

Exploring turnover intentions and engagement factors among pre-service teachers: a study in Schleswig-Holstein, Germany

Knut-Andreas Abben Christophersen¹, Eyvind Elstad^{2*}, Corinna Geppert³, Astrid Schmidt⁴ and Are Turmo⁵

¹Department of Political Science, Faculty of Social Sciences, University of Oslo, Postcode: 0317, Oslo, Norway

²Department of Teacher Education and School Research, Faculty of Educational Sciences, University of Oslo, Postcode: 0317, Oslo, Norway

³Department for Higher Education Research, Faculty of Education, Arts and Architecture, University for Continuing Education Krems, Postcode: 3500 Krems, Austria

⁴Institut für Pädagogik, Philosophische Fakultät, Christian-Albrechts-Universität zu Kiel, Postcode: 24118, Kiel, Germany

⁵The Norwegian Centre for Science Education, The Faculty of Mathematics and Natural Sciences, University of Oslo. Postcode: 0317, Oslo, Norway

*Corresponding author: eyvind.elstad@ils.uio.no

To cite this article (APA): Christophersen, K.-A. A., Elstad, E., Geppert, C., Schmidt, A., & Turmo, A. (2025). Exploring turnover intentions and engagement factors among pre-service teachers: a study in Schleswig-Holstein, Germany. *Journal of Research, Policy & Practice of Teachers and Teacher Education*, 15(2), 98-110. <https://doi.org/10.37134/jrppte.vol15.2.9.2025>

Received: 19 September 2025; Revised: 27 November 2025; Accepted: 10 December 2025; Published: 28 December 2025

Abstract

The purpose of this study is to investigate the relationship between German pre-service teachers' perception of their campus and field experiences with their anticipated engagement as teachers and their turnover intention. Structural equation modelling was used for data analysis in this study. A survey was conducted with pre-service teachers at two different locations, namely CAU Kiel and Europa-Universität Flensburg (EUF) in Schleswig-Holstein, Germany, as part of an online survey. Pre-service teachers were asked to voluntarily complete an online questionnaire after completing at least one practicum for teachers. The analysis revealed that the perceived relevance of the interaction between theory and practice in the school-based teacher education is the key element to explain both pre-service teachers' anticipated engagement in their future profession as teachers and their turnover intention. Further research is needed to better understand how study experiences are related to quality aspects of teacher education programs.

Keywords: Germany, pre-service teacher, teacher education

Introduction

Teacher shortages pose a significant challenge for numerous countries around the globe (Craig et al., 2023). Although the details of this issue may vary by region, it is broadly acknowledged as a pressing concern that adversely affects the quality of education and student learning outcomes (Goldhaber, 2012). One of the key drivers of the teacher shortage is the declining interest in teacher training programs in various nations (Holcomb-McCoy, 2023). With fewer individuals enrolling in these programs, the influx of new educators entering the workforce decreases, leading to a situation where, as current teachers retire or leave the profession, there are not enough replacements to fill the gaps, thereby exacerbating the overall shortage.

To address this crisis, it is crucial to examine the motivational factors influencing turnover intentions among pre-service teachers. In this article, we delve into the elements that affect these intentions and explore what cultivates long-term commitment to the teaching profession. This dedication stands in contrast to the tendency to leave the field. Our focus is specifically on the context of teacher education in Schleswig-Holstein, Germany.

Typically, teacher education in many nations includes two primary components: subject-specific instruction, which relates to school content, and a pedagogical component that prepares future educators for the diverse responsibilities of teaching. While the organization of these components may differ depending on the country and

specific program, many nations distinguish between a focused pedagogical approach tailored to specific subjects and a broader pedagogical training that encompasses various aspects of teaching, including the school environment and students, who are the central focus of educators' work.

The present study therefore proposes a new integrative motivational perspective on pre-service teacher commitment and turnover intentions. Whereas previous research has predominantly examined campus-based coursework and practicum experiences as separate predictors, we introduce perceived theory–practice coherence—defined as pre-service teachers' subjective experience that theoretical knowledge acquired at university is explicitly and meaningfully linked to, and usable in, authentic classroom practice during supervised practicums—as a distinct and previously under-examined predictive mechanism (Cohen et al. 2014). We argue that this construct represents more than the mere sum of isolated theoretical relevance and practical feedback; rather, it captures the successful integration of the two phases of teacher education and functions as a unique driver of anticipated professional engagement and a protective factor against turnover intentions. By empirically isolating theory–practice coherence as the sole significant predictor among the tested dimensions, our model offers a novel explanatory framework for early-career retention that extends and integrates insights from both Self-Determination Theory (Ryan and Deci, 2020) and the Theory of Planned Behaviour (Ajzen, 1991).

Given the persistent teacher shortage, even amidst global migration, it is crucial to explore why some pre-service teachers consider leaving their education programs before completing their training. We hypothesize that this phenomenon may arise from internal factors within teacher education. Therefore, our investigation will uncover how experiences in both the theoretical and practical components of teacher training can illuminate turnover intentions while also fostering a lasting commitment to the teaching profession.

Research suggests that anticipated engagement in a profession is a vital factor in promoting effective professional practice (Bartlett, 2001), and we can reasonably assume that this principle applies to educators as well. Good and effective educators exhibit both intellectual and emotional commitment to their work. This commitment relates closely to their professional identity, as both members of the broader teaching community and participants in their individual schools and departments (Day, 2013).

Pre-service teachers are not members of schools, but they usually have expectations for a future career as teachers when they begin their teacher preparation (Sanger and Osguthorpe 2011). The engagement of pre-service teachers to become teachers expresses their anticipated professional identity, their passion for teaching, and their expectations for their future lives as school subject matter experts (Hong 2010, Kim et al. 2021, Özüdogru 2021, Renwick 2023, Smooth 2007, Yuan and Lee 2015). These aspects are largely neglected in educational policy (O'Connor 2008, Yuan and Lee 2016). However, it can be costly for society and for the individual pre-service teacher if individuals who train to become teachers do not become teachers or leave the profession after a few years (Carver-Thomas and Darling-Hammond, 2019, Madigan and Kim 2021, Sorensen and Ladd 2020, Watlington et al. 2010). High attrition rates during teacher preparation are also a concern (Dos Santos 2021, Dove 2004, Gustems-Carnicer et al. 2019, Kelly et al. 2019).

The purpose of this study is to investigate how pre-service teachers' perception of campus and field experiences is related to their anticipated engagement as teachers and their turnover intentions. It is important to gain a better understanding of what explains pre-service teachers' anticipated engagement and their decision not to complete the teacher preparation program. Further information on these factors can facilitate the implementation of appropriate measures to improve teacher education in Germany (Brouër et al. 2018).

Engagement in one's profession is important, as an employee should have attitudes and motivation that are favourable for the purpose that their work serves (Ababneh 2021, Bartlett 2001, Boyd and Nowell 2020, Khan et al. 2010, Miao et al. 2020). This general statement is of course also true for the teaching profession (Lee et al. 2011, Robinson et al., 2009). The commitment to the teaching profession and a positive attitude towards the teaching function are important prerequisites for teachers' professionalism (Flores 2019, Siri et al. 2020, Skinner et al. 2021). There is reason to believe that pre-service teachers have varying degrees of prospective engagement for their future role in teaching (Chesnut and Cullen 2014, Klassen and Chiu 2011, Mérida-López et al. 2021, Silverman 2010). Pre-service teachers' prospective engagement and turnover intention can be strengthened or weakened due to experiences during teacher education, both in the campus-based components of the program and during field-based practicums (Ng et al. 2010). Therefore, this study aims to investigate the strength of the associations between campus and field-based experiences of teacher education and pre-service teachers' engagement in teaching and turnover intention. The study is based on the premise that experiences with campus and field-based teacher education promote engagement in teaching and limit turnover intention.

Although numerous studies have drawn on Self-Determination Theory (SDT; Ryan and Deci, 2020) and the Theory of Planned Behaviour (Ajzen 1991) to explain teachers' professional commitment and turnover intentions, the application of these frameworks to the pre-service phase remains fragmented and reveals important limitations. SDT-

based research typically examines the satisfaction of autonomy, competence, and relatedness needs among practicing teachers (e.g., Fernet et al., 2017; Collie et al., 2016), yet pre-service teachers operate in a context of limited occupational autonomy and delayed gratification of competence needs, rendering direct translations problematic (Watt and Richardson, 2020). Similarly, TPB studies successfully predict entry into the profession but show weaker explanatory power for persistence during teacher education, largely because they treat program experiences as distal antecedents rather than as proximal shapers of attitudes and perceived control (Bruinsma and Jansen, 2010). A critical gap in both traditions is the failure to conceptualize and empirically isolate perceived theory–practice coherence—the extent to which pre-service teachers experience theoretical knowledge as meaningfully connected to authentic classroom practice—as a distinct motivational mechanism capable of directly fulfilling competence and relatedness needs (SDT) and strengthening positive attitudes toward remaining in teaching (TPB). The present study addresses this gap by positioning perceived theory–practice coherence as a central integrative construct in understanding pre-service teachers anticipated professional engagement and turnover intentions.

The investigations conducted for this study aim to prove or disprove several hypotheses related to this premise. Hypothesis 1 states that the perceived relevance of education theory courses is positively related to prospective engagement of pre-service teachers to become teachers. Hypothesis 2 states that the perceived relevance of subject-specific didactics courses is positively related to prospective engagement of pre-service teachers to become teachers. Hypothesis 3 states that the perceived relevance of pedagogy courses is negatively related to the turnover intention of pre-service teachers, and Hypothesis 4 states that the perceived relevance of subject-specific didactics instruction is negatively related to turnover intention (Brandt et al. 2021)

In general, pre-service teachers are first sent to observe a teacher’s classroom and then gain practice by teaching sections or entire lessons (Holzberger et al. 2021, Voss and Kunter 2020). A supervisor at the school will observe these teaching sessions, which are often followed by a supervision session between the supervisor and the pre-service teachers (Copland 2010, Hojeij et al. 2021, Smith and Lev-Ari 2005). Pre-observation supervision, in which the pre-service teacher discusses and justifies a lesson plan, is also a common practice. The content and method of supervision sessions may vary depending on the professional perspective of the supervising personnel on supervision. Such supervision can be seen partly as personalized formative feedback and partly as theory-practice interaction. The former method emphasizes a humanistic approach, where the supervision focuses on the teacher's well-being and the need for specific advice on techniques and other strategies for mastering instruction (Wang and Odell 2002). However, the purpose of the field-based practicum is broader as a connection between theory and practice should be established, which should empower pre-service teachers to acquire theoretically informed practical skills in preparing, conducting, and evaluating lessons (Mok and Staub 2021, Tindowen et al. 2019). Mastering the theory-practice relationship in professional programs such as teacher education should be a fruitful challenge that encourages teacher candidates to learn by reflecting on practical experiences through the lens of theoretically informed concepts. Supervisors are expected to assist teacher candidates in this practical synthesis, so that they can better understand the practical relevance of the curriculum (Heggen and Terum 2013). Therefore, supervision should focus on pedagogical supervision with a bifocal perspective, so that mentees perceive the supervision in their classroom as relevant, which can be viewed as both theory-practice interaction and personalized formative feedback. The perception of teacher candidates regarding the relevance of theory for the practical performance of the teacher's professional work (i.e., interaction between theory and practice) depends on whether school supervisors actually relate the content of their supervision to the knowledge base created in the teacher education program on campus (Burn et al. 2022). There are reasons to believe that the practice of teaching can promote the potential commitment of pre-service teachers to teaching and restrict their turnover intention (Darling-Hammond 2006). Hypothesis 5 states that the interaction between theory and practice is positively related to pre-service teachers' prospective commitment to becoming teachers. The following theoretical expectation, which represents hypothesis 6, can be expressed: the interaction between theory and practice is negatively related to pre-service teacher turnover intention.

Providing personalized formative feedback during supervision can support the learning of pre-service teachers and be helpful in overcoming the challenges they face as teachers (Ferguson 2011, Flushman et al. 2019, Vertemara and Flushman 2017). Hypothesis 7 therefore suggests that the provision of formative feedback during supervision is positively related to the prospective engagement of pre-service teachers as teachers. The following theoretical expectation is formulated (Hypothesis 8): The provision of formative feedback during supervision is negatively related to turnover intention.

Teacher education in Germany is a comprehensive and rigorous process designed to prepare educators for various levels of the education system. The German education system is decentralized, with each federal state (Bundesland) having its own education policies and regulations, although a resolution established by the Standing Conference ensures the recognition of university examinations for the teaching profession across states. In 2004, the Standing Conference issued national standards for teacher education, outlining essential requirements and general

competencies, including teaching, education, assessment, and innovation, along with subject-specific competencies (KMK 2004, 2008)

The structure of teacher education in Germany consists of two phases: university-based study and partially supervised pedagogical training in school classrooms, known as *Referendariat*, lasting one to two years. The first phase has been revamped in 2004 from a course concluding with state examinations to a program typically spanning 10 semesters (5 years) and resulting in a master's degree in education (B.Ed. and M.Ed) (KMK 2004, 2008, Kotthoff and Terhart 2013). To ensure continuous professional growth, educators are obligated to regularly engage in training and development activities. In-service training for teachers is situated within the state where they hold tenure and is governed by state regulations. Professional development opportunities are available at the local, regional, and central levels, coordinated by supervisory authorities (*Schulämter*) operating under the jurisdiction of the Standing Conference (Lohmar and Eckhardt 2013). As a result of decentralisation, teacher education programs can vary slightly from one state to another. This is why this research was only carried out in two institutions, within the same federal state.

Conceptual framework

The conceptual framework of this study brings together complementary strands of motivational theory and program-level research on teacher education to explain how pre-service teachers' study experiences shape both their anticipated professional engagement and their turnover intentions. At its core, the framework assumes that pre-service teachers' developing motivation is not solely a function of stable individual dispositions but is dynamically co-constructed through their interpretation of campus-based coursework and field-based practicum experiences. Drawing on Self-Determination Theory (SDT; Ryan and Deci, 2020), we conceptualize anticipated engagement as a forward-looking indicator of pre-service teachers' emerging professional identity and intrinsic commitment to teaching, grounded in perceived opportunities to experience competence, autonomy, and relatedness in their preparation. At the same time, the Theory of Planned Behavior (Ajzen 1991) suggests that turnover intention during teacher education reflects a reasoned evaluation of teaching as a future career option, influenced by attitudes toward the profession, perceived social expectations, and perceived control over successfully entering and staying in the profession. Within this dual perspective, program experiences are not merely background conditions but function as proximal inputs that shape both the enthusiasm to become a teacher and the inclination to opt out of the teacher pathway.

Within this broader framework, the study focuses on four central quality dimensions of teacher education: the perceived relevance of education theory teaching, the perceived relevance of subject-specific didactics, perceived theory–practice interaction during practicum, and personalized formative feedback from school-based supervisors. These dimensions are conceptualized as latent constructs that capture pre-service teachers' interpretations of how well the program supports them in making sense of teaching as meaningful and feasible work. Perceived relevance of education theory and subject-specific didactics reflects the extent to which campus-based courses provide illustrative practical examples, clarify the connection between theory and classroom practice, and communicate content that is recognized as useful for future teaching. In SDT terms, such relevance perceptions should support competence (by framing knowledge as usable) and autonomy (by helping pre-service teachers see how they can enact informed professional judgments). From a TPB perspective, they should strengthen favorable attitudes toward the teaching profession and perceptions that one can successfully perform the role of a teacher, thereby reducing doubts about continuing in teacher education.

The field-based dimensions in the framework—perceived theory–practice interaction and personalized formative feedback—represent the practicum as a key arena where theoretical knowledge is tested, appropriated, and transformed into professional understanding. Perceived theory–practice interaction captures the degree to which supervisors and school contexts actively integrate university-based knowledge with real classroom situations, for instance by explicitly linking subject matter and pedagogical concepts to lesson planning, enactment, and reflection. This construct is theorized as a particularly powerful motivational mechanism because it directly addresses the well-documented “theory–practice gap” in teacher education and enables pre-service teachers to experience theoretical knowledge as instrumental for solving authentic classroom challenges. In SDT terms, this integration is expected to foster competence (feeling capable in real classrooms) and relatedness (feeling part of a profession that values informed practice), thereby nurturing anticipated engagement and buffering against turnover intentions. Within the TPB framework, a strong sense of theory–practice coherence is expected to strengthen positive attitudes toward a teaching career and reinforce perceived behavioral control by demonstrating that the demands of teaching can be met with the knowledge and tools acquired in the program. Personalized formative feedback from supervisors is conceptualized as an additional, more individualized support mechanism aimed at clarifying expectations, providing concrete guidance, and signaling recognition. In principle, such feedback should enhance perceived competence and

efficacy and thus contribute both to higher anticipated engagement and lower turnover intention. Together, these four dimensions form an integrative explanatory model in which campus- and school-based experiences are treated as interrelated, theoretically grounded predictors of pre-service teachers' motivational outcomes.

Research objectives

Anchored in this conceptual framework, the study pursues three interrelated research objectives. This study pursues the following research objectives:

1. To examine how pre-service teachers in Schleswig-Holstein perceive the relevance of key components of their teacher education, specifically, education theory teaching, subject-specific didactics, theory–practice interaction during school-based practicums, and personalized formative feedback provided by practicum supervisors.
2. To investigate the relationships between these perceived quality dimensions of teacher education and pre-service teachers' anticipated engagement in the teaching profession.
3. To analyze how these perceived quality dimensions are related to pre-service teachers' turnover intentions, that is, their inclination to leave the teacher education program or not to enter the teaching profession after graduation.

Methodology

Research design

In 2019, an online survey was conducted among pre-service teachers at two different locations in Germany. These locations differed in terms of the size and organization of the lectures. Information on the two institutions CAU Kiel and Europa-Universität Flensburg (EUF) in Schleswig-Holstein, Germany are mentioned in the following. The two locations differ in size and organization of teaching events but share a common commitment to high-quality teacher training and a strong emphasis on practical experience. After completing at least one field-based practicum, the pre-service teachers were asked to voluntarily complete an online-questionnaire.

Respondents of the study

A total of 474 completed questionnaires were returned. In the questionnaire, pre-service teachers were asked to recall the extent to which they experienced their campus-based studies as relevant during the practicum period, their experiences with their supervisors, and other relevant questions.

Table 1

Cronbach's Alpha, Constructs and Items, N = 484

Constructs	Items	CA
Prospective engagement to become a teacher I feel attracted to become a teacher It feels good to think that one day I will be a teacher I am looking forward to working as a teacher	Id w3 w4 w5	.88
Turnover intention If I find a well-paid job after my teacher training, I will not work as a teacher I often think about career possibilities other than becoming a teacher If I could go back and choose afresh, I would have chosen something other than teacher training Other careers are more attractive to me than becoming a teacher	Ti w56 w57 w58 w59	.91
Perceived relevance of education theory teaching In education theory teaching: I am given practical examples from actual teaching The connection between pedagogic theory and practice is made clear	Pp w35 w38	.78
Perceived relevance of subject-didactics teaching In subject-didactics teaching:	Sp	.92

continued

I am given practical examples from actual teaching	w39	
I have become familiar with academic content relevant to the work of a teacher	w40	
The connection between subject-didactics theory and practice is made clear	w42	
Theory-practice interaction	Is	.71
In the practice periods:		
I get to know how the study subject is relevant in school	w44	
I discuss with my supervisors how the subject matter can be applied in developing the teaching practice	w45	
I discuss practical experiences with the supervisors considering what we have learned so far	w46	
Personalised formative feedback during supervision	Ss	.91
Supervision meetings at the practice school help me understand what I should do to improve as a teacher	w51	
Supervisors at the practice school give me clear, direct feedback about where I stand	w53	
Feedback from supervisors at the practice school closely aligns with what I have achieved	w54	
Feedback from supervisors at the practice school makes clear what is expected of me as a prospective teacher	w55	

The following hypotheses were tested:

H1: The perceived relevance of education theory teaching (pp) is positively related to prospective engagement of pre-service teachers to become teachers (id).

H2: The perceived relevance of subject-specific didactics courses (sp) is positively related to prospective engagement of pre-service teachers to become teachers (id).

H3: The perceived relevance of education theory teaching (pp) is negatively related to the turnover intention of pre-service teachers (ti).

H4: The perceived relevance of subject-specific didactics instruction (sp) is negatively related to turnover intention (ti).

H5: The interaction between theory and practice (is) is positively related to pre-service teachers' prospective commitment to becoming teachers (id).

H6: The interaction between theory and practice (is) is negatively related to pre-service teacher turnover intention (ti).

H7: The provision of formative feedback during supervision (ss) is positively related to the prospective engagement of pre-service teachers to become teachers (id).

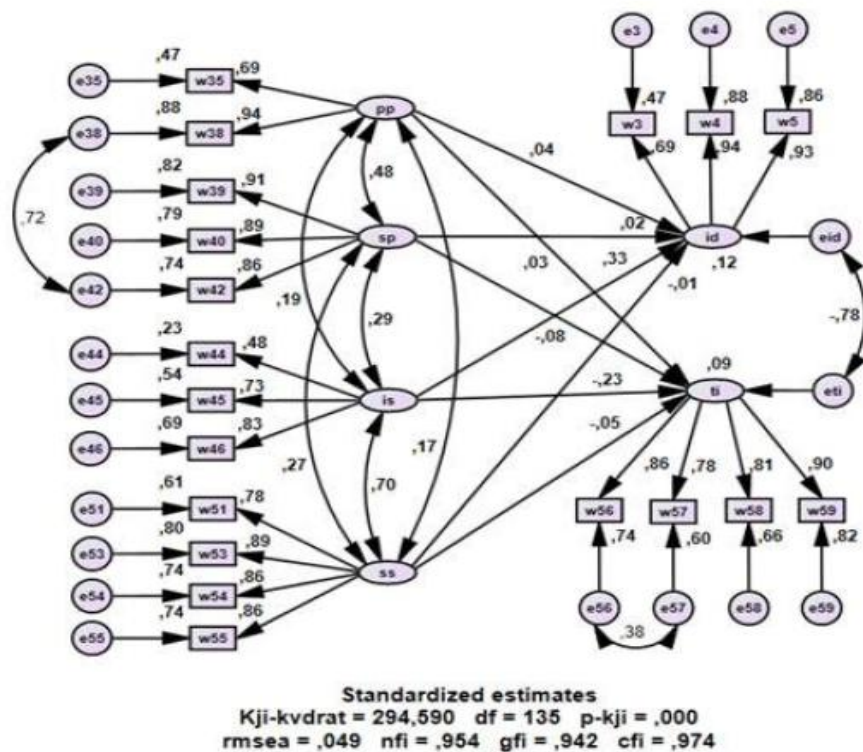
H8: The provision of formative feedback during supervision (ss) is negatively related to turnover intention (ti).

Findings and discussions

Structural equation modelling was used to analyse the relationships between the variables (see Figure 1). Structural equation modelling is suitable for analysing confirmatory factors and analysing paths. The fit assessments between the model and the data were based on the following indices: root mean square error of approximation (RMSEA), normalized fit index (NFI), goodness of fit index (GFI), and comparative fit index (CFI). A good fit is indicated by $RMSEA < 0.05$ and $NFI, GFI, \text{ and } CFI > 0.95$; an acceptable fit is indicated by $0.05 < RMSEA < 0.08$ and $NFI, GFI, \text{ and } CFI > 0.90$ (Kline, 2005). The measurement and structural models were estimated using IBM SPSS Amos 22. The actual values shown in Figure 1 indicate an acceptable fit. The RMSEA value of 0.048, the NFI value of 0.954 and the GFI value of 0.942 indicate an acceptable fit, and the CFI value of 0.974 indicates a good fit.

Figure 1

Structural Equation Model



The aim of this study was to investigate the relationship between the perception of campus and field experiences among pre-service teachers and their anticipated engagement as teachers as well as their turnover intentions.

The structural equation modelling revealed that the perceived relevance of pedagogical instruction among pre-service teachers is not significantly related to their expected engagement as teachers or their turnover intention (rejection of hypotheses 1 and 3). These findings need to be interpreted considering experiences with pedagogical instruction in teacher education programs. We had a reason to assume that the experiences from campus teaching about the relevance of educational theory to teaching practice help to strengthen the long-term motivation to become a teacher, what we call commitment. This plausible assumption (hypothesis 1) did not achieve empirical support in the data material. This should lead to an investigation into why campus teaching in educational theory is not related to a long-term motivation to become a teacher. Similarly, we are also surprised that there is also no relationship between the experience of educational theory teaching's relevance for teaching practice and turnover intentions (the expectation is expressed in hypothesis 3). This also arouses our wonder. On the other hand, our analyses from some other countries' teacher training programs (Elstad et al., 2023) show that in these cases too there is no relationship between experiences of relevance of campus teaching in educational theory and ditto commitment and turnover intentions. Dare we suggest that this should lead to a self-examination?

The structural equation modelling showed that the perceived relevance of subject didactics instruction is not associated with the expected engagement and turnover intention of pre-service teachers (rejection of hypotheses 2 and 4). Several investigations show how the practice teachers in several teacher education programs (Elstad et al., 2023) can build a personal relationship with the pre-service teachers during their internship, which is positively related to the long-term motivation to become a teacher and negatively related to turnover intention. In the analysis of the German data, these two relationships are very weak, which can be interpreted as the fact that German practice supervisors do not attach sufficient importance to the personalized support for the pre-service teachers. A follow-up study that gets the pre-service teachers' own words about how they experience this personalized support can give us better insight into whether the above interpretation is reasonable.

We investigated two strategies for developing a curriculum for field-based experiences in teacher education: personalized formative feedback and theory-practice interaction. The structural equation modelling demonstrated that the interaction between theory and practice is positively and significantly related to the expected engagement of pre-service teachers to become teachers (acceptance of [hypothesis 5](#)) and negatively and significantly related to their turnover intention teachers (acceptance of [hypothesis 6](#)). This means that pre-service teachers who understand the impact theoretical knowledge can have on their practice and have the feeling that the content they are confronted with are useful for their teaching in class, were more likely to be engaged and to stay within the profession. On the other hand, personalized formative feedback is not related to potential engagement or turnover intention (rejection of [hypotheses 7 and 8](#)). This could indicate that the feedback provided by supervisors may not be effectively influencing the pre-service teachers' motivation or involvement in their work. Alternatively, there may be other factors influencing their engagement that are not addressed solely by personalized formative feedback. The finding also suggests that personalized formative feedback does not have a direct effect on pre-service teachers' turnover intention, which refers to their inclination to leave the teaching profession. This finding implies that factors other than feedback may be more influential in determining their intention to stay or leave. These factors might include job satisfaction, work environment, professional growth opportunities, or personal reasons unrelated to the feedback they receive. There could be several reasons why personalized formative feedback does not impact engagement or turnover intention. Firstly, the quality or effectiveness of the feedback might be questionable. If the feedback lacks specificity, relevance, or constructive guidance, it may not motivate or engage pre-service teachers effectively. Secondly, there may be external factors influencing their engagement and intention to stay, such as workload, classroom management challenges, or limited support beyond feedback.

It's important to consider individual differences among pre-service teachers. While some individuals may highly value and be motivated by personalized formative feedback, others might not perceive it as influential or necessary for their engagement or career decisions. Different pre-service teachers may respond differently to feedback based on their unique personality traits, motivations, or learning preferences.

The context in which the feedback is provided also plays a crucial role. The organizational culture, supervisory relationships, and support structures surrounding pre-service teachers can influence how they perceive and respond to feedback. If the overall context is not conducive to utilizing feedback effectively, its impact on engagement and turnover intention may be limited.

Conclusions and recommendations

Like all similar studies, this research faced certain limitations both from methodological (e.g., a cross-sectional design) and conceptual (e.g., parsimonious modelling) perspectives. We acknowledge these limitations and argue that they contribute to a basis for future studies. It should be emphasized that relatively little quantitative research has been conducted on prospective engagement of pre-service teachers and turnover intentions, so we do not have a solid foundation for empirically related research.

Another limitation is the use of self-reported questionnaire data. The subjective component of such data is undeniable. Independent judgments can provide interesting data about an employee's performance. However, it is difficult to perform this process while maintaining anonymity promises. Another limitation is that we did not have the opportunity to link pre-service teachers' self-reporting to objective performance-related goals.

Implications for practice

The findings of this study underscore several implications for teacher education programs, particularly in enhancing pre-service teachers' engagement and addressing turnover intentions. Given that the interaction between theory and practice significantly contributes to engagement and retention, teacher education curricula should prioritize creating connections between theoretical frameworks and practical applications. Educators and program directors should emphasize experiential learning opportunities that allow pre-service teachers to see the relevance of their studies in real classroom settings.

To implement changes effectively, teacher preparation programs may consider integrating more collaborative practices between supervisors and pre-service teachers during practicums. Creating structured sessions in which supervisors explicitly relate theoretical concepts to practical scenarios could strengthen pre-service teachers' understanding and commitment to teaching. Such sessions can also encourage reflective practices, where pre-service teachers articulate how theoretical knowledge informs their teaching strategies. Additionally, there appears to be a pressing need to enhance personalized support in teacher preparation programs. As findings indicate limited relationships between personalized formative feedback and engagement/turnover, it would be beneficial to train

supervisors in delivering high-quality feedback that is specific, actionable, and contextually relevant. Supervisors should be encouraged to engage in professional development that hones their feedback skills, fostering an environment in which pre-service teachers feel valued and supported.

Future research directions

The study reveals significant gaps in understanding how different pedagogical strategies and feedback mechanisms impact pre-service teachers' commitment and turnover intentions. Future research should focus on longitudinal studies to examine how the relationships between feedback, engagement, and turnover intentions evolve over time. Such studies can help delineate the long-term impacts of specific teaching methodologies on pre-service teachers' professional identities.

Moreover, more nuanced examinations of individual differences among pre-service teachers—such as personality traits, motivations, and learning preferences—are warranted. A mixed-methods approach could uncover deeper insights into how pre-service teachers perceive and utilize feedback, as well as how these perceptions influence their engagement levels and intentions to remain in the profession.

Research that investigates the role of external factors—like support systems in educational institutions, the professional climate of schools where practicums occur, and the workload demands on pre-service teachers—could also provide a more comprehensive understanding of the challenges they face. These insights could inform the development of targeted interventions aimed at enhancing overall teacher preparation and retention rates.

Final thoughts

This study highlights that the relevance of theory-practice interactions is pivotal for fostering the engagement of pre-service teachers and reducing turnover intentions. Educational stakeholders must recognize the complexity of teacher training and the diverse experiences that shape a pre-service teacher's pathway. By strategically enhancing curriculum design, supervisor training, and feedback mechanisms, we may cultivate a more supportive environment that not only prepares pre-service teachers to enter the profession but also encourages them to remain committed long-term. Future research is essential for unravelling the intricate dynamics of teacher education, offering further insights that can ultimately contribute to building a more resilient teaching workforce.

The main conclusion is that the perceived relevance of theory-practice interactions in the school-based part of teacher education is the key element to explain both the prospective engagement of pre-service teachers in their future profession as teachers and their turnover intentions. It is widely acknowledged that pre-service teachers often face difficulties in translating the theoretical knowledge they acquire at university into effective teaching practices during their practical training (Advisory Panel for Teacher Education, 2020). The supervisor's role in bridging the gap between theory and practice is crucial, as it not only helps to enhance their dedication towards becoming teachers but also mitigates any inclination to abandon the course. The perceived relevance of pedagogy, subject didactics, and personalized formative feedback during supervision is not associated with prospective engagement and turnover intentions. We do not know much about why these factors are not so clearly related to engagement and turnover intentions. Therefore, we highlight the need for further research in this area. The need for finely grained concepts in this type of research is present to understand how quality aspects are experienced in the different phases of teacher education. Again, we highlight the need for more research in this area to better understand the unique features of teacher education. In-depth case studies with observations, interviews with pre-service teachers, analyses of their lesson plans, and written and oral feedback from educators and supervisors to the learners could be relevant.

Conflict of interest

The authors report no conflicts of interest in the work on the article. The institutions from which the data were collected have not attempted to influence the analysis and the discussion of the institutions. Christophersen, Elstad, Geppert and Turmo have no ties to the institutions that participated in the study.

Author contribution

Astrid Schmidt has organized the data collection and provided information about the institutions where the data were collected. Christophersen has analysed the data. Elstad, Turmo, Schmidt and Geppert have collaborated on the writing of the article.

Data availability statement

The dataset is available to other researchers by contacting the corresponding author.

Acknowledgment

Christophersen, Elstad and Turmo thank Christian-Albrechts-Universität zu Kiel for their goodwill during their visit to the institution.

References

- Ababneh, O. M. A. (2021). How do green HRM practices affect employees' green behaviors? The role of employee engagement and personality attributes. *Journal of Environmental Planning and Management*, 64(7), 1204-1226. <https://doi.org/10.1080/09640568.2020.1814708>
- Advisory Panel for Teacher Education (2020). Transforming Norwegian Teacher Education: The Final Report for the International Advisory Panel for Primary and Lower Secondary Teacher Education. Norwegian Agency for Quality Assurance in Education. <https://www.nokut.no/globalassets/nokut/rapporter/ua/2020/transforming-norwegian-teacher-education-2020.pdf>
- Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, 50(2), 179-211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Bartlett, K. R. (2001). The relationship between training and organizational commitment: A study in the health care field. *Human Resource Development Quarterly*, 12(4), 335-352. <https://doi.org/10.1002/hrdq.1001>
- Boyd, N. M., & Nowell, B. (2020). Sense of community, sense of community responsibility, organizational commitment and identification, and public service motivation: a simultaneous test of affective states on employee well-being and engagement in a public service work context. *Public Management Review*, 22(7), 1024-1050. <https://doi.org/10.1080/14719037.2020.1740301>
- Brandt, J. O., Barth, M., Merritt, E., & Hale, A. (2021). A matter of connection: The 4 Cs of learning in pre-service teacher education for sustainability. *Journal of Cleaner Production*, 279, 123749. <https://doi.org/10.1016/j.jclepro.2020.123749>
- Brouër, B., Burda-Zoyke, A., Kilian, J., & Petersen, I. (Eds.). (2018). *Vernetzung in der Lehrerinnen-und Lehrerbildung: Ansätze, Methoden und erste Befunde aus dem LeaP-Projekt an der Christian-Albrechts-Universität zu Kiel*. Waxmann.
- Bruinsma, M., & Jansen, E. P. (2010). Is the motivation to become a teacher related to pre-service teachers' intentions to remain in the profession?. *European journal of teacher education*, 33(2), 185-200. <https://doi.org/10.1080/02619760903512927>
- Burn, K., Mutton, T., & Thompson, I. (Eds.). (2022). *Practical Theorising in Teacher Education: Holding Theory and Practice Together*. Taylor & Francis.
- Carver-Thomas, D., & Darling-Hammond, L. (2019). The trouble with teacher turnover: How teacher attrition affects students and schools. *Education Policy Analysis Archives*, 27(36).
- Chesnut, S. R., & Cullen, T. A. (2014). Effects of self-efficacy, emotional intelligence, and perceptions of future work environment on student teacher commitment. *The Teacher Educator*, 49(2), 116-132. <https://doi.org/10.1080/08878730.2014.887168>
- Cohen, E., Hoz, R., & Kaplan, H. (2014). The practicum in student teacher education: A review of empirical studies. *Teaching Education*, 24(4), 345-380. <https://doi.org/10.1080/10476210.2012.711815>
- Collie, R. J., Shapka, J. D., Perry, N. E., & Martin, A. J. (2016). Teachers' psychological functioning in the workplace: Exploring the roles of contextual beliefs, need satisfaction, and personal characteristics. *Journal of Educational Psychology*, 108(6), 788-799. <https://doi.org/10.1037/edu0000088>
- Copland, F. (2010). Causes of tension in post-observation feedback in student teacher training: An alternative view. *Teaching and Teacher Education*, 26(3), 466-472. <https://doi.org/10.1016/j.tate.2009.06.001>
- Craig, C. J., Hill-Jackson, V., & Kwok, A. (2023). Teacher shortages: What are we short of? *Journal of Teacher Education*, 74(3), 209-213.
- Darling-Hammond, L. (2006). Constructing 21st-century teacher education. *Journal of Teacher Education*, 57(3), 300-314. <https://doi.org/10.1177/00224871052859>
- Day, C. (2013). Teacher quality in the twenty first century: New lives, old truths. In X. Zhu & K. Zeichner (Eds.), *Preparing teachers for the 21st century*. Dordrecht: Springer (pp. 21-38).

- Dos Santos, L. M. (2021). Self-efficacy and career decision of pre-service secondary school teachers: A phenomenological analysis. *International Journal of Instruction*, 14(1), 521-536.
- Dove, M. K. (2004). Teacher attrition: A critical American and international education issue. *Delta Kappa Gamma Bulletin*, 71(1), 8-30.
- Elstad, Eyvind; Christophersen, Knut-Andreas & Turmo, Are (2023). Nordic Student Teachers' Evaluation of Educational Theory, Subject Didactics, Practice Training, Time on Task and Turnover Intentions. In: Elstad, Eyvind (ed.), *Teacher education in the Nordic region*. Springer Nature. ISSN 978-3-031-26050-6. pp. 287–320.
- Ferguson, P. (2011). Student perceptions of quality feedback in teacher education. *Assessment & Evaluation in Higher Education*, 36(1), 51–62. <https://doi.org/10.1080/02602930903197883>
- Fernet, C., Chanal, J., & Guay, F. (2017). What fuels the fire: Job-or task-specific motivation (or both)? On the hierarchical and multidimensional nature of teacher motivation in relation to job burnout. *Work & Stress*, 31(2), 145-163. <https://doi.org/10.1080/02678373.2017.1303758>
- Flores, M. A. (2019). Unpacking teacher quality: Key issues for early career teachers. In A. Sullivan, B. Johnson & M. Simons (Eds), *Attracting and keeping the best teachers: Issues and opportunities*, (pp. 15-38). Singapore: Springer. <https://doi.org/10.1007/978-981-13-8621-3>
- Flushman, T., Guise, M., & Hegg, S. (2019). Improving Supervisor Written Feedback: Exploring the "What" and "Why" of Feedback Provided to Pre-Service Teachers. *Issues in Teacher Education*, 28(2), 46-66.
- Goldhaber, D. (2012). Teachers matter, but effective teacher quality policies are elusive. In H. F. Ladd & M. E. Goertz (eds.) *Handbook of research in education finance and policy* (pp. 168-187). Routledge.
- Gustems-Carnicer, J., Calderón, C., & Calderón-Garrido, D. (2019). Stress, coping strategies and academic achievement in teacher education students. *European Journal of Teacher Education*, 42(3), 375-390. <https://doi.org/10.1080/02619768.2019.1576629>
- Heggen, K., & Terum, L. I. (2013). Coherence in professional education: Does it foster dedication and identification? *Teaching in Higher Education*, 18(6), 656–669. <https://doi.org/10.1080/13562517.2013.774352>
- Hojejj, Z., Atallah, F., Baroudi, S., & Tamim, R. (2021). Challenges for practice teaching in UAE schools: Supervisors' and pre-service teachers' perceptions. *Issues in Educational Research*, 31(2), 513-536.
- Holcomb-McCoy, C. (2023). Creating teacher education programs to solve the teacher shortage. *Childhood Education*, 99(2), 72-78.
- Holzberger, D., Maurer, C., Kunina-Habenicht, O., & Kunter, M. (2021). Ready to teach? A profile analysis of cognitive and motivational-affective teacher characteristics at the end of pre-service teacher education and the long-term effects on occupational well-being. *Teaching and Teacher Education*, 100, 103285. <https://doi.org/10.1016/j.tate.2021.103285>
- Hong, J. Y. (2010). Pre-service and beginning teachers' professional identity and its relation to dropping out of the profession. *Teaching and Teacher Education*, 26(8), 1530-1543. <https://doi.org/10.1016/j.tate.2010.06.003>
- Kelly, N., Cespedes, M., Clarà, M., & Danaher, P. A. (2019). Early career teachers' intentions to leave the profession: The complex relationships among preservice education, early career support, and job satisfaction. *Australian Journal of Teacher Education*, 44(3), 93-113.
- Khan, M. R., Ziauddin, J. F., & Ramay, M. I. (2010). The impacts of organizational commitment on employee job performance. *European Journal of Social Sciences*, 15(3), 292–298.
- Kim, D., Long, Y., Zhao, Y., Zhou, S., & Alexander, J. (2021). Teacher professional identity development through digital stories. *Computers & Education*, 162, 104040. <https://doi.org/10.1016/j.compedu.2020.104040>
- Klassen, R. M., & Chiu, M. M. (2011). The occupational commitment and intention to quit of practicing and student teachers: Influence of self-efficacy, job stress, and teaching context. *Contemporary Educational Psychology*, 36(2), 114–129. <https://doi.org/10.1016/j.cedpsych.2011.01.002>
- KMK – Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland. (2004). *Standards für die Lehrerbildung: Bildungswissenschaften* [Standards for teacher education: Educational sciences]. Retrieved from http://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2004/2004_12_16-Standards-Lehrerbildung.pdf
- KMK – Ständige Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland. (2008). *Ländergemeinsame inhaltliche Anforderungen für die Fachwissenschaften und Fachdidaktiken in der Lehrerbildung* [Joint-state content requirements for subject-specific studies and didactics in teacher education]. Retrieved from http://www.kmk.org/fileadmin/veroeffentlichungen_beschluesse/2008/2008_10_16-Fachprofile-Lehrerbildung.pdf

- Lee, J. C. K., Zhang, Z., & Yin, H. (2011). A multilevel analysis of the impact of a professional learning community, faculty trust in colleagues and collective efficacy on teacher commitment to students. *Teaching and Teacher Education, 27*(5), 820–830. <https://doi.org/10.1016/j.tate.2011.01.006>
- Lohmar, B. & Eckhardt, T. (2013). *The Education System in the Federal Republic of Germany 2012/2013: A description of the responsibilities, structures and developments in education policy for the exchange of information in Europe.* Retrieved from https://www.kmk.org/fileadmin/Dateien/pdf/Eurydice/Bildungswesen-engl-pdfs/dossier_en_ebook.pdf
- Madigan, D. J., & Kim, L. E. (2021). Towards an understanding of teacher attrition: A meta-analysis of burnout, job satisfaction, and teachers' intentions to quit. *Teaching and teacher education, 105*, 103425. <https://doi.org/10.1016/j.tate.2021.103425>
- Mérida-López, S., Extremera, N., & Chambel, M. J. (2021). Linking self-and other-focused emotion regulation abilities and occupational commitment among pre-service teachers: Testing the mediating role of study engagement. *International Journal of Environmental Research and Public Health, 18*(10), 5434. <https://doi.org/10.3390/ijerph18105434>
- Miao, S., Rhee, J., & Jun, I. (2020). How much does extrinsic motivation or intrinsic motivation affect job engagement or turnover intention? A comparison study in China. *Sustainability, 12*(9), 3630. <https://doi.org/10.3390/sul2093630>
- Mok, S. Y., & Staub, F. C. (2021). Does coaching, mentoring, and supervision matter for pre-service teachers' planning skills and clarity of instruction? A meta-analysis of (quasi-) experimental studies. *Teaching and Teacher Education, 107*, 103484. <https://doi.org/10.1016/j.tate.2021.103484>
- Ng, W., Nicholas, H., & Williams, A. (2010). School experience influences on student teachers' evolving beliefs about effective teaching. *Teaching and Teacher Education, 26*(2), 278–289. <https://doi.org/10.1016/j.tate.2009.03.010>
- O'Connor, K. E. (2008). “You choose to care”: Teachers, emotions and professional identity. *Teaching and Teacher Education, 24*(1), 117–126. <https://doi.org/10.1016/j.tate.2006.11.008>
- Renwick, K. (2023). Developing teacher identity through purposeful dialogue. *Teaching and Teacher Education, 128*, 104135. <https://doi.org/10.1016/j.tate.2023.104135>
- Robinson, V., Hohepa, M., & Lloyd, C. (2009). *School leadership and student outcomes. Identifying What Works and Why. Best Evidence Synthesis Iteration [BES].* New Zealand: Ministry of Education, New Zealand.
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary educational psychology, 61*, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Silverman, S. K. (2010). What is diversity? An inquiry into student teacher beliefs. *American Educational Research Journal, 47*(2), 292–329. <https://doi.org/10.3102/00028312103650>
- Siri, A., Supartha, I. W. G., Sukaatmadja, I. P. G., & Rahyuda, A. G. (2020). Does teacher competence and commitment improve teacher's professionalism. *Cogent Business & Management, 7*(1), 1781993. <https://doi.org/10.1080/23311975.2020.1781993>
- Skinner, B., Leavey, G., & Rothi, D. (2021). Managerialism and teacher professional identity: Impact on well-being among teachers in the UK. *Educational review, 73*(1), 1-16. <https://doi.org/10.1080/00131911.2018.1556205>
- Smith, K., & Lev-Ari, L. (2005). The place of the practicum in pre-service teacher education: The voice of the students. *Asia-Pacific Journal of Teacher Education, 33*(3), 289–302. <https://doi.org/10.1080/13598660500286333>
- Sorensen, L. C., & Ladd, H. F. (2020). The hidden costs of teacher turnover. *Aera Open, 6*(1), 2332858420905812. <https://doi.org/10.1177/2332858420905812>
- Kotthoff, H. G., & Terhart, E. (2013). Teacher education in Germany: Traditional structure, strengths and weaknesses, current reforms. *Scuola democratica, 4*(3), 0-0. <https://doi.org/10.12828/75802>
- Tindowen, D. J., Bangi, J., & Parallag Jr, C. (2019). Pre-service teachers' evaluation on their student internship program. *International Journal of Learning, Teaching and Educational Research, 18*(10), 279-291.
- Vertemara, V., & Flushman, T. (2017). Emphasis of university supervisor feedback to teacher candidates. *Journal of Student Research, 6*(2), 45-55. <https://doi.org/10.47611/jsr.v6i2.392>
- Voss, T., & Kunter, M. (2020). “Reality shock” of beginning teachers? Changes in teacher candidates' emotional exhaustion and constructivist-oriented beliefs. *Journal of Teacher Education, 71*(3), 292-306. <https://doi.org/10.1177/00224871198397>
- Wang, J., & Odell, S. J. (2002). Mentored learning to teach according to standards-based reform: A critical review. *Review of Educational Research, 72*(3), 481–546. <https://doi.org/10.3102/00346543072003481>

- Watlington, E., Shockley, R., Guglielmino, P., & Felsher, R. (2010). The high cost of leaving: An analysis of the cost of teacher turnover. *Journal of Education Finance*, 36(1), 22–37. <https://www.jstor.org/stable/40704404>
- Watt, H. M., & Richardson, P. W. (2020). Motivation of higher education faculty:(How) it matters! *International Journal of Educational Research*, 100, 101533. <https://doi.org/10.1016/j.ijer.2020.101533>
- Yuan, R., & Lee, I. (2015). The cognitive, social and emotional processes of teacher identity construction in a pre-service teacher education programmed. *Research Papers in Education*, 30(4), 469-491. <https://doi.org/10.1080/02671522.2014.932830>
- Yuan, R., & Lee, I. (2016). ‘I need to be strong and competent’: A narrative inquiry of a student-teacher’s emotions and identities in teaching practicum. *Teachers and Teaching*, 22(7), 819-841. <https://doi.org/10.1080/13540602.2016.1185819>