

Final thesis in the context of research-based teacher education in Germany:

A case study of University of Oldenburg

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Although the final thesis represents the culmination of research-oriented teacher education, it has received little scholarly attention in Germany. This article examines its professionalisation functions and influencing factors (structural, organisational, and didactic), reviews the limited research on the topic, and discusses possible reasons for its underrepresentation within German educational academic discourse. In addition, international research is systematically used as an analytical lens to contextualise the German situation and to identify transferable conceptual insights. A case study at the University of Oldenburg demonstrates how institutional guidelines and a research-based curriculum can integrate the final thesis into teacher training. The findings highlight it as a crucial link between academic preparation and reflective practice. The article argues for establishing research on final thesis as a distinct field in order to strengthen research-oriented, reflective teacher education.

Keywords: Final thesis, research-oriented teacher education, research-based learning, teacher professionalisation, teacher education in Germany, primary teacher education.

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Introduction

This article examines and discusses the role of the final thesis in teacher education in Germany from an educational science perspective. As the final examination, the final thesis serves two main functions at the level of professionalisation. First, future teachers must demonstrate that they meet the academic requirements of higher education, including rigour in scientific inquiry, practical research knowledge, methodological and research competence, and professional expertise in their respective subject disciplines. On the other hand, they must show, at an educational science level, that they can reflect in a nuanced manner on professional challenges and requirements related to their future pedagogical activities in schools and classrooms, as well as on issues of school development (Kamm & Bieri, 2008; Vetter & Steiner, 2016).

However, the topic of final thesis is currently underrepresented in academic discourse in Germany, particularly regarding empirical research. This is surprising, as discussions on the final thesis are closely linked to key educational science issues in teacher education at three levels: (a) *structural* (educational degrees and curricula), (b) *organisational* (legal regulations, institutional procedures, and organisational frameworks) and (c) *didactic* (pedagogical practices and support structures). At the didactic level in particular, investigations should focus on the pedagogical practices and organisational actions of university lecturers. It is imperative to examine how supervisory relationships in the context of final theses are established and structured with respect to mutual rights and obligations. Additionally, the pedagogical practices of university lecturers during the supervisory process should be reconstructed, particularly with regard to assessment procedures. However, a strong emphasis should be placed on the immediate needs, challenges, and experiences of students throughout the process – from topic selection through to conducting research and writing the thesis (Gerteis et al., 2021).

Against this background, the present article does not claim to provide new empirical evidence on students' or supervisors' experiences. Instead, it pursues an analytical and systematising aim: to reconstruct how final theses are institutionally framed, pedagogically legitimised, and professionally positioned within research-based teacher education in Germany. By combining document analysis, curriculum analysis, and a systematic synthesis of international research, the article aims to clarify the professionalisation potential of the final thesis as a research-based learning format, while simultaneously identifying blind spots and limitations in current German research. The case of the Carl von Ossietzky University Oldenburg thus serves as a theory-informed institutional example, not as an empirical evaluation of practice. Within this conceptual framework, the article seeks to answer three central research questions:

- (1) What role do final theses play in teacher education in Germany within the context of research-based teaching, and which structural, organisational, and didactic factors influence their design and impact?
- (2) How can the current state of research on final theses in Germany be characterised, and what potential reasons account for the limited scholarly engagement with this topic to date?

- (3) How do institutional regulations and curricular frameworks specifically affect the design and implementation of final theses in teacher education at the Carl von Ossietzky University Oldenburg?

Teacher education in Germany and final thesis

This section provides a discussion of the structure of teacher education in Germany, national guidelines for final thesis and debates on its implementation in teacher education programs. Our purpose is to offer a general portrayal of research literacy development in teacher education at the national level as a background for our university-based case study that follows.

Dual-phase structure of academic and practical teacher education

There are two phases of teacher education as discussed below:

Phase 1 – University

Teacher education is conventionally divided into two distinct phases. In the first phase, prospective teachers complete an academic programme at a university or teacher education college. This comprehensive programme forms the academic foundation necessary for the teaching profession. The degree programme for teaching in Germany has been largely restructured in accordance with European requirements of the Bologna Process, incorporating the ECTS credit system, modular study structure, and the award of bachelor's and master's degrees. However, some federal states, for instance, Hesse and Bavaria, still mandate a university-based training model culminating in a state examination (Staatsexamen) (Cramer, 2020; Schmees, 2020).

Admission to a university teacher education programme in Germany is contingent upon the Abitur, the highest level of educational qualification. The Abitur is typically obtained at grammar schools or equivalent institutions after 12 or 13 years of schooling. There is no standardised entrance examination or general admission restriction (numerus clausus, i.e., the average Abitur grade) for entry into a teacher education programme at a university or comparable higher education institution. Only certain subjects within the bachelor's degree programme may be subject to an admission restriction or require an entrance examination (Barczak, 2020).

From a professionalisation theory perspective, the foundational phase for the future teaching profession involves both instruction and the acquisition of pedagogical, educational science, didactic, and subject-specific knowledge across two academic subjects (Cramer, 2012; de Boer et al., 2018). The university phase typically comprises a bachelor's degree programme spanning six to eight semesters, requiring the study of two school-relevant subjects (i.e., a two-subject bachelor's degree programme). This phase concludes with a Bachelor's thesis and results in the conferral of a B.A. degree (which may be a Bachelor of Education, Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Science, or Bachelor of Music, depending on the subject chosen). The bachelor's degree programme is a prerequisite for the subsequent Master of Education. The master's degree programme, generally lasting two years, is a professionally orientated course that concludes with a final thesis, ultimately awarding a Master of Education (M.Ed.) (KMK, 2022).

Legal and administrative criteria, as well as the content requirements for composing a final thesis, vary according to the federal state, the specific degree programme, and the

examination regulations of the respective universities. For instance, at Carl von Ossietzky University Oldenburg, empirical research papers are required for the teaching degree at grammar schools (Gymnasien). The final thesis for the teaching degree at primary schools, however, may alternatively be presented as a theoretical essay or literature review (Literaturarbeit) (Carl von Ossietzky Universität, 2025; 2022a). Moreover, practical phases frequently incorporating research-based learning activities constitute an integral component of university training within both bachelor's and master's programmes at numerous institutions (Koch-Prieue et al., 2022).

Phase 2 – Preparatory Service (Referendariat)

The second phase of teacher education in Germany comprises the practical school-based preparatory service, often referred to as the traineeship. Eligibility for this phase requires the successful completion of a teaching-related polyvalent Bachelor's degree followed by a Master of Education. During this phase, which varies depending on the federal state, prospective teachers gain practical experience by working and teaching in schools while simultaneously attending part-time, practical training sessions at designated study seminars (Studienseminare). The duration of this phase is typically 18 to 24 months. The programme culminates in a state examination, and the full teaching qualification is only conferred upon the satisfactory fulfilment of all stipulated requirements (Peitz & Harring, 2021).

Federal structure of the German education system

The second structural model pertains to the legislative autonomy in general education policy, which is exercised at the state level. In Germany's federal education system, administrative oversight of the two-phase teacher education is vested in the ministries of science and culture of the 16 federal states. National standards for state regulations are established solely by the Standing Conference of the Ministers of Education and Cultural Affairs. These standards outline the core objectives of teacher professionalism and provide guidelines for pedagogical practices in schools and classrooms (KMK, 2022).

School type-related teacher education tracks

Teacher education in Germany is differentiated into various school-based pathways at universities, each of which is associated with distinct requirements concerning the format of the final thesis. This differentiation reflects the inherently complex and segregated nature of the German education system (Kramer et al., 2009). The German school system is structured around established institutional pillars and organised educational phases. Typically, children commence their schooling at the age of six in elementary school, which covers grades 1 to 4 and forms the primary level. Upon completing primary education, students are tracked into different school types early on, based on their academic performance and aptitude. These include Hauptschule/Realschule, Oberschule, Gesamtschule, and Gymnasium for grades 5 to 10 (Terhart, 2004). These school types not only represent distinct learning and developmental environments, each with their own requirements, performance standards, and graduation credentials, but also function as a key mechanism in the (re)production of social and educational inequality.

The stratification into differentiated and hierarchical school types has long been contentious in both educational science and policy circles. Since Germany's mediocre

performance in the PISA studies from 2000 onwards, this debate has gained further momentum (Dumont et al., 2014; Gerheim & Spies, 2017).

This differentiation in teacher education pathways, based on school type, has significant implications. It leads to variations in the duration of training, the content of courses, and the requirements for master's degrees, including the composition of the final thesis (Carl von Ossietzky Universität, 2025; 2022a; 2022b).

Research-based learning in teacher education in Germany

The requirements for composing an academic final thesis in Germany are structured in two distinct ways. First, a final thesis tackling a question or problem based solely on secondary sources, often referred to as a literature-based thesis, may be produced. Second, a research-based final thesis may be written, which entails planning and executing an independent research project. Work on this latter type of thesis can be carried out in collaboration with existing university research projects, under the academic supervision of a mentor, or independently. The thesis can be written in either a specialist discipline or the field of educational sciences, with a self-determined research question and object of investigation (Carl von Ossietzky Universität, 2022a; 2022b). In certain federal states and universities, students are encouraged to undertake a research-based final thesis as a self-chosen empirical research project. This approach is structurally intertwined with the curricular implementation of research-based learning formats, which form part of the research-oriented framework of university teacher education (Berding et al., 2018). In the following section, the pedagogical concepts related to research-based teacher education in Germany are briefly presented and discussed.

The format of research-based teaching and learning in higher education is a topic of intense debate both in supranational discourses (European Commission, 2014) and in national educational policy and educational science within the context of teacher education (BERA, 2014a; Jakku-Sihvonen & Niemi, 2006; Mincu, 2013; Tatto, 2013; Wissenschaftsrat, 2001). In light of various theoretical traditions, concepts and implementation methods, research-based learning and its application within teacher education is widely regarded as a productive and didactically valuable structural model.

The explicit discourse on research-based learning (RBL) and the general implementation of RBL formats in higher education has been present in Germany since the 1970s. Organizational deficits were identified at the outset of the higher education policy debate on research-based learning, prompting grassroots democratic modernisation and innovation processes at German universities (Baacke et al., 2009; Huber 2006, 2009; Lehmann & Mieg, 2018; Mieg & Lehmann, 2017).

On a conceptual level, research-based learning is thus defined as a didactic teaching and learning format that emphasises the independent design and execution of a self-chosen student research project, focusing on the object of investigation, research question, and methodological approach. In relation to teacher education, Fichten and Meyer (2014, p. 14) broadly characterise research-based learning as “an open and participant-activating teaching–learning concept” including three central objectives: firstly, to equip student teachers with methodologically and analytically sound ‘research literacy’ (BERA, 2014a); secondly, to foster key skills such as flexibility, teamwork, and critical thinking; and thirdly, to instil a research-based approach to teacher education (Spies, 2017). Moreover, teacher professionalism is envisaged as fostering a critically reflective stance towards pedagogical practice in

schools and classrooms, as well as influencing school development processes (Gerheim, 2019; 2022; Spies, 2019). This innovative paradigm mandates that teacher education students critically reflect on their own practice, extract implicit knowledge from their experiences in schools, classes, teaching, and school development, and subject it to systematic evaluation and transformation. This entails examining, analysing, and reflecting upon one's subjective convictions, assumptions, and concrete pedagogical practices, and their consequent impact on schooling and teaching. The aim is to directly enhance pedagogical practice through research (Brew & Saunders, 2020; Gerheim, 2018; Schiefner-Rohs et al., 2019). This premise underlies the development of an empirical final thesis by student teachers, which is expected to be scientific, goal-oriented, and relevant to practice.

Before the Bologna reform, the establishment of higher education didactic RBL formats in teacher education was largely voluntary, historically taking the form of research workshops (Feindt, 2000). Since the 2000s, however, there has been a marked increase in the curricular integration as well as in educational discourses on research-based learning (Fichten, 2010).

Currently, mandatory RBL formats are increasingly incorporated into teacher education curricula, particularly during the practical phases in schools. Universities are progressively establishing the necessary conditions for a research orientation to evolve into a professionalisation pattern for student teachers during the initial phase of teacher education programmes (Schüssler et al., 2017). Additionally, students are developing a foundational understanding of research, including its epistemological, methodological, application- and results-oriented dimensions, and can apply this knowledge practically (van Ophuysen et al., 2017). The preparation of an empirical final thesis requires adherence to scientific quality criteria such as objectivity, reliability, validity, intersubjective verifiability, and conformity with research ethics. These principles are indispensable for independent scientific treatises.

Similarly, at the administrative level within universities, research-based learning formats (RBL) give rise to distinct didactic structures. This development renders RBL a central organisational issue within the broader framework of university development processes (Carl von Ossietzky Universität Oldenburg, 2017b). In this context, the two projects “FLiF+” (Forschungsbasiertes Lernen im Fokus plus) and “FoL+” (Forschungsorientierte Lehre plus), funded as part of the “Qualitätspakt Lehre” by the Federal Ministry of Education and Research (BMBF), should be mentioned in particular as outstanding examples of this development, with teacher education constituting a central component (Carl von Ossietzky Universität Oldenburg, n.d.a.). It is also important to note that there are various research-based examination formats available at different stages of university teacher education, such as writing a final thesis or conducting research during undergraduate or bachelor's studies.

To conclude, various formats of research-oriented learning in teacher education at German universities are implemented through different practical models of the research-teaching nexus, as described by Healey and Jenkins (2009) and Levy and Petrulis (2012). More concretely, Yildirim, Åström, and von Brömssen (this issue) propose a framework that links teacher-education orientations to distinct final-thesis practices and locates these on a continuum from research via inquiry to practice. This perspective specifies that the final thesis functions as a research-based learning format in different ways depending on whether programmes prioritise predominantly academic orientations (e.g., theory-based research competence) or professional orientations (e.g., practice-near judgement and reflection), and

on the degree of research literacy targeted. For the German context, this framework can serve as a methodological point of departure for future studies by providing categories to analyse thesis formats, theory–practice relations, and the institutional conditions under which these relations are realised.

Current discussions and research on final thesis

Investigating the format of final thesis examinations in teacher education and analysing assessed final theses written in a research-based learning context represents a notable gap in German research discourse. It is noteworthy that, beyond the German-speaking academic sphere, diverse and productive research endeavours have emerged that examine and analyse the topic of final theses in teacher education from various research perspectives.

In particular, the productive Scandinavian debate merits special attention. Here the topic of final theses is examined in the context of the broader debate on research-based teacher education and the theory–practice relationship (Eklund, 2019; Erixon & Erixon, 2017; Larsen, 2024; Maaranen, 2010; Råde, 2019; Sæther et al., 2024). In particular, Eklund et al. (2019) and, for the non-Scandinavian context, Kowalczyk-Wałędziak et al. (2020) analyse in a cross-national study how students and teachers retrospectively perceive the process of writing and the final product of their final thesis as an academic qualification. Other studies employ content analysis to investigate thematic focus areas, research questions, methodological approaches, and research designs found in master’s theses related to teacher education (Duman, 2021; Durak et al., 2016; Nuri et al., 2021).

Additionally, specific aspects of final theses have been explored in research, such as multilingualism as a research topic (Dewilde, 2024) and grammatical challenges in the results section (Kristanti et al., 2023). Another key research strand focuses on the supervision and assessment of final theses, particularly the supervisory relationship between students and academic advisors and its impact on the success of the thesis (de Kleijn et al., 2012; Filippou et al., 2019; Jegstad et al., 2024; Stolpe et al., 2021).

In the German context, such empirical approaches remain largely unexplored, despite their acknowledged significance. At a basic descriptive level, future research should therefore also establish the quantitative landscape of final thesis production, i.e., at which universities final theses in teacher education are written, in what numbers, and how this distribution varies across programmes and federal states. Adopting comparable analytical frameworks would then allow future research to systematically examine thematic emphases, research designs, and theory–practice relations within final theses in teacher education.

An examination of the current state of educational research in Germany reveals a notable paucity of both theoretical and empirical work on final theses. In contrast to the productive international academic discourse, only three publications have explicitly addressed this issue (Berding et al., 2018; Bock & Hany, 2016; Bock et al., 2020). Bock and Hany (2016) and Bock et al. (2020) discuss the implementation and evaluation of a research-based teacher education project called “MasterMind Research Laboratory” at the University of Erfurt as one of the few contributions in this area. The Research Laboratory Project is part of the quality offensive teacher training project ‘QUALITEACH’ funded by the Federal Ministry of Education and Research (BMBF). These articles examine the implementation of individual methodological counselling for student teachers during the design and execution of a research-based empirical final thesis. These supportive, didactic measures, which were

identified by Beckmann and Ehmke (2020) as aspects of research-based teaching and learning processes that are positively experienced, productive and goal-oriented, form the basis for this higher education didactic initiative. In addition to individual counselling sessions for students, the project established research and methods workshops and forged co-operations with schools to generate practice-relevant research topics for the final thesis. The project evaluation indicates that students find the methods counselling service both useful and beneficial during the research process and while writing their final thesis.

Berding et al. (2018) present the implementation of a competence development portfolio as part of the teacher training programme in vocational education at the Carl von Ossietzky University of Oldenburg. The competence development portfolio model follows a spiral curriculum based on the theoretical foundations of research-based learning and the cultivation of a self-reflective research attitude. The central didactic aim of this curricular spiral is to interlink various research-based teaching–learning formats, beginning in the early phase of the B.A. programme and extending through the bachelor’s thesis, the master’s programme, and culminating in the empirically written final thesis. The programme evaluation has yielded overwhelmingly positive results.

In contrast to the debate in Germany, Switzerland, as another German-speaking country, has witnessed an intensive theoretical and empirical debate on the content of final theses in the teaching profession. This debate reflects a productive theoretical and empirical engagement with the subject. For instance, the topic of “academic theses” is the central focus of the double issue of the journal *Beiträge zur Lehrerinnen- und Lehrerbildung* (2021a, 2021b). Particularly noteworthy in the Swiss context are the early work by Kamm and Bieri (2008) and the studies by Vetter et al. (2021), Vetter (2016) and Vetter et al. (2014). The latter study, drawing on data from the University of Fribourg, Switzerland, reconstructs three central research approaches in the context of final theses: (1) the theory-based development and testing of classroom and school materials; (2) the reflection on one’s own teaching practice informed by theoretical frameworks and iterative development; and (3) the theory-based analysis of teaching and school realities. All research designs are directly oriented towards (future) pedagogical practice in schools and classrooms. The article concludes that this particular form of research-based learning within the context of the final thesis can be assessed as a significant (and positive) professionalisation process. The key outcomes include: (a) the promotion of a research-based habitus; (b) the enhancement of expertise in pedagogical–psychological, subject-specific or subject-didactic professional knowledge; and (c) the development of reflective skills.

In conclusion, it can be stated that research on final theses in teacher education is scarce within the German educational debate, and the phenomenon has only been theoretically addressed in a basic manner. This clearly indicates the need for future research, which is discussed in more detail in the outlook section of this article.

Final thesis at the Carl von Ossietzky Universität Oldenburg

The section below presents the institutional framework, supervision process, academic standards and final thesis in primary school teacher education program at University of Oldenburg.

Institutional framework

The “Verordnung über Masterabschlüsse für Lehrämter in Niedersachsen” (Nds. MasterVO-Lehr, NI - Niedersächsische Masterverordnung-Lehrämter | Niedersächsisches Vorschrifteninformationssystem (NI-VORIS), n.d.) and the examination regulations for the different types of teaching degrees valid at the University of Oldenburg (Carl von Ossietzky Universität Oldenburg, 2025; 2022a) establish the primary legal and procedural guidelines for composing a final thesis as a final examination. These regulations define the institutional framework, supervision, curriculum, performance assessment and requirements for a final thesis, including aspects of content, form and research references.

As a brief indication of the programme’s reach, the University of Oldenburg had 4,825 students enrolled in Master of Education degree programmes during the winter semester of 2023/24, and 654 students successfully completed their master’s degree in the examination year of 2022 (Carl von Ossietzky Universität, n.d.d).

A final thesis in the teaching profession may be written either in educational sciences or in a teaching subject, as stipulated in §11 Nds.MasterVO-Lehr. To be eligible to submit a final thesis for the M.Ed. in Primary Education, candidates must have accrued 60 ECTS within the modules of the master’s programme. The final thesis itself is worth 18 ECTS credits and is accompanied by a compulsory course (Master’s Thesis Module, mam) worth 2 ECTS credits (Carl von Ossietzky Universität Oldenburg, n.d.b.). This one-semester course provides students with professional and methodological support from educational science lecturers throughout their planning and writing process. They also benefit from peer feedback provided by fellow seminar participants. The course is designed to alleviate the pressure of examinations and to enable students to openly address content-related questions and issues concerning their final thesis (Carl von Ossietzky Universität Oldenburg, n.d.c.). In consultation with their supervisors, students select their own topic, ensuring that their thesis meets academic standards and is produced independently.

Supervision process

The final thesis is supervised and graded by two lecturers, one of whom must be full professor. Regarding supervision processes, teacher education in Germany could profit substantially from international supervision research, which consistently foregrounds the supervisor–student relationship as a pivotal mechanism through which academic standards and learning outcomes are co-produced. Drawing on quantitative evidence, de Kleijn et al. (2012) show that students’ perceptions of the supervisory relationship are systematically associated with central outcome measures, including satisfaction, perceived supervisor contribution to learning, and final grades; notably, perceived affiliation is positively related to these outcomes, whereas perceived control must be carefully balanced.

This underscores the need to treat supervision as a relational-didactic practice that combines support and autonomy in a calibrated manner. Complementing this relational focus, Filippou et al. (2019) theorise supervision in international master’s programmes as a

dynamic constellation of roles—spanning, *inter alia*, academic expert, project manager, and mentor—and highlight trust-building, topic selection, encouragement, and early-stage focusing as particularly consequential supervisory tasks. Recent research by Jegstad et al. (2024), based on interviews with Norwegian teacher educators, indicates that the final thesis is perceived as contributing not only to academic competence but also to the development of personal traits, reflective capacity, and aspects of professional identity; supervisors describe themselves as project leaders and stress relational competence and availability as key conditions for guiding students while safeguarding student autonomy. At the same time, the study points to structural challenges, including uneven supervisory experience and perceived competence gaps, which cannot be addressed by short training formats alone and therefore call for institutional support arrangements.

While we cannot substantiate these connections through systematic empirical or evaluation studies within the German context, key insights from the supervision research outlined above resonate strongly with our own recurrent experiences as supervisors of final theses (approximately 25–30 theses per year). In particular, the importance of a robust, trust-based supervisory relationship, the need to balance guidance and student autonomy, and the critical role of early process phases (topic selection, focusing, and clarification of expectations) repeatedly emerge in our supervisory practice as conditions that shape productive working processes and high-quality thesis outcomes. Against this backdrop, the supervisory model at the University of Oldenburg—characterised by dual supervision, structured guidelines, and curricular embedding within a research-based programme—can be interpreted as institutionally aligned with internationally discussed quality criteria for productive supervision; however, a systematic empirical evaluation of supervisory practices and experiences (students and supervisors) remains a clear desideratum for future research in Germany.

Academic standards

The University of Oldenburg (2017) has established academic standards for the writing of final theses, which are outlined in separate guidelines compiled by the Institute of Education. These guidelines serve as binding instructions for students throughout the research and writing process. The assessment of the final thesis is based on a five-point grading system (very good, good, satisfactory, sufficient and failed—with intermediate gradations), and the final grade must be justified by both supervisors in a written report. According to the examination regulations (§ 23,7), the maximum time permitted for the completion of the final thesis is 20 weeks from the date of registration with the Examinations Office (Carl von Ossietzky Universität, 2025; 2022a). The structure and the timeline of the institutionalized process of writing a master's thesis at the UOL can be visualized as such:

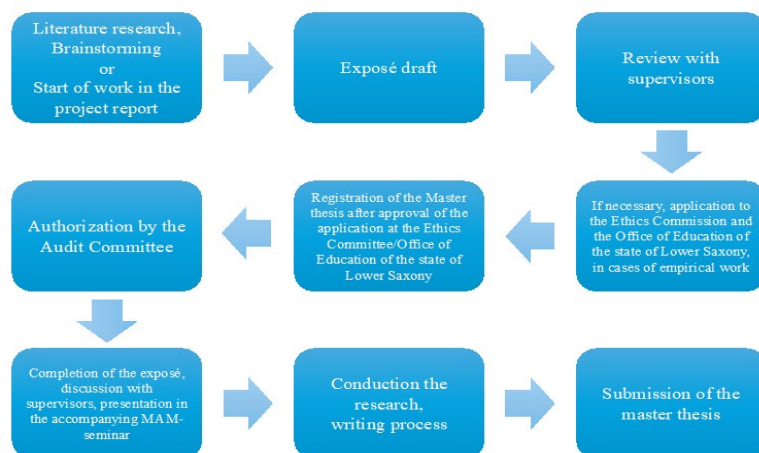


Figure 1. Final thesis process at the C.v.O. (Carl von Ossietzky Universität, 2017a, p. 3)

Final thesis and research-based learning in primary school teacher education

Since the 1990s, the nationwide discourse on ‘research-based learning’ has also been adopted at the University of Oldenburg and embedded in teacher education courses and examinations. In this context, final theses that emerge from students’ research-based learning projects have been met with strong acceptance and have become a recurring format for consolidating research literacy and reflective professional development.

Following the reform of the study structure in 2014, the teacher training programme for primary and (lower) secondary teachers in Lower Saxony was extended to 300 ECTS and integrated into the M.Ed. programme. Therefore, the Ministry of Science and Culture implemented a practical semester that is obligatory for all students and comprises a three-semester supervision period. During this phase, empirical or evaluative data are collected at placement schools and subsequently analysed either within the teaching subjects or in educational science. This is linked to the explicit expectation of the Ministry that student research projects should contribute to school development (Carl von Ossietzky Universität Oldenburg, 2022b; Spies et al., 2017).

The curriculum for the master’s programme in educational sciences as well as the associated teaching concept for the practical phase, explicitly stipulates that students aspiring to teach at primary schools may develop their final thesis based on their research project. This can be undertaken from the first to the third semester in the research module prx 566, with the project volume finalized in the fourth semester (Carl von Ossietzky Universität, 2022b; Spies & Gerheim, 2022). Students may decide whether their final thesis adopts an empirical approach, based on data collected in the project context, or addresses a more in-depth theoretical and discursive question derived from their findings; however, in both cases it is required that the thesis incorporates aspects of school development.

In sum, and in line with Yildirim et al.’s (this issue) model on final thesis orientations, Oldenburg institutionalises pathways for both research-based and inquiry-oriented thesis work while explicitly tying both to professional practice via school development.

Discussion

The article demonstrates that there are glaring deficits in the educational and educational science debates in Germany regarding final theses in teacher education. The current state of research may be described as eclectic or virtually non-existent. A scientifically comprehensive analysis and discussion of the topic of final theses require not only valid quantitative and qualitative data from contemporary research efforts but also a robust theoretical understanding of the subject. In the absence of these prerequisites within the German academic discourse, it remains unclear how this phenomenon can be adequately explained, and what research perspectives and conclusions can be drawn, particularly for the organisational debate in teacher education.

The following hypotheses can be advanced to account for this significant gap in the educational research landscape: On the one hand, the federal structure of the German education system, with the educational policy autonomy and decision-making authority vested in each of the 16 federal states, likely creates a degree of fragmentation that hinders research access to content-related, institutional, and organisational aspects. On the other hand, the heterogeneity among universities, even within a single federal state, complicates research access further, though it does not fundamentally preclude such research at the national or federal level.

One potential contributing factor to the inadequate research situation may be identified at the symbolic or research policy level. Research endeavours are invariably interpreted in terms of the symbolic capital that can be accumulated within the scientific field. This perception exerts influence on both the habitual dimensions of research practice and the struggles for recognition, status, and interpretive authority within the social field (Schwingel, 1993). Consequently, it may not appear subjectively 'sensible' or 'reasonable' for many researchers to invest considerable energy in this area, especially given the often-arduous process of securing the necessary financial resources. As has been documented, there is an absence of established research clusters or traditions (e.g., schools or theoretical approaches) in Germany that are specifically associated with final thesis research. Consequently, the quest for research funding in this domain necessitates a greater investment of effort, accompanied by a notable risk of failure and the prospect of only marginal gains in terms of cultural capital.

In consideration of these issues, research on final theses could be productively connected to the question of which training structures need to be implemented from an educational science perspective to optimise teacher training. This is particularly relevant given the central debate between proponents of mandatory academic-scientific professionalisation within the framework of an undergraduate university degree (Cordingley, 2013; Menter, 2015) and advocates for a model favouring vocational training for teachers, which implies a practical-technical view of teaching and learning (Mulenga, 2020; Puustinen et al., 2018).

In the context of the global discourse on education policy and educational science, the initial phase of teacher training in Germany remains firmly aligned with university academic standards. Final theses are generally required to adhere to these standards. Research on the final thesis could directly build upon this foundation by investigating the impact of writing final theses on professionalisation and knowledge generation, determining which skills are acquired, and assessing whether a reflexive research habitus is developed as a result. Such research could also address pressing societal questions regarding educational inequality

and justice in Germany, particularly in relation to optimising training structures within teacher education (Solga & Dombrowski, 2009).

The discourse on research-based learning and research-based teacher education provides a promising theoretical and empirical starting point for future final thesis research. A positive relationship between research engagement and the outcomes of teacher education may be established if (1) the initial phase of teacher education is oriented towards academic, science-based standards, and (2) subject-specific, subject-didactic, and pedagogical professional knowledge is imparted in a research-oriented manner (Aspfors & Eklund, 2017; BERA, 2014b; van Katwijk et al., 2019). This approach enables students to engage with current research, reflect critically, and become familiar with teaching and learning methodologies that encourage autonomous inquiry. Writing a final thesis, in particular, can be considered a key instance of research-based learning (RBL) in teacher education. It offers both opportunities and challenges in fostering students' abilities to conduct independent inquiry, connect theory and practice, and develop a research-oriented disposition.

Limitations and future research

In summary, given these fundamental structural patterns derived from professionalization theory and higher education didactics, it is reasonable to argue that the analysis of final thesis should be established as an essential research program within German educational sciences field. Such a program should explicitly investigate how the final thesis experience can be optimized as a form of research-based learning to foster the development of critically reflective and research-oriented teachers.

To connect this agenda more explicitly to international conceptual work on professional formation, Råde's (2019) notion of a "fusion of academic and professional orientation" provides a productive lens for specifying what such optimisation should achieve. In this perspective, the final thesis becomes a potential site for integrating vertical discourse (conceptually structured, theory- and research-based knowledge) and horizontal discourse (context-bound, practice-near professional knowledge) into a coherent professional learning trajectory.

However, it is important to acknowledge the limitations of the present study. First, the exclusive focus on a single institution namely, the Carl von Ossietzky University Oldenburg, restricts the generalisability of the findings, particularly given the federal structure of the German higher education system. The diverse curricular frameworks and support systems for final theses across German universities necessitate further investigation. In order to further discuss final theses in the field of teacher education from a scientific perspective, it is recommended that future research includes a broader range of institutions to capture the heterogeneity of the subject. Furthermore, future studies should prioritise original empirical research in two key areas: practice and professionalisation. This approach aims to establish a more robust, data- and evidence-based foundation for scholarly discourse.

With respect to practice, research should systematically examine the experiences of students and supervising professors regarding the selection of final thesis orientations (empirical or theoretical), subject matter, research questions as well as methodological approaches. Such investigations should also address the expectations and work processes involved in writing final theses, especially those that are research-based. Key topics to explore

include motivation, challenges encountered and problems, and available support systems. Additionally, the scope and quality of supervision during the final thesis phase should be thoroughly analysed and evaluated.

Regarding professionalisation, research should examine to what extent research-based learning fulfils its promise, and how conducting an empirical research project contributes directly and measurably to future pedagogical practice in schools and classrooms for preservice teachers. In line with Råde (2019), this also entails analysing whether final thesis enables a fusion of academic and professional orientation, i.e., whether and how students translate vertically organised research knowledge into horizontally situated professional judgement and practice.

In this context, it is essential to consider potential conditions that might enable productive professionalisation and reflection processes for student teachers, for instance regarding thesis models, topic selection and methodological choices. Empirical work could therefore examine how different thesis models and supervisory arrangements support (or constrain) the integration of vertical and horizontal discourses in both the thesis process and the resulting products, thereby sharpening the assessment of the final thesis beyond its function as a terminal examination format.

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