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The Teacher Education Panel Study (TEPS) Framework

- Version 1.0

Liva J. Martinussen*, Bas Senden* og Isa Steinmann*

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THE TEACHER EDUCATION PANEL STUDY (TEPS) FRAMEWORK

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Abstract

The Teacher Education Panel Study (TEPS) is a landmark initiative in educational research on Norwegian teacher education: a comprehensive, large-scale longitudinal panel study designed to investigate the full trajectory of student teachers—from their entry into initial teacher education to their transition into professional working life.

In Norway, most existing research on teacher education has been small-scale, fragmented, and qualitative, making it difficult to build a cumulative knowledge base. At the same time, teacher education is continuously going through major reforms and facing pressing challenges, such as a trend of declining applicant numbers. Against the backdrop of such reforms and challenges, there has been a repeated call for systematic, high-quality data on the implementation of teacher education.

By collecting comprehensive data from different teacher education institutions, TEPS aims to enable evidence-based policy and practice through high-quality research. The longitudinal, multi-level, multi-cohort design of TEPS allows strong inferences, including causal ones. Similar large-scale studies on teacher education exist in only a few other countries, such as Germany and Australia. Thus, TEPS will position Norway at the forefront of international research on teacher education.

While the primary objective is to establish a research database that is accessible and supports state-of-the-art educational research, findings from this research can also contribute to improving the quality of teacher education.

This framework document introduces the objectives and status of the TEPS study, and outlines its contextual, theoretical, and empirical rationale behind the design. It describes the structure of Norwegian teacher education and addresses the need for a database in light of the current developments and challenges Norwegian teacher education faces. The TEPS framework also draws on key theoretical frameworks and lines of inquiry in prior empirical research on teacher education. It describes TEPS' assessment design, including the target population, the longitudinal and multi-cohort modular design, the types of quantitative data collected, and the content areas covered.

This framework serves as the foundation for the ongoing development and piloting of TEPS instruments and represents a milestone in the establishment of a national data infrastructure that can be used for high-quality and impactful research on teacher education.

Sammendrag

Panelstudien om lærerutdanning (Teacher Education Panel Study; TEPS) er et banebrytende initiativ innen utdanningsvitenskapelig forskning på lærerutdanningen i Norge: en omfattende, storskala, longitudinell panelstudie som er designet for å undersøke hele utdanningsløpet til lærerstudenter—fra de starter på lærerutdanningen og til overgangen til yrkeslivet som lærere.

Den eksisterende forskningen på lærerutdanning i Norge har i hovedsak vært av liten skala, fragmentert og kvalitativ, noe som har gjort det vanskelig å bygge en kumulativ kunnskapsbase. Samtidig går lærerutdanningen gjennom store reformer og står overfor betydelige utfordringer, slik som den nedadgående trenden i antall søkere. I lys av disse reformene og utfordringene har det vært et økende behov for systematiske data av høy kvalitet som omhandler gjennomføringen av lærerutdanningen.

TEPS samler inn omfattende data fra ulike lærerutdanningsinstitusjoner i Norge for å legge til rette for evidensbasert politikk og praksis basert på solid forskning. Det longitudinelle designet til TEPS, som også inkluderer flere nivåer og kohorter, gjør det mulig å trekke sterke slutninger, inkludert slutninger om kausale sammenhenger. Tilsvarende storskalastudier på lærerutdanning finnes kun i noen få andre land, som Tyskland og Australia. Dermed plasserer TEPS Norge i fronten av internasjonal forskning på lærerutdanning.

Selv om hovedmålet med TEPS er å etablere en tilgjengelig forskningsdatabase som støtter utdanningsvitenskaplig forskning av høyt nivå, kan funnene fra denne forskningen også bidra til å forbedre kvaliteten på lærerutdanningen.

Dette rammeverksdokumentet introduserer målene og status for TEPS-studien, og presenterer den kontekstuelle, teoretiske og empiriske bakgrunnen for designet. Rammeverksdokumentet beskriver strukturen til den norske lærerutdanningen og behovet for en database sett i lys av den nåværende utviklingen og utfordringene den norske lærerutdanningen står overfor.

TEPS-rammeverket bygger også på sentrale teoretiske rammeverk og tidligere forskningsområder innenfor empirisk forskning på lærerutdanning. Dokumentet beskriver også studiedesignet (assessment design) for TEPS, inkludert målpopulasjon (target population), det longitudinelle multikohort-designet med flere moduler, de ulike typene av kvantitative data som samles inn og de faglige innholdsområdene som dekkes.

Dette rammeverket legger grunnlaget for den pågående utviklingen og piloteringen av TEPS-instrumentene og markerer en milepæl i etableringen av en nasjonal datainfrastruktur som kan brukes til forskning av høy kvalitet og med stor innvirkning på lærerutdanning.

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1.1 Objectives of the Teacher Education Panel Study (TEPS)

The Teacher Education Panel Study (TEPS) is a comprehensive, large-scale longitudinal panel study designed to investigate the full trajectory of student teachers in Norway—from entry into initial teacher education to their transition into professional working life.

The main objective of TEPS is to establish a research database to stimulate high-quality, quantitative research on teacher education. TEPS is the first initiative of its kind in Norway, and there are few similar studies internationally. Thus, TEPS positions Norway at the forefront of research on teacher education internationally, while playing a pivotal role in advancing the research field nationally. The TEPS database will be developed with input from numerous teacher education institutions, thereby strengthening communication and research collaborations between these institutions. This further elevates the field of educational research on teacher education.

In profession-related studies like teacher education, such research should have direct implications for higher education practice. For example, teacher educators can adjust their practice based on findings on what kind of teaching and assessment methods are applied by others, and how these are perceived by students. Furthermore, TEPS' findings can be used to provide an evidence base for institution-level and national policy decisions, which in turn affect relevant contexts and prerequisites for teaching and learning. A secondary objective is therefore to provide the Norwegian teacher education sector with research findings that can help to improve the quality of teacher education practice, both directly and indirectly via policy stakeholders.

To achieve this, TEPS is designed to capture a broad picture of initial teacher education, across subjects. Therefore, a variety of different topics and variables are assessed using different quantitative methods (i.e., questionnaires, analysis of text data, curation of register data). The study follows student teachers longitudinally through their studies and one year into working life. To explore the student teachers' learning conditions, data at the level of courses and institutions are also collected, including information about teacher educators. This multi-level design with a total of 12 modules is essential to ensure that TEPS achieves its objective of painting as holistic a picture as possible.

The modules and module contents are selected to cover topics that are both relevant from a theoretical perspective, in connection with international educational research on teacher education, as well as in the specific context of Norwegian teacher education. Furthermore, the TEPS data are supposed to stay relevant over time. Therefore, TEPS is designed to expand, assessing the same modules for every new cohort of student teachers.

Specifically, TEPS focuses on five-year integrated master's programs in initial teacher education in Norway. TEPS is not an evaluation of these programs with a predefined set of research questions; TEPS is intended to enable a variety of relevant research questions to

be investigated in secondary research. In the long term, the TEPS data will therefore be made available to the research public.

Example questions that TEPS is designed to answer include:

- What kind of students start a teacher education program and why? What expectations do they have? Do these differ between study programs and locations?
- How do student teachers' teaching-related beliefs, motivation, and identity develop on their way through their studies and after the transition to work? How do these differ by contextual factors?
- How do student teachers make use of learning opportunities and what kind of learning strategies and tools do they use? How does this relate to contextual factors and their study progression?
- How do student teachers evaluate their studies over the course of their master's programs and in retrospect? How do such study evaluations relate to contextual factors and their study progression?
- What reasons do student teachers give for dropping out of their studies along the way or reporting that they do not intend to work as teachers at the end of their studies?
- What kind of master's theses do student teachers write at the end of their studies? How do these differ by contextual factors such as subject majors or teacher education institutions?
- How do student teachers and teacher educators evaluate courses? To what extent do their evaluations align and relate to contextual factors?
- To what extent do study programs and teacher education institutions differ in the types of courses they offer? How are these course types evaluated by student teachers and teacher educators?
- To what extent do teacher education institutions differ in terms of their staff of teacher educators as well as studying and working conditions? How do these factors relate to student-reported study evaluations?
- How are the same courses evaluated across different cohorts of student teachers? Are changing course evaluations related to changes in course characteristics?
- To what extent are changes in the recruitment of student teachers associated with study progression measures such as graduation rates?

Beyond such questions, the TEPS study offers opportunities for individual quantitative and qualitative follow-up studies, for example, to investigate interesting findings with in-depth qualitative interviews, or to track newly qualified teachers over longer periods in their teaching careers

1.2 The need for a comprehensive, longitudinal study on teacher education in Norway

High-quality teacher education that prepares students in the best possible way for their later work in schools, serves as a key lever to foster high-quality learning outcomes of pupils (Darling-Hammond, 2006; König et al., 2024; Scheerens & Blömeke, 2016), which is key to securing the future of societies (e.g., OECD, 2025). In line with this, the Norwegian government prioritizes profession-related studies such as teacher education in its long-term plan for research and higher education (St. Meld. 5, 2022; St. Meld. 19, 2023). Moreover, the government underlines that teacher education should be research-based, with teaching and teaching materials grounded in recent national and international research (Kunnskapsdepartementet, 2017, 2025a, 2025b, 2025c, 2025d).

At the same time, there is relatively little systematic research data on teacher education available in Norway—most educational research on teacher education in Norway is small-scale, qualitative work (Forsström & Munthe, 2023). This lack of systematic data is particularly striking when one considers that Norway has internationally outstanding data infrastructures in the school sector, ranging from register data (Utdanningsdirektoratet, 2025b) to the extensive participation in international large-scale assessments (Utdanningsdirektoratet, 2025a) such as the Programme for International Student Assessment (PISA), and large longitudinal studies such as Young in Norway (Ung i Norge; Wichstrøm, 2009), the Linking Instruction and Student Achievement study (LISA; Klette, Blikstad-Balas, et al., 2017), and the Norwegian Mother, Father and Child Cohort Study (MoBa; Magnus et al., 2016).

Together, this need for, and lack of, comprehensive data on teacher education calls for establishing a national data infrastructure on teacher education. TEPS addresses this by providing comprehensive, large-scale data that enables investigations of how teacher education works, how it can be improved, and how reform decisions are affecting it.

TEPS collects systematic data from the different teacher education institutions and has a longitudinal component both at the level of the student teachers as well as the teacher education institutions (see Section 4 below), which is a strong design to draw inferences, including causal ones.

1.3 Status of the TEPS project in September 2025

The work on TEPS is embedded in broader efforts of the Faculty of Education and International Studies at Oslo Metropolitan University to build up a research infrastructure for educational research in the field of teacher education (Oslo Metropolitan University, 2025). While TEPS focuses on establishing a large-scale, quantitative database, other projects aim to curate qualitative data, for example.

Under the leadership of Isa Steinmann, the work on TEPS started in 2023, with a first outline of TEPS' assessment design and covered content areas. Since 2023, pre-piloting projects have been undertaken to investigate how information from already existing text data can be

quantified for the use in TEPS (see Section 4.3.2 below), and to obtain an overview of questionnaire instruments that might be reused or adapted for the use in TEPS (see Section 4.3.1 below). Two postdoctoral researchers, Liva Jenny Martinussen and Bas Senden, have been employed to work on the TEPS questionnaires over a three-year period (2025–2028). A dedicated project website has been established to provide regular updates (https://uni.oslomet.no/teps/). This work has been, and is currently, funded by internal strategy funds from Oslo Metropolitan University.

In the next project phase, comprehensive pilot studies will be carried out for all modules of the TEPS project. Different partner organizations, especially other Norwegian teacher education institutions, will contribute actively to this phase, providing feedback on the instruments (see Section 4.3 below) and delivering empirical pilot data. After this piloting, TEPS will enter the operational phase in which the data will be collected for the whole target population (see Section 4.1 below) and shared with the research community via digital infrastructure from the Norwegian Agency for Shared Services in Education and Research (SIKT). In November 2025, an application for funding will be submitted to the Research Council of Norway (NFR) to enable TEPS' full-scale establishment and transition into the operational phase.

1.4 Development of the TEPS framework

The aim of the present framework is to give an overview of the assessment design and the covered content we selected for the TEPS study, and to describe the central considerations behind these decisions. In the next phase of the TEPS project, this framework will form the basis for instrument development and (further) piloting.

Considering the objective that TEPS should be relevant from the perspective of the Norwegian teacher education sector as well as from the perspectives of established theories and international educational research on teacher education (see Section 1.1 above), we reviewed three areas before we decided on our assessment design (see Section 4 below) and the coverage of specific content areas (see Section 5 below):

1. Relevant developments and challenges in Norwegian teacher education (see Sections 2.3 and 2.4 below)
2. Relevant theoretical foundations for the TEPS study (see Section 3.1 below)
3. Broad areas and concepts in international research on teacher education (see Section 3.2 below)

These reviews aim to ensure that TEPS includes a comprehensive range of topics and variables that secondary users, both in Norway and internationally, may need to address their research questions. In addition to these reviews, we collected feedback on a draft version of this framework document from a group of multi-disciplinary experts. As mentioned in the Acknowledgements section above, we would like to thank these expert reviewers for their valuable suggestions and comments.

2 Contextual background: Teaching and teacher education in Norway

2.1 The Norwegian education system

In the following, a brief overview of the Norwegian educational system is provided (see **Error! Reference source not found.**). More detailed information can be found on Eurydice (2025).

- Kindergarten (*barnehage*) is offered from ages 1 to 5 and, while optional, children are—according to the Kindergarten Act (Barnehageloven, 2005, §16)—entitled to a place in kindergarten from age 1. Norwegian kindergartens have a strong focus on play, social development, and well-being as well as fostering creativity and curiosity (Eurydice, 2025).
- Compulsory education (*grunnskole*) is a ten-year education that all children and young people from age 6 to 16 have a right and obligation to receive as established in the Educational Act (Opplæringslova, 2023, §2-1). It includes two components:
    - Primary school (*barneskole*), covering grades 1 to 7 and providing a broad education.
    - Lower secondary school (*ungdomsskole*), covering grades 8 to 10, while including more specialization in school subjects.
- From age 16, pupils who have completed compulsory education are entitled (Opplæringslova, 2023, §5-1), but not obliged, to attend upper secondary education (*videregående skole*). This stage covers grades 11 to 13 and offers various study paths, both academic and vocational. Although voluntary, it is attended by the vast majority. For example, a total of 91.5% of all 16-18-year-olds were enrolled in the 2023-24 school year (Statistisk sentralbyrå, 2025).
- After upper secondary school, from age 19, it is possible to pursue higher education (*høyere utdanning*) at several types of institutions, including universities (*universiteter*), university colleges (*høyskoler med institusjonsakkreditering*), or specialized colleges (*vitenskapelige høyskoler*). Higher education includes undergraduate and postgraduate programs.

2.2 Teacher education in Norway

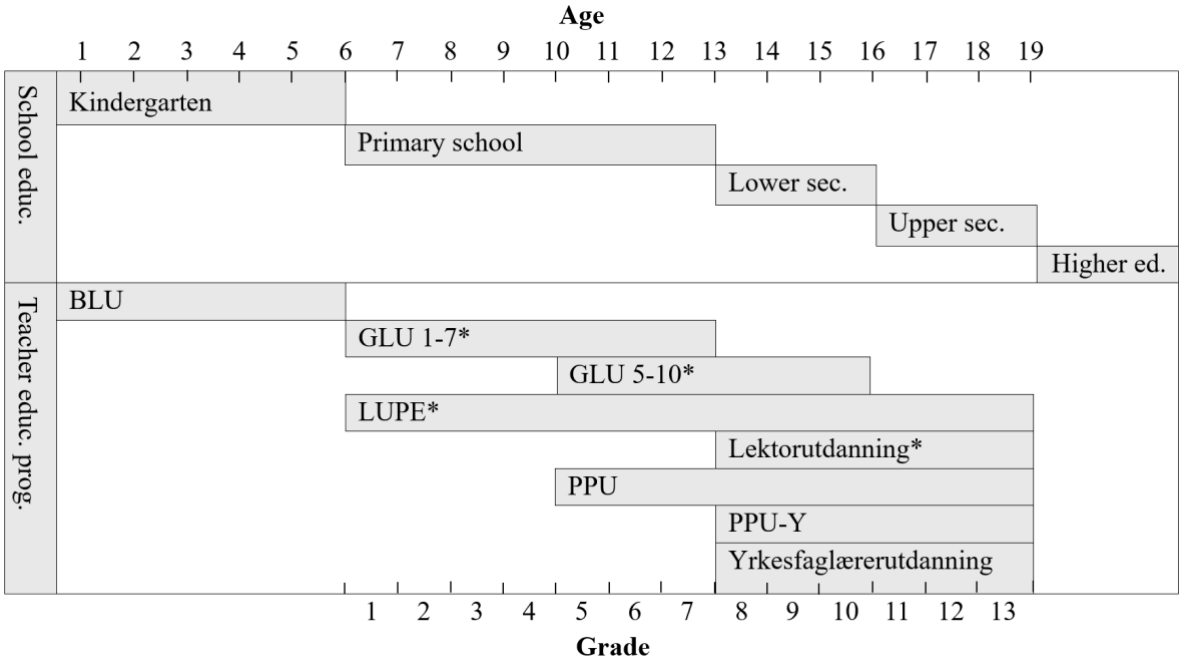
Teacher education in Norway is structured around several distinct programs, each targeting specific grades and/or subject areas (see **Error! Reference source not found.**). In the following, we provide a brief overview of Norwegian teacher education; more information can be found on Eurydice (2025).

- Kindergarten teacher education (*barnehagelærerutdanning; BLU)* is a three-year bachelor's program focusing on the education and care of preschool children.

- Primary and lower secondary teacher education (*grunnskolelærerutdanning; GLU*) consists of two five-year integrated master's programs, combining bachelor and master level studies in continuous programs:
    - GLU 1–7: This program qualifies graduates to teach grades 1 to 7, covering primary school.
    - GLU 5-10: This program qualifies for teaching grades 5 to 10, covering the upper grades of primary school and lower secondary school.
- Teacher education in practical and aesthetic subjects (*lærerutdanning i praktiske og estetiske fag; LUPE*) qualifies graduates to teach practical-aesthetic subjects in grades 1 to 13, covering primary, lower secondary, and upper secondary education. Student teachers specialize in one of six subjects: (1) dance, (2) design, arts and crafts, (3) drama and theatre, (4) physical education and sports, (5) food and health, or (6) music. These programs are five-year integrated master's programs.
- Integrated secondary teacher education (*lektorutdanning; Lektor*) qualifies graduates to teach in lower and upper secondary education, grades 8 to 13. It includes subject specialization and is organized as a five-year integrated master's program.
- Postgraduate programs in educational theory and practice include two strands. Both have entry requirements, such as previous qualifications and work experience, and can be completed full-time over 1 year or part-time over 2 years:
    - The postgraduate program for subject teachers (*praktisk-pedagogisk utdanning; PPU*) qualifies for teaching in the final grades of primary school as well as lower and upper secondary education, grades 5 to 13.
    - The postgraduate program for vocational subject teachers (*praktisk-pedagogisk utdanning for yrkesfag; PPU-Y*) qualifies graduates to teach vocational subjects in both lower education and in the vocational track of upper secondary education, grades 8 to 13.
- Vocational teacher education (*yrkesfaglærerutdanning*) qualifies graduates to teach vocational subjects in both lower education and in the vocational track of upper secondary education, grades 8 to 13. This is a three-year bachelor's program.

Figure 2.1

Match between teacher education programs and the educational system by pupils' age (top) and grade (bottom)



Note. BLU = kindergarten teacher education, GLU = primary and lower secondary teacher education, LUPE = teacher education in practical and aesthetic subjects, Lektorutdanning = integrated secondary teacher education, PPU = postgraduate program in educational theory and practice; PPU-Y = postgraduate program in educational theory and practice for vocational subjects, yrkesfaglærerutdanning = vocational teacher education.
* = Teacher education programs that are the focus of the TEPS study.

TEPS focuses on the five-year integrated master's programs in teacher education (see Section 4.1 below). The following description of these programs is based on current framework plans and guidelines (see Kunnskapsdepartementet, 2025a, 2025b, 2025c, 2025d; Universitets-og høgskolerådet, 2025).

All integrated master's programs in teacher education span five years, comprising ten semesters (one fall and one spring semester each year). The programs are designed to be profession-oriented and cohesive, combining coursework with extensive school-based practice (hereafter referred to as practicum). In addition, they must be based on relevant research and provide student teachers with a foundation in scientific principles. Across all programs, student teachers are expected to acquire a comprehensive set of knowledge, skills, and general competences that prepare them for the complex demands of the teaching profession. To support the development of these competences, each program comprises 300 credit points (ECTS), including at least 60 ECTS in pedagogy and didactics (*profesjonsfag*), a minimum of 120 ECTS in one or more teaching subjects (including the master's specialization), and a master's thesis of at least 30 ECTS.

In addition, students must complete a minimum of 100–130 days of supervised and assessed practicum in schools over the course of five years, depending on the program. The practicum must be closely integrated with coursework and an arena for inquiry-based and reflective learning. The latter aligns with what Dewey (1904) referred to as the laboratory model, where practicum is not merely about imitating effective strategies from a mentor teacher, but a setting for inquiry, reflection, learning through observation, theory-informed experimentation, and the analysis and interpretation of classroom events. Moreover, the practicum should be adapted to the students' chosen subjects and professional specialization. Although compulsory, students receive no ECTS for the practicum.

2.3 Developments in Norwegian teacher education

This section outlines recent developments in teacher education, particularly focusing on programs central to the TEPS study: the five-year integrated master's programs and teacher induction (i.e., graduates' transition into the teaching profession).

2.3.1 Developments in initial teacher education

Over the past two decades, teacher education has received considerable political attention and undergone significant restructuring in Norway. Triggered by evaluations in the early 2000s that identified recurring challenges in teacher education programs—such as variation in quality across institutions, high dropout rates, a weak integration between coursework and practicum, and insufficient professional relevance (NOKUT, 2006, 2010; Norgesnettrådet, 2002)—the Norwegian government launched a series of ambitious reforms to raise the status and quality of teacher education.

A cornerstone of this effort was the 2014 strategy Lærerløftet, which marked a major political and professional commitment to the teaching profession (Kunnskapsdepartementet, 2014). Following this, the Ministry of Education launched a national strategy in 2017, outlining several goals to be achieved by 2025 to ensure attractive teacher education programs of high quality (Kunnskapsdepartementet, 2017). Throughout all reforms, the Norwegian Agency for Quality Assurance in Education (NOKUT) has been continuously mapping and evaluating various teacher education programs (e.g., NOKUT, 2013, 2019, 2022, 2024).

One key development in recent years has been the restructuring of several teacher education programs to five-year integrated master's degrees. The primary and lower secondary teacher education programs were the first to undergo this transformation from four- to five-year programs, with the reform coming into effect in the autumn of 2017 (Kunnskapsdepartementet, 2016b, 2016a). More recently, the programs for teacher education in practical and aesthetic subjects followed. While institutions could initially choose between the former three-year subject teacher education and the new five-year integrated programs, as of autumn 2023, all institutions are required to offer the five-year integrated master's program (Kunnskapsdepartementet, 2020). In contrast, the integrated secondary teacher education program has been a five-year integrated master's degree since its introduction in 2003.

Each of these program reforms has been accompanied by the development or revision of national guidelines and regulations. Most recently, in August 2025, new national regulations came into effect for all teacher education programs (Universitets-og høgskolerådet, 2025). In addition, the government has decided to develop two overarching national regulations: one for Norwegian teacher education and one for Sámi (indigenous) teacher education, which will replace the current program-specific regulations. The new regulations are expected to be finalized in autumn 2025 and will provide common structural principles, while still allowing for program-specific adaptations (Regjeringen, n.d.).

The shift toward five-year integrated master's programs had a strong impact. One important change was the requirement to complete a master's thesis, which should be both academic and relevant for practice and work in schools (Kunnskapsdepartementet, 2016b, 2016a, 2020). This also prompted scientific interest in the kinds of master's theses that students in Norwegian teacher education programs write (e.g., Bakken & Langørgen, 2024; Engelsen et al., 2024; Sæther et al., 2024; Steinmann et al., 2025).

In addition, significant investments in faculty qualifications and development were made to meet the elevated research and development demands embedded in the new programs (Kunnskapsdepartementet, 2017; NOKUT, 2024). Many university colleges attained university status. Other institutions merged, with the aim of concentrating expertise, improving coordination, and enhancing access to qualified academic staff (Kunnskapsdepartementet, 2017). This drastically reduced the number of institutions offering teacher education. However, the number of teacher education programs remained largely the same, as most merged institutions continued to run parallel programs across multiple campuses.

2.3.2 Developments in teacher induction and professional development

In Norway, there has been broad agreement on the importance of teacher induction as the transition phase between higher education and the entry into the teaching profession, and particularly the central role of mentoring (Dahl, 2006; Kunnskapsdepartementet, 2018, 2025e, 2025f; Rambøll, 2020).

In 2018, national frameworks for mentoring newly qualified teachers were introduced to ensure that all newly qualified teachers receive high-quality mentoring (Kunnskapsdepartementet, 2018). The framework consists of three elements: (1) principles and commitments for mentoring newly qualified teachers, (2) a written guide on how to design and implement effective mentoring programs at the local level, and (3) continuing professional development opportunities for mentors (Kunnskapsdepartementet, 2018).The principles and commitments were recently published and state that employers are responsible for ensuring that newly qualified teachers are well-supported through mentoring and professional development and that mentoring should be carried out systematically by (preferably) qualified mentors within the first two years of employment (Kunnskapsdepartementet, 2025e).

In addition, from 2025 to 2026, a new national system for competence and career development is being implemented to ensure that all teachers have opportunities to maintain and further develop their professional competence throughout their careers. As part of this system, the government provides funding for several key initiatives, including professional mentoring of newly qualified teachers (under the condition that mentoring occurs in line with the principles and commitments), further educational opportunities (e.g., courses at universities), and school-based professional development (Kunnskapsdepartementet, 2025f).

2.4 Challenges in Norwegian teacher education

The current section outlines recent challenges in initial teacher education and the transition to the teaching profession, with emphasis on the five-year integrated master's programs.

2.4.1 Challenges in initial teacher education

Despite sustained political attention and a series of reforms aimed at elevating their quality and status (see Section 2.3 above), teacher education and the teaching profession continue to face major challenges. A particularly pressing concern is the current teacher shortage coupled with a trend of declining enrollment in teacher education programs (Direktoratet for høyere utdanning og kompetanse, 2025; Kunnskapsdepartementet, 2024; Utdanningsforbundet, 2024). Particularly the primary and lower secondary teacher education programs have seen a sharp decline in first-choice applicants in recent years, a trend that is expected to continue and has already led to unfilled study places and the relaxation of entry requirements at multiple teacher education institutions for 2024 and 2025 (Direktoratet for høyere utdanning og kompetanse, 2025; Utdanningsforbundet, 2024). If such a trend continues, the current teacher shortage might not be resolved in the future, as previously projected by the central bureau of statistics (Statistisk sentralbyrå, 2015). In response, the government recently launched a national strategy for the recruitment to teacher education and the teaching profession for 2024–2030 (Kunnskapsdepartementet, 2024).

Another challenge is the lack of comprehensive data on initial teacher education to answer substantial questions at the national level (Forsström & Munthe, 2023). This lack of data hinders efforts to further develop teacher education in a research-based manner. To strengthen teacher education in Norway, we need comprehensive data to answer substantial questions such as: "Who are we preparing?", "Do we educate enough teachers in the various subjects?", or "How are they assessed?".

Recent evaluations of primary and lower secondary teacher education and the integrated secondary teacher education programs have also pointed to several challenges (NOKUT, 2022, 2024). First, there is a lack of (perceived) coherence between academic coursework and the master's theses in light of the realities of classroom practice, weakening the professional relevance of the programs. Second, there seem to be substantial differences

between programs across institutions, including variations in how national guidelines are implemented, how practicum is organized, and how much emphasis is put on preparing students for the profession (e.g., linking theory and practice, ensuring relevance), leading to unequal student experiences.

2.4.2 Challenges related to teacher induction

The transition from teacher education to the teaching profession is a critical phase in which newly qualified teachers must connect theoretical knowledge with real-world classroom experiences, while also reflecting critically on their own practice. Given the demanding and complex nature of the teaching profession, targeted induction support is essential to help newly qualified teachers navigate their roles as both professionals and employees (Helms-Lorenz et al., 2013).

Graduates of Norwegian teacher education programs often face a difficult transition into the profession, with many reporting a lack of adequate support during the early years of teaching (Munthe & See, 2022; Respons Analyse AS, 2024). In addition, a high workload, limited support structures, and the relatively low status of the profession contribute to teacher dissatisfaction, and many (including newly qualified) teachers express that they consider leaving the profession (Respons Analyse AS, 2024). In addition, there is an absence of clear career development opportunities, which can restrict long-term professional growth and retention in the field (NOU 2022:13).

Induction practices aim to ease the transition into the profession, support retention, and are commonly used by Norwegian schools as a recruitment strategy (Munthe & See, 2022). Although there is limited empirical evidence in Norway showing that mentoring or other induction practices improve teacher recruitment or retention, there is wide consensus among relevant stakeholders that mentoring is valuable and necessary for both the professional development and an easier induction into the teaching profession (Munthe & See, 2022; Rambøll, 2020). Still, recent data indicates that approximately one third of newly qualified teachers in Norway do not receive any form of induction (Rambøll, 2020; Respons Analyse AS, 2024). Furthermore, the local implementation of mentoring varies in scope, structure, and quality. Many mentors lack formal training, and mentoring is often informal and unstructured (Rambøll, 2020; Respons Analyse AS, 2024). However, recent policy developments—such as the national principles and commitments introduced in 2025—may improve the consistency and quality of mentoring practices by clarifying the responsibilities of employers and encouraging and funding systematic, competence-based support (Kunnskapsdepartementet, 2025e, 2025f).

3 Theoretical and empirical foundation

Striving for a comprehensive understanding of teacher education in Norway, TEPS builds on educational effectiveness models (e.g., Scheerens, 1990; Scheerens & Blömeke, 2016), existing research on teacher education (e.g., Forsström & Munthe, 2023), previous large-scale studies on teacher education (e.g., Tatto et al., 2008), as well as national guidelines (Universitets-og høgskolerådet, 2025) and policy documents (e.g., Kunnskapsdepartementet, 2017). These sources provide the foundation for TEPS' assessment design and covered content areas.

3.1 Theoretical background

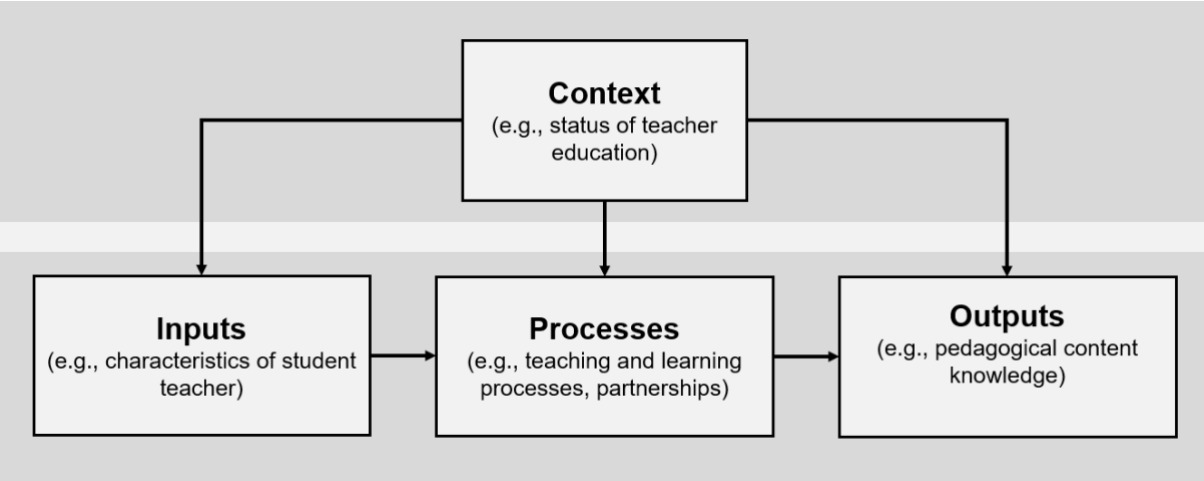
Reforms have provoked considerable discussion about aspects of Norwegian teacher education, such as the structure of the programs or the coherence between theory and practice (see Section 2.4 above). However, there is comparatively little debate in Norway about what happens within the programs themselves—what Darling-Hammond (2006) has referred to as the "black box" of teacher education.

This black box encompasses courses, practicum, and other learning experiences that student teachers engage in, and how these experiences collectively shape the professional knowledge, skills, and dispositions that ultimately influence what they do in the classroom when entering the teaching profession (Darling-Hammond, 2006).

A useful model for examining the inner workings of teacher education is the context-inputs-processes-outputs model (CIPO). Although originally developed for schools (Scheerens, 1990), the model can also be applied to teacher education (Scheerens & Blömeke, 2016). From this perspective, teacher education is seen as a black box through which inputs are transformed into outputs via specific processes, all shaped by a broader context (Scheerens & Blömeke, 2016; see Figure 3.1).

Figure 3.1

The context-inputs-processes-outputs model (CIPO) of teacher education



Note. Adapted from Scheerens & Blömeke (2016).

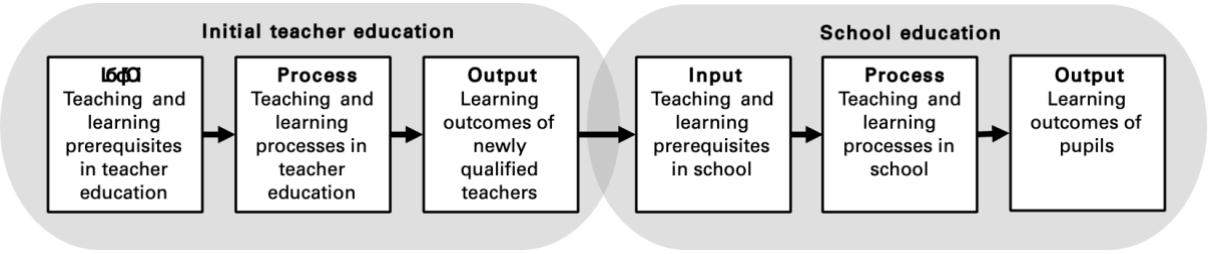
This basic model can be implemented at multiple levels (e.g., individual, course, or institution levels) and also functions as an analytical framework through which educational quality can be reviewed (Scheerens, 1990; Scheerens & Blömeke, 2016)[1].

In addition, teacher education and teaching effectiveness models have been integrated to better capture how improving the quality of teacher education affects the learning conditions and outcomes of their future pupils in schools (König et al., 2024; Scheerens & Blömeke, 2016; see Figure 3.2 below). In this extended model, the competencies acquired by newly qualified teachers—such as pedagogical content knowledge or professional motivation and beliefs—form the later teaching and learning prerequisites at school. The teaching and learning prerequisites of teachers then influence teaching and learning processes, which ultimately lead to improved outcomes for pupils.

[1] A similar approach was recently adopted in NOKUT's evaluation of primary and lower secondary teacher education (NOKUT, 2024). Building on NOKUT's model of quality in higher education, quality in teacher education was conceptualized according to input quality, process quality, content quality, and product quality, while also considering the importance of the broader context—historical, economic, political, local, regional, and national factors shaping teacher education.

Figure 3.2

Integration of teacher education and teaching effectiveness models

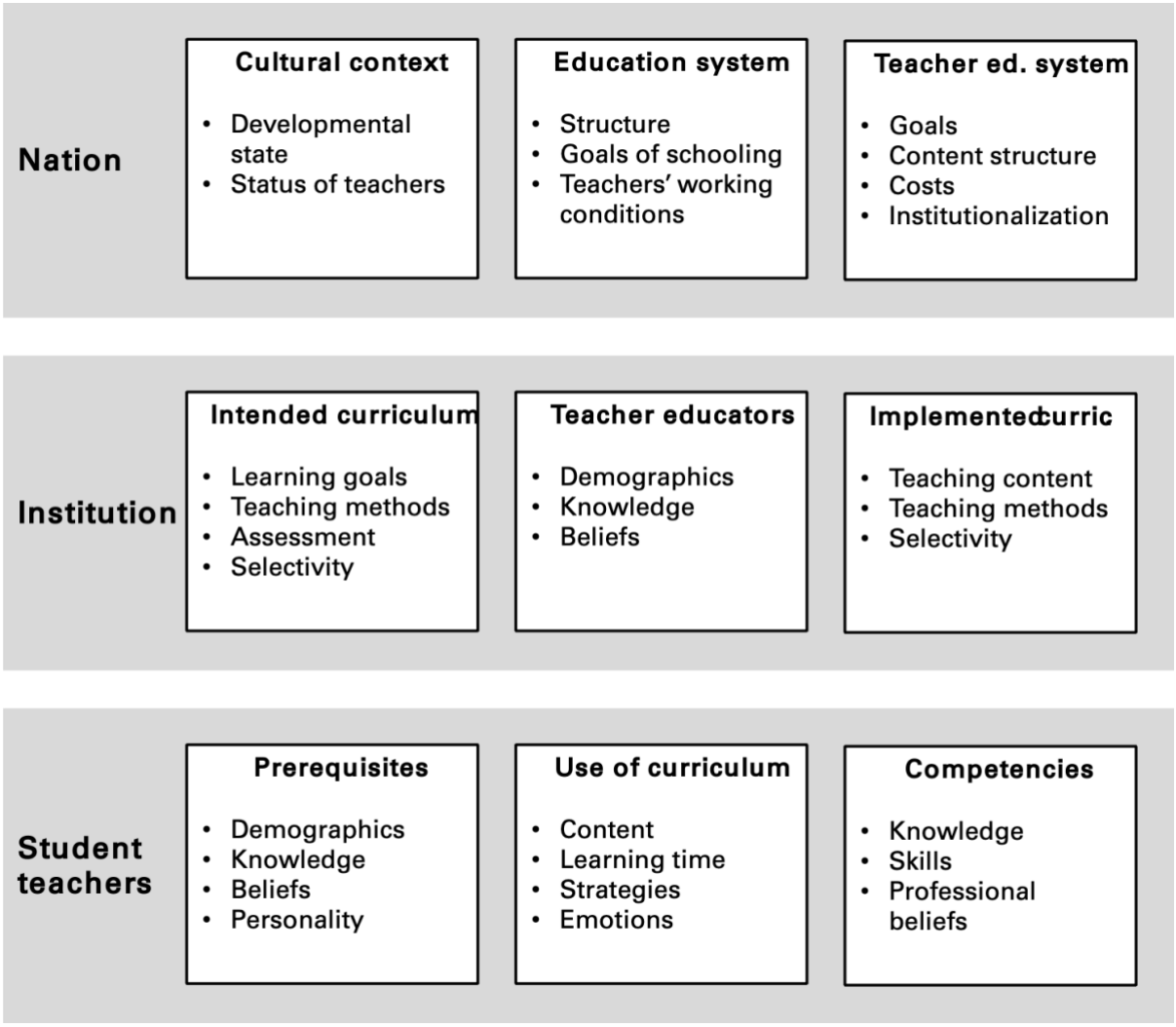


Note. Own illustration of arguments put forward by Scheerens and Blömeke (2016).

A model of teacher education effectiveness has been developed that provides a broad overview of different input, process, output, and context factors at different levels of analysis (Scheerens & Blömeke, 2016; see Figure 3.3).

Figure 3.3

A multi-level teacher education effectiveness model



Note. Simplified and adapted illustration of the multi-level teacher education effectiveness model by Scheerens and Blömeke (2016).

The multi-level model of teacher education effectiveness provides a theoretical foundation for the TEPS study and operates across three interrelated levels:

(1) the student teacher (individual) level
(2) the institutional/program level, and
(3) the national level.

At the student teacher level, the model clearly follows the input, process, and output logic: student teachers enter teacher education with certain preconditions (inputs), for example, prior academic knowledge, beliefs about teaching and learning, or motivation to become a teacher. Through a range of learning processes—such as coursework, school practice, or the master's thesis—the student teachers are exposed to opportunities to grow and learn. Student teachers use these opportunities to different degrees and, in turn, differ in relevant

outputs of teacher education, for example, increased pedagogical content knowledge or changes in teaching-related beliefs and motivations.

However, this process does not occur in isolation; it is influenced by the programs student teachers follow and the institutions that administer the programs. Although all institutions follow the same national guidelines (see Section 2.3 above), they differ in how they implement such guidelines (NOKUT, 2022, 2024). Institutions and programs can furthermore differ in terms of the qualifications and pedagogical approaches of teacher educators, or the coherence between theory and practice.

To conceptualize this variation in teaching and learning contexts across institutions, it is helpful to draw on the idea that the curriculum functions on three levels: the intended, the implemented, and the attained curriculum (McDonnell, 1995). The intended curriculum refers to official regulations and guidelines of what student teachers are expected to learn (e.g., Universitets-og høgskolerådet, 2025). The implemented curriculum reflects how these guidelines are interpreted and implemented in specific learning contexts (e.g., through courses, practicum, supervision). Finally, the attained curriculum captures what students learn and internalize during their education (e.g., beliefs about teaching, pedagogical content knowledge, or other professional competencies).

Both the individual and institutional/program levels are further embedded in the national level, which includes broader societal and political influences. For example, national policies, structural reforms, or the status and working conditions of the teaching profession shape how teacher education is organized and perceived. This level functions as a contextual layer that shapes both institutional practices and individual learning processes and has been elaborated on in Section 2 above.

All in all, the teacher education effectiveness model by Scheerens and Blömeke (2016; see Figure 3.3) positions teacher education as a multi-level system in which student teachers' competencies develop over time through structured opportunities to learn, shaped by institutional/program characteristics and national influences. It provides a useful theoretical foundation for investigating the black box of teacher education.

3.2 Empirical research on teacher education

Educational research on teacher education is a relatively young field, particularly when compared to the more established field of research on teaching at school (Darling-Hammond, 2016; Grossman & McDonald, 2008; Mayer, 2021). Nonetheless, teacher education research has made significant strides over the past decades, and there is a growing interest among researchers in understanding the systems, structures, and processes through which teachers are prepared, educated, and certified (Cochran-Smith et al., 2015; Mayer, 2021).

3.2.1 Current trends and challenges

There is a large variation in topics examined in the field of research on teacher education, and attempts have been made to categorize prevalent lines of inquiry and topics. We recommend Cochran-Smith and Villegas (2015) for an overview of general research on teacher education, Livingston and Flores (2017) for research published in the European Journal of Teacher Education, and Forsström and Munthe (2023) for research on initial teacher education within the Nordic countries published between 2010 and 2020.

A general finding across these reviews—as well as other studies—is that much of the existing literature continues to consist of isolated, small-scale qualitative studies based on interview or questionnaire data (Cochran-Smith et al., 2015; Forsström & Munthe, 2023; Livingston & Flores, 2017; Menter, 2020; Sleeter, 2014). While such studies offer valuable insights and contribute significantly to the development of teacher education, their limited scale and fragmented nature make it difficult to build a cumulative knowledge base capable of informing policy and practice (Cochran-Smith et al., 2015; Darling-Hammond, 2016; Mayer, 2021; Sleeter, 2014). As a result, researchers have repeatedly called for more large-scale studies with large samples, established instruments, longitudinal designs, and mixed-method approaches (Cochran-Smith et al., 2015; Forsström & Munthe, 2023; Livingston & Flores, 2017).

3.2.2 International comparative studies

Two comparative studies have examined mathematics teacher education in multiple countries: the Mathematics Teaching in the 21st Century (MT21; Schmidt et al., 2007) and the Teacher Education and Development Study Mathematics (TEDS-M; Tatto et al., 2008).

MT21 was conducted in six countries and aimed to investigate how lower secondary school mathematics teachers were prepared. The study was relatively small-scale and collected a convenience sample (Schmidt et al., 2007). MT21 was considered a feasibility study and laid the groundwork for many of the instruments developed in TEDS-M (Tatto et al., 2008). The latter was launched by the International Association for the Evaluation of Educational Achievement (IEA) as the first large-scale, cross-national, comparative study of teacher education (Tatto et al., 2008). The study was conducted in 17 countries and aimed to investigate how primary and lower secondary teachers were prepared to teach mathematics across countries. To this end, data at the national, institutional, and individual level was gathered (Ingvarson et al., 2013). This included data on, among others, the policy context, the nature and content of teacher education programs, student teachers' knowledge and beliefs about teaching and learning mathematics, as well as background characteristics of student teachers (e.g., previous career) and teacher educators (e.g., teaching experience and beliefs) (Ingvarson et al., 2013; Tatto et al., 2008). As international comparative studies, a key objective of MT21 and TEDS-M was to enable cross-national comparisons. However, their cross-sectional designs do not allow for the investigation of developments over time.

Other international comparative studies have focused on specific aspects of teacher education. For example, the Coherence and Assignment Study in Teacher Education (CATE)

focused on the preparation of language arts and mathematics student teachers across five countries, with particular emphasis on the pedagogical practices and assignments that foster stronger links between theory and practice in teacher education programs (Klette, Hammerness, et al., 2017). Data was gathered through questionnaires, observations of courses, interviews, and document analysis (Hammerness et al., 2020).

3.2.3 National large-scale studies

In addition, a few countries have implemented large-scale (panel) studies on initial teacher education, showcasing the feasibility of a study such as TEPS. The Panel of Teacher Education Students (Lehramtsstudierendenpanel (LAP); Schaeper et al., 2023) is a longitudinal study of a representative sample of student teachers in Germany who were initially recruited in 2010. LAP is part of the National Educational Panel Study (NEPS) in Germany, in which student teachers were oversampled among higher education students. LAP followed student teachers from all teacher education programs covering all German states, into their profession as teachers between 2010 and 2022 and included in total 19 panel waves. To understand how teachers' professional competencies and educational practices evolve, LAP included several modes of data collection, including paper and pencil questionnaires, computer-assisted telephone and personal interviews, online surveys, and standardized tests measuring student teachers' general (noncognitive) competencies (e.g., motivation to teach), specific competencies (e.g., dealing with digital media), and teaching practices (e.g., classroom management), among others.

Studying the Effectiveness of Teacher Education (SETE; Mayer et al., 2017) was a large-scale, mixed-methods, longitudinal, and iterative study of teacher education effectiveness in Queensland and Victoria, Australia. The study examined "the effectiveness of teacher education in preparing teachers for the variety of school settings in which they began their teaching careers" (Mayer et al., 2017, p. 7). All teachers graduating in 2010 and 2011 across the states of Queensland and Victoria were invited. The study employed a mixed-method design that included a mapping of teacher education programs, four waves of online questionnaires with newly qualified teachers and their school principals, as well as case studies across numerous schools, particularly focusing on newly qualified teacher preparedness and effectiveness.

The Finnish Teacher Education Database (FinTED) is a research infrastructure on Finnish teacher education that is under development and currently piloting different types of data (see Vilppu et al., 2024). Baseline register and questionnaire data is collected from all student teachers at the eight universities offering teacher education in Finland. Specifically, FinTED collects data longitudinally and follows student teachers from the beginning of the studies into the profession working as teachers, mapping students' learning, motivation and engagement in teacher education and in the teacher profession, and in teachers' work-related fields of competence (FinTED, n.d.).

3.2.4 Norwegian large-scale studies and data infrastructures

There are currently no large-scale assessments designed specifically for research on Norwegian teacher education. The project Partnership for Sustainable Transition from Teacher Education to the Profession (STEP), however, is an ongoing research project that examines student teachers' transition from teacher education institutions to working as professional teachers. In a first step, STEP contacted a convenience sample of the first cohort of student teachers that started in the integrated master's program in their final year as students in 2021. Specifically, using an online survey, student teachers were asked about their job expectations before starting work on their master's theses (Olsen et al., 2022).

Moreover, higher education institutions are regularly assessed for administrative and evaluative purposes in Norway. NOKUT performs tasks both as an independent administrative body such as the accreditation of educational programs and institutions, and tasks delegated by the Norwegian Ministry of Education and Research such as administering national surveys (NOKUT, 2023). The Student Survey (*Studiebarometeret*) is part of NOKUT's systematic quality evaluation of higher education and has so far been sent out annually to all universities and university colleges in Norway to assess students' perception of the quality of all study programs, including teacher education. From 2025, it will be sent out biannually. The survey collects perceptions from students in their 2nd and 5th year and enables comparisons across different study fields and programs (e.g., Flaata Bjaaland et al., 2025). Response rates varied around 40% over the last few years (Direktoratet for høyere utdanning og kompetanse, n.d.-b)

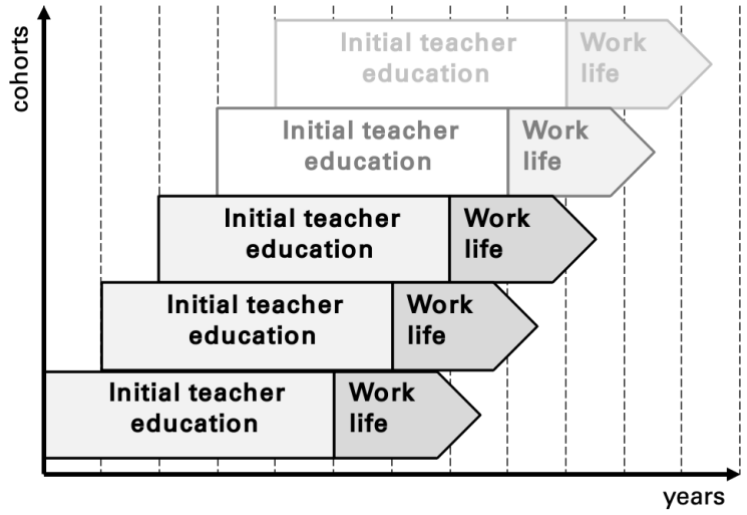
Moreover, the Norwegian Ministry of Education and Research has initiated an administrative Database for Statistics on Higher Education as part of the work of the Norwegian Directorate for Higher Education and Skills, which covers a range of quantitative information about higher education students and institutions (see Direktoratet for høyere utdanning og kompetanse, n.d.-a).

4 Assessment design of TEPS

TEPS focuses on five-year integrated master's programs in initial teacher education and graduates' transition into working life (see Section 4.1 below). The study aims to include all teacher education institutions in Norway that provide such programs. Based on the objectives of the TEPS project (see Section 1.1 above), we developed TEPS to have a longitudinal design that is able to capture change at both the individual (i.e., following student teachers through their studies and into their working lives) and institutional levels (i.e., taking up new student teacher cohorts every year). As illustrated in **Error! Reference source not found.**, this design allows the TEPS database to expand over time, which also assures its long-term relevance and timeliness.

Figure 4.1

TEPS's longitudinal multi-cohort design



Since the TEPS project does not address a predefined set of research questions but aims to be able to answer as many questions as possible (see Section 1.1 above), we developed a set of modules that can be linked individually (see Section 4.2 below). Most modules are questionnaire-based, but to minimize the burden on participants, we additionally curate already existing data as much as possible (see Section 4.3 below). Data from the different modules can be linked to address a variety of research questions, including longitudinal ones. Linking variables will be institution identifiers, course identifiers, student teacher identifiers, and time point variables.

The TEPS design also allows for a range of quantitative, qualitative, or mixed-method follow-up studies. Since student teacher identifiers are available, follow-up studies can build on specific findings with in-depth interviews, for example, or longer-term follow-up studies on teacher education graduates' working life in schools.

4.1 Target population in TEPS

TEPS focuses on five-year integrated master's programs in initial teacher education, and their graduates' transition into professional working life. There are currently four such programs in Norway (see Section 2.2 above): Two programs for primary and lower secondary teacher education, grades 1–7 (GLU 1–7) and grades 5–10 (GLU 5–10), the program for teacher education in practical and aesthetic subjects (LUPE), and the integrated program for lower and upper secondary teacher education (Lektor). TEPS does not include further education or ongoing professional development programs for in-service teachers, programs for future school principals, programs for PhD candidates, or shorter initial teacher education programs (e.g., kindergarten teacher education).

As of September 2025, there are 19 institutions in Norway that offer at least one of the five-year integrated master's programs (see Table 4.1 below).

Table 4.1

Teacher education institutions offering five-year integrated master's programs in initial teacher education

	Study program			
Institution	GLU 1–7	GLU 5–10	LUPE	Lektor
Arctic University of Norway (UiT)	90	45		40
NLA University College	40	30		
Nord University (Nord)	75	65	10	10
Norwegian School of Sport Sciences (NIH)			50	
Norwegian School of Theology, Religion and Society (MF)				10
Norwegian University of Life Sciences (NMBU)				10
Norwegian University of Science and Technology (NTNU)	175	135		255
Oslo Metropolitan University (OsloMet)	190	115	90	
Rudolf Steiner University College (RSH)	5			
Sámi University of Applied Sciences	no data	5		
University of Agder (UiA)	80	70		95
University of Bergen (UiB)				155
University of Inland Norway (INN)	55	55	15	15
University of Oslo (UiO)				210
University of South-Eastern Norway (USN)	175	115	20	25
University of Stavanger (UiS)	25	35		40
Volda University College (VUC)	20	20		
Western Norway University of Applied Sciences (HVL)	255	230	70	
Østfold University College	50	75		

Note. GLU = primary and lower secondary teacher education, LUPE = teacher education in practical and aesthetic subjects, Lektor = integrated secondary teacher education. The numbers reflect the approximate amount of students (rounded to the nearest 5) who showed up at the start of the first semester in 2024 (Direktoratet for høyere utdanning og kompetanse, n.d.-c).

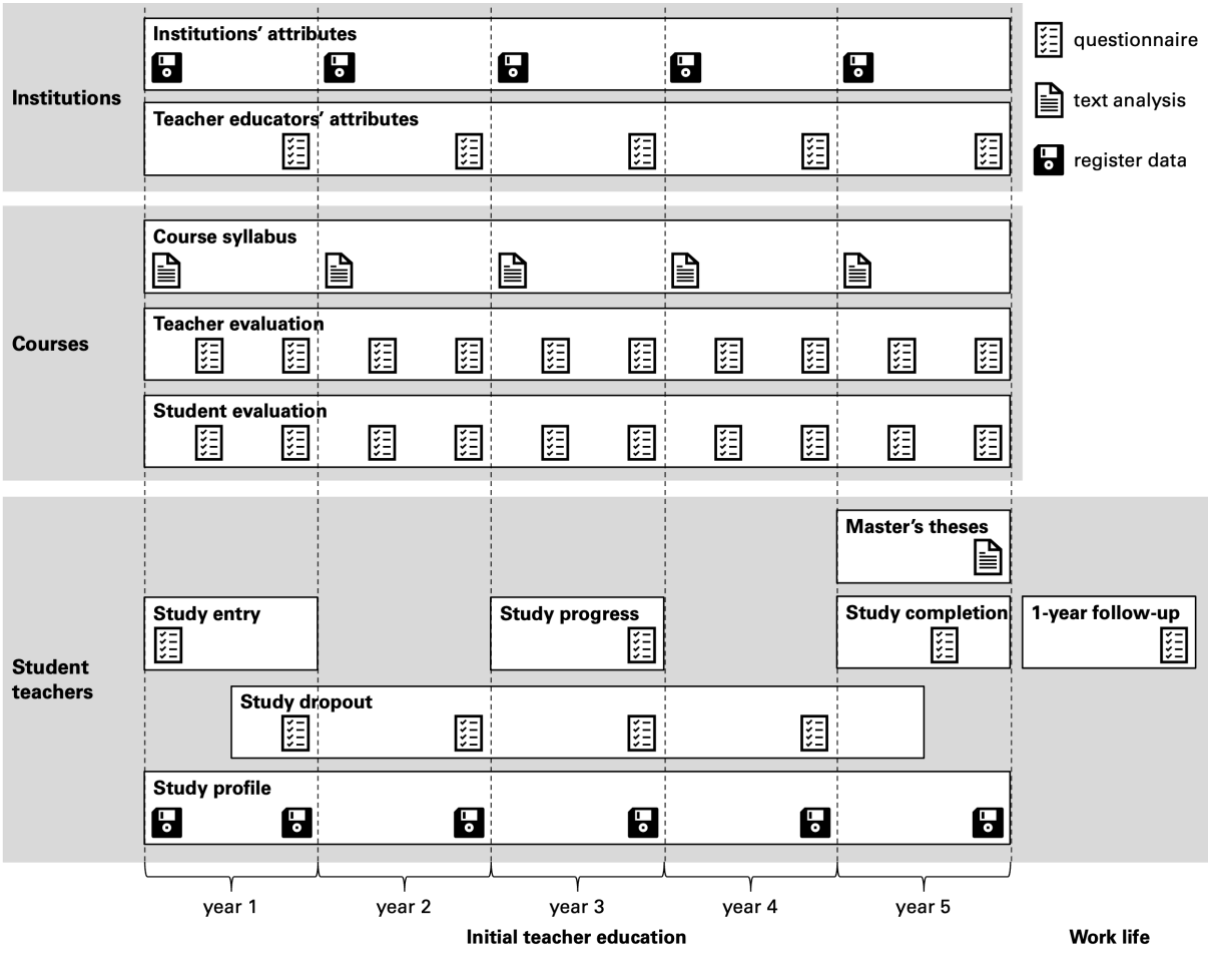
TEPS strives for a full population sample of student teachers in these programs across all institutions, instead of drawing smaller samples like previous large-scale panel studies on teacher education (see Section 3.2 above). This is because TEPS does not aim to build a one-time research sample but a data infrastructure that grows over time and allows comparing institutions and programs (see Section 1.1 above). The aim of this fully representative data is to be able to investigate the generalizability of research findings across student teachers, teacher education institutions, and time points in Norway.

4.2 TEPS modules

The aim of the modular design of the TEPS study is to create a comprehensive picture of how initial teacher education is conducted while maximizing the number of potential research questions that can be addressed (see Section 1.1 above). The study includes a total of twelve modules across three hierarchical levels, the level of student teachers, the level of courses, and the level of institutions (see Figure 4.2 below). Eleven modules concern initial teacher education, and one focuses on the transition to working life of newly qualified teachers. Some of the modules are only administered once per student teacher, and others are repeated after every semester.

Figure 4.2

Overview of TEPS modules



4.2.1 Modules at the level of student teachers

At the level of student teachers, TEPS covers seven modules (see Figure 4.2 above). Five of these modules are questionnaire-based (see Section 4.3.1 below).

At the beginning of the first semester, student teachers receive the *study entry* questionnaire, which addresses their reasons for choosing teacher education, their teaching-related beliefs and motivations, prior teaching experiences, and first impressions of their studies. At the end of the third year (i.e., at the end of the bachelor's component), they receive the *study progress* questionnaire, which addresses among others their learning strategies and tools, degrees of study participation, an interim study evaluation, as well as their teaching-related beliefs, motivation, and identity. In the beginning of the last semester, they receive the *study completion* questionnaire, which focuses on a more detailed, summative study evaluation, career plans, and their teaching-related beliefs, motivation, and identity.

One year after graduation, the newly qualified teachers respond to the *one-year follow-up* questionnaire, which collects information about their career path, a retrospective study evaluation, and their teaching-related beliefs, motivations, and identity. For those who work as teachers, this questionnaire also contains questions on their teacher induction experiences.

Lastly, student teachers who exmatriculate from their teacher education studies before graduating are sent a *study dropout* questionnaire, asking about their reasons for dropping out and their further plans, among others.

In addition to these questionnaire-based modules, the *master's theses* module addresses what kind of theses are being written by student teachers at the end of their studies. For this module, the texts of the theses' titles and abstracts are coded using large language model (LLM) technology for text analysis (see Section 4.3.2 below), obtaining information about the theses' subject fields, methodology, and data basis.

Furthermore, TEPS complements the data at the level of student teachers with *study profile* data obtained from the national register (see Section 4.3.3 below). At the beginning of the first semester, data on student teachers' demographic and academic backgrounds will be extracted, while at the end of each academic year, register data on academic achievements will be added (i.e., completed courses, attained grades).

4.2.2 Modules at the level of courses

At the course level, TEPS includes three modules (see Figure 4.2 above), two of which are questionnaire-based (see Section 4.3.1 below). At the end of each semester, the short *student evaluation* questionnaire will be sent out to everyone enrolled in five-year integrated initial teacher education courses. These questionnaires will contain brief course evaluations, including students' satisfaction with the course, subjective learning progress, and workload. The student responses will be aggregated at the course level. This perspective of student teachers will be complemented by the perspective of their teachers, in the form of the *teacher evaluation* questionnaire. Everyone who was involved in teaching the courses will respond to questions about their satisfaction with the course, about teaching methods and tools used, as well as perceived limitations to teaching (e.g., student teachers' absenteeism,

lack of preparation time). Again, this data will be aggregated at the course level if a course has multiple teachers.

Furthermore, the *course syllabus* module captures background information about the courses' structure, teaching and learning methods, as well as supervision and assessment regulations, among others. This information will be derived annually from the course syllabi as published on the institutions' websites, using text analysis methods that utilize LLM technology (see Section 4.3.2 below).

4.2.3 Modules at the level of institutions

At the level of teacher education institutions, TEPS comprises two modules (see Figure 4.2 above). First, the *teacher educators' attributes* module includes questionnaire data (see Section 4.3.1 below) and will be sent out to everyone who has formal teaching duties in initial teacher education at the end of each academic year. It will address topics such as teacher educators' demographic and academic backgrounds, teaching-related working conditions (e.g., job satisfaction, professional development opportunities), as well as teaching-related beliefs, motivation, and identity. This data will be aggregated at the level of institutions.

Second, TEPS includes annual register data (see Section 4.3.3 below) on some of the *institutions' attributes*, such as the initial teacher education programs that the institutions offer, whether they are universities or universities of applied sciences, the number of campuses, and their number of students. This helps to contextualize the conditions under which initial teacher education operates.

4.3 Data types in TEPS

TEPS collects comprehensive, quantitative data on initial teacher education in Norway. Most modules (see Section 4.2 above) are questionnaire-based, but since responding to questionnaires puts a participation burden on student teachers and teacher educators, and comes with the risk of non-response, TEPS also curates already existing text and register data whenever possible. In the following, we describe the three data types and the rationale behind including them in more detail.

4.3.1 Questionnaires

The TEPS questionnaires have to fulfill several requirements to make sure that the resulting data achieves the objectives of the TEPS study (see Section 1.1 above). To ensure this, we follow criteria set by the standards for psychological and educational testing (AERA et al., 2014) as well as relevant literature:

1. The questionnaires have to capture the intended content of the TEPS study (see Section 5 below).

2. The questionnaires have to work across contexts (i.e., teacher education subjects, study programs, teacher education institutions) and over time.
3. Lengthy questionnaires can lead to a decreased willingness to participate, and non-response (see Galesic & Bosnjak, 2009). Therefore, the questionnaires must be as short and easy to fill out as possible.
4. All questionnaires must be suitable to be delivered in an online format.
5. The questionnaire scales and single items must have good psychometric properties.

Since developing high-quality questionnaire scales and items from scratch is time- and resource-intensive, and to maximize the connectivity of TEPS to previous research, we will use already established scales and items whenever possible (i.e., if they fulfill the requirements above and if we get permission to use them in TEPS). In a pre-piloting project in 2024, we have already started to review the instruments of relevant predecessor studies (e.g., TEDS-M, NOKUT evaluations, LAP; see Section 3.2 above). We will develop new or adapt existing items and scales wherever necessary, following state-of-the-art design principles and methods (cf. DeVellis & Thorpe, 2022; Gideon, 2012; Peytcheva & Yan, 2025).

For complex and abstract constructs, we will select or develop scales (i.e., operationalization via multiple items) and single items for more simple, concrete constructs to minimize the total number of questionnaire items (cf. M. S. Allen et al., 2022). To make sure that the questionnaires are swift and easy to fill out, we will focus on common multiple-choice formats with Likert response scales, for example (e.g., five categories from “disagree a lot” to “agree a lot”) and closed item formats (i.e., avoid open text responses). To maximize item wording clarity and prevent response errors, we will avoid negatively worded items (e.g., Chen et al., 2024; Steinmann et al., 2024).

To ascertain that the TEPS questionnaires meet the criteria listed above, validity evidence will be collected in two phases. First, through expert reviews of the content as well as cognitive interviews with participants. Next, the questionnaires will be piloted, collecting response data from samples of heterogeneous student teachers and teacher educators from a set of teacher education institutions. These candidate questionnaires will contain additional, established scales to be able to analyze construct validity. This will make it possible to empirically test whether the questionnaires assessing the intended constructs, work in different contexts, and have good psychometric properties. Oslo Metropolitan University has employed two postdoctoral researchers, Liva Jenny Martinussen and Bas Senden, to conduct these questionnaire pilot studies over a three-year period.

Based on previous studies, we expect a degree of non-response to the questionnaires, and a decline in participation over time (e.g., Schaeper et al., 2023). The average response rate in online surveys in educational research is 44% (Wu et al., 2022). For studies similar to TEPS, such as LAP, response rates vary considerably across different waves and response formats. For all types of first-year students’ (from NEPS) response rates varied between 58.8% and 73.3% (Zinn et al., 2020). STEP had a low response rate at 17% (Olsen et al., 2022), which highlights the importance of recruitment strategies. To reduce these risks of non-response and a decline in participation over time, a dedicated strategy will be developed

that can include, for example, incentives for participation, ensuring relevance and endorsement across participating institutions, or implementing multiple recruitment approaches. For example, LAP implemented several approaches for recruitment which successfully increased participation, such as inviting participants by mail followed by sending field workers to the relevant locations (Brachem et al., 2019; Schaeper et al., 2023; Zinn et al., 2020).

4.3.2 Text analysis

To minimize the data collection burden that comes with questionnaires, two modules analyze already existing text data that are publicly available, the *master's theses* and *course syllabus* modules. The ambition is to annually incorporate key information about all newly published master's theses as well as all course syllabi in teacher education in Norway into TEPS.

This requires analysis of extensive text data, which is highly time-consuming when performed manually. To this end, we have conducted two pre-pilot projects in 2023 and 2024, in which we developed first versions of coding instruments and explored whether it is possible to make use of artificial intelligence (AI) large language models (LLMs) as research tools to code this kind of text data effectively and efficiently. Such LLM tools have demonstrated an impressive capacity for the processing of natural language and answering questions about text data (e.g., Chew et al., 2023; Mizumoto & Eguchi, 2023; Tai et al., 2024). Specifically, we tested Open AI's ChatGPT 4 (OpenAI et al., 2023).

Our pre-pilot projects supported that ChatGPT can be used for the coding tasks in TEPS's This is state-of-the art practice in other large-scale studies. *master's theses* and *course syllabus* modules. In the pre-pilot related to the master's theses, we compared the coding results of ChatGPT to the coding results of two human coders for each of almost 300 master's theses in teacher education (specifically their titles and abstracts), and found that the coding agreement between two humans was not systematically higher than between a human and the machine (Steinmann et al., 2025). We concluded that ChatGPT performs well at the coding task, and we derived some implications for the improvement of our coding instrument.

In TEPS, an LLM will analyze the titles and abstracts of all master's theses using an improved version of this coding instrument to derive information about what kind of master's theses are being written by student teachers (subject fields, methodology, and data basis). The required text data will in the future be openly available for all passed master's theses in a national archive (Nasjonalt Vitenarkiv; NVA; https://nva.sikt.no/).

In the pre-pilot related to the course syllabi, we also developed a coding instrument to capture background information about, for example, the courses' structure, teaching and learning methods, as well as supervision and assessment regulations. Again, we compared the coding results of two humans and an LLM for sample course syllabi and found that the machine performed similarly to human coders. We identified a greater need to improve the coding instrument than with the coding instrument related to master's theses. For this reason, a revision and second round of piloting is currently taking place (in fall 2025). This

work is funded by strategy funds of Oslo Metropolitan University. In the long run, all course syllabi in teacher education in Norway are to be coded using an LLM and entered into the TEPS database. These course descriptions are publicly available for all courses on the institutions' homepages.

4.3.3 Register data

In Norway, there is rich register data on the higher education sector available (Database for Statistikk om Høyere Utdanning; DBH; https://hkdir.no/tall-og-statistikk/statistikk-om-hogare-utdanning). This data is not publicly accessible, but available on request for research use. It includes among others information about the teacher education institutions, their employees, and their students. Among relevant student information is background data such as citizenship, study entry grades from upper secondary school, exam grades during the studies, as well as obtained qualifications.

The register data is available for all institutions and students, which means that it can help to reduce the data collection burden of the TEPS study and, at the same time, address missing data concerns. As discussed, we anticipate that not all student teachers and teacher educators will respond to the TEPS questionnaires, at least not at all measurement points (i.e., attrition). Having register data for all student teachers allows us to assess findings' representativity in light of the underlying population. It furthermore allows us to compute nonparticipation or nonresponse weights to account for potential non-random missingness in the data and increase the representativity of findings (e.g., Meinck, 2020). This is state-of-the-art practice in other large-scale studies. Furthermore, having at least some data about all student teachers makes it possible to apply multiple imputation techniques to address missing data concerns in substantive analyses (e.g., Lüdtke et al., 2017; Rubin, 1987).

5 Content coverage in TEPS

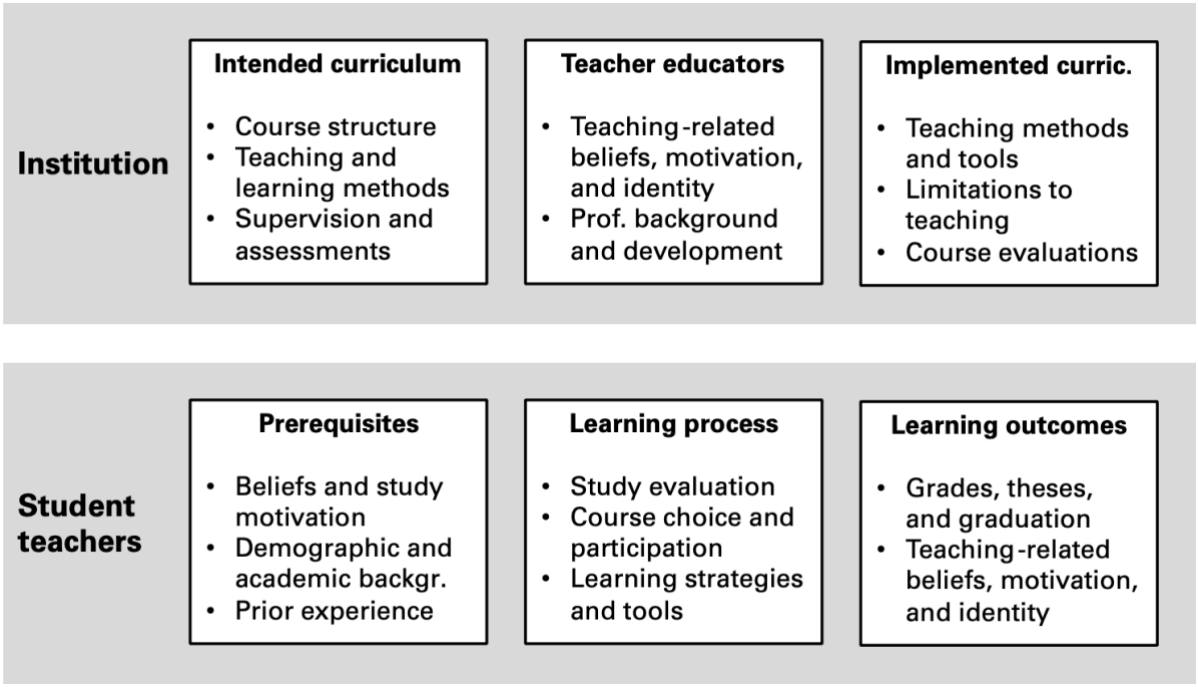
Since TEPS aims to enable a variety of relevant research questions to be investigated in secondary research (see Section 1.1 above), it is designed to capture a variety of different topics and variables that seem most relevant for research on teacher education in Norway (see Section 2 above) and in light of international theoretical and empirical work (see Section 3 above). A modular design (see Section 4.2 above) and the use of different data types (see Section 4.3 above) allow TEPS to quantify as much relevant content as possible without overburdening resources such as the time of questionnaire respondents. In line with these considerations, TEPS focuses on topics that are directly related to teacher education instead of also including further, more general topics (e.g., student teachers' teaching-related beliefs instead of more general beliefs). While TEPS intends to use unchanged measures over time to measure change (see Section 1.1 above), we recognize that unforeseen future developments may necessitate revising or expanding the content covered.

Figure 5.1 below illustrates some central content that TEPS covers, displayed to match the structure of Scheerens' and Blömeke's (2016) multi-level teacher education effectiveness model (see Section 3.1 above). The figure focuses on content related to initial teacher education within institutions, not the transition to work. At the level of student teachers, TEPS covers information about the students' individual study prerequisites, their learning processes, and learning outcomes. At the level of teacher education institutions, TEPS covers information about the curriculum that is intended in the different teacher education courses, the teacher educators who teach these courses, and the curriculum that is implemented in the courses.

In the following, we provide a more detailed explanation of why certain content is and is not covered in TEPS, while Section 4.2 above explains which modules assess these content areas.

Figure 5.1

Overview of central content covered in terms of initial teacher education in TEPS



Note. Own illustration oriented towards Scheerens' and Blömeke's (2016) multi-level teacher education effectiveness model.

5.1 Assessment, supervision, and mentoring

5.1.1 Assessment

For the purpose of this framework, assessment (*vurdering*) refers to any formal evaluation of student teachers during initial teacher education, in the sense of summative evaluations (e.g., Hattie, 2009). Assessment is conducted continuously throughout initial teacher education and serves as a core mechanism for determining the extent to which student teachers meet program expectations and are suitable for the teaching profession. In addition, assessments play an important role in quality assurance and in identifying variation between student teachers. Assessment in Norwegian initial teacher education includes the assessment of (1) coursework, (2) practicum, (3) research competence, and (4) suitability.

Assessment of coursework. Student teachers typically complete one or more graded assignments in each course. Teacher education institutions are primarily responsible for the assessment of coursework, which are graded as pass/fail or A-F grades in exams. Grading is carried out anonymously by internal and, in some cases, external examiners, following assessment criteria and guidelines provided by the institutions.

Assessment of practicum. The assessment of practicum is a shared responsibility between practice schools and teacher education institutions, although teacher educators at the institutions have the final responsibility to set the grade. Mentor teachers (*praksislærere*) in the schools in which the student teachers complete their practicum, observe, guide, and evaluate the students' teaching practice. Teacher educators at the institutions ensure alignment between theory and practicum and that assessment criteria match program standards. The practicum part of teacher education is typically graded on a pass/fail basis.

Assessment of research competence. The development and demonstration of research competence is primarily evaluated through a master's thesis (*masteroppgave*), typically conducted during the 10th semester. In addition, some programs also include other, smaller assignments to assess research competence at earlier stages (e.g., a research report at the end of the 6th semester). Additionally, student teachers often have to pass assignments in research methodology courses.

Assessment of suitability. National regulations state that a suitability assessment (*skikkethetsvurdering*) should be conducted in teacher education to assess whether a student teacher is 'fit' to enter the profession (Universitets- og høyskoleforskriften, 2024, § 7). A student is considered suitable if they do not pose a potential danger to pupils or others with whom they will come into contact during practicum or future professional practice. Suitability is evaluated by both teacher educators and mentor teachers.

Graduating initial teacher education means that the student teacher passed all required coursework, their master's thesis, completed the practicum and was deemed suitable to enter the profession (i.e., formal certification).

TEPS will collect student-level data on these formal assessment aspects in teacher education (e.g., passed/failed courses, grades, graduation), as well as more in-depth information about the master's thesis they wrote (e.g., subject field, methodology, and data basis). Minor research assignments are not included in TEPS since the extent to which these are implemented varies between programs and institutions.

Furthermore, TEPS will cover self-assessed, subjective learning outcomes of the student teachers. TEPS will not conduct objective, standardized tests measuring student teachers (pedagogical) content knowledge, like the TEDS-M study, for example (see Section 3.2 above).

Moreover, TEPS will include information about the assessment methods (e.g., oral versus written exams, group versus individual assignments) that are intended for the different courses at the level of institutions. These are intended to be varied across courses.

5.1.2 Supervision and mentoring

Mentoring refers to a dyadic relationship in which a more experienced person provides guidance and support to a less experienced person, with the aim of facilitating learning and fostering the development of specific competencies (Murray, 2001; Tonna et al., 2017). Mentors can also have a formal evaluative role. For example, mentor teachers during

practicum (*praksislærere*) provide guidance, but also carry a formal responsibility for evaluating student teachers' performance and suitability, although teacher educators from the institution still have the final responsibility for setting the grade. Similarly, teacher educators typically have both a mentoring and formal evaluation role at once.

TEPS covers four scenarios in which mentoring occurs. First, mentoring is integrated into teacher education programs, where student teachers receive feedback and guidance from teacher educators on, among others, coursework and assignments (i.e., formative assessments; Hattie, 2009). Second, student teachers receive mentoring during the master's thesis process, where the quality of supervision is a key factor for the successful completion of the thesis (Eklund & Løvland, 2025). Third, mentoring plays a crucial role in guiding and supporting teachers during practicum (Hobson et al., 2009; Lejonberg et al., 2018). Fourth, mentoring is a major component of teacher induction programs (Wang et al., 2008) and is considered of high importance in Norway (Dahl, 2006; Kunnskapsdepartementet, 2025e; Rambøll, 2020). TEPS will assess both information on the intended supervision by teacher educators and mentor teachers at the level of courses, and the subjective supervision/mentoring experiences of student teachers across mentoring scenarios.

5.2 Affective-motivational variables

Several theories exist within the field of identity, beliefs, and motivation, focusing on related, yet distinct affective-motivational sub-concepts. TEPS covers affective-motivational variables relevant across different teacher education research areas and that can be used by researchers with different research perspectives.

5.2.1 (Student) teachers' professional identity

Teachers' professional identity has been an important research topic for a long time (Beijaard et al., 2004). Initial teacher education is important in shaping student teachers' professional identity (e.g., Hanna et al., 2020; Izadinia, 2013; Rodrigues & Mogarro, 2019), which in turn is assumed to have a positive influence on, for instance, teaching-related attitudes, teaching behavior (Izadinia, 2013), and also pupils' psychosocial environment (Denfeld et al., 2023). Teacher identity, including student teachers' professional identity, is considered a "fragmented, dynamic, multidimensional, changeable, intersubjective" concept (Rodrigues & Mogarro, 2019, p.7). Additional work is needed to understand how student teachers' professional identity develops throughout initial teacher education (Rodrigues & Mogarro, 2019), including factors influencing its development (see, Izadinia, 2013; Rodrigues & Mogarro, 2019). With its longitudinal design, TEPS allows for an investigation into how several domains of student teachers' professional identity (e.g., Hanna et al., 2020) develop within student teachers (individual level) across teacher education programs and institutions, and how the development of student teachers' professional identity is influenced by specific factors at the individual level (e.g., practicum), course level (e.g., instructional

practices) and institutional level (e.g., teacher identity of the teacher educators (see Izadinia, 2014), see Figure 4.2 above and Figure 5.1 above).

5.2.2 Teacher beliefs

Student teachers already have beliefs about teaching when they enter initial teacher education (Kagan, 1992; Pajares, 1992, 1993; Valcke et al., 2010). These beliefs will affect how students acquire and interpret new knowledge (Pajares, 1992). Student teachers may, for instance, believe that they are ready to teach without learning from theory, and may thus be surprised by the complexity of teaching (Pajares, 1993; Valcke et al., 2010). Similarly, they may vary in their beliefs in how well they think they will perform in teaching, influencing their effort and persistence (see Tschannen-Moran & Hoy, 2001, 2007), and they may have different beliefs regarding knowledge and whether it is acquired via transmission or construction (e.g., Blömeke et al., 2014). Importantly, teacher beliefs in general have long been considered a key factor influencing teacher practice (for reviews see Fives & Buehl, 2012; Kagan, 1992; Pajares, 1992; Valcke et al., 2010). Thus, teacher educators' teacher beliefs may influence student teachers, while student teachers' teacher beliefs may influence their future pupils.

TEPS aims to cover the range of teacher beliefs student teachers and teacher educators can have. While there are several ways to categorize the content of teacher beliefs, here we refer to the categorization of Fives and Buehl (2012). TEPS will thus include self-beliefs (e.g., self-efficacy), beliefs about the learning environment (e.g., beliefs about relationships with peers or colleagues), beliefs about teaching practices and approaches (e.g., epistemological beliefs), and beliefs about students/pupils (e.g., learning).

5.2.3 Teaching-related motivations

To improve teacher education recruitment, retention, and to ensure that student teachers intend to work as teachers at the end of their studies, it is important to investigate motivational factors influencing study choices, factors sustaining motivation to pursue teaching careers, and factors associated with the motivation of teacher educators. TEPS therefore covers different motives for wanting to teach/remain in teaching, such as intrinsic and extrinsic motives, motives related to specific ability beliefs and values, in addition to (student) teacher interest, and job satisfaction among teacher educators.

Students may have both intrinsic and/or extrinsic motives for why they want to become a teacher (Bergmark et al., 2018; Han & Yin, 2016; Sinclair, 2008, see also the literature on Self-determination theory: Deci & Ryan, 1985), for instance wanting to work with children (intrinsic motivation) or because of the relatively long vacation periods (extrinsic motivation) (Sinclair, 2008). Motives may also be related to specific values and beliefs about abilities (i.e., FIT-Choice model, Watt & Richardson, 2007). Motivations to teach may be influenced by experiences during teacher education including practicum and may change during teacher education (Canrinus & Fokkens-Bruinsma, 2014; Sinclair, 2008), and are closely related to the development of teacher identity (Bergmark et al., 2018; Hanna et al., 2019,

2020). Motivation to teach may in turn influence who chooses to remain in the study program, and who is dropping out (as discussed in, for instance, Fokkens-Bruinsma & Canrinus, 2015, and Sinclair, 2008).

As a key outcome of profession-related studies like teacher education is that the student teachers intend to work as teachers at the end of their studies, TEPS maps the development of student teachers' motivations to teach from study entry up to one year into work life (see Figure 4.2 above). TEPS also measures job satisfaction both for the newly qualified teachers and for teacher educators as job satisfaction may prevent leaving the teaching profession (Skaalvik & Skaalvik, 2011).

TEPS also measures other influential motivational factors such as interest. For student teachers, (student) teacher interest – including subject interest, didactic interest, educational interest (Schiefele et al., 2013), and research interest can influence the motivation to work as a teacher and protect against dropout (Høgheim & Federici, 2022). For practicing teachers, interest has been associated with occupational well-being such as enjoyment of teaching and prevention against burnout, the use of specific teaching practices, and interest among pupils (e.g., Lazarides et al., 2023; Schiefele et al., 2013). TEPS maps the development of student teachers' interest from study entry up to one year into work life (see Figure 4.2 above).

Finally, as teacher educators are likely to influence their students' motivation and interest, TEPS also maps motivation, interest, and job satisfaction among teacher educators (at the institutional level).

5.3 Teaching and learning environment, and trajectories

TEPS aims to build a nuanced picture of how the learning environment and courses are experienced and implemented across institutions and over time. TEPS will also provide an overview of student trajectories, by mapping study choices, retention, and study drop-out.

TEPS refers to learning environments as the social, psychological, and pedagogical contexts that, in combination with student characteristics, influence different outcomes of teacher education, such as motivation to teach and teaching competence (based on Fraser, 1998). Learning environment can thus refer to, for instance, teaching practices, learning practices, limitations to teaching, and learning experiences.

5.3.1 Teaching practices

Teacher educators use different teaching methods, tools, and formats. The choice of these practices may be influenced by teacher beliefs (e.g., Lazarides et al., 2023), and they will likely influence learning outcomes of student teachers (e.g., Deslauriers et al., 2019). Importantly, the choice of teaching practices is also about modelling didactic approaches that student teachers can use in their own future teaching (see for instance, Korthagen et al.,

2006). TEPS maps teaching practices at the course and institutional level including methods, tools, and formats as reported by student teachers and teacher educators.

Teaching methods and tools. TEPS maps both methods and tools teacher educators use, as reported by both teacher educators and student teachers as part of course evaluations (see Figure 4.2 above). Teacher educators may for instance use collaborative teaching (e.g., Nevin et al., 2009), more or less student-active practices (e.g., Deslauriers et al., 2019), and digital learning software including AI tools (e.g., Karagöl et al., 2025). In addition, TEPS measures teacher educators' experienced limitations to teaching (e.g., if few students attend optional sessions).

Teaching formats. TEPS also measures which teaching formats (e.g., campus-based, digital, hybrid formats) and methods are intended at the course level (e.g., lectures, seminars, group work, excursions, colloquium groups), including within the practicum part of teacher education (e.g., practicum duration, observation of teaching versus own teaching). Preferably, teaching formats should be varied within and across courses. This will also prepare student teachers to respond to a complex and changing society (see Darling-Hammond, 2006).

Student teachers' perceptions of teaching and learning conditions. Finally, TEPS measures student teachers' perceptions of teaching and learning conditions as part of their study evaluations (see Figure 4.2 above). This includes experiences during practicum (e.g., degree of mentoring, fit to own specialization), the perceived support by teacher educators, the perceived coherence between teaching and learning practices in the practicum and other courses, and between the master's theses and the rest of their studies and future job requirements (e.g., J. M. Allen & Wright, 2014; Darling-Hammond, 2006; Dewey, 1904; Jenset et al., 2024; Korthagen, 2010).

5.3.2 Learning practices

How and to what extent these learning opportunities lead to desired learning outcomes depends, among others, on how student teachers make use of provided learning opportunities (Brühwiler & Blatchford, 2011; Seidel, 2014; Weyers et al., 2024). This also relates to the workload they should and actually do invest.

During teacher education, student teachers are provided with a variety of subject-related, pedagogical, and school-based learning opportunities aimed at supporting the development of the knowledge and skills necessary for the teaching profession (König et al., 2017; Mahler et al., 2024). The degree to which these learning opportunities foster the acquisition of such skills and knowledge depends on a combination of student teachers' individual prerequisites and how they use the provided opportunities (Weyers et al., 2024).

In TEPS we refer to the use of learning opportunities in terms of, for example, the learning strategies and tools they apply (and if they collaborate with peers, for example in colloquium groups), and the extent to which they participate and engage in their studies. In this context, we also assess, for example, to which degree they (have to) work for pay outside their

studies, which might limit their capacity to actively engage in their studies. We will also cover if they have had additional learning experiences like an international exchange.

Learning practices are not only relevant for student teachers, but also for teacher educators, since they are expected to engage in continuous professional development. TEPS therefore also examines how teacher educators perceive their own needs for, and access to, relevant teaching-related professional development, including professional development based on collaboration with colleagues (Nevin et al., 2009).

5.3.3 Trajectories

Collecting longitudinal data, TEPS will map different trajectories across student teachers, including course choices and the duration of studies (see Figure 4.2 above). TEPS will collect data on the programs students are enrolled in, making it possible to learn about program differences within institutions, potentially associated with different retention rates (Cochran-Smith et al., 2011). From the courses the students attend, information about the course structure can be derived (e.g., courses that are obligatory or elective, combination of courses with different credit points, at which points students can take which courses) and coherence (e.g., of teaching and assessment methods) across different trajectories students can take.

TEPS will also map the trajectories of newly qualified teachers, one year after graduation (i.e., do they work in schools, do they teach in their specializations etc.). This is important in profession-related studies such as teacher education and especially in Norway, in light of potential teacher shortages.

Finally, TEPS addresses the trajectories of students who drop out of teacher education. As some reasons for dropping out may be more desirable (e.g., realization that teaching is not the right profession for them) than others (e.g., dissatisfaction with study experiences), TEPS will map reasons for drop-out before graduation.

5.4 Background characteristics

5.4.1 Background characteristics of student teachers

Relevant background characteristics can include numerous factors such as student teachers' cognitive abilities, interests, gender, socioeconomic status, and prior experience.

There are several reasons to include student teacher background characteristics in a large-scale study on teacher education. First, in a societally important profession like teacher education, it can be considered an important goal to reflect society's demographic diversity. Data on background characteristics of students recruited into teacher education and students who graduate are relevant in themselves in order to understand the teacher labor force and to guide policymakers (Fray & Gore, 2018; Jerrim, 2024).

Second, student teachers' background characteristics have been shown to correlate with their knowledge development, self-efficacy and graduation (Blömeke et al., 2012; Franz et al., 2024; Weyers et al., 2024). Thus, background characteristics can explain variation in outcomes of teacher education. Furthermore, they provide an important statistical control in quantitative studies when examining other variables of interest (see Bråten & Ferguson, 2015, for an example).

Third, including background characteristics makes it possible to study potential differential patterns and effects across demographic groups, such as gender differences in the relation between student teacher interest and ambitions in teacher education (Høgheim & Federici, 2022).

Fourth, background characteristics shape not only how individuals act, but also how they perceive and report their experiences. For instance, research has shown that student teachers' individual characteristics are significantly associated with the extent to which they perceive having opportunities to learn (Cohen & Berlin, 2020).

Therefore, TEPS collects data on a wide range of background characteristics such as demographics (e.g., age and gender), academic background (e.g., prior school grades), and prior teaching experience (e.g., work experience as football coach for children).

5.4.2 Background characteristics of teacher educators

Teacher educators are at the core of teacher education programs. TEPS includes several relevant characteristics of teacher educators (e.g., whether they have completed a university pedagogy course, whether they are formally certified schoolteachers themselves, whether they have a PhD), which may shape their teaching practice, and consequently how and what student teachers learn. For instance, completing university pedagogy courses has been associated with more student-focused teaching methods and higher self-efficacy for university teachers in general (Postareff et al., 2007). Inferring from the literature on schoolteachers, teachers' teaching experience, qualifications, and specialization are highly relevant for pupils' learning outcomes (Coenen et al., 2018; López-Martín et al., 2023; Wayne & Youngs, 2003), which can be assumed to hold for higher education teachers and students as well. TEPS does not include background characteristics of mentor teachers.

5.4.3 Background characteristics of institutions

There are considerable differences between teacher education institutions in Norway, not only in terms of their geographic location but also with respect to the number of programs offered, institutional size, and student enrolment (see Table 4.1 above). In Norway, teacher education is provided by institutions across the country, including rural and sparsely populated areas. This contrasts with countries such as Australia, where teacher education is more strongly concentrated in metropolitan regions (Mayer et al., 2017). Geographic distribution may affect access to school placement sites, the availability of qualified teacher educators or mentors, the share of digital teaching formats, and overall institutional capacity.

Therefore, TEPS collects context data on institutional characteristics such as geographic location, the number of students enrolled, and their status (university, university college, or specialized college).

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AI Statement

The text was copy-edited using Google Gemini Pro to remove typos and grammatical errors. All suggested changes were accepted or rejected manually.

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