prepared activities with the aim of student teachers getting to know the teacher educators and some elements of central subjects.

Activities in music and art

Student teachers in the TE program for teaching in primary school attended workshops in music and art. The project group wanted to highlight the value of these subjects, particularly for the youngest children, and their need to express themselves and their natural ways of learning. The purpose of the workshops was to allow the student teachers to step quickly into the role of teacher, gaining knowledge of architecture and learning methods used in the Arts, as well as practice in group collaboration. One workshop focused on

practical music exercises illustrating how students could use songs and singing games in the classroom. Another workshop focused on arts and crafts and mathematics as students designed bridges using bamboo sticks.

Study information

The student teachers attended several meetings during the first week to get relevant information about the TE programs, including practical information on websites, digital platforms, and registration processes.

Final day

Student teachers gathered on the last day of the introductory program to evaluate the program, and present and discuss their experiences. They shared their impressions and experiences from the school visits and answered the question: *What do you now think about becoming a teacher that you did not think before?* The student teachers answered the question individually, using the digital collaboration tool Padlet[2].

The answers were saved, and word clouds were created for each seminar group that were immediately shared and discussed with the student teachers. The purpose of asking this question was twofold: to summarize the program and to document the students' learning outcomes.

Discussion of research methods

Our study focuses on initiating an intervention to improve practice in our institution concerning the student teachers' first experience of TE. Our choice was to use action research, an intervention program where the researcher intervenes in the field to be researched. Research of one's own practice and teaching can be characterized as action research, taking a challenge or a situation that can be improved as a starting point and implementing a planned change that can be monitored in a systematic way (Gjøtterud, 2020). In our context, we used logs, written input, and observations.

As both researchers and participants, we intervened in the phenomenon to be researched, but also clarified the reflexive dimension in the researcher's role. We also applied our role systematically to contribute to a process (Hammersley & Atkinson, 1995), as hosts of the dialogue café, workshop leaders, and leaders of the reflection session. In addition, we were observers during all phases of the project. In this study, we focused on the student teachers taking the program for teaching in upper primary and lower secondary school in the second year of implementation (2018). The study was designed by the authors of this chapter and was approved by the Norwegian Centre for Research Data. Data was collected from three different activities in the introductory program: the tablecloths where student teachers wrote statements about their motives for becoming teachers on the first day; from observation and participation in

the communication workshops during the week; and from the final reflection session, where we used the Padlet tool. All statements regarding the question "what do you now think about becoming a teacher that you did not think before?" were discussed and systematized through processes referred to as meaning condensation (Postholm, 2005), and the categories were sorted in line with Illeris' (2009) dimensions for learning: *content, incentive*, and *interaction*.

Presentation of relevant data and analysis

In the following we present and discuss some findings from the study we conducted in 2018, in the second implementation of program.

Knowledge about content in the teacher education program and profession

The findings from the final reflection session indicated that the student teachers experienced increased knowledge of different elements of the teaching profession. They realized that the TE program subjects entail more than the disciplinary approach: didactical approaches such as learning objectives, assessment, technology, and creative teaching elements are also included.

The teacher needs to have the ability to communicate, such as being aware of eye contact, body language, and voice intonation and articulation. One observation after the workshop in oral communication showed us that student teachers had experienced that being seen and heard, and being engaged, are important aspects of teaching. The importance of communication and body language is exemplified by the following quote: *I am more aware of minor things like body language, classroom management.*

From the initial dialogue café, we found that student teachers had various expectations regarding the role of teacher, of which many were based on their own experiences from being a learner at school. For example, some said they wanted to become teachers because they had experienced good or bad teachers themselves, or because they had a special interest in specific teaching subjects. They expressed various opinions on what kind of teachers they wanted to become and what it would take to become such teachers. Even though most of them had limited knowledge about the TE program, they wanted to learn about a variety of teaching methods. The student teacher responses in the dialogue café and the engagement we observed in the discussions gave us the impression that this activity was an important part of the awareness-raising process in terms of what the teaching profession entails. Thus, they expanded their knowledge about the content of learning (Illeris, 2009).

Collaboration and relationships

In our material, many of the participants mentioned the relational aspects of being a teacher as important and realized that being and becoming a teacher

requires extended collaboration with other actors, such as practice teachers, learners/pupils, fellow students, and university lecturers. Student teachers who participate in activities such as role play and school visits need to reflect on their approach and willingness for such collaboration. Becoming a teacher means developing collaborative and relational attributes, and some students might find this challenging. However, we found fewer statements in the collaboration and relationships category than we expected, since the project emphasizes collaboration and collective processes. We presume that the student teachers were not particularly surprised that collaboration and relational aspects are important in TE programs. This may indicate that they are familiar with collaboration and social interaction in education and that they consider this to be a natural part of everyday life and teachers' work. This is supported by the fact that collaboration, colloquium work, and contributing to a good study environment were already highlighted during the dialogue café. In the communication workshop, we observed that the participants developed their ability and awareness of interacting and collaborating, connected to Illeris' dimension of interaction in learning processes (Illeris, 2009).

Incentives and motivation for becoming a teacher

Illeris' third learning dimension (Illeris, 2009) concerns incentives for learning and motivation for becoming a teacher. The statements in this category are about motivation and student teachers' excitement, which we interpreted as a desire to learn. One student teacher wrote*: I realize now that the teacher profession is more demanding than what I expected previously.*

The fact that the program appears to be demanding (i.e., requires a lot of work) may reflect the greater awareness of student teachers' learning needs. As exemplified, the student teachers found that the teacher educator program and the profession as a teacher were more demanding than they previously believed. We do not know from their statements what they thought about this before they started the program, but many focus on their realization that the TE program is intellectually and/or emotionally demanding. Hard work was not a specific focus of the introductory program. Instead, emphasis was placed on challenges from experiencing teaching, conducting communication exercises with fellow student teachers, and learning more about various subjects in TE programs. It seems that the student teachers drew the conclusion that it is hard work both to study to become a teacher and to work as a teacher. Since so many student teachers agreed on this, they probably underestimated how demanding the study program and teaching profession are. The program had increased their awareness of the challenges ahead. Workshops, school visits, and academic presentations required engagement which challenged the student teachers. This may be because their previous experience regarding the teaching profession was as pupils and not student teachers. In these roles, it is difficult to understand what the teaching profession entails beyond teaching,

such as the requirements for new knowledge, planning, and collaboration with other teachers, cooperation with parents, etc.

Several student teachers mentioned *more motivated* when we asked how they had changed perspectives during the first week. Examples of statements are: "*Increased motivation and better insight into the role of teacher*" and *"I'm looking forward to becoming a teacher in a more positive way than I was before*." The fact that they felt it was a more important profession than they had assumed initially – that they became more motivated to become teachers and student teachers – shows a heightened awareness of their choice. The motivation for being a teacher was evident in the dialogue café, for example, the desire to influence the future or to make a difference for children and adolescents. This motivation is, as we interpreted it, generally important in learning processes. According to Illeris (2014), learning also has an emotional aspect, and the student teachers expressed that they experienced both joy and frustration.

As participating observers, we noted that first-week students "grew" into the role of student teachers. They dared to challenge themselves and deal with unfamiliar situations in new relationships; hopefully, in this way, the process of developing their teacher identity started.

Summary and conclusions

Our findings indicate that the introductory program contributed to student teachers gaining a deeper knowledge of the content of the TE program and what it means to become a teacher. The student teachers learned more about what the TE program entails, and they became more motivated and gained an increased understanding of the relational aspects of the profession. They also saw that being a teacher means being able to communicate with various groups of people. They became more aware that both the teaching profession and teacher education were more demanding than they originally thought. This statement may sum it all up: "*It takes a lot to become a good teacher*."

Based on the goals of the program, the project group considers the program to be successful. Most elements of the program functioned as intended with the success criteria being detailed planning, and dedicated project management in close interaction and dialogue with study administration, teachers, students, and schools. The involvement of the teachers and administration is considered to be one of several success criteria for the introductory program, together with the student teachers actively being present and involved in the exercises that the teachers had planned. The student teachers met committed, prepared, and professionally skilled teachers who led them through various practical exercises. The program has been further developed and is now an integral part of the introduction to the primary and lower secondary TE program at UiT. To sum up, new student teachers need to understand that knowledge *about* the profession itself is important and that it is just as important to understand that becoming a teacher requires commitment, empathy, and

collaboration with others. This study indicates that it is possible to start TE programs in a way that contributes to the required development, an interesting field of research for further studies.

Notes

1 https://theworldcafe.com/key-concepts-resources/world-cafe-method/
2 Padlet is a digital collaboration tool whereby students can log into a link via cell phone, and their comments will be visible to everyone, but without revealing the identities of the authors of the comments. www.padlet.com

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Part V

Video as a means of connecting coursework to teaching practice

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15 Video as a tool to connect coursework to teaching practice

Learning to reason around specific teaching practices

Inga Staal Jenset

Introduction

Researchers and policymakers increasingly argue for grounding teacher education (TE) and teachers' professional development in the practical work of teachers (Darling-Hammond et al., 2017; Grossman et al., 2009a), and researchers argue that student teachers need opportunities to study and enact practice, both during coursework and practicum of TE (Hammerness et al., 2020; Jenset et al., 2018). In that vein, a particularly useful tool might be the use of video representations of teaching (Borko et al., 2011; Gaudin & Chaliès, 2015; Santagata et al., 2021). International research indicates that videos have the advantage that they provide easier access to classroom observation, and the authenticity of the situation, closely linked to teachers' practical work (Gaudin & Chaliès, 2015). In their review of the use of video for professional learning, Gaudin and Chaliès argue that "the most important component of teaching expertise is the ability to identify and interpret relevant classroom events and make instructional decisions based on those interpretations" (2015, pp. 45–46). This ability to identify and interpret can be trained using videos and is often conceptualized as learning to "notice and reason" (Barnhart & van Es, 2015; Seidel & Stürmer, 2014). Research indicates that the use of video in professional training does indeed enhance this ability, in terms of gaining a more in-depth and specific interpretive analysis of teaching and learning (König et al., 2022; van Es & Sherin, 2008). For instance, van Es and Sherin (2008) reported on written analyses of student teachers' own teaching, using an analytical tool describing noticing on different levels. They found that the experimental group's trajectories proved more effective than those of the control group. Further, research indicates that the ability to notice and reason also increases in terms of increased attention to student learning (Barnhart and van Es, 2015; Santagata & Yeh, 2014; van Es & Sherin, 2002). In an intervention study, Barnhart and van Es (2015) found that the student teachers in the intervention group demonstrated higher sophistication in their ability to attend to, analyze, and respond to their pupils' thinking. Less is known about how and to what extent this ability relates to teaching quality, but some research indicates effects on the frequency and variation of responsive teaching

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practices (Sun & van Es, 2015), and the attention to students' mathematical thinking while teaching (e.g., Santagata & Yeh, 2014).

However, concerns have been raised that TE paying attention to, and foregrounding, specific teaching practices can become too instrumental and come with a loss of attention to the rich contextual issues that shape particular classrooms (Zeichner, 2012; Kennedy, 2016). More specifically, researchers are concerned that student teachers will not attend to pedagogical dilemmas (Kavanagh et al., 2020b) and that they will be unable to enact and adapt these practices in line with different instructional purposes (Kennedy, 2016), contextual factors (Zeichner, 2012), and student needs (Zeichner, 2012; Kennedy, 2016; Kavanagh et al., 2020b).

The chapter aims to contribute to this body of research on the use of video in TE. It reports on an innovation across coursework and fieldwork in TE, where three practices of instructional scaffolding were highlighted, and where video was used as a tool to learn to notice and reason around these specific teaching practices. The chapter reports on the data from the campus site of the innovation, by investigating the research question: *What characterizes* student teacher*s' reasoning around specific teaching practices in videos of teaching during coursework?*

This chapter is particularly interested in the extent to which the student teachers are able to use this learning opportunity to connect theory and practice, and simultaneously attend to contextual factors of teaching, despite the specific attention to particular teaching practices.

Innovation

The innovation described and studied in this chapter is the introduction of systematic use of video in TE coursework. The innovation was conducted by one teacher educator in collaboration with me, as the researcher. The focus of the innovation was on specific practices for instructional scaffolding. That specific focus was chosen because research finds that teachers increasingly seem to master some aspects of teaching that are important to teaching quality, such as providing emotional and organizational support – but that other aspects of teaching, such as instructional support, are less developed and have the potential for improvement (Kane & Staiger, 2012). Researchers thus argue that instructional scaffolding has the potential to enhance students' learning by making explicit the tacit rules of engagement and the thinking processes that help students approach a text or a task successfully throughout their lives (Grossman et al., 2013; Cohen, 2018; Tengberg et al., 2021).

In this work, the teacher educator and I conceptualized instructional scaffolding according to relevant research literature and emphasized the idea of gradual release of responsibility, as well as the importance of tailoring scaffolding to student needs (e.g., Brownfield & Wilkinson, 2018; van de Pol et al., 2010). In addition, to make instructional scaffolding observable to the

student teachers while watching videos, we conceptualized and operationalized this term in alignment with the Protocol for Language Arts Teaching Observation [PLATO] (2015), as strategy instruction, modeling, and feedback. *Strategy instruction* refers to a situation where students receive a variety of metacognitive strategies from their teacher – including information on how, why, and when these strategies can be used. The idea is that the students should learn to use the strategies intentionally and flexibly for complex problem-solving in a variety of learning situations (Dignath & Veenman, 2021). *Modeling* is often enacted by the teacher jointly with strategy instruction, to make subject-specific thinking and strategies explicit to learners (Cohen, 2018). Finally, *feedback* is a variety of teaching practices that provide information to the students on their performance: Detailed, specific, and substantive information on how they are performing in relation to specific goals and information on how to improve (Black & Wiliam, 2009).

We designed five coursework lessons where we used videos of experienced teachers and targeted different aspects of instructional scaffolding. These videos originated from existing classroom observation studies at our department (Klette et al., 2017) and professional development projects targeting the same practices of instructional scaffolding and having informed consent by participants to use the videos for teaching. We planned the lessons according to existing coursework syllabi and readings and chose video clips that seemed relevant to the purpose of the lesson. We designed a variety of assignments related to the use of video, ranging from a somewhat open observation focus (e.g., "What kind of support do you notice that the teacher provides the students?"), to more focused observations using a simplified version of the PLATO observation protocol as an observation tool for the student teachers. During coursework, the teacher educator focused the student teachers' attention on the appropriateness of teachers' use of scaffolding in the videos, as well as the implications for the students in the classroom.

After a period of coursework lessons, the student teachers had a nine-week period of practicum in schools, where they took individual responsibility for teaching in a Norwegian language arts classroom. During this period, the student teachers were asked to videotape three lessons where they planned to enact practices of instructional scaffolding, discussing these episodes with their mentors in schools. That part of the intervention is reported elsewhere (Brataas, 2023; Brataas & Jenset, 2023).

Discussion of methodological approach

The study is set within the five-year integrated TE program at the University of Oslo, in the student teachers' 6th and 7th semesters in courses of pedagogical content knowledge in Norwegian Language Arts in one cohort in 2020. One teacher educator and 30 student teachers participated. This chapter focuses on the coursework part of the innovation, and reports on five coursework lessons (n=450 minutes) across one academic year, to capture the

student teachers' reasoning around videos. All data are transcribed video data and analyzed using the software NVivo12.

To analyze the video data and the student teachers' reasoning, the focus was on their reasoning around the specific teaching practices for instructional scaffolding. I first identified episodes of pedagogical reasoning around these practices of instructional scaffolding, which I defined as episodes of talk in which student teachers described issues or raised questions about the three practices for instructional scaffolding, accompanied by some elaboration of reasons, explanations, or justifications. I identified these in whole-class discussions around videos between the teacher educator and the student teachers. Second, I coded this material using an analytical framework capturing reasoning based on previous research (Castro Superfine et al., 2019; Seidel et al., 2011). This framework distinguished reasoning with evidence and without evidence, and I found it suitable to measure the student teachers' ability to connect theoretical concepts and practical events in the videos. In addition, I included codes paying specific attention to contextual factors of the instructional practices, as this is highlighted in the research literature (e.g., Kennedy 2016; Zeichner, 2012). I assigned a code to every instance of talk (i.e., every utterance by a student teacher) about the practices of instructional scaffolding. The analytical framework is outlined in Table 15.1.

Table 15.1 Analytical framework for analysis of student teachers' reasoning around practices of instructional scaffolding

Codes	*Sub-codes*	*Definitions*
Description		To describe what one has noticed in the video
Interpretation	Without evidence	To interpret or evaluate what one has noticed *without* references to specific events in the video
	With evidence	To interpret or evaluate what one has noticed *with* reference to specific events in the video, to theoretical concepts, or to practical experience
	With attention to contextual factors	To interpret or evaluate what one has noticed *with* reference to characteristics of the students (e.g., age, gender, ethnicity, language background, school level, knowledge level, socio-economic status), or to aims or purposes of their teaching (e.g., overall purpose of schooling; overall language arts specific aims, knowledge or skills; aim of the lesson or assignment)
Prediction		To pose a hypothesis about the impact of what one has noticed on student learning, or what the impact on student learning would have been if the teacher had made a different teaching move
Decision-making		To suggest alternative teaching moves that could have been made in the particular situation, or next steps for future lessons

Findings: Reasoning around videos during coursework

The student teachers primarily used videos at campus to interpret events in the videos and connect theoretical concepts to episodes in the classroom. They also occasionally predicted what could have been done differently, or as next steps of teaching, or what kind of impact the teaching might have on the students, but this was often a result of prompting by the teacher educator. These findings are elaborated in the following, related to the codes in the analytical framework.

Descriptions and interpretations with and without evidence: Connecting theory and practice

The student teachers seldom *described* events in the videos without interpreting them. Sometimes, however, the student teachers would interpret an event, but *without any clear evidence* either from the videos or from concepts related to instructional scaffolding, or their coursework readings. They would rather make evaluations based upon their own opinions, or undefined evidence. For instance, in the "peer-feedback video clip," the student teachers had watched a video of a teacher introducing her students to giving peer feedback and trying out the practice themselves. The teacher then goes on to model giving feedback on a student text in plenary:

(1) ST[1]1: We talked about, maybe it was a point to do it on the fly, to simply illustrate that even in such a short time you can still say more than "this is well done"
(2) TE: Mhm, ST2?
(3) ST2: We also talked about, that what was nice about her doing it on the fly was that she was not so arrogant, but that it was a bit humble, that "now I will try my best, to give feedback". Do it on the fly instead of, kind of, "now I will show you how this is done!"

As the excerpt illustrates, the student teachers are here evaluating the teachers practice (1, 3) and refer back to the video in terms of the teacher modeling "on the fly." Still, they are not providing specific descriptions of the teacher's actions in the video, and they are not doing the linking work between the practical actions and theoretical concepts related to the practices of instructional scaffolding or related coursework readings (provided through handouts or on PowerPoint in advance).

However, the by far most common reasoning included episodes where the student teachers would identify the practices of instructional scaffolding in the videos, and as such, *interpret with evidence*. This happened in more than half of the utterances coded in our material. Often, the student teachers were provided with theoretical concepts by the teacher educator, and they were asked to look for, and reason around, these in the videos. Alternatively, the student

teachers would themselves point to episodes in the videos and relate them to theoretical concepts. In the following excerpt, the student teachers have watched the "convince your mum video clip" of a teacher providing her students with a list of argument types to prepare a whole-class discussion, or role-play, where they are supposed to convince the teacher (in the role as their mother) to stay longer at a party. The teacher educator has asked the student teachers to notice what kind of strategies the teacher provides her students:

(1) TE: Let me hear what you have talked about related to whether the students get any strategies for making an argument.
(2) ST: We discussed that one strategy is that when they are about to create their arguments, they could start the other way around, and look at possible counterarguments before they are going to create their own
(3) TE: Yes, that is a strategy. Imagine what arguments your opponent comes up with… where in the text did you find it?
(4) ST: [inaudible]
(5) TE: Yes, [reads from transcript] "and in order for you to be able to find good arguments, it is important to be very smart and think about what the parents might be saying."

Student teacher points to a situation in the video that they have interpreted as the teacher providing the students with a strategy (1). The student teacher is pressed by the teacher educator (3) to connect this to a specific event in the video, or in the transcript. We infer that the student teacher does indeed do so (5), as the teacher educator confirms and reads the specific portion of the transcript aloud (6). We thus coded this, and similar, episodes as *interpretation with evidence*, and see this as an important learning opportunity for the student teachers to study practice and to connect theoretical concepts to teaching practice.

Interpretations with attention to contextual factors: Attention to a generalized student and the purpose of the lesson

More seldom, but nevertheless quite prevalent in our material, the student teachers would reason around episodes in the videos and *interpret them with attention to contextual factors.* This was usually related to student needs and how the students in the classroom videos might experience the teacher's actions. Again, in the "peer-feedback video clip," the teacher goes around to the different pairs of students, and the students give each other feedback on text. While reasoning around this event, however, the student teachers are not sure that the students' needs are met in this situation. One student teacher argued:

> …it might appear a bit vague for the students, having to give feedback, when they really have nothing; they have no guidelines, other than to say that it's good, I liked it

These situations often followed a prompt or question by the teacher educator, asking the student teachers to pay attention to the students, to see how the teaching practices in the videos seemed to affect the kids, or to take the student perspective: "How do you think this is perceived by the students." Since the student teachers did not know the students in the videos, or much other contextual information connected to the teaching, this reasoning was most often interpretations related to a generalized student, and often to the students' presumed knowledge level. In few instances, the students would reason around other contextual factors, like instructional purpose. In this following episode, the student teachers had watched the "creative writing video clip" of a class writing narratives, and the teacher starts with focusing on the introductions to narratives. The teacher is showing her students model texts, in the form of very short introductions with focus on the main character in a narrative. The student teachers discuss that the models might be too short and only partly model what the teacher expects from her students. One student teacher nevertheless points to the purpose of activity, or the overall purpose of writing in Norwegian language arts, as a reason for keeping the models short:

> …at the same time, I think that if they had been given a too long model text, or introduction, then I think they could quickly become too confined, when you really want them to compose, and when creativity is what really is in focus. So, if they have a very short model, then creativity comes from [the students] and not from something the teacher says is correct.

It seems that the student teacher argues that the purpose of creative writing, as a core activity of language arts learning, might make it reasonable to keep the models shorter.

Rare occasions of prediction of student learning

The teacher educator's prompts to pay attention to the students in the videos would also on very few occasions result in reasoning coded as *prediction* in our material. This means that the student teachers would discuss how the teacher's actions would affect the students' learning. Again, in the "peer-feedback video clip" and the event where the teacher models on the fly how she would provide peer-feedback to a text written by a student (called Hannah below), the student teachers discuss whether the students have actually learned how to provide feedback to their peers and if they would be able to use this at a later occasion:

(1) ST: We do not really know if the students achieve their goal, because they do not get to show that they have understood the feedback they received on their feedback
(2) TE: …it is very meta [laughs]

(3) ST: We do not know, but Hannah manages to formulate what she ought to do next time
(4) TE: Yes
(5) ST: But we do not know if Hannah manages to give such feedback next time.

The student teacher points to the fact that we do not know the extent to which the teacher's modeling is effective for the students learning (1, 3, 5). Still, even though the teacher educator launches a question related to student experiences with the teacher's teaching in the videos in every lesson we observed, we do not see discussions related to these issues very often in the whole-class sessions.

Decision-making in the form of suggested alternative teacher actions

On a few occasions, the student teachers were asked to discuss or envision what the teachers in the videos could have done differently. In one situation, the student teachers had watched and discussed the "comic book-reading clip," where a teacher models for her students how to employ a specific strategy to prepare their reading. She is using a comic book and models how she can get an overview of the book through a surface read-through where she notices that her comic book has differently colored sections and that she states that she will use post-it notes to mark the sections. After watching the video, the student teachers discuss that the modeling by the teacher might be misinterpreted, and they argue that it seems that all the students are looking for colored sections in their own comic books, instead of looking at other surface features of their own books. They suggest different alternative moves to clarify that that is only one thing to look for and also that it might not be clear to all students that there are two strategies modeled: browsing through the book and using post-it notes:

(1) TE: … And why should they do so? What was the point of post-it notes?
(2) ST: She said, she does not say it explicitly at the beginning, but what she wants is that, if there is something they notice when they browse through [the book], then they should put a post-it note there, so that when they get to that specific point while they read, then they can reflect a little around … "What was I thinking when I started reading?"
(3) TE: Yes, she says so?
(4) ST: No, and that was what I was thinking (…), that I would tell [my students] what the post-it notes was for (…): "And then I put a post-it note right here". So she should have been a little more explicit.

The student teacher here suggests different moves that the teacher might have taken to improve her modeling (2) and also relates the reasoning to his/her own future teaching practice and what this person would have done.

Implications for teacher education and further research

The conversations captured in the video data demonstrate that the student teachers are able to describe and reason around videos of classroom teaching, using evidence both from videos and from theoretical concepts. This suggests that the use of video in TE constitutes an important opportunity to study practice at campus and that it thus can contribute to a more coherent learning opportunity and help the student teachers to link theory and practice. Reasoning, or systematic reflection, around videos of teaching thus might constitute the missing link (Korthagen, 2010) between theory and practice. The findings indicate that the videos are an important common point of departure for the discussions, and the student teachers steadily come back to specific instances in the videos while they discuss. This is important as previous research found that opportunities to learn that are grounded in practice are rare during TE coursework (Hammerness et al., 2020).

The innovation was, however, not only focusing on the use of video but concentrating simultaneously on some very particular teaching practices that the student teachers learned to identify and reason around. There are indications that this might have contributed to focusing the student teachers' reasoning. Scholars argue for a pedagogy of TE representing, decomposing, and approximating practice (Grossman et al., 2009b), before practicing with students in school (Lampert et al., 2013; McDonald et al., 2013). One might assume that the practice-oriented preparation these student teachers have received might help them to enact similar practices with their own students during practicum and as such enhance their perception of alignment between their coursework and their own teaching.

However, and as stated, the field is concerned that such particular attention to the practice of teaching might lead to route application of distinct teaching practices not adapted to the particular students or learning goals inherent in the situation (Kavanagh et al., 2020b). Indeed, the teacher candidates' reasoning in this study is somewhat limited. This might not be surprising, as the student teachers have limited contextual information about the students, or their local community – or the purpose of the lesson in the videos. As such, our findings to some extent confirm the concerns of researchers in the field (Zeichner, 2012). Still, it is an important question which role the use of video at campus can, and should, fulfill. The use of video of experienced teachers during campus coursework has surely helped the student teachers to identify the practices in focus, to notice and reason around them, and connect them to theoretical concepts. The findings nevertheless illustrate that attention to contextual factors could be further developed. There are indications in other parts of the data material that reasoning around videos during fieldwork takes contextual factors into account to a greater extent, since the contextual information during fieldwork is much more available to the student teachers (Brataas, 2023; Brataas & Jenset, 2023). It is thus reasonable to assume that the use of videos of their own teaching during campus coursework might also contribute

to making their reasoning more attentive to contextual factors. It is also fair to assume that stronger knowledge on the part of the teacher educator about the contextual factors of the videos, and the characteristics of the students in them, might have contributed in that vein.

The findings encourage the inclusion of videos in TE coursework as one way of connecting to teaching practice. An important implication is, however, that thorough work with the pedagogies of TE related to the use of video is needed before doing so. Many scholars point to distinct pedagogies for using videos and emphasize the importance of deliberate choices of videos, having a clear goal and observation focus, as well as connecting curricula to that specific observation focus (Borko et al., 2011; Seidel & Stürmer, 2014). Researchers also highlight the importance of planned and structured discussions of selected videos (Gaudin & Chaliès, 2015) and frameworks for talk-moves while facilitating the discussion of videos have been suggested (Kavanagh et al., 2020a; van Es et al., 2014). This study corroborates this research. In addition, this research implies that pedagogies for using videos in TE should attend to what I have called the contextual factors of the teaching in the videos. The findings indicate that there is ample opportunity to do so, also at the campus site of TE. Teacher educators setting out to use videos during coursework should seek out contextual information about the videos they intend to use – as there is no doubt that the teacher educators play an important role in helping the student teachers to balance their attention to specific teaching practices, while simultaneously paying attention to contextual factors and student needs, in their reasoning around videos of teaching. Overall, this indicates the need for better awareness of the different roles that the use of video can play in the two settings of TE and the different roles that the use of videos of own teaching versus videos of others teaching can play.

Note

1 Student teacher is abbreviated ST and teacher educator TE in the excerpts.

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16 Using authentic practice videos in formative assessment in teacher education

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Introduction

Formative assessment and feedback are among the most essential factors in promoting student teachers' learning and development into expert teachers (Hammerness et al., 2005; Morris, Perry & Wardle, 2021). Formative assessment provides student teachers with knowledge about their current performance levels and advice about how to improve or reach a desired goal (Hammerness et al., 2005). Despite a long-standing focus on the importance of formative assessment for students' learning in schools, the primary form of assessment in higher education is summative, focusing on students' final grades, as compared to formative arrangements, which focus on students' learning processes (Morris et al., 2021; Nicol, Thomson, & Breslin, 2014). Scholars emphasize the need to develop relevant forms of formative assessment in higher education, as well as in relation to practical training, to improve learning opportunities and outcomes for students (Morris et al., 2021).

Video technology is increasingly used in teacher education (TE) as a tool with which to strengthen coherence and bridge the gap between coursework and fieldwork (Santagata et al., 2021). In this chapter, we present insights derived from an innovation project at the University of Oslo, the Digital video assessment in different arenas (DIVA) project, in which student teachers' own practice videos are used in formative assessment conversations between these student teachers and campus- and school-based teacher educators, as well as in peer assessment seminars with other student teachers. The DIVA project is based on the assumption that authentic practice videos are powerful tools for use in student teachers' learning; they are approximations of practice (Grossman et al., 2009) that can be used regardless of time and space. The learning potential of the videos is realized in formative assessment situations, in which the student teachers actively participate.

Reflection, within the formative assessment of professional practice, is a crucial source of professional learning for student teachers. Reflection can be defined as a "self-critical, investigative process wherein teachers consider the effect of their pedagogical decisions on their situated practice with the aim of improving those practices" (Tripp & Rich, 2012, p. 678). Feedback is essential

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in this sense as a prerequisite for stimulating reflection. Thus, feedback is recognized as a core component of the learning process (Nicol et al., 2014). Nicol et al. (2014) argue that feedback should be conceptualized as a dialogue, not a one-way transmission process, and that higher education students should take an active part in the assessment process. One way of actively engaging student teachers in formative assessment is giving feedback to and receiving feedback from peers. Scholars have identified several benefits of peer assessment, for example, that student teachers perceive the feedback from peers as more understandable and helpful due to its more accessible language as compared to feedback from teacher educators (Nicol et al., 2014). Also, when multiple peers are involved in feedback conversations, the quantity and variety of feedback increases (Topping, 1998).

In recent years, video technology has allowed student teachers to familiarize themselves with a wide range of teaching practices, in addition to being able to reflect on their own teaching practices based on their own practice videos. Thus, video can be a powerful resource in the professional learning of student teachers by facilitating an improved understanding of teacher knowledge and expertise through the recording and analysis of classroom practice. Indeed, the use of video in teacher learning in TE has steadily increased over the past 20 years at all levels (Gaudin & Chaliès, 2015). One of the main reasons for this wide use is the opportunity afforded by video, as an "artifact of practice" (Flandin, Borer, & Gaudin, 2018, p. 1), to create a link between campus coursework and classroom practice in TE (for a further discussion, see Chapter 15). Thus, student teachers' own experiences from fieldwork can be stored in practice videos as an artifact for formative assessment.

This chapter examines how a TE program has adopted video-based formative assessment designs to promote student teachers' reflection and learning about teaching. The chapter shows how formative assessment conversations utilize practice videos to promote professional learning in TE. The chapter also demonstrates what characterizes formative peer assessment conversations utilizing practice videos in TE.

The use of video in teacher education

Research on the use of video as a resource in teacher learning is burgeoning, with a substantial number of studies focusing on student teachers' selective attention and ability to notice and identify relevant classroom events (Brataas & Jenset, 2023; Santagata et al., 2021; Sherin & van Es 2009), student teachers' reasoning process while watching classroom videos (Seidel et al. 2011), and student teachers' video-enhanced reflection processes (Gaudin & Chaliès, 2015; Körkkö, 2021; Sherin & van Es, 2009). Studies show that the use of video in TE can contribute to student teachers' exploratory conversations about practicum experiences (Siry & Martin, 2014) and ability to adapt and change their practice and become more autonomous professionals (Rich & Hannafin, 2009).

Typically, three types of videos are used in TE: classroom videos of unknown teacher activity, classroom videos of peer activity, and classroom videos of one's own activity. In this chapter, the focus is on the third kind of video, which features one's own professional practice and can provoke the development of critical reflection. Seeing themselves may increase student teachers' activation in terms of immersion, resonance, authenticity, and motivation as compared with viewing the practice of others (Brataas & Jenset, 2023; Borko et al., 2011; Seidel et al., 2011).

To promote learning, it is crucial for teachers to "learn to notice" how their classroom teaching affects their students' learning (Santagata et al., 2021; Sherin & van Es, 2009). Asking focused questions about how teaching influences learning should help student teachers reflect on their work in knowledge-based ways (i.e., justify and decide on alternative modes of action; Santagata et al., 2021; Santagata & Guarino, 2011). Videos of classroom practice are authentic representations of teaching events that capture the complexity of teaching. Videos can be viewed repeatedly, making it possible to view them from various perspectives. As such, video recordings from classrooms have considerable potential for use in developing professional vision because of affordances such as the chance to focus on the complex interactions between the content of learning, their learners' reactions and actions, and the student teachers' own actions and reactions (Santagata et al., 2021). However, as noted by Gaudin and Chaliès (2015), "…simply viewing video does not ensure teacher learning. An important issue concerns how to facilitate substantive analysis of teaching practice with video so that it becomes a productive learning tool for teachers" (p. 59). This forms the background for our interest in how practice videos of student teachers' own teaching can be used in formative assessment.

Formative assessment in teacher education

The potential of formative assessment and feedback processes to influence learning and professional development is widely accepted. Although there is no agreed-upon definition of the terms "formative assessment" or "feedback" in the literature, there is some consensus in this regard. Scholars agree that feedback is an integral element of a wider framework for formative assessment, where a student's current understanding or performance is used as feedback, that is, information to modify the teaching and learning activities in which a student is engaged (Black & Wiliam, 1998; Hattie & Timperley, 2007). This transfer of feedback information takes place not only between teachers and students but also in the peer assessment and self-assessment of student performance and advice about further steps to be taken. Henderson et al. (2019) highlight the fact that feedback is a *process* in which information about performance is used to influence subsequent performance. Furthermore, they suggest that the impact of feedback is "essentially any changed state within the learner as a result of the feedback process" (p. 42), implying changes related to cognitive processes, emotion, identity, relationships, and motivations.

The teacher educator is regarded as one of several sources of feedback information because feedback processes often involve a variety of agents, such as peers.

Teachers' peer feedback competence can be defined as their skill in conveying an assessment of a peer's teaching practice and thus stimulating reflection and professional development (Hammerness et al., 2005; Prilop et al., 2021). Peer feedback consists of constructively communicating a criteria-based evaluation of a peer's teaching performance that includes identifying potential strengths and weaknesses. Despite a scarcity of research, Morris et al. (2021) offer some promising findings related to the use of peer feedback in higher education. Regarding TE specifically, Prilop et al. (2020) claim that there is little research on how to promote student teachers' feedback quality concerning their teaching practice. In a study on the effects of digital video-based feedback environments on student teachers' feedback competence, Prilop et al. (2020) found that the feedback provided by experts was more specific, made more use of questions that triggered reflection, and used the first-person perspective more frequently than that of student teachers did. Student teachers used few specific descriptions of teaching situations in their feedback and very rarely used activating questions. Prilop et al. (2020) concluded that student teachers lack sufficient "professional vision" to notice relevant classroom events.

In our study, we investigate what characterizes student teachers' peer assessment conversations based on authentic practice videos. To do this, we use concepts developed by Mercer and Wegerif (1999) in which a framework for analyzing the quality of student talk in groups was developed. The framework is not manifested in research on formative assessment but, rather, in research on dialogic teaching. However, we use the framework as an analytical approach in the study presented in the current chapter. As an indicator of the quality of educational talk, Mercer (1996) refers to three types of talk: disputational, cumulative, and exploratory. Disputational talk is characterized by disagreement and individual decision-making, with few attempts to be unifying or offer constructive criticism of other participants' utterances. The participants are arguing in the form of short claims and counterclaims. Cumulative talk is characterized by participants building positively and uncritically on one another's utterances. Repetitions and affirmations are prominent in the conversations. The participants build common knowledge via accumulation. Exploratory talk is characterized by participants' critical engagement with one another's ideas. The reasoning and argumentation are explicit in the conversation. The participants offer alternative viewpoints, and they engage in the discussions with the purpose of joint consideration (Mercer, 1996).

Discussion of methodological approach

Empirical context

The formative assessment design focused on in the current study is developed as part of the DIVA project. The aim of the DIVA project is to develop

formative assessment designs in higher education, in which digital technology (video) is used as an innovation tool. This innovation project is hosted by the Center for Professional Learning in TE (ProTed), at the Department of TE and School Research (ILS) at the University of Oslo (UiO). It is carried out as part of UiO's five-year integrated TE Program, the one-year Postgraduate Certificate in Education Program, the master's program for school management, and the mentoring education program. The technology used in DIVA is the VIVA (Visual Vocal Application) app, which enables secure video and audio recording according to the General Data Protection Regulation (GDPR). Students use the VIVA app to record videos of one another's professional practice in school. These video recordings provide a unique opportunity for teacher educators to provide feedback (formative assessment) on students' practice and help students connect the curriculum to practice experiences.

The DIVA project has developed several designs for formative assessment using authentic practice videos, including *the peer assessment seminar* (see Figure 16.1 for an overview of the design). In this learning design, a group of 20 student teachers and a campus-based teacher meet in a digital seminar. Prior to the seminar, the students have video recorded a small sequence of their own instruction during practice placement. A task with a theoretical focus (e.g., class management) determines what type of instruction or lesson the students should video record. The peer assessment seminar begins with the campus-based teacher holding a short lecture on the selected theoretical topic before the students work in break-out rooms, assessing one another's videos

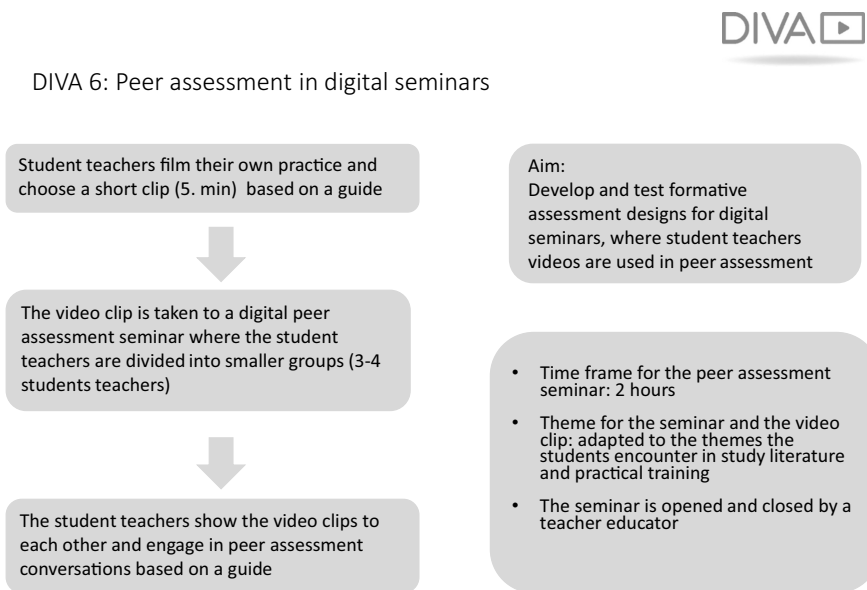

Figure 16.1 The design of the peer assessment seminar.

and discussing the theory linked to one another's experiences from practice. To support the peer-assessment conversations and help the student teachers to notice relevant aspects in their peer (and their own) videos (Santagata et al., 2021), we developed a guide. The peer assessment seminar ends with a plenary session in which the teacher educator consolidates the theory in focus by reflecting on and making links to theory using one or two selected student videos. For this learning design, the student-teacher ratio is high, and thus, the cost of the TE program is low. However, this innovative design involves unique learning opportunities, allowing peers to reflect on one another's practice experiences in relation to theory.

Methods and sample

This study aims to gain insight into how student teachers provided peer feedback on one another's authentic practice videos. Our research on the DIVA project in general and this study in particular draws on design-based research principles (Collins et al., 2016). The study is set within the one-year Post Graduate Certificate in Education program at the University of Oslo. Twenty-three student teachers and one teacher educator participated in the study. Six peer assessment conversations were conducted, with three or four student teachers in each group. The conversations were recorded in Zoom and later transcribed. The data consist of approximately seven hours of transcribed recordings. In addition, we conducted focus group interviews with all participants in the same groups as in the peer assessment conversations. Lasting 55–70 minutes each, the semi-structured interviews were audio-recorded and transcribed.

Analytical approach

In the initial phases of analysis, we discovered that there were differences in the way student teachers provided feedback to one another. To understand what characterizes their talk in the peer groups, we utilized two of Mercer and Wegerif's (1999) categories of classroom talk for analytical purposes: cumulative and exploratory. First, we analyzed the extent to which cumulative and exploratory talk appeared in the data. We detected that a large amount of peer assessment conversations could be classified as cumulative or exploratory talk. Based on this analysis, we identified two excerpts that function as empirical manifestations of the concepts of cumulative and exploratory talk in peer assessment conversations in this study. We do not claim that the selected excerpts are statistically generalizable; however, the excerpts serve as empirical links between the concepts of peer assessment and the concepts of cumulative and exploratory talk. Thus, the status of the excerpts is related to "the extent to which findings from one study can be used as a guide to what might occur in another situation" (Kvale, 1996, p. 233). Finally, the excerpts were analyzed using the analytical procedure of interaction analysis, which implies that talk

and interaction between the interlocutors are analyzed sequentially (Jordan & Henderson, 1995).

What did we find?

With the aim of gaining insight into how student teachers provide peer feedback on one another's authentic practice videos, we investigate what characterizes the conversations, how student teachers provide formative feedback, and whether and how the student teachers challenge one another in the conversations. We found that the participants engaged in various types of conversations.

We identified peer assessment conversations that were superficial and cumulative in nature. The student teachers only commented briefly on their peers teaching, without further elaboration or justification. In these conversations, only a few participants asked for clarifications or justifications of their peers' teaching choices. We also identified peer assessment conversations in which student teachers engaged with one other's video clips, gave feedback, exchanged ideas, and elaborated on one another's thoughts and understanding of the practice videos regarding theoretical concepts These conversations can be characterized as exploratory. In the following, we will present two excerpts demonstrating how cumulative and exploratory talk can enfold in peer-assessment conversations involving authentic classroom videos of students' own practice experiences.

Excerpt 1: Cumulative talk in student teachers' peer-feedback conversations

Before this excerpt,[1] one of the student teachers, Nora, had shown her practice video to her peers. The practice video shows a fifth-grade social studies lesson. Nora is leading a whole-class discussion with the aim of consolidating a group activity on source criticism, which was completed during the previous social studies class. The excerpt begins after the end of the video clip.

1.	Emilie	Wow! [All are clapping their hands.]
2.	Trine	Oh, my goodness, so clever they are, the kids. And I have to say, you were really great at having them talk and create a conversation where all were included.
3.	Nora	Thank you. And, as I said, I think I was a bit lucky with my class […]
4.	Trine	Uhum. But you are very good, though. As you said before you showed your video, it is a large and quite difficult topic. I am somewhat surprised that they are learning about this when they are so young, but I think you were very great at presenting it so that it becomes understandable for them, though, and made it very concrete.
5.	Nora	That is good. Thank you.
6.	Trine	Because I think that it is challenging to teach such a complicated topic to such young students.

7.	Nora	Uhum. That was a bit fun […]
8.	Trine	Yes, I can imagine that. I think it was really great. You were good at addressing everyone. You walked around and looked at them and were very present. I don't really have anything to criticize. Very good.
9.	Nora	[Nods and smiles.]
10.	Hassan	I also think it was very neat and well structured, and you inspired the students to participate in a very-(?). You seem like a very friendly teacher. Secure. And you reached all your goals. I think you had decided the concepts that you wanted to reach. You reached all of them, you got there. And you engaged them. That was really good, I think. You mentioned calling the students by name, but we have already talked about that.
11.	Nora	Yes, absolutely, that would have been a great advantage.
12.	Hassan	I also use my finger to point at students.
13.	Nora	I tried to use like this [holding her palm upside down] instead of like this [pointing with her index finger].
14.	Hassan	But very well carried out. And also, with regards to the subject, they became engaged, and they felt secure enough to become engaged. How old are these?
15.	Nora	Ten years.
16.	Hassan	Ten years. I have worked in primary school with six- and nine-year-olds. But that was great because your class was quite neat and calm but engaged. That is not easy to achieve.
17.	Emilie	Yes, seemed like clever kids. Yes, it was very great, very great. I don't really have anything more to add, other than that it was really good. Great dialogue between them, and you managed to lead the conversation between them in a good way, and yes, that was good.
18.	Nora	Yes, thank you for that. [Nora explains what she thinks she succeeded at in the video and shares a tip from her supervisor before the group changes their focus to Emilie's video clip.]

The excerpt begins with all the peers praising Nora by clapping their hands for Nora's teaching on the video clip. After this, Trine begins giving feedback to Nora, saying that Nora was really great at creating a conversation with the kids (line 2). She goes on by providing examples of what she thinks was great, such as "you made it very concrete" (line 4) and "you walked around and looked at them" (line 8), ending her feedback by saying "I don't really have anything to criticize. Very good." Hassan takes over and continues to praise Nora's teaching. He characterizes Nora as a "friendly" and "secure" teacher (line 10) and emphasizes that Nora is good at engaging the students (lines 10 and 14). He ends his feedback by relating to his own teaching in school and expressing that he is impressed by Nora's class management: "But that was great because your class was quite neat and calm but engaged. That is not easy to achieve" (line 16). Finally, it is Emilie's turn to provide feedback. She explicitly states that "she has nothing more to add, other than that it was really good" (line 17). She continues to reinforce the feedback from Trine and Hassan regarding how well Nora managed to lead the conversation with the

students. In her short feedback (line 17), she emphasizes that she thinks that Nora's teaching was "very great" or "good" four times. This excerpt is an example of how the peers in a group provide feedback to one another by accumulating one another's utterances. Trine, Hassan, and Emilie are obviously all very impressed by the way Nora leads the student conversation, and to some extent, they manage to justify their statements by providing examples. However, the feedback can be characterized by repetitions and affirmations about how great Nora's teaching is. The student teachers are building on one another's feedback uncritically, and none ask critical questions or attempt to give feedback on what teaching techniques Nora manages to use in her conversation with her class. We provide this excerpt to exemplify how student teachers provide feedback to one another by using cumulative talk.

Excerpt 2: Exploratory talk in student teachers' peer-feedback conversations

Before this excerpt began, Camilla showed her practice video to the group. The practice video shows a Norwegian lesson for the ninth grade, in which Camilla is leading a whole-class conversation about how to write a creative text. The class is discussing a student-produced text visualized on the smartboard. After seeing the video clip, Per has provided several positive comments targeting the student's teaching in the video clip. The group also includes Jing; however, she is quiet during the selected excerpt. The following excerpt begins with Per commenting on what could have been improved in the teaching sequence shown in the video clip.

1.	Per	Something that could have been better. I have no clue. This is a very different type of lesson than what I am used to=
2.	Camilla	I am open for advice.
3.	Per	[…] I feel that it went rather slowly, considering that you should go through a certain amount of things […] …my mentor has said, though= It has been like= It is nice to spend time thinking. It is wise to spend the time effectively, then. I don't know. I was just thinking=
4.	Camilla	Do you think my tempo could have been faster?
5.	Per	Maybe=
6.	Camilla	Some places.
7.	Per	Some places, maybe, there could have been variation in tempo.
8.	Camilla	Yes.
9.	Per	Because it is great that you spend time. And it is one of the techniques that they [*the students*] should be allowed to think. Maybe it is, like, in some periods the pace could have been higher than in other periods.
10.	Camilla	Uhum.
11.	Per	For all I know, this happened in this lesson. It was just in that for these five minutes, it was a steady calm pace, then.

12.	Camilla	One thing I myself noticed that I could have done more of, at least in the seconds that I saw that they were quiet= I could, though, have asked them to talk in pairs.
13.	Per	Nods.
14.	Camilla	Because I have done that in other classes when they have been a bit quiet. And it should be said that they are a quiet group. They are a bit like, you have to push them to give an answer. They know the answer, but they don't necessarily raise their hands. And I have noticed that this has helped in other classes, that I have asked them to talk in pairs, and then the chatter goes. And they talk, and they have lots to talk about, and when we then take it in a whole class talk, they have an answer.
15.	Per	Yes.
16.	Camilla	But it is like they only have to talk a bit first and break the wall of silence in one way or another, and that doesn't appear in the clip here, then.
17.	Per	That is interesting information. Because it makes sense. It seems like those who know the answer have very clear or good input, but why does it not come at once? But that is something you have noticed there, that you can think of, that, yes, ehm=

The excerpt begins with Per pointing to something that could have been improved in Camilla's teaching. Camilla is open to advice (line 2) and asks Per if he thinks her "tempo could have been faster?" (line 4). This invites Per to elaborate on his thinking. Before answering Camilla's question, he acknowledges that "spending time" stimulates students' thinking (line 9). Per affirms that he thinks the tempo could have been faster (line 9). Per's feedback makes Camilla reflect on something she could have done differently in her teaching: she could have asked the students to talk in pairs (line 12) to stimulate whole-class talk (line 14). She also points out that she has had great success with this technique in terms of helping the students "break the wall of silence" (line 16) but that this does not appear in the clip (line 16). Per finds this reflection interesting and in accordance with his observation that the students were reluctant to answer despite having clever answers. This excerpt is an example of how peers in a group provide feedback to one another by using exploratory talk. Per and Camilla are critically engaged with one another's thoughts and ideas, and their reflection and argumentation are explicit in the conversation. We will argue that Per and Camilla are referring to theory. Per refers to "time to think" as a "technique" (line 9) and Camilla refers to "talk in pairs" (line 12). These teaching techniques are well described in the student teachers' educational literature and presented in the lecture held immediately before the student teachers' group activity. We will therefore argue that, based on theory, the participants offer alternative viewpoints, reflect, and engage in the discussion with the purpose of joint consideration. We use this video to exemplify how students provide feedback to one another by using exploratory talk.

Discussion

The findings from our study demonstrate the potential of authentic practice videos as mediational means in student teachers' peer assessment. By using Mercer and Wegerif's (1999) analytical framework, we were able to disentangle how peer feedback on authentic practice videos was related to the concept of exploration. One of the excerpts (excerpt 2) illustrates how the students were drawn into reflections about their own teaching following feedback from their peers. In this conversation, students shared perspectives, argued, explained, and listened to one another, which are indications of high-quality discussion and exploration (Mercer & Wegerif, 1999; Mercer, 2004). In the conversation, the guide served as a support to notice relevant events in the videos (Santagata et al., 2021; van Es & Sherin, 2002). The findings coincide with the research on peer assessment, which emphasizes the learning potential of having different viewpoints highlighted from peers (Nicol et al., 2014). In addition, we saw, from our first iterations of the assessment design, that student teachers tended to focus on superficial matters, such as teacher characteristics, classroom management issues, and a more general assessment of the effectiveness of the lessons. This is in line with research highlighting the need for teacher educators to prepare student teachers regarding which important classroom events to focus on, that is, student teachers learning to notice relevant classroom events (see Chapter 15), as well as how to provide feedback to peers. In the DIVA project, digital opportunities are exploited in new and innovative ways. In the following, we outline some of the advantages of using video recordings of one's own practice experiences for student teachers' professional development and strengthening the development of TE.

New spaces for collaboration and common language for teaching: When practice videos are used as mediational means in formative assessment conversations with student teachers, the conversation between campus-based and school-based educators will force the actors to engage in shared meaning making and understand one another's language. In this way, practice videos facilitate the development of a common language of teaching (Nesje & Lejonberg, 2022; Tunney & van Es, 2016) and contribute to the manifestation of the third space (Daza et al., 2021).

New and flexible representation of the knowledge domain: Video recordings of student teachers' own practice experience create a new form for representation of the knowledge domain, and this allows for new ways to visualize and reflect on knowledge. Video-based knowledge representations can be shared, played, and replayed. Attention to specific parts of the knowledge domain can be given by selecting specific sequences of the practice video. Actors can reflect on the video clips individually before sharing well-prepared feedback in groups, or the video clip can be analyzed collaboratively to encourage sharing initial reflections among the actors. Because this new form of representation allows for sharing digitally, both asynchronously and synchronously, this can lead to flexible online collaborations between actors located at different sites.

Strengthening the coherence of classroom practice and coursework for student teachers: By using practice videos, it becomes possible to refresh and share practice experiences during campus-based coursework. Theoretical assignments and tasks in course work may be based in these videos, and in this way, theoretical concepts, frameworks, and models in the TE curriculum may become more relevant when directly related not only to video recordings of practice experiences in general but to student teachers' own practice experiences. Thus, practice videos are transforming formative assessment, which was previously restricted to theoretical assignments, tasks, and activities, into a formative assessment of the coherence between theory and practice. In turn, this strengthens the coherence of fieldwork and coursework and helps to bridge the gap between theory and practice.

Concluding remarks

This chapter reports on a study examining a formative assessment design using video recordings of students' own practice experiences as a powerful tool, promoting student teachers' professional development. The video recordings of students' own practice experiences have the potential to bridge the gap between theory and practice, as well as to serve as mediational means of stimulating collaboration between campus-based and field-based educators. The development of new and innovative technology enabling student teachers to video record their own classroom practice is a vital contribution to transforming the TE programs at UiO, and we believe it has great transfer value to other TE institutions.

Note

1 Transcript notations: [ ] Text in square brackets represents clarifying information, = indicates the breaking and subsequent continuation of a single utterance, ? indicates rising intonation, : indicates the prolongation of a sound, underlining indicates emphasis in speech, (.) indicates a short pause in speech, (# of seconds) indicates the time, in seconds, of a pause in speech, […] indicates utterances removed from the original dialogue, a single dash (-) in the middle of a word denotes that the speaker interrupts herself, a double dash (--) at the end of an utterance indicates that the speaker's utterance is incomplete, and ((Italics)) indicates the annotation of nonverbal activity.

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Part VI

Epilog

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17 Epilog

Teachers as epistemic change agents

Andreas Lund

An epilog usually refers to a concluding part of a book. But it is different from a conclusion. The purpose of an epilog is to provide additional information and possibly insights, sometimes giving readers or viewers a glimpse into the future. The following pages have been written with this in mind.

Then and now

In 2015, when ProTed's first anthology was published, it catered to a Norwegian (or possibly Scandinavian) audience with a title that translated from Norwegian reads *Pathways to excellence in teacher education* (Rindal, Lund, & Jakhelln, 2015). Its first chapter, also translated, was titled *Excellence in teacher education – what is it and how can we achieve it?* (Lund, Jakhelln, & Rindal, 2015). This signaled a focus on quality in teacher education (TE), specifically addressed in a chapter asking what amounts to quality in teacher education (Vestøl, 2015). Quality and excellence aspects were further pursued through anthology sections that thematized teaching in disciplines, partnerships linking universities and professional practice, digitalized learning environments, educational leadership and competence development, and integrated study designs.

Jump to 2023 and this second anthology from ProTed. Significantly, the content is now in English, catering to a wider audience and where the first part of its title reads *Transforming University-based Teacher education through Innovation*, accompanied by a first chapter echoing the anthology's title. Also significantly, the first sentence in the opening chapter reads, *Teachers are key agents in educating citizens for the future*,… Thus, the two anthologies with their focus on quality and transformation reflect a dual perspective on teacher education. Together, these two themes are mutually constitutive of a future-oriented and professionally oriented teacher education that serves to foster agentic teachers.

The first anthology aimed to identify and promote qualities that the five-year master's level TE sought to harness. This coincided with curriculum reform and the work that the Ludvigsen Committee published in two reports on the renewal of school subjects and competencies and the knowledge basis for students' learning in the school of the future

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(Ludvigsen-utvalget, 2014, 2015)[1] and which is referred to in some detail in the epilog to the first ProTed anthology (Ludvigsen, 2015).

This second anthology coincides with the National Strategy for Teacher Education 2025 (Norwegian Ministry of Education and Research, 2018). The implementation of the strategy is accompanied by the work of The Advisory Council for Teacher Education 2025 (ACTE)[2]. The Council provides professionally based analyses and recommendations for operationalization of the strategy. Like ProTed, the Strategy and the work of the Council aim to bridge the often perceived disconnect between campus-based and practice-based TE. So far, the work of the ACTE has materialized in producing knowledge bases and recommendations related to three broad themes. The first theme centers on partnerships between universities and schools/kindergartens and with a focus on 'third spaces' that amount to more than collaboration (see, e.g., Daza, Gudmundsdottir, & Lund, 2021; Zeichner, 2010). Third space approaches address hybridity, suspending asymmetric roles for student teachers, academic staff and practitioners, and acknowledge tensions, conflicts and identity formation as drivers for professional development. The second theme centers on the role of bachelor and master theses and how these can be made more relevant by merging epistemologies found in research-based and experiential knowledge. The theses' unreleased potential of knowledge advancement and dissemination was targeted, and also organizational development by connecting more systematically to the role of practitioners and schools/kindergartens throughout and following the writing process. The third – and at the time of writing ongoing – thematic work centers on 'extended practice'. This involves identifying situations, practices, and challenges that student teachers have had few opportunities to encounter in their study programs and practicum. Examples are sensitive situations or information connected with students with special needs, opportunities for students to engage in analysis, together with supervisors from campus and mentors in schools/kindergartens, of their teaching when in practice, and a deeper and more holistic understanding of schools and kindergartens as organizations. The key elements are student teacher participation and enactment, not just being exposed to such themes in lectures and seminars. Simulations, virtual reality, 'shadowing', and use of video recordings are but a few of the possible resources for such extensions.

These three ACTE themes touch base with essential contributions in the present anthology. A common denominator is the transformative expertise and agency that student teachers need to cultivate in order to function as true professionals in a variety of educational contexts. Teachers are not just executioners of curricula and syllabi; they are – to once again quote the first sentence in Chapter 1 – *key agents in educating citizens for the future.*

This is an ambitious and welcome re-appraisal of the importance of teachers. However, it also involves competences that go beyond what we traditionally have come to require and expect from teacher education programs. Among such competencies is an increased understanding and enactment of agency

(Emirbayer & Miche, 1998; Etelepälto, Vähäsantanen, Hökkä, & Paloniemi, 2013) and professional agency (Nagel, Gudmundsdottir, & Afdal, 2023). Such teacher agency can be epistemic (Heikkilä, Hermansen, Liskala, Mikkilä-Erdmann, & Warinowski, 2020; Lund & Aagaard, 2020), for example, how teachers influence developmental and learning processes by designing learning environments and learning activities. It can also be relational when teachers work in inter-professional contexts and institutional settings (Edwards, 2007). And, as much recent research has shown, such agency can be transformative (Haapasaari & Kerosuo, 2015; Kerosuo, 2017; Aagaard & Lund, 2020) and understood as 'breaking away from a given frame of action and the taking of initiatives to transform it' (Virkkunen, 2006, p. 43). The present anthology is an operationalization of such transformative agency; Chapter 1 connects transformative efforts to different types of innovations in its five thematic sections.

To further document the continuity and constant development of the ProTed center, Lund and Eriksen (2016) presented some challenges that appeared to be common in the current landscape of TE and TE research. Summarizing the first years of ProTed development, the article argued that the principles of transformative agency and double stimulation (Sannino, 2015) offered a conceptual framework for studying changes in teacher education and can contribute to the understanding of how we can design future-oriented study programs. The article synthesized findings from a number of projects attempting to reconfigure TE, transcend epistemological dichotomies (experiential and research-based knowledge; an epistemic focus seems to be deficient in TE), and prepare teachers for a changing world. Also, the article concluded that the reconfiguration of educational research and practice in TE was doable and that the examples of projects presented could serve as empirical lenses and carriers of new understandings of how to transform TE in the knowledge society. In sum, the two anthologies, and the article referred to, document how transformative efforts have energized the 10 years ProTed has existed. How this corresponds to the work of the ACTE also demonstrates how it aligns with policy initiatives and, thus, testifies to its wider relevance for teacher education.

Agents and artifacts

It is interesting to compare the sections in the first anthology with those in the present volume. In Table 17.1, the parts are listed in order to get a snapshot of how themes and foci have developed over the years (titles in the first anthology have been translated).

While the snapshot indicates a continued focus on integrated TE and the importance of partnerships, there are some noticeable thematic shifts. While the first anthology often emphasized structural and contextual factors for integrated TE, the second anthology has a more pronounced emphasis on the role of the student teachers and teacher educators (including mentors in schools) and their professional development. This is seen, for example, in the

Table 17.1 A comparison of sections in the first and second ProTed anthologies

First anthology	*Second anthology*
Part 1: Teaching in school subjects	Part 1: Development of integrated teacher education in Norway
Part 2: University schools and professional practice	Part 2: Research literacy in Teacher education
Part 3: Digitalized learning environments	Part 3: Bridging the gap between campus and schools (theory and practice)
Part 4: Educational leadership and competence development	Part 4: Development of professional identity
Part 5: Integrated study designs	Part 5: Video as a means of connecting coursework to teaching practice
Epilog	Epilog

contributions on student teachers' research literacy, their role as co-researchers, and how they work with their master's theses. The latter theme also being one of the ACTE's focus areas.[3]

It is somewhat unfair to highlight certain themes, or chapters, but two themes in the present anthology that, at least to this author, carry great potential for invigorating TE and preparing student teachers for their profession are found in the chapters on mentoring (Chapters 12 and 13) and the use of video (Chapters 15 and 16). What these two themes have in common is the use of cultural tools – digital artifacts – and an extended agency enacted by student teachers.

The digital artifacts from the *Tools for Mentoring* project (decision simulator, response tool, digital video recordings of student teachers' practice) have the potential to suspend the persistent asymmetry in power relations between supervisors at the TE institutions and the mentors in schools and the student teachers caught in the middle of sometimes different or even conflicting signals (Lillejord & Børte, 2016). The project and its accompanying chapter outline new and extended mentoring practices as a result of technologies being co-constructed by researchers and actors from the practice field. As mentoring becomes increasingly important in bridging TE arenas, epistemologies, and in making practice experiences subject to both reflection and analysis, these contributions are both transformative and future oriented. Also, as the Part 4 title indicates, they are constitutive of professional *identity*, a notion that extends a perception of professionalism as skills or competencies and reaches into the often neglected affective and emotional aspects of being a teacher. These contributions are essential to ProTed's legacy.

The same goes for Chapters 15 and 16 where the use of video recordings connects student teachers' teaching practices and their reflections, reasoning and analysis and how these components add up to a basis for formative assessment. This represents a leap in authentic and research-based practice as digital

video changes the *representation* of the TE domain. Instead of trying to recall what happened *in situ* or observing other (student) teachers' activities, student teachers now produce a data corpus that captures their own educational designs, activities including the ephemeral 'teachable moments' (Reister, 2023), and sudden decisions for re-viewing and analysis. The argument I would like to advocate here is that the chapters on mentoring as well as on the use of video (in fact, the whole anthology) amount to an epistemic shift in TE; under what conditions and by what means we come to understand TE is changing (see also Lund & Aagaard, 2020, for an extended discussion).

Beyond ProTed

ProTed has had the advantage of being a center of excellence for over 10 years. The series of interventions and innovations is long and intriguing. But it is also necessary to raise questions of sustainability and dissemination. TE research and development is ripe with examples where project funding produces extremely interesting designs and developments but – when funding stops – the projects remain local or, even worse, tradition eats innovation and everything returns to the previous state of things (Jónasson, 2016). Thus, the many promising insights risk ending up as pearls without a string.

The ProTed legacy would seem to avoid this fate. I would like to venture three conditions that need to be met in order for the insights to gain a life beyond its local context:

1. *Relevance*. The parts and chapters in this (and the previous) anthology capture the essence of what can be improved and what is a stake in TE. Reading the chapters, one is struck by how they address essential challenges and bring about insights, principles, and models that are not constrained by a Norwegian context but resonate with international issues in TE.
2. *Scalability*. Projects are by their nature confined by the number of people involved, funding, infrastructure, and cultural-institutional factors. Reading the chapters in light of potential up-scaling, even the more tech-intensive interventions and innovations appear to be manageable on larger institutional and even regional/national levels. However, this requires institutional strategy and not merely thinking in terms of projects.
3. *Re-contextualization*. The ProTed projects are the offspring of a certain professional community, in this case represented by two major universities in Norway. Thus, they are to some extent context-sensitive and can be seen as responses to both local and national needs and challenges in TE. However, the way many of the projects capture both agentic levels (practices), institutional levels, and policy levels would seem to indicate that by observing diverse contextual factors, processes, and products (lessons learned) can be re-contextualized and adapted internationally. This is not a question of simple transfer or generalizability, but continuous refinement and further development of some basic principles.

These three principles together with the fact that this volume is published in English should indicate that ProTed has grown out of its project phase and has the potential to be an international source of accumulated knowledge and further inspiration to develop TE.

The transformative teacher

During the time this anthology was planned, prepared, and written, educational perspectives were massively shaken by the advent of generative digital technologies such as ChatGPT and development in artificial intelligence (AI). This is not the place to open up for a broad discussion of implications and neither does the anthology address this particular issue. However, it is obvious that we will see fundamental shifts in educational tasks, assignments, and problem solving: in educational activities and practices where humans and non-humans enter into relational argumentation structures to advance knowledge and with unavoidable consequences for tests, exams, and assessment. This amounts to a post-human design approach that empowers students to become expert creators in new emerging practices of co-creation (Wakkary, 2021). This perspective is especially applicable to a profession educating a future workforce and socially aware citizens. Consequently, it resonates with the previous quote from the introduction to this volume: *Teachers are key agents in educating citizens for the future*.

And while it is the responsibility of future TE to respond to these challenges, the present volume has made substantial contributions in communicating the agentic (student) teacher as the protagonist in future scenarios. In 2010, Ian Menter and colleagues identified four models of teacher professionalism; the effective teacher; the reflective teacher; the enquiring teacher; and the *transformative teacher* (Menter, Hulme, Elliot, & Lewin, 2010). In the latter model, teaching was positioned as a transformative activity, bringing an 'activist' dimension into the profession. This entails a double undertaking in that teachers should contribute to social change and also prepare their pupils to contribute to positive change in society. Thus, agency in a transformative and TE perspective involves (student) teachers identifying educationally challenging situations and adapting or working with relevant resources to transform the problem situation into a constructive and teachable event. In recent years, transformative agency has attracted a lot of attention in educational research including teaching and TE (see, e.g., Brevik, Gudmundsdottir, Lund, & Strømme, 2019; Etelepälto et al., 2013; Lund, Furberg, & Gudmundsdottir, 2019; Stetsenko, 2017). As AI and generative digitalization also demonstrate agentic (although not conscious) performance, the division of labor between humans and non-humans may not always be clear. However, the educational responsibility firmly rests with human agents – in this case the teacher educators and student teachers.

Teachers' transformative agency is important when we – in line with the purpose of an epilog – cast a glance into the near future to identify themes

and challenges teachers will have to face. Digitalization is already mentioned. But increasingly, themes that make themselves strongly felt are, among many:

- Further development and cultivation of partnerships, including third space approaches and issues of epistemology (see, e.g., Part 3)
- Fostering professional learning communities (see, e.g., Part 1)
- Cross-cultural competence, diversity, inclusion, mental health, and well-being (see, e.g. chapter 9 for multilingual approaches)
- Inter- and trans-disciplinary approaches to teaching and learning (highly relevant in a Norwegian perspective with three interdisciplinary themes being introduced in a recent curriculum reform)
- Teaching creativity, critical thinking, and untraditional approaches to solving or coping with problems including crises and wicked problems. (Part 2 on research literacy is relevant here)
- Experiential, social, and emotional learning (the chapters on the use of video are highly relevant)
- Assessment practices and accountability; teachers will meet totally different assessment criteria and procedures (Chapter 4)

The above list is but an indication of where we are heading and how ProTed has made itself relevant, not just in past and recent interventions, but in ways that are future oriented. Professional and highly educated teachers are required more than ever. Thus, it is worrying to note that internationally as well as in Norway there is now an unfortunate trend of having difficulties in recruiting student teachers, attrition among practicing teachers, and increasing dropouts from the teaching profession (Craig, 2017; Nesje, Brandmo, & Berger, 2018). This ProTed anthology comes across as a most important contribution to countering these trends. Consequently, this epilog congratulates ProTed with 10 years of impressive contributions and with a legacy that will be both treasured and put to work in TE.

Notes

1 These report on renewal of school subjects and competencies is also published in English and can be accessed from https://www.regjeringen.no/en/dokumenter/nou-2015-8/id2417001/
2 The website of the Council and reports in English can be accessed from https://nettsteder.regjeringen.no/frlu/in-english/
3 An extensive report (in Norwegian only) can be accessed from the ACTE website: https://nettsteder.regjeringen.no/frlu/partnerskapilaererutdanningene/

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