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Longitudinal development of well-being and motivation in teacher education:

Investigating the role of social support

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Included Publications

The dissertation was written cumulatively and includes two studies. The first study is already published, and the second has been accepted for publication. Both passed the peer-review process of international journals. The publication of the second study is planned for the 3rd quarter of 2022. The author of this dissertation is the first author of both publications and therefore mainly responsible for the implementation of the studies regarding conception, writing of theoretical content, data preparation, data analysis, as well as for the entire publication process.

The first study focuses on heterogeneity and change in motivational variables and investigated pre-service teachers up to two years into the teaching profession:

Hartl, A., & Holzberger, D. (2022). Identifying teachers' motivational profiles and their change from teacher education into practice: A longitudinal study. *Zeitschrift für Erziehungswissenschaft.*

In addition to the publication process, the first author was also responsible for the first version of the manuscript, in particular, theoretical positioning, methodological procedure, and data analyses (70 %). The co-author Prof. Dr. Doris Holzberger contributed substantially to the improvement of the theoretical framework of the manuscript (30 %) by providing substantive comments and theoretical input.

The second study addresses student teachers and their well-being at university.

Hartl, A., Holzberger, D., Hugo, J., Wolf, K., & Kunter, M. (accepted and in press). Promoting student teachers' well-being: A multi-study approach investigating the longitudinal relationship between emotional exhaustion, emotional support, and the intentions of dropping out of university. *Zeitschrift für Psychologie.*

In addition to the publication process, the first author was also responsible for the first version of the manuscript, in particular the theoretical positioning, methodological approach, and quantitative analyses (65 %). The qualitative analysis was lead-managed by Julia Hugo (5 %). The co-authors Prof. Dr. Doris Holzberger (15 %), Dr. Kristin Wolf (10 %), and Prof. Dr. Mareike Kunter (5 %) contributed to the significant improvement of the study through critical but constructive feedback.

Abstract

Teacher shortages pose an increasing problem for the years to come. Besides political causes, this can also be attributed to the fact the teaching profession but also teacher education are associated with high levels of stress and strain that can lead to a decrease in well-being and motivational variables and, as a possible consequence, to teacher dropout. Theoretically, based on the qualification hypothesis that professional competence builds up and develops over time, this dissertation aimed to use longitudinal analyses for different phases of teacher education that investigate the development of variables linked to student teachers' well-being (emotional exhaustion) and beginning teachers' professional competence (motivation) over time. Social support from peers or colleagues was considered a preventive resource from the individual context.

Study I investigated student teachers at university over three consecutive semesters, focusing on the relationship and change in emotional exhaustion and emotional support from peers. While emotional exhaustion was seen as an indicator of well-being, emotional support was regarded as a resource for overcoming challenging situations. Quantitative latent change score models showed that emotional exhaustion first increased, followed by a slight decrease. Emotional support from peers reached high levels right from the beginning and remained stable over time. The bivariate latent change score model suggested that emotional support is not a predictor for later emotional exhaustion. The subsequent qualitative content analyses aimed to identify student teachers' dropout intentions and, as a consequence, to derive preventive measures that can improve the conditions for future student teachers. (1) Performance problems, (2) lack of study motivation, and (3) study conditions were identified as the three main dropout intentions for this target group.

Study II examined the transition phase from the end of pre-service teacher education up to two years into the teaching profession. This occupational phase is frequently described as stressful, and there is evidence that the dropout rate is especially high. Our study accessed the motivational dimension of professional competence by investigating teacher self-efficacy and teacher enthusiasm over time. Theoretically, high values on these motivational variables correlate to positive outcomes for students, lesson procedures, and the teacher. Using a person-centered approach to identify participants with different motivational patterns, latent profile analyses were considered. Results for the end of pre-service teacher education revealed three quantitative motivational profiles: low, medium, and high. Two years after entering the profession, these profiles were not separable. A variable-centered approach was subsequently used to investigate the change in motivational variables over time in more detail. The latent change score model showed that only enthusiasm for the subject increased over time. A significant decrease was found for self-efficacy for classroom management (disruptive behavior) and enthusiasm for teaching. No significant changes were shown for general self-efficacy and classroom management (lesson procedures). Finally, we examined whether social support from colleagues could affect the change in motivational variables. For our data, there is no evidence that social support impacts change.

Zusammenfassung

Ein Mangel an Lehrkräften wird in den kommenden Jahren ein zunehmendes Problem darstellen. Zurückgeführt werden kann dies, neben politischen Entscheidungen, auch auf die Tatsache, dass das Lehramtsstudium sowie der Lehrerberuf mit einem hohen Maß an Stress und Belastung einhergehen. Damit verbunden sein kann eine Abnahme des Wohlbefindens sowie der Motivation. Eine daraus resultierende mögliche Folge kann ein Ausscheiden aus dem Studium oder dem Lehrerberuf sein. Theoretisch begründet mit der Annahme der Qualifikationshypothese, dass sich die professionelle Kompetenz im Laufe der Lehrerausbildung entwickelt, wurden im Rahmen der Dissertation Längsschnittanalysen für verschiedene Ausbildungsphasen durchgeführt. Im Fokus stand dabei die Entwicklung sowie das Zusammenspiel von Variablen die mit dem Wohlbefinden und der professionellen Kompetenz von angehenden Lehrkräften zusammenhängen. Soziale Unterstützung durch Mitstudierende oder Kolleg*innen wurde insbesondere als präventive Ressource aus dem individuellen Kontext berücksichtigt.

Studie I untersuchte Lehramtsstudierende in drei aufeinanderfolgenden Semestern hinsichtlich der Veränderung und des Zusammenspiels von emotionaler Erschöpfung und emotionaler Unterstützung durch Mitstudierende. Während die emotionale Erschöpfung als Indikator für das Wohlbefinden angesehen wird, ist die emotionale Unterstützung durch Mitstudierende eine präventive Ressource zur Bewältigung herausfordernder Situationen. Quantitative latente Veränderungsmodelle zeigten, dass die emotionale Erschöpfung im Verlauf von drei Semestern zunächst zunimmt und dann leicht abflacht. Die emotionale Unterstützung durch Mitstudierende war von Anfang an hoch und blieb über die Zeit stabil. Das bivariate latente Veränderungsmodell zeigte, dass emotionale Unterstützung kein Prädiktor für eine spätere emotionale Erschöpfung ist. Die daran anknüpfende qualitative Inhaltsanalyse verfolgte das Ziel die Studienabbruchintentionen von Lehramtsstudierenden zu erfassen, um daraus präventive Maßnahmen für zukünftige Lehramtsstudierende abzuleiten. (1) Leistungsprobleme, (2) mangelnde Studienmotivation und (3) Studienbedingungen wurden als die drei Hauptabbruchintentionen für diese Zielgruppe identifiziert.

Studie II untersuchte die Übergangsphase vom Vorbereitungsdienst in den Beruf. Diese Phase wird häufig als belastend beschrieben und es gibt empirische Hinweise auf eine sinkende Motivation sowie hohe Abbruchquoten. In unserer Studie wurde Motivation (Selbstwirksamkeit und Enthusiasmus) als eine Dimension der professionellen Kompetenz untersucht. Hohe Ausprägungen werden mit positiven Outcomes für Schüler*innen, Unterrichtshandeln, aber auch für die Lehrkräfte selbst assoziiert. Ausgehend von einem personenzentrierten Ansatz wurde mittels latenter Profilanalysen untersucht, ob es angehende Lehrkräfte mit unterschiedlichen Motivationsprofilen gibt. Für das Ende des Vorbereitungsdienstes konnten drei quantitative Profile (niedrig, mittel und hoch) identifiziert werden. Zwei Jahre nach Berufseintritt konnten keine signifikant voneinander trennbaren Profile ermittelt werden. Um die Veränderung der Variablen im Detail zu untersuchen, wurde ein variablenzentrierter Ansatz herangezogen. Ergebnisse des latenten Veränderungsmodells zeigten, dass nur Fachenthusiasmus über die Zeit zunahm. Ein signifikanter Rückgang zeigte sich für Selbstwirksamkeit hinsichtlich Klassenmanagement (Unterrichtsstörungen) und Enthusiasmus für das Unterrichten. Für die allgemeine Selbstwirksamkeit sowie Selbstwirksamkeit hinsichtlich Klassenmanagement (Unterrichtsablauf) zeigte sich keine

signifikante Veränderung über die Zeit. Abschließend wurde untersucht, ob die soziale Unterstützung durch Kolleg*innen sich auf die Veränderung von Motivationsvariablen auswirkt. Für unsere Daten gibt es keine Hinweise darauf, dass soziale Unterstützung durch Kolleg*innen die Veränderung der Motivationsvariablen beeinflusst.

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1 Introduction

1.1 The Teacher Shortage and Teacher Education in Germany

The teacher shortage is already a problem in German schools (e.g., Bellenberg et al., 2020; Tillmann, 2020), and figures suggest it will become more serious in the coming years (e.g., KMK, 2018; OECD, 2021). Whereas the Standing Conference of the Ministers of Education and Cultural Affairs (KMK, 2020a) estimated a shortfall of around 14.000 qualified teachers up to 2030, Klemm (2022) suggested that there will be a much larger gap, with 81.000 teachers lacking for this period. The predictions are particularly critical concerning the shortage of primary and vocational school teachers and secondary school teachers in STEM subjects, with an oversupply only forecasted for academic school teachers (e.g., Klemm, 2022; KMK, 2020a; Stellmacher et al., 2020).

Common reasons for the expected lack of qualified teachers in Germany are the rising birth rate, stemming from a successful family policy, and increased migration (Klemm, 2022; KMK, 2018). Nationally and internationally, teacher shortages can also be attributed to teacher dropout, which typically occurs during the first years of teaching (e.g., Dupriez et al., 2016; Sass et al., 2012; Schlichte et al., 2005; Smith & Ingersoll, 2004) or at the end of the teaching profession, where it occurs in the form of early retirement (Ingersoll, 2012; Kunter, Kleickmann, et al., 2013). Such dropout is mainly caused by occupational stress related to a decrease in well-being (e.g., Kunter, Kleickmann, et al., 2013). Reasons why a substantial number of teachers do not stay in the profession (e.g., Darling-Hammond, 2006; Ingersoll, 2001, 2012; Sass et al., 2012) are job conditions (Dupriez et al., 2016), reduced motivation (Han et al., 2016) or reduced well-being (e.g., Leung & Lee, 2006). As a result, the teacher shortage is associated with negative consequences for the students, such as canceled lessons, substitution by teachers from other subjects or career changers, and, a general decline in the quality of education (e.g., Freiling, 2020).

Even if international studies have shown that the teacher shortage is caused by dropouts from the profession and (early) retirements, it is, still important to ensure that student teachers complete their studies (Bohndick, 2020; Güldener et al., 2020) and successfully transition into the teaching profession. The reasons why students teachers drop out of university are expected to be comparable with those of in-service teachers, including a decline in well-being while experiencing high levels of emotional exhaustion.

Therefore educational research needs to identify favorable contextual factors for teacher education at university and later at school that yield motivated teachers with high occupational well-being to prevent a dropout of the educational system at any stage. This dissertation addresses the identified research gap, and, in particular, investigates social support as a resource from the contextual environment for all phases of teacher education. Social support from peers at university or from colleagues at school is said to shape well-being (e.g., Collings et al., 2014; Kim et al., 2018; Mokgele & Rothmann, 2014; Väisänen et al., 2016) and motivation (e.g., Adler-Constantinescu et al., 2013; Woolfolk Hoy & Burke Spero, 2005) positively.

Since the underlying data were collected in Germany, the teacher education system, with its specific element of pre-service teacher education, needs to be briefly introduced here.

In Germany, teacher education comprises two obligatory phases that build on each other (e.g., Cortina & Thames, 2013; Kleickmann & Anders, 2013; KMK, 2020b). The first phase is university teacher education, a phase that mainly focuses on the transfer of theory (e.g., Cortina & Thames, 2013) and is supplemented by initial school internships (e.g., König et al., 2017). Teacher education at university is comparable to the study programs of most countries; it starts with a bachelor's program (three years) and is followed by a master's program (two years). At some universities, it is still possible to graduate with a state examination. Secondary school teachers study at least two teaching subjects (Cortina & Thames, 2013), but they also have to complete didactic and general education courses (e.g., Kleickmann & Anders, 2013; Linninger et al., 2015). What content these educational courses cover and to what extent depend on the course of study and whether the student teacher will later be enrolled in academic or nonacademic-track schools (e.g., Kleickmann & Anders, 2013). The successful completion of university teacher education with a master's degree or a state examination is a prerequisite for starting the second phase of teacher education, namely, pre-service teacher education (e.g., Cortina & Thames, 2013).

The mandatory practice-oriented pre-service teacher education (Kleickmann & Anders, 2013) is when beginning teachers start with independent classroom teaching, which is accompanied by weekly theoretical courses at a teacher training institute (e.g. Cortina & Thames, 2013; Kleickmann & Anders, 2013). Depending on the federal state, pre-service teacher education lasts between one and a half and two years (e.g., Cortina & Thames, 2013; Kleickmann & Anders, 2013), and beginning teachers at school are often supported by a mentor, who is an already experienced teacher. After completing both phases successfully, the beginning teachers are allowed to teach as fully qualified teachers at school (for a detailed overview, see Cortina & Thames, 2013). By combining theoretical and practical elements teacher education aims to shape qualified future teachers (König et al., 2017).

For completeness, it is important to point out that after the two phases mentioned above, in-service teaching with further qualification is sometimes considered the third phase of teacher education (e.g., BMBF, 2016; KMK, 2020b).

In the context of this dissertation, all phases of German teacher education were considered, with a focus on the change in well-being and motivation over time. Therefore, two empirical studies with different target groups were conducted. Below, the term "student teachers" will be used to describe the teachers in the university phase of teacher education, whereas "beginning teachers" refers to teachers in the transition phase from the end of pre-service teacher education until two years into the teaching profession.

The empirical studies progressed as follows: First, study I investigated the change in well-being in a sample of student teachers at the university over three consecutive semesters. In addition, reasons for dropout intentions were evaluated with the aim of deriving implications that prevent actual study dropout.

Second, study II investigated the change of two prominent motivational variables (self-efficacy and enthusiasm) from beginning teachers at the end of pre-service teacher education until two years into the teaching profession. It is of special interest to investigate this transition phase because it is an occupational phase that is frequently described as challenging for

beginning teachers, for example, in terms of changed framework conditions. For that reason it is particularly associated with a "reality shock" that occurs, when expectations built during teacher education do not match the reality at school (e.g., Dicke, Elling, et al., 2015; Kim & Cho, 2014; Veenman, 1984).

Both longitudinal studies have in common that a resource from the social environment social support was considered to focus on how to train and keep healthy and motivated teachers in the profession, and prevent them from dropping out of the educational system.

Based on previous studies (e.g., Kim et al., 2018; Schwarzer et al., 2003; Woolfolk Hoy & Burke Spero, 2005), the underlying assumption was that peer (study I) or collegial (study II) support would be beneficial for the well-being and motivational variables.

2 Theoretical Framework

This chapter presents the theoretical foundation for this dissertation by presenting the model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013), where both empirical studies are embedded (section 2.1). This is followed by a section on challenges during teacher education and practice, where the relevant constructs of emotional exhaustion and dropout intention are introduced (section 2.2). The next section focuses on opportunities during teacher education (section 2.3) and presents the motivational constructs of self-efficacy and enthusiasm. A special resource of a persons' individual social context, social support, is introduced in section 2.3.1.

2.1 Development of Professional Competence During Teacher Education

The empirical studies of this dissertation can be theoretically integrated into an already well-examined, multidimensional model that aims to explain the development of professional competence during teacher education and the related influences on student and teacher outcomes: That is the model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013). This model is grounded on the assumption from the qualification hypothesis that professional competence is learnable, develops over time, and follows the aim to explain successful teaching (Kunter, Klusmann, et al., 2013). Further, assumptions of the bright person hypothesis, which focuses on given characteristics like the teaching personality, are also included (Kennedy et al., 2008; Kunter, Klusmann, et al., 2013).

To be able to act successfully, teachers must acquire different dimensions of professional competence during teacher education and further develop them on the job. This developmental perspective is one reason why the model builds the overarching framework for this dissertation. In line with other researchers (e.g., Klassen & Chiu, 2010; Strauß et al., 2019), it is assumed here that studies on longitudinal development of dimensions of professional competence are of key importance during different phases of teacher education.

The core, located in the middle of the model (see Figure 1), comprises different dimensions of professional competence, well-known as the main determinants for successful teaching; these are professional knowledge, beliefs, motivation, and self-regulatory skills (Kunter, Kleickmann, et al., 2013). All dimensions can be further subdivided and represent separate research fields. For example, the knowledge dimension is often investigated using the categorization from Shulman (1987), who differentiated between general pedagogical knowledge, subject-matter content knowledge, pedagogical content knowledge, and curriculum knowledge. Nevertheless, to act as a competent teacher in the classroom, merely having knowledge is not sufficient (e.g., Pekrun, 2021; Strauß et al., 2019); rather, it is the interaction of the competence dimensions that a teacher must master.

To build up and train professional competence, and as a result show professional behavior in the classroom, as well as in other general working practices, the formal and informal learning opportunities located on the left side of the model are essential (Kunina-Habenicht et al., 2013; Kunter, Kleickmann, et al., 2013). Learning opportunities differ according the phase of teacher education. Whereas learning opportunities at university are mainly offered via seminars or lectures, pre-service teacher education and in-service teaching offer more practice-oriented learning opportunities via classroom teaching. In addition to the mere provision of learning

opportunities, they must be actively used. The extent to which this happens depends on personal characteristics, as well as contextual variables. These personal characteristics (e.g., cognitive abilities and personality) also further moderate whether competence is translated into professional behavior in the classroom (Voss et al., 2015).

The model also includes outcome variables for the students and the teachers located on the right. The underlying assumption is that teachers with high values on professional competence dimensions exhibit successful teaching (e.g., high instructional quality), and, this, positively affects the students' learning success and motivation. In addition, positive outcomes are expected for teachers, such as high engagement, career advancement, or high occupational well-being – a point that is especially relevant for this dissertation (Kunter, Kleickmann, et al., 2013).

At the top, the model includes contextual framework conditions that also determine the development of professional competence. According to Kunter, Kleickmann, et al. (2013), contextual factors can be broadly defined as the general educational system or the surroundings at the individual school. This means that the presented learning opportunities at an institution and the uptake of those learning opportunities are connected to institutional decisions. The same applies to teachers' classroom behavior, which can also be linked to overall institutional decisions (Baumert & Kunter, 2006).

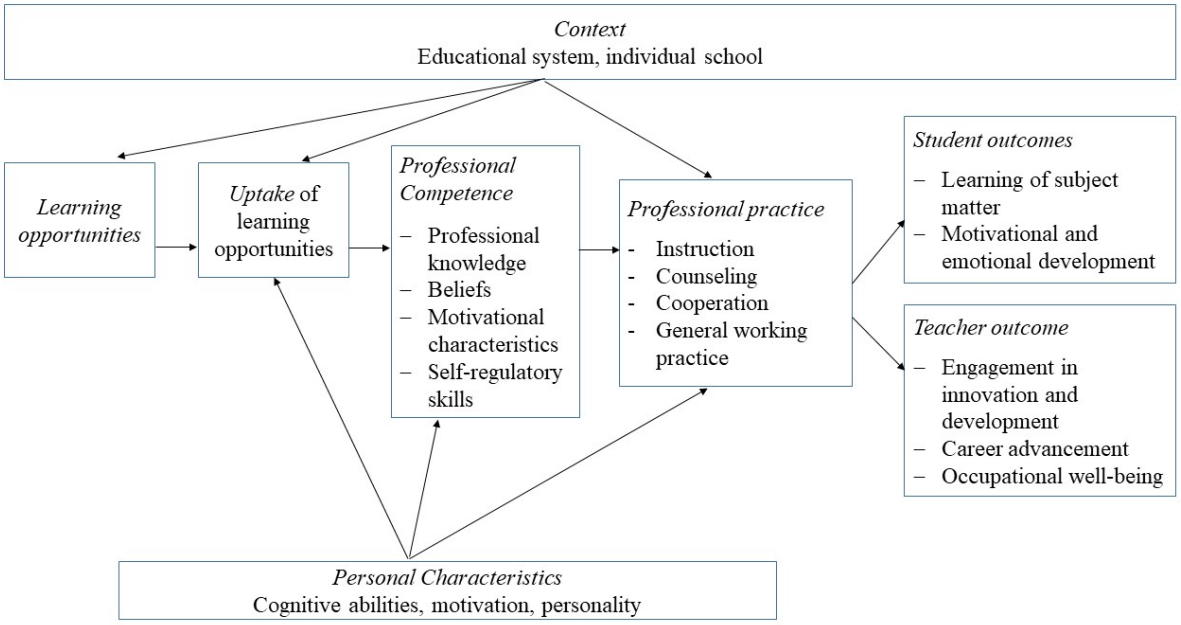

Figure 1: Model of the determinants and consequences of teachers' professional competence (according to Kunter, Kleickmann et al., 2013, p. 67)

While the core element of the model regarding professional knowledge (e.g., Kunina-Habenicht et al., 2020; Kunter et al., 2017; Linninger et al., 2015) and their interplay with outcome variables (e.g., Dicke, Parker, et al., 2015; Keller et al., 2017) have already been well investigated, there is still a shortage of studies regarding the further dimensions of professional competence, particularly concerning the development over time. Study II of this dissertation contributes to this research gap by examining the interplay and change of motivational variables over different phases of teacher education, starting with the end of pre-service teacher education and continuing until two years into practice teaching at school.

To date, the investigation of contextual factors as determinants for professional competence has played a subordinate role in educational research, and the model only adopts a global view of contextual variables. Theoretically similar models, such as offer-and-use models that explain the teaching and learning process for the university phase, consider the framework conditions of teacher education in a more differentiated way and focus on social factors of the learning environment, such as the competence of lecturers or the support of the existing peer group (e.g., Braun et al., 2014). Starting from this point, this dissertation aims to further differentiate the contextual factors of the existing model to gain a more specific insight into a persons' individual context.

A further concern of this dissertation is to examine the role of social support, seen as a social contextual factor, in more detail. In particular, in the empirical studies, peers from university (study I) and colleagues at school (study II) were investigated. From a theoretical perspective, social support is a relevant construct because there is evidence that the occupational network (peers, colleagues, mentors) positively shapes well-being or motivation (e.g., Fiorilli, Benevene, et al., 2019; Kim et al., 2018). The teaching profession is associated with various tasks beyond classroom teaching, such as teaching preparation, meeting with parents, or attending administrative meetings (e.g., Kunter, Kleickmann, et al., 2013), that can cause stressful situations; thus, it can be assumed that social support is a beneficial resource, especially for beginning teachers.

To sum up, this dissertation investigates, longitudinal changes in well-being and motivation. Beyond this focus, it also investigates whether social support from peers or colleagues acts as a determinant to shape well-being and motivation during teacher education.

2.2 Challenges During Teacher Education and Practice

While the model of the determinants of professional competence from Kunter and colleagues (2013) assumes a positive view and aims to explain study success, such models as the job demands–resources model (Demerouti et al., 2001) and the job demand–control model (Karasek, 1979) assume that occupational life is associated with both resources and challenging situations. Considerable research has shown that teachers report very high levels of work-related stress and exhaustion compared with other occupational groups (e.g., Bermejo-Toro et al., 2015; Hakanen et al., 2006; Kokkinos, 2007; von der Embse et al., 2015). Since stress levels of teachers are especially related to the working context, occupational well-being can be broadly defined as the positive assessment of different aspects connected to the work environment (van Horn et al., 2004). Nevertheless, even with high work-related stress, working at a school is perceived as rewarding for most teachers and they reported high levels of job satisfaction (e.g., Skaalvik & Skaalvik, 2015).

Challenging situations that go back to the teaching context and can consequently determine occupational well-being have already been investigated for a long time (e.g., Burke et al., 1996). In a review almost published 40 years ago, Veenman (1984) described challenging situations that do not seem to have changed in essence since that time. As core problems for beginning teachers, which are still relevant, Veenman (1984) identified "classroom discipline, motivating students, dealing with individual differences, assessing students' work, relationships with parents, organization of class work, insufficient and/or inadequate teaching materials and supplies, and dealing with problems of individual students" (p. 143). However, there is an

assumption that the teaching profession has become more complex over time. For example, extended requirements may have arisen because of heterogeneous classes (e.g., Lotan, 2006; Vock & Gronostaj, 2017) or the inclusion of disabled students (e.g., Klemm, 2022).

Such issues as work overload in general or classroom disruption linked to a classroom teaching situation can lead to long-term stressful situations that negatively affect the teachers' well-being, particularly causing exhaustion (e.g., Haydon et al., 2018). In addition to cynicism and reduced personal accomplishment, emotional exhaustion is a core element of burnout (Maslach et al., 1996; Maslach et al., 2001); it can be described as a feeling of chronic fatigue and a loss of energy caused by excessive and prolonged stress in a professional context (Hakanen et al., 2006; Maslach et al., 1996). Considering emotional exhaustion from a teacher-shortage perspective, teachers who are burned out are more likely to leave the profession (Friedman, 1993). In addition, exhaustion in teachers is associated with reduced performance, which can have a negative effect on student outcomes, such as achievement and motivation (e.g., Schlichte et al., 2005; Schonert-Reichl, 2017).

Stressful or challenging situations can also occur at the beginning stage of entering the teaching profession, during university, and they emerge because of high workloads, time pressures, completing various exams at the end of the semester, or a lack of social support (e.g., Cilliers et al., 2018; Shankland et al., 2019; Skaalvik & Skaalvik, 2010, 2015). Recently, there has been a growing research interest in student burnout at university (e.g., Schaufeli et al., 2002); evidence has emerged that academic burnout is comparable to burnout on the job (e.g., Rodriguez-Hidalgo et al., 2014; Schaufeli et al., 2002). Lesener et al. (2020) transferred the job demands–resources model (Demerouti et al., 2001) to a university context and established and tested the study demands–resources framework. However, studies conducted on this topic usually refer to students in general (e.g., Shankland et al., 2019) and do not consider the specific group of student teachers. Therefore, to date, the development of emotional exhaustion for student teachers is largely unexplored and results relate mainly to pre-service teacher education or in-service teachers (e.g., Dicke et al., 2016; Dicke, Parker, et al., 2015; Voss & Kunter, 2020). An explanation for this is that the consequences for the later occupational phases at school are more serious (Oliveira et al., 2021) because teachers' negative well-being affects their performance, and as a consequence, the students' well-being (Schonert-Reichl, 2017). Nevertheless, to combat teacher shortages right from the beginning, it is important to investigate emotional exhaustion longitudinally and identify resources that prevent student teachers from dropping out of university. Starting with this research gap, first, study I of this dissertation followed the aim of investigating the change of emotional exhaustion over three consecutive semesters to gain insight into student teachers' well-being. Second, it applied a qualitative analysis to obtain a detailed picture of student teachers' dropout intentions that can also affect occupational well-being.

Dropout from university, defined as students leaving the university without graduating (Heublein & Schmelzer, 2018; Heublein & Wolter, 2011) is a global problem (Cabrera et al., 2006; Tudela, 2014). The common assumption is, that dropout is a process that is complex and multicausal (e.g., Heublein, 2014; Isleib et al., 2019; Kehm et al., 2019; Neugebauer, Heublein, & Daniel, 2019). It is generally considered negative, because it is often associated with quality problems in the study programs (e.g., Tudela, 2014), as well as high costs for both the university

and society (e.g., Bohndick, 2020; Neugebauer, Heublein, & Daniel, 2019). Based on the perspective of those affected, it can also be associated with positive emotions for the students concerned in that they are free to choose a more suitable job or a more suitable course of study (e.g., Cabrera et al., 2006; Herfter et al., 2015; Neugebauer, Heublein, & Hannover, 2019).

Dropout is also a problem during teacher education (Gilroy, 2014). Reliable figures for Germany for study programs ending with a state examination showed a 6% dropout rate for the graduating courses in 2010; this rate increased to 14% in 2014 (Heublein et al., 2017). Figures available for the bachelor's program for the graduating class of 2016 showed a dropout rate of 15% (Neugebauer, Heublein, & Daniel, 2019). Compared to the average university dropout rate in Germany, which is 23%, the dropout rate in teacher education is still below average (Güldener et al., 2020; Heublein et al., 2017). Nevertheless, in view of the already existing teacher shortages it is of particular societal relevance, that student teachers complete their studies (Güldener et al., 2020).

Internationally, various models are available that aim to explain university dropouts (for a detailed overview, see Tudela, 2014). A subject-independent model from the German context that considers the dropout process by integrating the pre-university phase, the actual study phase at the university, and the ultimate decision to stay in the program or drop out refers back to Heublein et al. (2017). While the pre-university phase comprises constructs like educational background, personality, or motives for the uptake of a study program, the actual study phase comprises the individual study process (e.g., social and academic integration), as well as framework conditions of the university (e.g, study conditions). Relating to the study program are also external factors from private life (e.g., children, financial resources). This interaction leads to the conclusion that dropout is multicausal and refers to more than a singular decision (Heublein et al., 2017). The authors also identified major dropout factors for university students and grouped them into the following motive groups: (1) performance problems, (2) lack of motivation to study, (3) lack of practical work, (4) financial situation, (5) personal reasons, (6) professional alternatives, (7) study conditions, (8) family reasons, and (9) study organization.

Although the results of Heublein et al. (2017) precisely illustrate the challenges students are confronted with, there is still a shortage of research investigating the specific target group of student teachers. Through the comparison of motive groups related to general study programs with those related to teacher education, this dissertation contributes to the ongoing discussion of whether student teachers are a special group of students and whether dropout is comparable between study courses (e.g., Bohndick, 2020; Carstensen et al., 2021). In a recent study Bohndick (2020) compared student teachers studying STEM subjects with students from other study programs regarding academic and social integration and found that student teachers are less integrated. Additonally, Carstensen et al. (2021) found out that student teachers perceive less appreciation than subject students, which is associated with higher levels of exhaustion and an increased dropout intention.

Study I of this dissertation builds on this findings but uses a broader approach, including student teachers from different semesters, school tracks and subjects. Neugebauer, Heublein, and Daniel (2019) further criticize that dropout research is often analyzed retrospectively. Our study used a qualitative research approach and investigated student teachers in the study phase to obtain a detailed picture of the possible dropout intentions they deal with. To date, preventive

measures to improve the conditions at university have been previously described as deficient (Neugebauer, Heublein, & Daniel, 2019). Preventive measures could be derived from our results with the aim of creating favorable contextual conditions and thus enabling student teachers' study success.

To sum up, even for the early phase of teacher education at university, emotional exhaustion and dropout seem to be crucial constructs. Through the study design of a multi-method study that combines quantitative and qualitative approaches it was possible to obtain initial insights on the change of emotional exhaustion (an indicator for well-being) over time. Additionally, further factors that may determine well-being during the time at university could be identified through the analysis of student teachers dropout intentions.

2.3 Opportunities in Teacher Education and Practice

Until now, the previous theoretical assumptions have drawn a negative picture, but well-being can also be viewed from an opposite perspective by asking which factors have a positive effect on well-being. The model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013) considers the core aspects of the model (professional knowledge, beliefs, motivation, and self-regulatory skills) as prerequisites for professional behavior, and in turn, teacher well-being.

For study II of this dissertation, motivation, an important aspect of professional behavior, and related to teacher well-being was taken into account. In general, motivation is defined as a psychological process that propels the initiation, direction, persistence, and intensity of goal-directed behavior (Heckhausen & Heckhausen, 2006). From that perspective, motivation is multidimensional (e.g., Cook & Artino, 2016; Holzberger et al., 2013) and comprises various constructs, including self-efficacy, enthusiasm, goal orientations and autonomous motivation.

In particular, the motivational variables of self-efficacy and enthusiasm were selected as part of this dissertation because the constructs are usually correlated (e.g., Baumert & Kunter, 2006; Burić & Moè, 2020; Fauth et al., 2019), and associated with positive outcomes regarding well-being. In addition, they are theoretically separable and embedded in different theories. While self-efficacy refers to theories focusing on the expectancy of success (Eccles & Wigfield, 2002) enthusiasm refers to theories of intrinsic motivation (e.g., Csikszentmihalyi, 2014; Krapp, 2002).

General self-efficacy was originally defined based on social cognitive theory by Bandura (1997) and can be seen as a person's belief in their efficacy to achieve a goal even in difficult situations. Teacher self-efficacy, in particular, is conceptualized as the judgment of a teacher's belief in their ability to teach successfully and influence the student's learning outcome even in difficult classroom situations or with difficult students (e.g., Skaalvik & Skaalvik, 2010; Tschannen-Moran & Woolfolk Hoy, 2001, 2007).

To date, teacher self-efficacy has been intensively investigated in various studies, with the result that high levels of self-efficacy are associated with positive outcomes for students and teachers (e.g., Aloe et al., 2014; Klassen & Tze, 2014; Zee & Koomen, 2016). Positive outcomes for students are achievement and motivation (e.g., Caprara et al., 2006; Tschannen-Moran & Woolfolk Hoy, 2001). Further, high levels of self-efficacy are associated with more

effective classroom-management (Holzberger et al., 2013; Holzberger & Prestele, 2021) via offering more student-centered lessons (Graham et al., 2001) and innovative teaching methods (e.g., Tschannen-Moran & Woolfolk Hoy, 2001; Zee et al., 2016). Teachers with higher self-efficacy experience higher job satisfaction (e.g., Caprara et al., 2003; Klassen & Chiu, 2010; Stephanou et al., 2013; Toropova et al., 2021; Zee & Koomen, 2016) and higher levels of commitment to the teaching profession (e.g., Caprara et al., 2003; Caprara et al., 2006; Chesnut & Burley, 2015; Klassen & Chiu, 2010; Zee & Koomen, 2016). High levels of self-efficacy are further associated with increased well-being (e.g., Dicke, Parker, et al., 2015; Tschannen-Moran & Woolfolk Hoy, 2001) and less burnout symptoms (e.g., Aloe et al., 2014; Fives et al., 2007; Skaalvik & Skaalvik, 2007, 2010; Zee & Koomen, 2016).

The construct of self-efficacy comprises different facets (e.g., efficacy for instructional quality and efficacy for classroom management; Tschannen-Moran & Woolfolk Hoy, 2001). Study II of this dissertation investigated beginning teachers in the transition phase from the end of pre-service teacher education to in-service teaching. For this target group of beginning teachers, the dimension of classroom management is particularly relevant (e.g., Dicke, Elling, et al., 2015; Lazarides et al., 2020). In this regard, the meta-analysis of Aloe et al. (2014) investigated self-efficacy for classroom management in terms of burnout and found that classroom management is strongly related to teachers' well-being; therefore, it is crucial for preventing dropout from the teaching profession.

For the development of self-efficacy, there are still no consistent results. While Bandura (1997) mentioned that a shock is needed to re-evaluate once self-efficacy is established. Results specific to teacher education indicate that self-efficacy is especially malleable at the beginning of classroom teaching and stabilizes when teachers gain experience (Tschannen-Moran & Woolfolk Hoy, 2007; Wolters & Daugherty, 2007; Woolfolk Hoy & Burke Spero, 2005). The malleability of self-efficacy, especially at the beginning of the teaching profession, can be justified with the four sources of self-efficacy (Bandura, 1997), which are as follows: mastery experience (actual teaching experiences), vicarious experience (observing of a teaching situation), social/verbal persuasion (feedback, e.g., from a colleague), and physiological arousal (palpitation or excitement). However, to date, the time point when teacher self-efficacy stabilizes remains unclear. Results from studies that investigated a whole teaching career showed evidence of a nonlinear or U-shaped relationship (Klassen & Chiu, 2010).

A further motivational construct that is positively associated with well-being and can therefore be assigned to the opportunities during teacher education is enthusiasm. Teacher enthusiasm is defined as a feeling of enjoyment or excitement that occurs during professional activities at school (Keller et al., 2016; Kunter et al., 2008), and it is frequently associated with effective teaching (Burić & Moè, 2020; Kunter, Klusmann, et al., 2013). Teacher enthusiasm is expressed via a teachers' behavior in the classroom (Keller et al., 2016; Kunter et al., 2008). An enthusiastic teacher, for example, experiences pleasure for the teaching profession and can inspire students.

In our investigation we considered enthusiasm in more detail and differentiated between enthusiasm for teaching and enthusiasm for the subject, as strongly recommended by previous researchers (Kunter et al., 2008; Kunter et al., 2011). Enthusiasm for teaching focuses on classroom experiences and is therefore activity-related, whereas enthusiasm for the subject

focuses on the content of the subject (Kunter et al., 2011). Therefore, the constructs are shaped through different mechanisms. While enthusiasm for teaching is linked to classroom variables such as student behavior, motivation, or performance (Frenzel et al., 2009), enthusiasm for the subject refers to intrinsic motivation (Krapp, 2002).

Beyond the theoretical distinction, enthusiasm can be further classified into an experienced component (e.g., positive or negative feelings) and a behavioral component (displayed, verbal, and nonverbal behavior in the classroom) (Keller et al., 2016). Even if the two facets can be attested to be related, this does not mean that they always coincide within a teacher.

Like a teacher with high self-efficacy, an authentic, enthusiastic teacher positively affects student outcomes, the lessons, and the teacher. Students benefit from an enthusiastic teacher in terms of their achievement motivation, interest, and enjoyment (e.g., Frenzel et al., 2009; Keller et al., 2014; Kunter, Klusmann, et al., 2013), because enthusiasm is associated with high-quality instruction (Keller et al., 2016; Kunter et al., 2011). However, enthusiasm also has positive outcomes for teachers because high values are positively related to job satisfaction and well-being (Keller et al., 2016; Klassen & Chiu, 2010; Kunter et al., 2011). In addition, enthusiastic teachers show decreased burnout symptoms (Kunter et al., 2011).

Regarding the development of enthusiasm, there are limited results available to date. Since enthusiasm for teaching is linked to classroom variables, research has sought to foster the development of enthusiasm during lessons. Keller et al. (2018) investigated the components of experienced and displayed enthusiasm in detail, reporting that teaching behavior is stable across lessons, whereas the experienced component differs. Enthusiasm for the subject is justified by personal interest (Krapp, 2002), meaning that it is independent of context. Especially, enthusiasm for the subject is described as a stable construct (Kunter et al., 2011).

To sum up, high levels of both motivational variables are linked to positive outcomes regarding teachers' well-being (e.g., Dicke, Parker, et al., 2015; Keller et al., 2016) and can be seen as opportunities for teachers to deal with challenging situations. To date, both constructs have mainly been investigated cross-sectionally (e.g., Chen et al., 2020; Kunter et al., 2011; Mahler et al., 2018). Therefore, longitudinal studies are especially called for that consider different phases of teacher education (e.g., Klassen & Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2007). In addition, the interplay of the variables remains unclear because there is an assumption that motivational constructs do not act independently (Wigfield & Eccles, 2000). For example, this issue raises the question of whether there are beginning teachers that experience a high level of self-efficacy but at the same time low levels of enthusiasm and vice versa.

Starting with the delineated research gaps, study II of this dissertation aimed to investigate the interplay and change of these central motivational constructs with the theoretically funded assumption (e.g., Holzberger et al., 2021) that high levels of teacher self-efficacy and enthusiasm contribute to teachers' well-being.

2.3.1 Social Relationships: Are They a Special Opportunity in Teacher Education?

Referring back to the model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013), social support from peers, lecturers or colleagues can be attributed to contextual factors specific to a person's individual university or school environment. While most parts of the model have been validated in previous studies (e.g., Dicke, Parker, et al., 2015; Linninger et al., 2015; Wolf, 2019), the relationship of contextual variables in the development of a core element of professional competence, motivation remains largely unclear. In addition, the model does not include a direct path from contextual factors to outcome variables such as teachers' well-being. Nevertheless, following from previous results (e.g., Kassis et al., 2019; Mokgele & Rothmann, 2014; Taylor et al., 2019), that social contextual factors from an occupational environment can affect teachers' well-being.

Theoretically, three different terms must first be distinguished; these are social network, social integration and social support (Schwarzer et al., 2003). A s*ocial network* refers to the number of people around one person; thus, it is the basis for social integration or social support (Schwarzer et al., 2003). Network aspects focus on the quantity of the associated relationships. A classification can be made for the associated people of a network. People from the internal network are associated with an occupational context (e.g., peers at university, lecturers, mentors, colleagues at school), whereas the external network is linked to private life (e.g., family, friends) (Fiorilli, Benevene, et al., 2019). *Social integration* further includes the structure of the network, as well as such quantitative aspects as the size and density and the frequency of interaction (Schwarzer et al., 2003). Finally, *social support* focuses on the quality of relationships and aims to change existing stressful situations (e.g., Kim et al., 2018). Social support can be perceived, received, or given, and therefore, it is an interactive process (Schwarzer et al., 2003). Theoretically, three different sources of social support can be further distinguished (e.g., Richter et al., 2011; Väisänen et al., 2016): *Informational support* refers to sharing relevant information or giving advice to another person, and is usually provided from experts (Helgeson, 2003). *Instrumental support* focuses on assistance with a given problem through the provision of materials. Last, *Emotional support* means listening to and being there for other persons or calming them down in stressful situations (Schwarzer et al., 2003).

Figure 2 presents a schematic visualization that aims to show the relationship between the constructs social network, social integration, and the sources of social support. Regarding the development of social support, there is an assumption that social support is built at the beginning of teacher education but remains stable once established (e.g., Collings et al., 2014; Tao et al., 2000).

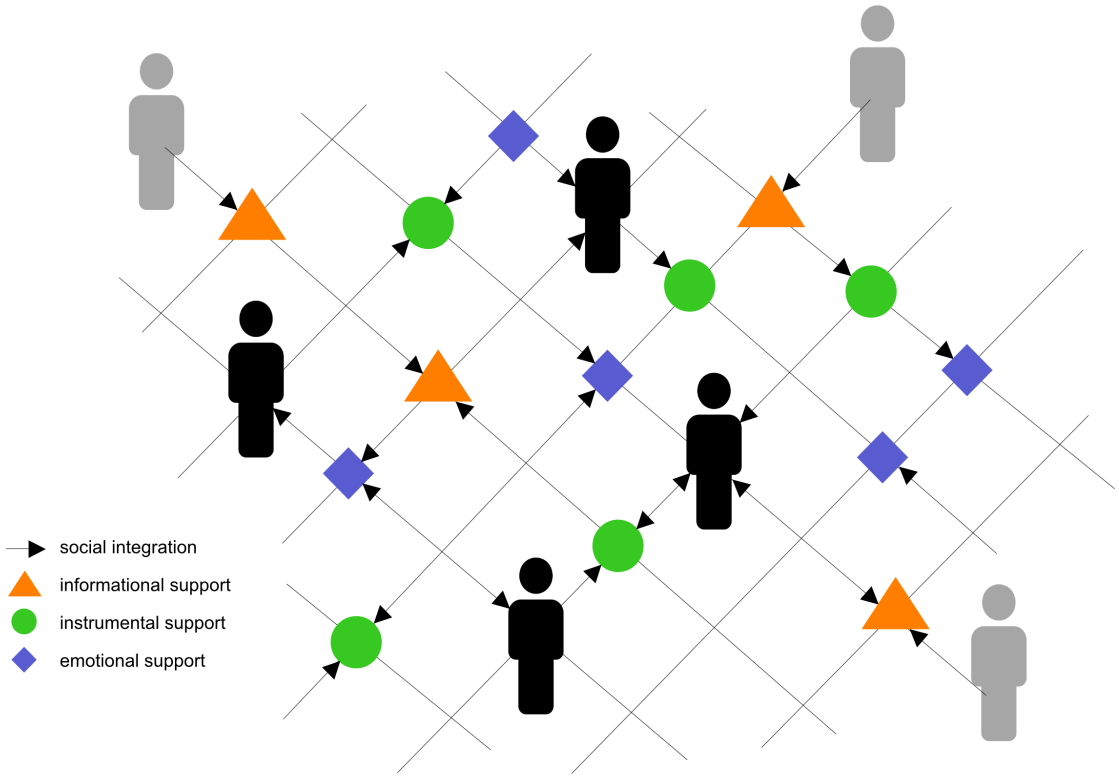

Figure 2: Schematic representation of social network, social integration, and social support

Social support is important for teacher education at university because as a group, student teachers report stress and strain at an early point in their careers (e.g., Reichl et al., 2014). One reason therefore could be, that the peer group for student teachers is not stable because they study different subjects (Cortina & Thames, 2013). In addition, they have to participate in educational courses, that differs in their amount related to the studied school type (e.g., Schulze-Stocker et al., 2016). Through this specific structure, that for example courses are located at different faculties, it can be assumed that building relationships in teacher education is more difficult than it is in in other study programs. Another factor that can determine the well-being of student teachers is negative experiences during school internships (e.g., Reichl et al., 2014). To deal with these requirements, peers can be a crucial resource (e.g., Kassis et al., 2019). Peers for teacher students at university are normally at the same experience level, and most of the time, they study similar subjects. They are familiar with the university situation and can show empathy and understanding in difficult situations (e.g., Dennis et al., 2005). Therefore, peers can be a crucial resource for preventing emotional exhaustion, and consequently, they foster students' well-being (e.g., Collings et al., 2014; Gusy et al., 2016; Mokgele & Rothmann, 2014).

For colleagues at school, the experience level usually differs among individuals. In contrast to the beginning teacher, who has newly entered the teaching profession, colleagues at school are usually experienced with the processes at school. In addition, to carrying out organizational and teaching tasks, they are already integrated in the existing collegium, which comprises colleagues, the principal, and administrative members. Schlichte et al. (2005) investigated special education teachers and found that a lack of social support is associated with high

occupational stress levels. Regarding the professional competence dimension of motivation, perceived social support is associated with high levels of self-efficacy (e.g., Chen et al., 2020; Woolfolk Hoy & Burke Spero, 2005) and enthusiasm (e.g., Cobb & Foeller, 1992; Richter, Kunter, et al., 2013).

Both studies in this dissertation aimed to investigate the role of social support; thus, they focused on the quality of relationships. Study I examined peers from university and their influence on well-being, whereas study II considered support from colleagues at school.

Previous studies have already confirmed that the peer group, for example, influences performance (e.g., Berthelon et al., 2019; Kehm et al., 2019; Mattanah et al., 2012), which is an important variable for teacher education because dropout frequently relates to performance problems (Heublein et al., 2017). To date, there is a lack of longitudinal studies investigating the relationship of social support of peers with student teachers' well-being. Study I of this dissertation aimed to investigate both variables longitudinally over three consecutive semesters and further examined the relationship.

While the positive impact of social support on the knowledge component of professional competence has already been confirmed for student teachers (e.g., Berthelon et al., 2019; Kehm et al., 2019), the impact of social contextual factors with regard to the motivational dimension remains largely unclear (Holzberger & Prestele, 2021). Study II sought to address this research gap, examining whether colleagues at schools determine the change in motivation for beginning teachers.

3 Selected Research Gaps

Following from the theory and research gaps raised in previous studies showing that teacher education and in-service teaching combine challenging situations and opportunities, one research interest of this dissertation was to focus on the interplay and development of associated variables. In the following central selected research gaps derived from theory are brought together.

(1) Lack of studies that investigate well-being during the first phase of teacher education

Well-being is especially important for in-service teachers, because low levels of well-being are associated with lower teaching quality (e.g., Klusmann et al., 2008), and thus, they affect student achievement and motivation (e.g., Oliveira et al., 2021; Schonert-Reichl, 2017). Keeping teacher shortages in mind, it is also important for student teachers at universities to complete their studies successfully (e.g., Bohndick, 2020; Güldener et al., 2020). Therefore, it is relevant to investigate the well-being of the student teachers because burnout at university is associated with dropout (e.g., Marôco et al., 2020). Especially longitudinal studies over a study period are requested to investigate well-being during the time at university (Mokgele & Rothmann, 2014).

(2) Lack of dropout motives for student teachers

The process of dropout and dropout motives have already been well-investigated for university students in general (e.g., Fleischer et al., 2019; Heublein et al., 2017; Neugebauer, Heublein, & Daniel, 2019). Nevertheless, there are only few results available that systematically examine the specific group of student teachers. This results usually cover only one university and are investigated retrospectively (e.g., Herfter, 2015). In addition, the investigation of dropout motives for this target group also allows us to contribute to the discussion of whether student teachers are a special group of students because of the structure of German teacher education (e.g., Bohndick, 2020; Carstensen et al., 2021).

(3) Lack of studies that investigate the interplay and change in motivational variables during the transition phase

Also based on the qualification hypothesis it is assumed that motivation is malleable during teacher education (e.g., Kleickmann & Anders, 2013; Kunter, Klusmann, et al., 2013; Locke & Latham, 2004). Empirical findings on professional knowledge are in agreement with this view (Strauß et al., 2019) but there is still a research gap regarding the development of motivational variables (Bauer et al., 2020; Strauß et al., 2019). In addition, previous studies mainly focused on the development of students' (e.g., Rodriguez-Hidalgo et al., 2014) or in-service teachers' motivation (e.g., Keller et al., 2018), but there is a scarcity of studies investigating the transition phase from pre-service teacher education into in-service teaching.

Building on motivational theory, it is assumed that motivation comprises multiple dimensions that do not act independently (Wigfield & Eccles, 2000). For the dimensions self-efficacy and enthusiasm, there is evidence that the constructs are usually positively related (e.g., Baumert & Kunter, 2006; Burić & Moè, 2020; Fauth et al., 2019). However, since the constructs have been studied predominantly in a variable-centered manner (e.g.,

Burić & Moè, 2020; Praetorius et al., 2017) the extent to which these constructs interact and change over time remains unclear.

(4) The role of social contextual variables is unclear

The social context of a student teacher seems to be important for study-related topics, such as student performance (e.g., Berthelon et al., 2019; Kehm et al., 2019; Mattanah et al., 2012). To prevent dropout, it is also important to investigate the influence of the peer group on student teachers' well-being. Therefore, information is needed to the state and development of social support from peer students at university and the interplay with well-being.

The subsequent professional phase is characterized by many changes in contextual factors. Beginning teachers start to work at a new school, meet new colleagues, and paractice independent classroom teaching. Perhaps also because of the changed contextual conditions, early dropout from the profession increasingly occurs during this occupational phase (e.g., Ingersoll, 2012; Stokking et al., 2003). To date, it is assumed that social support acts as a buffering resource but it remains unclear whether social support from colleagues determines the beginning teachers' motivation.

(5) High demand for longitudinal studies

To derive causal assumptions, longitudinal studies are indispensable. To date, there are no longitudinal results available from studies investigating the change in emotional exhaustion for student teachers at university. In addition, the results for pre-service teacher education show an inconsistent picture. For example, emotional exhaustion increased during the first year of pre-service teacher education in the study by Klusmann et al. (2012), whereas Dicke et al. (2016) found an initial decrease during pre-service teacher education. Regarding the constructs, self-efficacy and enthusiasm are also predominantly studied cross-sectionally (e.g., Chen et al., 2020; Mahler et al., 2018). For this reason, longitudinal studies are especially needed for different professional phases of teacher education (e.g., Klassen & Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2001).

3.1 Research Questions of the Dissertation

The research gaps presented above bring up the following overarching research questions for this dissertation:

(1) How do well-being and motivation develop over different phases during teacher education?
(2) What are the main dropout motives for student teachers?
(3) What is the role of the social contextual variable of social support?

To answer these main research questions, two empirical studies were conducted examining seven research questions in total (presented in detail in sections 4.2 and 4.3). In addition, the model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013) was expanded (see Figure 3) in reference to previous studies and theoretical assumptions.

Most parts of the model have already been intensively investigated, but little research has been done so far on the contextual variables of the model in which the development of professional competence takes place.

In the model from Kunter, Klusmann, et al. (2013), contextual factors were considered in a broad way, referring to the general educational context (the educational system of a country) and to the individual school. It is assumed that given contextual factors affect the given learning opportunities, the uptake of learning opportunities, and the professional practice.

The extended theoretical model also considers the broad educational context and the individual school, but it separates these two aspects.

The national conditions in which teacher education takes place are summarized in the educational context; therefore, they are a prerequisite for all processes of the model. As a result, it can be seen as the framework in which teacher education takes place. For this reason, the broad educational context now frames the whole process of building up and developing professional competence. This is represented in the expanded model by a light blue background encompassing the full process.

The individual occupational context of a person was previously represented in the model with the surroundings at a school. However, professional competence is learnable (e.g., Kunter, Kleickmann, et al., 2013) and thus can also be built up and trained during the first phase of teacher education at the university. For that reason, the university was added to the individual context of the model.

Based on the results of previous empirical studies, the individual context could be systematized and expanded, into demographic, structural, and social aspects. *Demographic aspects* refer to the size (Berger & Milem, 2000; Lohse-Bossenz et al., 2018; Umbach & Porter, 2002) or location (Braun et al., 2014; James, 2001) of an institution, whereas *structural aspects* refer to the school type or the taught subjects. For the context of university teacher education structural aspects can also include the curriculum organization (Blüthmann, 2012; Jansen, 2004; van der Hulst & Jansen, 2002), the size of a course (Blüthmann, 2012; Braun et al., 2014) or the competence of lecturers (Braun et al., 2014; Mokgele & Rothmann, 2014). *Social aspects* like the climate of an institution or contact with peers or colleagues are of special interest because they can determine not only professional competence (e.g., Berthelon et al., 2019; Kehm et al., 2019; Tschannen-Moran & Woolfolk Hoy, 2007) but also outcome variables like well-being or dropout (e.g., Cohen et al., 2009; Collings et al., 2014; Mokgele & Rothmann, 2014). Especially, if social aspects are perceived as deficient, this can lead to a decrease in well-being (e.g., Mokgele & Rothmann, 2014), and as a possible consequence, teachers could drop out of the educational system. Both nationally and internationally, dropout is particularly relevant for beginning teachers, who show high dropout rates (e.g., Ingersoll, 2012). Since the original model focuses on positive outcomes, retainment at an institution was included as a further outcome variable in the model.

Based on theoretical assumptions, two new paths were included in the model (highlighted in bold in Figure 3): The first path connects the individual context of a person with professional competence. This new path mainly stems from the research interest of this dissertation, namely, whether social aspects can foster motivation. There is evidence, especially for beginning teachers, that social aspects determine motivation (e.g., Adler-Constantinescu et al., 2013; Chen et al., 2020; Woolfolk Hoy & Burke Spero, 2005). Because previous studies showed that social

aspects impact well-being (e.g., Collings et al., 2014; Gusy et al., 2016; Mokgele & Rothmann, 2014), the second new path connects the individual context with teacher outcomes.

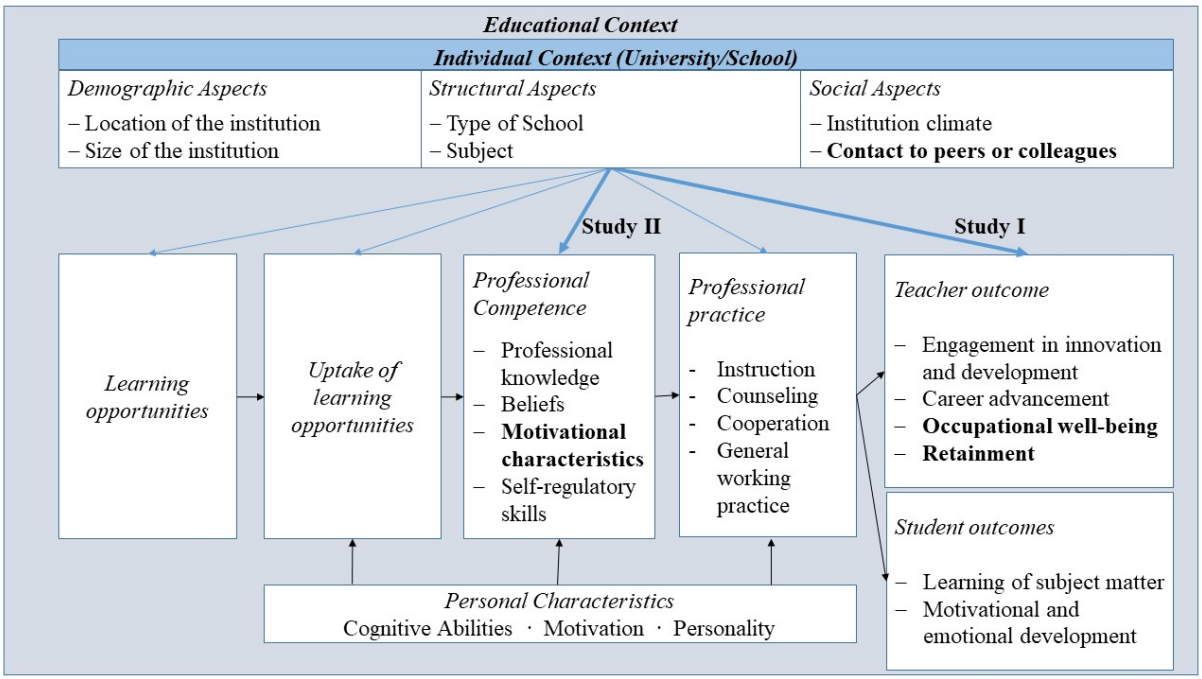

Figure 3: Expanded model of the determinants and consequences of teachers' professional competence (according to Kunter, Kleickmann, et al., 2013, p. 67) with included studies of the dissertation. All study variables and new theoretical paths are marked in bold in the model.

Referring back to the dissertation, study I examined the outcome variable of occupational well-being from student teachers over three consecutive semesters and investigated a further outcome variable, university dropout, in more detail. Therefore, the new path of the model that connects the individual context with teacher outcome variables was examined with the assumption that high levels of support predict well-being. The dropout of student teachers was investigated qualitatively to gain insights into challenging situations at university.

Study II fist examined the change in motivational variables from pre-service teacher education to two years into the teaching profession. The role of social support was also examined in this study with the assumption that social support positively influences the change in motivational variables.

4 Methodology

In this chapter, the database for this dissertation is presented (section 4.1). This followed by brief summeries of the two empirical studies (sections 4.2 and 4.3) that form the basis of this cumulative dissertation and contribute to answering the overarching research questions.

4.1 Research Data

Both studies in this dissertation refer to the BilWiss research program, with three project phases, funded by the Federal Ministry of Education and Research (BMBF)[1].

Two longitudinal datasets emerged from this program. The first dataset (Kunter et al., 2017; Kunter et al., 2020; database for study II) includes the project phases BilWiss and BilWiss-Beruf and examines beginning teachers from the beginning of pre-service teacher education up to seven years after starting their career at school. This dataset was carried out as a full survey at measurement point 1 and maps the population from the beginning of pre-service teacher education in North Rhine-Westphalia. After this full survey, a representative subsample was followed up longitudinally. To date, this dataset includes six measurement time points. To answer the research questions for the transition phase, measurement points 3 and 4 were selected for study II.

The second dataset (Kunina-Habenicht et al., 2020; database for study I) refers to the project phase BilWiss-UV and includes student teachers from four German universities located in four different federal states over three consecutive semesters. The dataset includes three measurement points from spring semester 2017 to spring 2018.

Both BilWiss datasets are available at the Research Data Center at the Institute for Educational Quality Improvement in Germany and can be used for secondary analyses.

A detailed description of the samples, instruments, and analyses can be found in the respective publications (see Appendixes A and B). In the interest of good and transparent scientific practice, the syntaxes for all analyses have been made available via the open science framework prior to the peer review process.

[1] **Project phase 1 (period 2009-2013):** *"Educational knowledge and the acquisition of professional competence in teacher training"* (BilWiss) was funded by the Federal Ministry of Education and Research of the funding line: Development of professionalism of pedagogical staff in educational institutions (ProPäda). Funding code: 01JH0910.
Project phase 2 (period 2013-2016): "*The importance of university based education knowledge for the career entry of teachers"* (BilWiss-Beruf), was also funded by the Federal Ministry of Education and Research of the funding line: Competence modelling and competence assessment in the higher education sector (KoKoHs). Funding code: 01PK1007
Project phase 3 (period 2016-2019): *"Returns and development of educational knowledge—Validation of a competence test for teacher students"* (BilWiss-UV), funded by the Federal Ministry of Education and Research of the funding line: Competence modelling and competence assessment in the higher education sector (KoKoHs). Funding code: 01PK15007

4.2 Study I: Promoting Student Teachers' Well-Being

Summary of the theoretical background

With the shortage of teachers in some European countries in mind, there is a societal interest in student teachers who successfully finish their studies. However, student teachers report stress at an early stage (e.g., Reichl et al., 2014), with the possible consequence that their well-being will decrease. In general, stressors that can occur during the time at university are a high workload, problems with time management, or a lack of social support (e.g., Gusy et al., 2016; Kim et al., 2018; Shankland et al., 2019). A high level of stress combined with unfavorable contextual conditions can lead to student dropout (e.g., Marôco et al., 2020). However, keeping in mind the teacher shortage, it is important for student teachers to complete their studies. Therefore, it is particularly necessary to gain insights into student teachers' dropout intentions to implement preventive measures at an early stage.

Research questions

The study's aim was twofold: First, it used a quantitative approach to capture the state and change in emotional exhaustion (an indicator of well-being; RQ Ia) and emotional support (resource of the individual environment; RQ Ib). To investigate the relationship between the variables (RQ II), we asked whether earlier emotional support can predict later emotional exhaustion. Second, a qualitative approach was used to identify dropout intentions for student teachers (RQ III).

Sample description

The sample of this study comprised 903 student teachers from four German universities who were followed over three consecutive semesters. The database stems from the BilWiss research program (Kunter et al., 2020). Student teachers were predominantly female (71.5%) at the first measurement point, and on average, 22.20 years old (SD = 3.29). The students were enrolled in different school types and semesters (M = 3.708, SD = 2.213). Missing data were estimated using the full information maximum likelihood approach (e.g., Graham, 2009).

Method

To answer RQ I, univariate latent change score models were computed to map the change of the variables over time (e.g., Kievit et al., 2018). Therefore, models with three measurement points were applied. After this, the univariate models were combined into a bivariate latent change score model to investigate the relationship between both variables (RQ II). Finally, a qualitative content analysis (Mayring, 2014) was used to identify possible dropout intentions in teacher education (RQ III).

Results

The first univariate model showed that emotional exhaustion increased significantly from time 1 to time 2 (M = 0.220, SE = .043, p < .001), followed by a small but significant decrease (M = –0.108, SE = .046, p = .020). The second univariate model for emotional support showed no evidence that there were significant changes over time (change 1: M = 0.060, SE = .043, p = .161; change 2: M = 0.074, SE = .044, p = .090). However, student teachers in the sample report that they felt very highly supported right from the beginning (M = 4.974, SD = 0.914,

scale: 1-6). Significant variances for all change variables indicate individual differences in experiencing emotional exhaustion and emotional support. The bivariate model confirmed the assumption that the less supported student teachers are, the more is the emotional exhaustion and vice versa. Still, there is no indication that earlier emotional support can predict later emotional exhaustion. The qualitative content analysis identified performance problems, lack of study motivation, and study conditions as the frequently mentioned dropout intentions for student teachers. A comparison of the results with the nine already existing motive groups for subject-independent student dropout developed by Heublein et al. (2017) revealed a new motive group for student teachers with special characteristics related to the teaching profession.

Discussion

This study confirmed individual differences in experiencing emotional exhaustion and social support during teacher education. Our analysis showed that the social support of peers does not predict later well-being. Therefore, the qualitative analysis was used to identify more probably stronger predictors. To sum up, the study identified challenges in teacher education, such as performance problems, a lack of motivation to study, and study conditions. While performance and motivational problems have also been frequently mentioned for other study programs, study conditions seem to have greater relevance for teacher education.

The results can be used to derive preventive measures for teacher education and thus prevent students from dropping out of university.

4.3 Study II: Identifying Teachers' Motivational Profiles

Summary of the theoretical background

Teacher motivation is a heterogeneous construct comprising different dimensions, such as self-efficacy and enthusiasm. High levels of motivational variables are associated with positive effects at the student level (e.g., motivated teachers are said to use more innovative teaching strategies; Nurlu, 2015) and among the teachers themselves (e.g., higher well-being; Aloe et al., 2014; Fives et al., 2007), where they are more satisfied with their jobs (Caprara et al., 2003; Klassen & Chiu, 2010). This study investigated the transition phase from the end of pre-service teacher education until two years into the teaching profession. A phase that is often described as challenging and frequently associated with a "reality shock" (e.g., Dicke, Elling, et al., 2015; Kim & Cho, 2014; Veenman, 1984).

Research questions

Using latent profile analysis, the study aimed to identify the interplay of motivational variables, namely, teacher enthusiasm and teacher self-efficacy. RQ I addressed the profiles at the end of pre-service teacher education, whereas RQ II investigated the underlying profiles at two years into the teaching profession. Finally, RQ III analyzed whether colleagues' social support predicts the change in teacher's motivation from time 1 (end of pre-service teacher education) to time 2 (two years into in-service teaching at school).

Sample description

The sample of this study comprised 662 beginning teachers at the end of pre-service teacher education until two years of entering the teaching profession. The data came from the BilWiss

research program (Kunter et al., 2017). 77% of the participants were female at measurement point 1, and on average, they were 28.14 years old (*SD* = 3.31); they worked in different school types. Because of the high dropout rate in the longitudinal dataset, missing values were treated using full information maximum likelihood estimation (e.g., Graham, 2009).

Method

To answer RQ I and RQ II, latent profile analyses were used to map the interplay of the motivational variables. The change in the motivational variables (RQ III) was investigated using an overall latent change score model. Colleagues' social support was subsequently included as a predictor in the latent change score model.

Results

We found three profiles for the end of pre-service teacher education that differed in quality, showing low, medium, and high motivation (RQ I). For two years after entering the teaching profession, these profiles were no longer significantly separated from each other (RQ II). To map the changes in the variables in more detail (RQ III), a latent change score model was applied. Since previous confirmatory factor analyses showed two separate factors for general self-efficacy and for self-efficacy for classroom management, separate factors were included in the latent change score model. General self-efficacy consisted of capacity to deal with problematic students and parents (factor 1), and using innovative teaching methods (factor 2). Self-efficacy for classroom management consisted of using lesson procedures (factor 1) and dealing with disruptive behavior (factor 2). The results of the overall latent change score model showed a significant increase over time for subject enthusiasm. A significant decrease was identified for enthusiasm for teaching and for one dimension of self-efficacy for classroom management (disruptive behavior). No significant changes over time were observed for general self-efficacy (problematic students and parents and innovative teaching methods) and self-efficacy for classroom management (lesson procedures). Nevertheless, significant variances for all motivational dimensions indicated individual differences. Finally, the added covariate social support from colleagues did not influence the change in motivational variables.

Discussion

The results of the latent profile analysis indicated that there are beginning teachers with different levels of motivational variables at the end of pre-service teacher education, but the motivation becomes more homogeneous until two years into the teaching profession. The latent change score model indicated that the different motivational dimensions change independently, and it would be particularly interesting to investigate the underlying processes for this.

5 Overall Discussion

Investigating the development of well-being at an early phase at university is of special interest because there is empirical evidence that student teachers are already stressed at university (e.g., Reichl et al., 2014) and transfer into the teaching profession in this state (Rauin, 2007; Väisänen et al., 2018). Consequently, teachers with lower well-being are more likely to drop out of the teaching profession. In addition, motivational variables are related to teacher-well being; Fostering these variables, for example, during pre-service teacher education, may allow a smooth transition into the job. Therefore, motivational variables can also be beneficial in preventing teacher shortages.

Starting from this viewpoint the dissertation aimed to answer three overarching research questions, which were as follows:

(1) How do well-being and motivation develop over different phases during teacher education?
(2) What are the main dropout motives for student teachers?
(3) What is the role of the social contextual variable of social support?

5.1 Interpretation of the Main Findings

Below, the answers to the above stated research questions of this dissertation are embedded in previous research findings. Therefore, the main results are discussed with regard to the existing research gaps. starting with results on the development of student teachers' well-being (section 5.1.1) and dropout intentions (section 5.1.2). This is followed by an interpretation of the development of beginning teachers motivation' (section 5.1.3). Next section 5.1.4 summarizes and discusses the role of the contextual resource of social support. Finally, section 5.1.5 refers to the expanded model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013) and discusses in particular the extent to which the expansion is beneficial.

5.1.1 Interpretation of Findings Associated to Student Teachers Well-Being

Because of inconsistent results regarding how emotional exhaustion changes mainly been obtained from pre-service teacher education or in-service teachers (e.g., Dicke, Elling, et al., 2015; Voss & Kunter, 2020), it was of special interest to investigate the state and the change of this construct related to student teachers' well-being. Therefore, study I is a valuable extension to previous results with a focus on a new target group.

For our sample, emotional exhaustion was not a stable construct, and it varied over time. The results showed that student teachers were exhausted at the beginning of our study on a moderate level. Latent change variables first indicated a significant increase in emotional exhaustion during one semester, followed by a significant but small decrease during the following semester. The moderate starting value suggested that most student teachers were able to cope with the requirements of teacher education. One particularly encouraging finding is that emotional exhaustion did not increase continuously over time. In this way, our results contradict the subject-independent findings from Blüthmann (2012), who found that students in higher

semesters are significantly more dissatisfied. Although study dissatisfaction is not identical to the construct of emotional exhaustion, but relationships can be assumed as exhausted students are considered to be more dissatisfied. Rather, our results suggest that it is possible encourage the students by informing them that after a stressful phase with increased emotional exhaustion, there will be a better phase in which they can probably recover. From our results, it can be further deduced that spring and fall semesters may be exhausting in different ways. An increase of emotional exhaustion was found, especially for the fall semester, which is longer in terms of the number of weeks. In addition, the survey period could also play a significant role in the experience of emotional exhaustion. It should be noted that no measurement point was placed during the examination period.

Significant variances for both change variables indicated that the perception of emotional exhaustion differed between student teachers. At this point, the question can be raised of the extent to which personal characteristics affect the development of emotional exhaustion. Kokkinos (2007) showed that both personality characteristics and work-environment stressors affected the development of burnout. In particular, the dimension of emotional exhaustion was influenced by stressors from the work environment.

A resource that is expected to shape well-being positively is social support from peers.

In our sample, the student teachers reported that they already perceived very high levels of emotional support from peers right from the beginning that did not change significantly over the three semesters. Rather, the values remained stable at a high level. These results show that the building of supportive networks during teacher education is possible even with this special structure in which student teachers study different subjects and courses, as well as in different school types, with a changing peer group. An unstable peer group is predominantly seen as a problem in building a constant and stable network. However, it can also be considered that student teachers have the opportunity to make many contacts with students studying subjects, as well as with other student teachers. The results further support the assumption that networks remain stable once established.

Even if perceived emotional support is stable and high on average, significant variances indicate that this is not the case for all student teachers. Teacher education could start at this point and bring students together, with a focus on fostering well-being. Therefore, well-known teaching methods in which students work together, such as group work, peer feedback, or the jigsaw method, can be fruitful during seminars or lessons.

Of further interest was the relationship between the variables of emotional exhaustion and emotional support, which were examined to verify whether emotional support is a resource for well-being. We found no evidence that earlier emotional support predicts later emotional exhaustion. The question that remains is whether there are stronger influences during the time at university that influence well-being. To answer this question, we coded an open response item to dropout intentions to obtain a detailed picture of what matters to student teachers at university.

5.1.2 Interpretation of Findings on Student Teachers Dropout Intentions

From a teacher shortage perspective, it is important to examine the dropout intentions of student teachers to implement study conditions that allow them to study successfully. Therefore

the second research question of this dissertation asks: *What are the main dropout motives for student teachers?*

This is the first investigation to systematically identify student teachers' dropout intentions and compare them with the nine already existing motive groups of the subject-independent dropout motives developed by Heublein et al. (2017; see section 2.3). First, the results for student teachers confirmed all nine dropout motive groups identified so far. Second, in addition to the mere comparison, a new motive group labelled the teaching profession was found for the sample of student teachers; this comprised teaching-related motives (e.g., school system, teaching role, doubts about job suitability). The identified frequencies of the motive groups were interesting. Whereas performance problems (n = 456) and a lack of study motivation (n = 161) were mentioned most frequently in our study, study conditions (n = 126) followed in third place for student teachers. The new motive of teaching profession and therefore a motive group specific for teacher education was not frequently mentioned (n = 87).

Referring to the quantitative analysis finding that emotional support cannot predict later emotional exhaustion, the qualitative study supported this assertion. Social support from peers was rarely mentioned (n = 11). Therefore, it can be inferred that other university factors or dropout intentions have a more central impact on well-being.

Finally, the procedure and results of the empirical study allowed us to enter the ongoing discussion of whether student teachers are a specific group of students. It can be inferred that student teachers initially face identical challenges as all other students, especially, performance problems and a lack of motivation to study. However, study conditions seemed to play a crucial role for student teachers; indeed, they were named as the third most frequent group of dropout motives. In addition, the new motive group—the teaching profession—is only applicable to student teachers. Since general dropout motives were more frequently mentioned, it is assumed that student teachers should not be viewed as a totally different group of students, even if the study conditions are more relevant.

To sum up, the results of study I confirmed that emotional exhaustion in teacher education cannot be seen as a stable construct because it changed over time in the study, also in a positive direction. In our sample, student teachers reported high perceived emotional support, which suggests that the structure of teacher education also allows networks to be established and kept stable. The high coding for the variable of dropout intentions indicated that dropout thoughts are widespread in teacher education. Most dropout intentions for student teachers are relate to performance problems, lack of study motivation, and study conditions.

5.1.3 Interpretation of Findings on Beginning Teachers' Motivation

Beginning teachers motivational profiles

For the end of the pre-service teacher education, three profiles were identified; because the profiles only differ in quantity, they were labelled low, medium, and high motivation. This means that the motivational variables of self-efficacy and enthusiasm are on an equal level for the respective profiles. Since there were only six people associated with the low profile, and in general, mean averages of the motivational scales were high, our results indicate that beginning teachers enter the school as motivated teachers. Two years into the teaching profession, there is no evidence that the profiles are clearly distinguishable. This suggests that beginning teachers

become more homogeneous in terms of their motivational facets. The level of this profile is still high, and in our study, it reached values between the medium- and high-motivated profiles.

The results suggest that no practice shock is expected with regard to motivational variables, whether at the end of pre-service teacher education or at the beginning of in-service teaching. It is possible that the findings point to a solid teacher education system in Germany, that prepares and motivates future teachers for career entry through practical learning opportunities during pre-service teacher education. There is evidence via the one-profile solution, with its still high motivational levels, that the requirements and challenges of a beginning career can be well managed.

The findings of only the quantitative profiles regarding self-efficacy and enthusiasm are in line with previous profile analyses. Thommen et al. (2021) also computed latent profile analyses with the motivational constructs of self-efficacy, enthusiasm, and goal orientation. Results for mathematics teachers showed similar levels of self-efficacy and enthusiasm but they differed in their goal orientation. Based on previous latent profile analyses that identified qualitative profiles (e.g., Blömeke et al., 2012; Holzberger et al., 2021) a change from quantitative into qualitative profiles were expected if further dimensions of professional competence would be included, such as professional knowledge, beliefs, or self-regulatory skills.

Change in motivational variables

To gain insights into the motivational constructs and their subdimensions differ in detail a latent change score model was applied, but it only showed a significant increase over time for the scale of enthusiasm for the subject. This is particularly interesting because enthusiasm for the subject is theoretically described as a rather stable construct (Kunter et al., 2011) because it is based on a person's interests (Krapp, 2002). One possible factor that may shape enthusiasm for the subject is interaction with students in the classroom. It is conceivable that interested students with specific questions can positively affect the experienced component of enthusiasm for the subject in a positive manner. In their study, Mahler et al. (2018) identified a significant relationship between enthusiasm for the subject and student performance. A bidirectional relationship can possibly be derived from this: Teachers who teach the subject enthusiastically may engage their students, leading to good performance; students' good performance could increase teachers' subject enthusiasm in turn.

A significant decrease was found in enthusiasm for teaching and self-efficacy for classroom management (disruptive classroom behavior). In particular, enthusiasm for teaching is sensitive to contextual variables (Frenzel et al., 2009). Pre-service teacher education is characterized by lessons of beginning teachers being monitored by experienced teachers. If those observant situations are experienced or judged as negative by beginning teachers, this could attenuate enthusiasm for teaching. Our sample consisted of teachers at the beginning of their career at school, who were thus still in the process of developing professional competence. Classroom disruptions seem to be particularly challenging for this group (Lazarides et al., 2020), and associations with teacher well-being are already confirmed (e.g., Aloe et al., 2014; Klusmann et al., 2008).

For our sample, the factors of general self-efficacy (problematic students and parents, as well as innovative teaching methods) and self-efficacy for classroom management (lesson procedure) were found to be stable. These results indicate that beginning teachers are well

prepared for the general lesson procedure. Nevertheless, they experience challenges when disruptions occur in the classroom. Being prepared to implement innovative teaching methods and for lesson procedures can also be linked to the practical preparation of pre-service teacher education. During this time, teachers are supported by a mentor teacher and gain their first experience in the classroom. Regarding the sources of self-efficacy (Bandura, 1997), this is the phase in which the beginning teacher has the chance to build up mastery experience. In addition, the mentor teacher can engage in social persuasion by offering feedback.

Significant variances in the change variables indicate individual differences in how beginning teachers experience self-efficacy and enthusiasm. Therefore, it can be deduced that the transition phase is perceived as strenuous in different ways in relation to distinct motivational characteristics.

Social support from colleagues as a resouce

Social support by colleagues was investigated, with the assumption that this variable from the social context positively shapes the change in motivational variables. For our sample, we found a result that was not in line with our previous expectations; there was no indication that social support from colleagues affects the change in motivational variables. Maybe this refers to the composition of the sample of already highly supported and motivated beginning teachers. A further possible explanation is, that the career-entry at school is associated with a variety of tasks, such as preparing lessons for the first time, fulfilling the organizational requirements, participate in meetings. Although it was assumed that colleagues can act as a benefical resource in that transition phase maybe other aspects are more important, such as successful classroom management or dealing with disruptive classroom behavoir.

To sum up, the person-centered results of this study showed evidence of different quantitative motivational patterns at the end of pre-service teacher education. Investigating this from a longitudinal perspective, motivational variables changed and become more homogeneous. As a consequence, no separable profiles were detected for in-service teachers. Since motivational levels for the one-profile solution are still high, it can be concluded that beginning teachers adapt to the entry requirements well. This is in line with various theories stating that motivation is a dynamic construct influenced by contextual factors (Wigfield & Koenka, 2020), for our study, the transition phase. Our analyses are a valuable extension of previous research and support the theoretical assumptions by showing that motivational variables differ over occupational phases. Particularly beneficial was the subsequent variable-centered analysis with the result that motivational variables changed in different directions.

5.1.4 Interpretation of the Findings on Contextual Resource Social Support

At this point, the results of the two studies regarding social support are brought together to answer the following research question of this dissertation: *What is the role of the contextual resource of social support?* It was theoretically assumed that peer (study I) or collegial (study II) support would be beneficial for well-being and the change in motivational variables (e.g., Kim et al., 2018; Schwarzer et al., 2003). Referring back to the theoretical framework, social support can be categorized as informational, instrumental, and emotional support (e.g., Richter et al., 2011).

Study I investigated the change in emotional support with the theoretical assumption that supportive networks build during the time at university (e.g., Cilliers et al., 2018) and are stable networks once established (e.g., Cilliers et al., 2018; Tao et al., 2000). Therefore, stability was also expected for the emotional support dimension. Because of the already high starting values, no further positive development was expected in advance. However, it would also have been conceivable that social support could decreases over time because students lose sight of their network through framework conditions at university. The results contradict this suggestion, indicating that emotional support remained stable over time at a high level. Constant perception of high emotional support for student teachers is especially gratifying because they can be seen as a group of students that do not have a stable peer group. Therefore, the results suggest that student teachers can build up stable and emotionally supportive networks even if the framework conditions during teacher education are not optimal in terms of studying in different subjects.

In study II, social support did not determine the change in motivational variables. This is for example in line with Bauer et al. (2020) who investigated internships within the university phase and found that social support does not affect changes in self-efficacy. Nevertheless, the positive impact from colleagues on beginning teachers' motivation was confirmed in some studies (e.g., Chen et al., 2020; Richter, Kunter, et al., 2013; Woolfolk Hoy & Burke Spero, 2005). Therefore, previous findings on the role of social support and its relationship with motivational variables did not provide a clear picture. Further research is needed, that investigate the extent to which social support from colleagues affects motivation.

To sum up, for both studies in this dissertation, there is no evidence that social support affects the change in well-being or motivational factors, wether for university students or for the later occupational phase. Nevertheless, the findings do not imply that social support is unimportant: In addition to the confirmation that perceived emotional support from peers is a stable construct, the analysis of study I also allowed the investigation of the relationship between emotional exhaustion and emotional support. Descriptive results show that the more emotionally supported student teachers are, the lower their emotional exhaustion becomes and vice versa. Therefore, it can be deduced that social support is related to student teacher well-being but there are probably stronger implications at the university that shape well-being of student teachers, such as contact with lecturers (Väisänen et al., 2016).

5.1.5 Interpretations of the Expanded Model of Teachers' Professional Competence

In section 2.1 the model that aimed to explain how professional competence builds and develops (Kunter, Kleickmann, et al., 2013) was expanded with references to theoretical assumptions and the previous literature (see Figure 3). First, the contextual variables were systematized into demographic, structural, and social aspects. As part of this dissertation, social support as a social aspect was investigated in more detail. Even if there were theoretical assumptions and previous results showing that the individual social context of a person directly determines occupational well-being or motivational characteristics (e.g., Chen et al., 2020; Collings et al., 2014; Mokgele & Rothmann, 2014), the results of this dissertation showed no evidence for the included direct paths. For this reason, no recommendation can be made at present to accept the unvalidated direct paths. Further empirical studies with representative samples should verify the assumed relationships. Therefore, it seems beneficial to combine

different resources from the social context such as people from internal (e.g., peers or colleagues) and external network (e.g., family or friends) (e.g., Fiorilli, Benevene, et al., 2019; Fiorilli, Schneider, et al., 2019; Schlichte et al., 2005). For a sample of middle-school teachers Cirik (2015), showed that a combination of network members was beneficial. For that reason, the support of the external network from family or friends should not be neglected because this support can also positively impact well-being or motivation. Furthermore, it would also be desirable for future research to further advance the systematization of the individual context.

Regarding studies included in this dissertation, there are different conceivable explanations for why it was not possible to confirm the direct path.

First, this could be the result of the BilWiss samples' composition. For both databases in the research program, favorable conditions with above-average values were reported for the social contextual variable of social support. Second, further methodological issues may be possible. In particular, study I referred exclusively to the influence of emotional exhaustion of peers, because it was assumed that peers are familiar with the situation at university and can offer suitable support because they understand and identify with the challenges during teacher education (e.g., Dennis et al., 2005). It is possible that investigating only one component of social support was not sufficient to predict student teachers' well-being. Therefore, future research should include more comprehensive social aspects. The results of the qualitative dropout intentions further indicated that lecturers in particular could offer helpful support during teacher education at university. For that reason, lecturers should be considered when investigating the supportive social context.

5.2 Methodological Reflections on the Databases, Analyses, and Constructs

This section reflects on the strengths and limitations of the database (5.2.1), the analyses (5.2.2), and the used constructs (5.2.3), which formed the basis to answer the research questions. In addition, future research directions are discussed.

5.2.1 Methodological Reflection on the Databases

The relevance of longitudinal studies to investigate the development of variables has been repeatedly emphasized for constructs related to well-being (e.g., Reichl et al., 2014; Väisänen et al., 2016) or motivation (Klassen & Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2007) and for different phases of teacher education (Strauß et al., 2019; Tschannen-Moran & Woolfolk Hoy, 2007). To start from this point, the BilWiss research program, with its two longitudinal datasets relevant to teacher education, was the suitable database for the planned analyses.

The database allowed longitudinal analyses of different phases of German teacher education. Both empirical studies in this dissertation used this great potential and examined the relationship and the development of variables over time. Whereas the student dataset (study I) is an accruing sample of four German universities located in four different federal states, the second dataset maps a representative sample of beginning teachers in North Rhine-Westphalia from pre-service teacher education until in-service teaching (study II). A strength of both databases is that they comprise participants from different subjects, as well as school types.

Further, it should be noted that the participants of both datasets are not the same teachers. Nevertheless, they offer the possibility of carrying out longitudinal analyses.

The student dataset (study I) covers a relatively short period, at 1.5 years, examining only three semesters. A longer period would be necessary to provide causal statements about the development of well-being in teacher education. For future studies, it would be desirable to examine the full study period at university. Nevertheless, it was possible to carry out longitudinal analyses with three measurement points that covers half of the bachelor's program (outgoing from a regular study time of six semesters). This allowed us to arrive at a first impression that student teachers' emotional exhaustion is flexible over time.

Even if we consider students from all semesters, it would be desirable to investigate freshman students right at the beginning of their teacher education. For our sample, 46.9% of the participants were at the first measurement point in their first study year. Thus, the sample in the analyses was more heterogeneous. It is assumed that student teachers in particular have to cope with the new requirements at university and that the peer group was also established during the first semesters. Further, based on the result that dropout is especially high in the first year of university (e.g., Cabrera et al., 2006; Neugebauer, Heublein, & Daniel, 2019; Tudela, 2014), it is also possible that the sample of study I of this dissertation may have already lost these students. Starting an investigation with freshmen students, it could also be relevant to investigate the reasons why a teacher education program was chosen. Student teachers may realize that their choice of study is not the right one, dropping out of teacher education at this early stage. Blüthmann (2012) confirmed that study choice motives are related to student satisfaction. Therefore, future studies should also investigate whether the study choice motive is related to student well-being.

The dataset with beginning teachers (study II) depicted the transition phase. A strength of this dataset is that it covers six measurement points with a time span of 10 years in total. Accordingly, the dataset offers the opportunity to examine different phases of teacher education. As part of the dissertation, an important phase for beginning teachers was selected, namely, the transition phase from pre-service-teacher education until in service teaching.

Even if the database is a full-survey from the federal state of North Rhine-Westphalia and a representative subsample was followed up after measurement point 1, specific influences of the teacher education elements of the federal states are possible. However, there is no assumption that motivational variables from beginning teachers act significantly differently regarding federal states. Nonetheless, considering other federal states would be beneficial for future research.

A well-known problem with longitudinal data is the dropping out of participants over time (e.g., Graham, 2009). The dropout rates of both studies can be classified as high, but they were adequately treated by a model-based procedure of missing values using the full information maximum likelihood approach (e.g., Enders & Bandalos, 2001; Graham, 2009). With this highly recommended approach (e.g., Peugh & Enders, 2004), all participants who participated in at least one measurement point of the study could be considered. Additionally, dropout analyses were carried out before the main analyses. For study I, a biased sample was assumed because the results showed that emotionally exhausted and less supported students were lost over time. For study II, the dropout rates were high and could have been influenced by several

factors. The data stemmed from a large research program with a total of six measurement points. In the data analyses, measurement points 3 and 4 were selected, so test fatigue could be one reason for the high dropout rates. Further, it cannot be excluded that beginning teachers had already dropped out of the sample because they had changed into a different job. Nevertheless, dropout analyses showed evidence of a random dropout for this sample because there were no significant differences in demographic and motivational variables.

A further methodological assumption that also applies to the dataset is that participants with high levels of motivational variables are more likely to participate in studies (Richter, Engelbert, et al., 2013). The latent means of the constructs indicate that the study participants were motivated and supported at a high level. For this reason, a biased sample can be assumed.

Since both databases are relevant for German teacher education, the extent to which the results can be transferred to countries with different teacher education systems—for example, countries where entry into the teaching profession follows directly after graduation from university—is still an open question. Regarding the development of professional competence, previous studies with an international perspective showed that teachers' professional knowledge differs between countries (An et al., 2004). This result can be attributed to various learning opportunities during teacher education. Most countries do not have the element of mandatory pre-service teacher education. In these countries, practice teaching at school starts directly after the theoretical phase in university. Since different teacher education systems can lead to differences in the development of professional competence (Blömeke et al., 2012), further research should focus on extent to which this finding regarding professional knowledge can be transferred to further dimensions of professional competence, such as motivational characteristics.

5.2.2 Methodological Reflection on the Analyses

To answer the research questions, both empirical studies used advanced analysis methods with latent modeled variables. Further, proven instruments with high levels of internal consistency were used. Nevertheless, all data were collected exclusively by self-report, which can be a limitation because of common method variance (e.g., Podsakoff et al., 2003).

Study I investigated student teachers with a multi-method design combining quantitative (latent change score models; e.g., McArdle, 2009) and qualitative (qualitative content analysis; Mayring, 2014) approaches. Therefore, the aim was twofold: First, we studied the development and relationship between the constructs of emotional exhaustion and emotional support from peers. Second, we evaluated dropout intentions of student teachers and compared them with already existing dropout motives from other study programs.

Latent change score models are a flexible approach that investigates the average change in variables over time; these modesls are comparable to longitudinal structural equation models and also consider individual differences (Kievit et al., 2018; Klopack & Wickrama, 2020; McArdle & Grimm, 2010). In particular, the bivariate model allows the investigation of the relationship of the variables. Therefore, it was possible to investigate the latent relationship between emotional exhaustion and emotional support at measurement point 1. The bivariate model allowed us further to investigate whether earlier emotional exhaustion predicts later well-being. For this reason, latent change score models were an appropriate method of analysis to answer the research questions of this disseration.

The open-response item to dropout intentions was adopted by the BilWiss research group and referred specifically to student teachers. The item focused only on dropout intentions; by definition, these cannot be equated with actual dropout. Nevertheless, dropout intentions are a suitable measure and can be seen as the strongest predictor of actual dropout (e.g., Blüthmann, 2012; Bohndick, 2020; Fleischer et al., 2019). From the perspective of dropout research, the study entry phase should be particularly considered since dropout from university mainly occurs at an early point (Neugebauer, Heublein, & Daniel, 2019). A further limitation is that our analysis did not allow longitudinal analysis of dropout intentions. Although data from three measurement points were available, we used the data from measurement points 2 and 3 to confirm our coding scheme. Implementing a valid instrument was particularly important because student teachers have predominantly not been considered to date. For future research, it would be desirable to use our coding scheme for student teachers longitudinally, for example, over a whole study program.

A methodological strength of study II is that a person-centered (latent profile analyses) and a variable-centered approach (latent change score model) were used. First, latent profile analyses were used to identify participants sharing similar motivational patterns (e.g., Berlin et al., 2014; Marsh et al., 2009; Nylund et al., 2007). In our study only two dimensions of motivation were considered. Since motivation involves more than the two selected dimensions, it is recommended that future studies investigate further dimensions such as goal orientation, interest, or autonomy to gain a broader insight into the interplay of different motivational patterns.

Our research interest was to determine how the motivational variables that theoretically connect to different components (self-efficacy on expectation of success and enthusiasm on a value component) interact with each other. With this more exploratory person-centered approach, it was possible to answer the question of whether there are beginning teachers with high levels of self-efficacy and low levels of enthusiasm or vice versa (possibility of qualitative profiles, profile shape; Marsh et al., 2009). It was also conceivable that self-efficacy and enthusiasm would be expressed on an equal level (possibility of quantitative profiles, profile level; Marsh et al., 2009).

Contrary to the person-centered approach, which clusters individuals with similar patterns within a person, the variable-centered approach investigates the relationship between variables across persons (Marsh et al., 2009). In contrast to the person-centered approach, the variable-centered approach requires large sample sizes and information about the relationship of the variables in advance (Bennett et al., 2016).

The results from the latent profile analyses—with only quantitative profiles (low, medium, high motivation) and only six participants assigned to the low-motivation profile—raised the question of whether the person-centered approach is beneficial. The choice of the person-centered approach was driven by theoretical assumptions. Although there is a consensus that teacher motivation is multidimensional (e.g., Cook & Artino, 2016; Holzberger et al., 2013), variable-centered research often considers only isolated facets of motivation (e.g., Keller et al., 2018; Rodriguez-Hidalgo et al., 2014). However, our research interest was to find out more about the interplay of self-efficacy and enthusiasm in response to previous research showing that the constructs are correlated (e.g., Burić & Moè, 2020; Fauth et al., 2019; Lazarides et al.,

2021; Praetorius et al., 2017). For this reason, it was important to investigate them together to find out more about their interrelation. Even if only quantitative profiles were detected, the results revealed that motivational variables changed over time. Whereas the patterns at the end of pre-service teacher education were clearly separable, they became one profile until two years into the teaching profession. To adhere to good scientific practice, the research design was determined in advance based on theory and existing research gaps. For this reason, and via the more exploratory nature of latent profile analyses, we were unbiased in terms of whether qualitative or quantitative profiles would arise.

To conclude, quantitative profiles mainly refer to profile-level differences; therefore, they are not a big advantage to a variable-centered approach. Nevertheless, through latent profile analysis, it was possible to show that motivational characteristics become more homogeneous after two years in the teaching profession. Therefore, the subsequent variable-centered approach was a valuable extension to map the change of the variables in more detail.

5.2.3 Methodological Reflection on the Constructs

Having reflected on the database and the analyses, in this section, we discuss the constructs that were used to answer the research questions. As this section is particularly relevant for future researchers, the focus is on the implications for future research practice.

Emotional exhaustion at university as an indicator of student well-being

The results revealed that emotional exhaustion changed over three consecutive semesters. Significant variances in the latent change score variables illustrated that the changes did not affect all participants equally. For future research, it would be beneficial to investigate why some students become more exhausted than others do. One research idea that could be beneficial to answer this question would be to consider personal characteristics. Reichl et al. (2014), for example, showed that neuroticism in combination with extrinsic motivation for choosing teacher education favors stress, and therefore, it is negatively related to well-being. In contrast, they found that high values on the personal characteristics of extraversion and conscientiousness in combination with intrinsic motivations (interest in the taught subject) positively affect well-being.

Our research design included only emotional support from peers and investigated the relationship with well being. Emotional support from peers seems not to be the strongest resource for explaining a later change in student teachers' well-being. Therefore, other contextual variables need to be identified that positively shape well-being. Emotional support from peers is a construct that is connected to the student situation at university (internal factors). It is also conceivable that external factors affect well-being. External factors comprise conditions of life, such as the financial situation or personal factors (e.g., illness or discrimination). Although these factors were mentioned rarely in the qualitative content analysis (financial situation: $n = 74$, personal reasons $n = 72$) compared to internal factors (e.g., performance problems: $n = 456$, lack of motivation to study: $n = 161$), they may have an influence on the different perception of emotional exhaustion. For future studies, it is recommended to also address this research gap by testing different internal and external contextual variables like that may shape well-being.

Further suggestions for future studies to make even better use of the potential of the available BilWiss data and to investigate performance problems in more detail are to consider variables that can influence occupational well-being at university, such as failed examinations or modules that had to be repeated.

Finally, it must also be noted that occupational well-being was viewed only from a negative perspective in this dissertation, which investigated the development of emotional exhaustion with the assumption that teacher education is characterized by challenges and unfavorable contextual conditions. Theories on occupational well-being unanimously claim that well-being is a multidimensional construct that involves both positive (e.g., job satisfaction or organizational commitment) and negative dimensions (occupational stress) (Mankin et al., 2018; van Horn et al., 2004). Therefore, it is recommended that future research include both perspectives to gain a more comprehensive picture, even for university students.

Student teachers dropout intentions

Research on student dropout often excludes student teachers'. This also becomes apparent because, to date, no model is available that explains dropout specifically for teacher education (Herfter et al., 2015). However, it is essential to examine this target group regarding dropout intentions to prevent future teacher shortages. With the insight that student teachers are not a specific group of students and face the same challenges as students from other study programs, it was possible to apply general preventive measures that can be helpful for future student teachers to improve study success (see section 5.3). Although most motive groups have agreed with the subject-independent findings from Heublein et al. (2017), one new motive group for student teachers was identified. For further research, it would be necessary to confirm the results of this dissertation, especially on the new motive group that is specific to teacher education.

Our investigation considered four universities located in four different federal states. For this reason, causal statements are not possible. Future studies should investigate dropout nationwide, including with regard to different teacher education contexts.

Finally, the findings do not allow any statements about which dropout intentions are perceived as particularly stressful or to what extent they can be structured hierarchically. An investigation of the Universitiy of Leizpzig that less frequently mentioned dropout motive groups were in some cases more decisive for dropping out of university (Herfter et al., 2015). Further qualitative research, especially interview studies, would be beneficial to address this issue.

Beginning teachers motivation

It would be interesting to assess how further dimensions of professional competence, such as knowledge, beliefs, or self-regulation, act together with motivational variables. An analysis that started on that basis is the study by Holzberger et al. (2021). These authors conducted a latent profile analysis with motivational variables and different dimensions of professional competence (knowledge, beliefs, motivation, and self-regulation). As a result, three qualitative profiles were also found for beginning teachers at the end of pre-service teacher education. In contrast to the profile analysis of this dissertation, which showed that beginning teachers become more homogeneous regarding the motivational variables of self-efficacy and enthusiasm and enter the teaching profession highly motivated. Holzberger et al. (2021) showed

that beginning teachers differ regarding the starting conditions when they enter the teaching profession. Therefore, it seems fruitful to include further dimensions of professional competence and to investigate how these variables act together. Starting with this, objective measures, such as competence tests, can be a valuable extension to self-reported data.

Whereas study II examined the interplay and change in motivational variables it would also be beneficial to investigate the relationship with outcome variables in more detail. Since a lack of well-being is especially responsible for early retirements—and as a consequence, teacher shortages— it seems to be particularly relevant to identify the relationship with constructs that foster teacher well-being.

Future research directions to build on the motivational constructs of self-efficacy and enthusiasm can be described as follows: Here, to investigate the specific target group of beginning teachers in the transition phase, general self-efficacy (measured with the Teacher Self-Efficacy Scale from Schwarzer et al., 1999) and self-efficacy for classroom management (subscale of the Teachers' Sense of Efficacy Scale from Tschannen-Moran and Woolfolk Hoy, 2001) were used. Both are common and validated instruments and were suitable for our sampe of beginning teachers. For our sample, previous confirmatory factor analysis for both instruments showed, that there are two underlying factors. This is particularly interesting regarding self-efficacy for classroom management, because a subscale was already used. For beginning teachers in our sample, the subscale was further divided into lesson procedures and disruptive behavior. The results of the latent change score analysis support this distinction. While a significant decrease was found in disruptive classroom behavior, the lesson procedure remained stable over time. In general, a variety of instruments are available especially for the construct of teacher self-efficacy (e.g., Enochs & Riggs, 1990; Gibson & Dembo, 1984; Sharma et al., 2012; Tschannen-Moran & Woolfolk Hoy, 2001). Two conclusions can be deduced from these findings: First, researchers should intensively consider in advance which of the many proven measurement instruments is suitable for their planned study. In addition, proven instruments that are used for a specific target group should again be validated for their dimensionality. A study that systematizes instruments of teacher self-efficacy is currently prepared at the Centre for International Student Assessment (Täschner et al., in preparation).

Regarding enthusiasm our study considered the important distinction between enthusiasm for teaching and enthusiasm for the subject. This is particularly important because of the different underlying mechanisms. While enthusiasm for teaching is related to classroom variables (Kunter et al., 2011) and decreased for our sample, enthusiasm for the subject is related to a person's interest and increased for our sample (Krapp, 2002). Accordingly, the findings indicate that this separation is beneficial and should be maintained in future studies. However, a successful teacher is also characterized by a match between experienced and displayed enthusiasm (Keller et al., 2018). Since there were no data available in the BilWiss dataset, an evaluation in this respect was not possible for our study. It would be desirable to take this interaction into account in future studies. At this point, it would also be beneficial to compare self-reports with student ratings.

Finally, both for the development of self-efficacy and for enthusiasm, it would be desirable to investigate even longer periods. While the aim of study II was to examine, the transition phase, it would be desirable to examine the full duration of teacher education until in-service teaching. In particular, studies that survey the period from the beginning of teacher education

at university to in-service teaching would be important to determine when exactly the change in the variables occurs and whether there is a point in time at which motivation is established and remains stable.

Social support from peers and colleagues

To answer the third question (*What is the role of the social contextual variable of social support?),* both studies investigated social support as a possible resource by focusing on the internal network under consideration of peers (study I) and colleagues (study II).

To date, social support has been predominantly studied cross-sectionally (e.g., Chung, 2019; Fiorilli, Benevene, et al., 2019), while longitudinal studies are scarce. Study I focused on this aspect and investigated the emotional support of peers over three consecutive semesters. Even if only one dimension of social support was considered in that investigation, emotional support was shown, besides informational support, to be particularly important for student teachers if it is perceived as appropriate (e.g., Väisänen et al.,2016). Nevertheless, future studies should comprehensively investigate social support by including the common dimensions of emotional, instrumental, and informational support (e.g., Richter et al., 2011). Regarding the relationship of the variables, there was no evidence that emotional support influences later well-being. Future research should investigate whether support may have a stronger impact on variables that are primarily associated with studying at university. In their study, Mattanah et al. (2012) showed that social support had a positive effect on the performance of university students.

The contextual aspects at university differ strongly in how supportive they are (Zimmermann et al., 2018). For future research, it is recommended to identify and investigate further possible contextual resources that can mitigate stressful situations and therefore foster well-being. This is also analogous to a research gap identified by Kassis et al. (2019), who stated that further research is needed to identify how students can be supported from their institution. This would be particularly beneficial to further differentiate the contextual aspects in the expanded model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013).

Regarding supportive persons, both studies investigated support from the internal network, focusing on people that are familiar with the professional realities.

Besides peers and colleagues, two other groups that can also be linked to the internal network of students were not considered in our studies but seem worthwhile for future research—namely, lecturers and mentors. Mokgele and Rothmann (2014) showed that university lecturers play an important role in offering social support regarding motivation to study, whereas Väisänen et al. (2016) emphasized that support by lecturers is relevant for student well-being. In particular, when support from lecturers is perceived as lacking and students don't know what lecturers expect or cannot discuss their questions, they can lose their motivation to study (Mokgele & Rothmann, 2014). Considering the qualitative results of study I, a lack of support from lecturers was mentioned more often than a lack of support from peers regarding dropout intentions. Mentors can also play an important role in supporting students or beginning teachers, and this has a positive effect on dropout (Schlichte et al., 2005). From a theoretical perspective, mentors are experienced teachers at school and can act as role models. Looking at the sources that influence the development of self-efficacy (Bandura, 1997), mentors

can offer social persuasion. The results from Richter, Kunter, et al. (2013) showed that selecting suitable mentors is crucial; in particular constructivist-orientated mentoring approaches positively influence self-efficacy, enthusiasm, and emotional exhaustion.

For teachers at school, relationships with students also play a significant role in the motivation to stay in the profession (Han et al., 2016). For future studies, it would be desirable to conduct a more comprehensive investigation, analyzing colleagues and the relationship with students with whom teachers spend a particularly large amount of time at work. Additionally, the relationship with principals could be a valuable future investigation in combination with the dropout intentions of an institution.

In addition to the different actors who can offer social support, it would be interesting to find out more detailed information about the quality and composition of the network. As an more objective measure that also considers the quantity of contacts, social network analyses (e.g., Borgatti et al., 2018) can offer insights into group characteristics and compositions (Berthelon et al., 2019; Lintner, 2022). In the context of future research, it would be beneficial to combine self-reported data regarding social support and validate this perception with approaches that also take the quantity of contacts into account.

5.3 Practical Implications for Teacher Education

Impending teacher shortages right from the beginning, major efforts are being made in Germany, for example, by the Quality Initiative in Teacher Education (called *" Qualitätsoffensive Lehrerbildung"* in German), to make teacher education more attractive for future students (BMBF, 2016).

The dissertation revealed the following most frequently mentioned dropout intentions from student teachers: *Performance problems* and a *lack of motivation to study*.

First, performance problems and a lack of motivation to study can emerge when a study program does not match individual expectations (e.g., Isleib et al., 2019; Reichl et al., 2014). For that reason, counseling services before enrolling in a study program can be recommended to clarify whether teacher education is likely to fit individual expectations (Reichl et al., 2014). The most popular instrument for German universities that focuses on job-related interests and personality is the Career Counselling for Teachers (CCT) (Mayr et al., 2016). This web-based tool is the most used in Germany, but only obligatory in Baden-Württemberg and North Rhine-Westphalia (e.g., Mayr et al., 2016; Renger et al., 2019). An advantage of the tool is that, in addition to the sole assessment of the environment-fit, future students receive appropriate information about the teaching profession (Mayr et al., 2016). For that reason, the tool can be particularly relevant for students who are unsure about their choice of study and prevent early dropout. In addition, letters of motivation or selection interviews, which tend to be conducted at mainly smaller universities, could also be beneficial to increase the individual's fit to a study program, and in turn, reduce performance and motivational problems.

While the first practical implications were mainly based on assumptions of the bright person hypothesis, recruiting student teachers with favorable characteristics, the following practical implications focus on assumptions of the qualification hypothesis that professional competence builds up and develops over time.

Another approach, that aims to alleviate performance problems and is already partly offered by universities involves setting courses that prepare beginning teachers after graduation from school and before starting university (called *"Brückenkurse"* in German). Simply imparting content in which the personal fit for the subject or the study program can be verified, these courses also bring students together at an early stage; thus, they may enable the initial establishment of the future network.

Having considered the time before taking up teacher education further practical implications can be outlined that are directly related to the course of study. Since student dropout usually occurs at an early stage (e.g., Neugebauer, Heublein, & Daniel, 2019), and our study may also have lost students who dropped out of teacher education early, a further implication is the need to guide and support students, especially in their first semester. Beyond peer students, lecturers seem to play a crucial role. Research has already confirmed (see section 4.2.3) that lecturers at university play an important role in students' performance. For this reason, pedagogical, and social trainings of lecturers, already offered at many universities, can be helpful in addressing students' performance problems and issues with teaching quality. It is assumed that trained lecturers are better at handling student difficulties and offering more appropriate help. However, lecturers also influence students' motivation to learn by highlighting the relevance of the learning content to their later professional lives (Blüthmann, 2012).

A strategy, that stems from burnout research and has already proven successful in practice is the teaching of coping strategies at an early stage. In their investigation, Väisänen et al. (2018) showed that coping with stress related to the teaching profession starts during the phase at university. Using proactive strategies that can already be taught during university teacher education can help to overcome phases that are especially exhausting, such as examination phases. Pietarinen et al. (2013) argued similarly for the sample of in-service teachers that strategies which prevent burnout and enable a better work-environment fit can be learned.

Study conditions were another aspect that seemed particularly relevant for student teachers and frequently mentioned concerning dropout intentions. Study conditions apply equal to all students, and adjustments by the university can help to improve the situation for all. The most frequent motive that was mentioned regarding study conditions in our study was an inadequate study organization, which can be further described in terms of the availability of courses or the structure of the modules. Regarding the availability of courses, it would be desirable for student teachers to have a sufficient number of courses available in each semester that they do not have to worry about lacking a place. A large number of crowded courses can have the worst consequence in that the study program cannot be completed in the standard period. The coordination of courses seems particularly relevant for student teachers because they can be assigned to different faculties if they study different subjects. In addition, to the course organization the coordination of internships also needs to be considered. Given these organizational conditions, it is not surprising that study conditions were mentioned as the third most common factor in student teachers' dropout intention.

A further issue that is associated with study conditions is the coherence of a study program. In the investigation student teachers perceived that modules do not build on each other. This lack of connectedness from courses is a well-known problem in teacher education (e.g.,

Hammerness, 2006; Wagner et al., 2019). Additionally, teacher education is characterized through obligatory practical phases. School internships, should also be integrated in lessons at university and supervised (e.g., Bauer et al., 2020; Darling-Hammond, 2006). Efforts are already being made to improve this problem, particularly through the accreditation of study programs. Further, connecting the phases of teacher education in Germany is one of the main goals of the Quality Initiative in Teacher Education (BMBF, 2016).

Although our study did not give evidence that emotional support from the peer group predicts later well-being, previous findings indicate that peers are particularly relevant for student performance and dropout (e.g., Collings et al., 2014; Mattanah et al., 2012). In addition, Gibney et al. (2011) showed a key concern of beginning students is that they do not develop a network at university. For this reason, it still seems important to bring students together. Collaboration of peers can be promoted at the university in lesson procedures by applying appropriate teaching methods that foster student networks, such as learning groups. In addition, there are programs available that connect peers. One example is le-to (learning together), in which students with similar personal characteristics and types of learning are assembled (TUM Junge Akademie, 2021).

The implications mentioned above relate to the university phase of teacher education, but the results of study II also allows to outline practical implications regarding the transition phase from pre-service teacher education into in-service teaching. Above all, the results speak for the effectiveness of German pre service teacher education.

The results suggested that motivational facets were promoted during pre-service teacher education. Beginning teachers seem to have a realistic view when they enter the teaching profession and established perceptions seems to match the reality. This assumption is due to the fact that only six people were associated to the low motivational profile at the end of pre-service teacher education and regarding in-service teachers after two years into the teaching profession motivation was still at a high level. Therefore, a second “reality shock” was not detected for our sample regarding the motivational dimensions of self-efficacy and enthusiasm.

This result speaks to the effectiveness of the additional pre-service element of German teacher education, where beginning teachers are guided to the profession via weekly courses that take place at the teacher training institute. Further, it is also frequently the case that experienced teachers support beginning teachers on site at school. This support is especially helpful when mentors support constructivist learning (e.g., Richter, Kunter, et al., 2013). Arguing with the sources that can shape self-efficacy, mentors can offer vicarious experiences and social/verbal persuasion through feedback. Previous results also indicate that this support has a positive effect on reducing dropout intention (Podolsky et al., 2016; Schlichte et al., 2005).

Even if our participants were highly motivated, there are also beginning teachers who start pre-service teacher education with less favorable prerequisites. Training programs could be especially beneficial for those participants who show unfavorable motivational conditions. This practical implication ties primarily to the assumption that motivation is malleable and develops over the course of teacher education (e.g., Kleickmann & Anders, 2013; Kunter, Klusmann, et al., 2013; Locke & Latham, 2004).

Although our study found no evidence that collegial support affects the development of motivational factors, it is an important variable regarding future teacher shortages. Podolsky et al. (2016) showed, for example, that colleagues represent an important resource to help teachers stay in the profession. Accordingly, it seems a fruitful practical implication that the school context should foster teacher collaboration, such as discussion groups for teachers with the same subjects, but also the exchange between teachers from different schools.

6 Conclusion

Teacher shortages are expected to become an increasing problem in the coming years. Thus, it is the responsibility of educational research to identify resources that have a positive impact on teachers' retention in the educational system. To date, contextual variables played a subordinate role even if they are malleable and can be adjusted through the institution to improve the current situation for students or beginning teachers. For this reason, it is supposed that if contextual factors are perceived as appropriate this can prevent student teachers or beginning teachers of dropping out of the system.

In order to investigate contextual variables in a theory-based framework, the model of the determinants and consequences of teachers' professional competence (Kunter, Kleickmann, et al., 2013) was extended as part of this dissertation and comprises now *demographic*, *structural*, and *social aspects*. It was assumed, that particularly social aspects such as the support from peers or colleagues acts as resources to buffer challenging situations.

Theoretically, based on the qualification hypothesis that professional competence builds up and develops over time, a further aim this dissertation was to perform analyses with longitudinal designs for different phases of teacher education. Of particular intersest was the development of variables linked to student teachers' well-being (emotional exhaustion) and beginning teachers' professional competence (motivation).

With that study design, the dissertaion allowed to answer three overarching research questions:

(1) How do well-being and motivation develop over different phases during teacher education?
(2) What are the main dropout motives for student teachers?
(3) What is the role of the social contextual variable of social support?

To answer the first part of research question I on how well-being develops during teacher education, a student sample of four German universities was analyzed. The results confirmed that emotional exhaustion cannot be seen as a stable construct because it changed over the time span of 1.5 years. After an initial increase, emotional exhaustion changed in a positive direction. This particular positive finding can be interpreted as showing that after a more challenging phase at university, there will be a phase in which student teachers can recover. The results for our sample did not indicate that there is a constant negative trend and teacher education gets more and more exhausted over time. Nevertheless, the evaluation of the dropout intentions showed that there are aspects (in particular the study conditions) that can be improved. As a consequence, this could maybe lead to further reduce emotional exhaustion.

Answering research question II, the main dropout motives for student teachers in more detail, it can be concluded from a high number of codings that thinking about university dropout is widespread in teacher education. The dissertation specifically addressed the research gap in which student teachers are not considered in terms of dropout intentions. Referring to already proven subject-independent motive groups of dropout, a large overlap of motive groups was found. Accordingly, it can be concluded that student teachers, like other students, are concerned with performance problems and a lack of motivation to study. In particular, study conditions seem to be relevant for student teachers. The availability of courses and the structure of the modules were issues rated as especially problematic. Since our results allowed to derive practical implications for educational practice, this dissertation also makes an important contribution to educational practice.

An occupational phase that is of particular interest regarding teacher shortages because it is associated with high dropout rates was investigated in study II. This allowed answering how motivational variables develop the following pre-service teacher education until two years after in-service teaching (second part of research question I). Therefore, the motivational variables of self-efficacy and enthusiasm were selected because both are associated with favorable outcome variables for the students but also for the teachers. While latent profile analyses at the end of pre-service teacher education showed evidence for three different quantitative motivational patterns, these could not be identified two years after entering the teaching profession. Therefore, the analysis of this dissertation supports the assumption that motivation is malleable and changes during the time of teacher education. To investigate the change of variables in more detail, a variable-centered approach was used, and it was found that dimensions of self-efficacy and enthusiasm changed in different directions. This result is particularly relevant for future research to find underlying mechanisms that explain the change in more detail.

As stated above, of particular interest of this dissertation was the role of social support as a contextual variable (research question III). It can be seen in the expanded model of the determinants and consequences of teachers' professional competence that social support refers to the social aspects of a person's individual context. Even if direct paths from the individual context on well-being and motivation could not be confirmed, the findings do not imply that social support is irrelevant. The dissertation solely investigated the internal network—people that are connected to the work environment. However, a supportive network also includes external people, such as family and friends and it is strongly recommended for future research to investigate the groups in combination. Ultimately, beyond the relationship between well-being and motivation, longitudinal analyses with the subdimension of emotional support for university students allowed to derive that it is possible to establish networks during teacher education and keep them stable.

Overall, the dissertation investigated relevant constructs that are associated with challenges and opportunities of teacher education and examined the interplay and the development of the variables over different phases of teacher education. Even if no significant influences were found with regard to the role of social support, the results nevertheless show a positive picture. Student teachers are able to form stable relationships with other students right from the beginning and beginning teachers master the entry into the profession quite well and continue with predominantly high levels of self-efficacy and enthusiasm.

7 References

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Appendix

Appendix A

Hartl, A., & Holzberger, D. (2022). Identifying teachers' motivational profiles and their change from teacher education into practice: A longitudinal study. *Zeitschrift für Erziehungswissenschaft.* https://doi.org/10.1007/s11618-022-01093-0

Appendix B

Hartl, A., Holzberger, D., Hugo, J., Wolf, K., & Kunter, M. (2022). Promoting student teachers' well-being: A multi-study investigating the longitudinal relationship between emotional exhaustion, emotional support, and the intentions of dropping out of university. *Zeitschrift für Psychologie, 230*(3), 241-252. https://doi.org/10.1027/2151-2604/a000495

Note:

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