





Enhancing pre-service teachers' well-being during long-term internships: The roles of self-efficacy, mentoring, and task-related sense of coherence

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ABSTRACT

This study investigates the protective influence of different resources on the occupational well-being of pre-service teachers during their long-term internship. This research grounded in the theoretical framework of the JD-R model seeks to comprehend how internal resources such as self-efficacy and task-related sense of coherence (SoC) in pre-service teachers along with external resources such as different mentoring styles can foster engagement and mitigate emotional exhaustion. This study introduces the task-related SoC as a novel internal resource in the context of long-term internships to determine its value alongside other resources. The study used a sample of 213 pre-service teachers who answered self-questionnaires at the beginning and end of their four-month-long internship. Structural equation modeling explored the relationships between self-efficacy beliefs, task-related SoC, mentoring approaches, engagement and emotional exhaustion. Results indicate that self-efficacy and task-related SoC significantly predict pre-service teachers' occupational well-being. Among mentoring approaches, emotional mentoring emerged as the most influential in fostering well-being. The findings confirm the health-promoting effects of self-efficacy and emotional mentoring. This is the first study to apply the general construct of a sense of coherence to the specific context of a long-term internship. It demonstrates that strengthening pre-service teachers' SoC about particular tasks can be an additional resource for mental health promotion during this period. The results suggest that supporting pre-service teachers in perceiving their internship activities as comprehensible, meaningful and manageable can be beneficial and should be externally promoted by the university.

Contribution/Originality: This study explores the impact of task-related sense of coherence, self-efficacy, and mentoring styles on pre-service teachers' occupational well-being during their long-term internship. It is the first study to apply a task-related sense of coherence in this context highlighting its potential as an essential resource for pre-service teachers and shifting the focus to the perceived meaningfulness and comprehensibility of internship tasks.

1. INTRODUCTION

Teaching internships also called teaching practice or practicum are considered one of the most important components of pre-service teacher education (Cohen, Hoz, & Kaplan, 2013; Fives, Hamman, & Olivarez, 2007; Korthagen, 2010). Thus, most German universities as well as universities worldwide have introduced prolonged

internship periods that allow pre-service teachers to be fully integrated into a school for several months and to engage in an in-depth exploration of the realities of the teaching profession (Košinár, Gröschner, & Weyland, 2019; Lawson, Çakmak, Gündüz, & Busher, 2015). While students mostly appreciate those long-term internships, they are also linked to stress and exhaustion (Gardner, 2010; Kokkinos & Stavropoulos, 2016). For most pre-service students, it is the first time they fully engage with students and implement their lessons. They have to fulfill the role expectations of both the university and the school and manage a considerable workload (Cohen et al., 2013; Jantowski & Ebert, 2014; Krawiec, Fischer, & Hänze, 2020).

Recent research indicates an increasing trend in the stress associated with the teaching profession given that pre-service teachers are at the start of their careers with limited coping strategies (Herman, Hickmon-Rosa, & Reinke, 2018). It is essential to provide prospective teachers with resources to effectively manage the demands of the teaching profession, both during their prolonged internships and subsequent careers. However, research conducted on teaching internships has primarily focused on the aspect of professionalization and competence development with comparatively less emphasis on the promotion and maintenance of occupational well-being (Gröschner et al., 2015; Hascher, 2012; Lawson et al., 2015). As a result, there remains a lack of information on the resources available to pre-service teachers to enhance their ability to cope with work-related demands during this pivotal period.

The current study aims to address this research gap by using the job demands-resources (JD-R) model (Bakker & Demerouti, 2007) as a theoretical framework to determine whether pre-service teachers' internal and external resources can predict outcomes of occupational well-being during their long-term internship. This study emphasizes the task-related sense of coherence, a resource examined for the first time in this context alongside established resources of self-efficacy and mentoring. Enhancing the well-being of pre-service teachers during their internships is crucial to prevent burnout and promote health. Understanding these protective resources is essential for universities to target and support them and to integrate them into future teaching programs (Hakanen, Bakker, & Schaufeli, 2006; Klusmann & Waschke, 2018).

1.1. Structure of the Long-Term Internship

Internships allow pre-service teachers to gain on-site experience before entering the professional world. Long-term internships usually conducted during the master's program can last several months and exceed regular internships in their duration and prospect of providing authentic teaching experiences (Gröschner, 2012). During this period, pre-service teachers are integrated into a real classroom environment where they can plan and implement their teaching units. These extended internship periods are particularly valuable for the professional development of pre-service teachers and thus, most German federal states have introduced such extended internships. While the structural framework may vary across Germany and the world, the overarching goal remains the professionalization of the prospective teachers, linking theory and practice reflection as well as planning and teaching (Ambrosetti, Knight, & Dekkers, 2014; Cohen et al., 2013; Gröschner et al., 2015).

The introduction of pre-service teachers into the school system is typically supported by dual supervision involving teachers from the internship school and university staff. School teachers known as mentors provide daily support by hosting the teaching students in their classrooms, offering learning opportunities, feedback, and emotional support (Ellis, Alonzo, & Nguyen, 2020; Hobson, Ashby, Malderez, & Tomlinson, 2009). University supervision primarily involves seminars on subject didactics, lesson planning, implementation, reflection, and classroom visits for collaborative feedback (Allen & Wright, 2014; Gröschner, 2012).

1.2. Theoretical Background

Occupational well-being can be described as the presence of positive experiences such as engagement and satisfaction, and the absence of strains and emotional exhaustion (Aldrup, Klusmann, Lüdtke, Göllner, & Trautwein,

2018). However, being satisfied at work does not negate the existence of any demands. Demands are not to be understood as something negative but as any occupational factor that requires some kind of effort such as time pressure, disruptive students, workload or collaboration with colleagues. If there are not enough or the right resources available such demands can be perceived as unfavorable and cause strain. Strain can appear in the form of emotional exhaustion, the central symptom of burnout, leaving employees feeling drained, overwhelmed, and exhausted (Maslach, Schaufeli, & Leiter, 2001). Thus, the occurrence of negative strain depends on the availability and adequate utilization of resources to cope successfully with such demands (Bakker & de Vries, 2021).

A leading explanatory framework for conceptualizing occupational well-being is the JD-R model which places demands, resources and outcomes into context (Bakker & Demerouti, 2007). Its basic assumption is that job strain results from an imbalance between demands and resources. As two parallel processes, demands and resources lead either to strain and exhaustion if resources are unavailable or to well-being and job engagement if resources are at hand. However, these two processes also interact in such a way that demands can reduce the effect of resources on well-being, and resources can reduce the effect of demands on strain. This study examines the motivational process to identify resources that can enhance occupational well-being (engagement) and reduce symptoms of strain (emotional exhaustion) in the context of the long-term internship. Fostering the well-being of pre-service teachers is crucial for their long-term success and retention in the teaching profession since low personal well-being can lead to career doubts and premature dropouts, exacerbating teacher shortages (Chambers Mack, Johnson, Jones-Rincon, Tsatenawa, & Howard, 2019; Mostert & Pienaar, 2020). Additionally, pre-service teachers are particularly vulnerable to stress and burnout due to limited coping strategies (Fives et al., 2007; Schaarschmidt, 2005) with burnout often taking root in the pre-service stage (Gavish & Friedman, 2010). Therefore, it is essential to promote their well-being particularly during internships and to equip future teachers with the resilience needed to thrive in their careers, ultimately benefiting the entire education system.

2. LITERATURE REVIEW

2.1. Demands of the Long-Term Internship

Research on the experiences and mastery of demands during long-term internships is still scarce and inconsistent. Some studies indicate increased stress levels in pre-service teachers during this period (Hascher & Hagenauer, 2016; Jantowski & Ebert, 2014; Schüle, Schriek, Kahlert, & Arnold, 2017) while more recent studies do not support these findings (Kokkinos & Stavropoulos, 2016; Krawiec et al., 2020; Kücholl, Westphal, Lazarides, & Gronostaj, 2019). It is important to note that the comparability of studies is limited due to the distinct education systems in each country. However, in light of the mentioned studies and building upon the findings of Fives et al. (2007) and Ulvik, Helleve, and Smith (2018) it can be concluded that the internship phase is a particularly delicate period defined by a myriad of interconnected demands. According to Kokkinos and Stavropolous (2009) there are four primary sources of stress during school-based internships: administrative stressors (i.e., work overload and time management), classroom-based stressors (i.e., disruptive behavior and lack of high school student discipline), personal stressors (i.e., the pressure to perform successfully and feelings of personal competency) and assessment-related stressors (i.e. the anxiety of being evaluated) (Kokkinos & Stavropolous, 2009). The pre-service teachers must not only navigate the demands of students, school administrators, and their expectations (Fichten, 2017; Hobson & Maxwell, 2020) but also fulfill the requirements of the university which might result in different and potentially conflicting expectations from both sides (Fichten, 2017; Hobson & Maxwell, 2020). Furthermore, pre-service teachers may experience a clash between their idealistic and optimistic beliefs and the practical realities of the teaching profession (Cady, Meier, & Lubinski, 2006).

Krawiec et al. (2020) interviewed prospective teachers during their long-term internship and identified student misbehavior, unclear role attributions, and inadequate supervision and organization as the most significant stressors. Similarly, Chaplain (2008) highlights student behavior, workload and insufficient support from mentors,

teachers and school leaders as significant stressors. Additionally, other studies have highlighted that university requirements such as creating portfolios, conducting research tasks and participating in accompanying seminars also contribute to stress (Bach, 2015; Holtz, 2014; Mertens, Glock, & Gräsel, 2018).

Although findings remain partly inconclusive, the long-term internship can be considered a psychologically sensitive period that requires pre-service teachers to use various resources to gain valuable and encouraging practical experience during their long-term internship and to maintain their occupational health (Cohen et al., 2013; Klassen & Durksen, 2014; Krawiec et al., 2020).

2.2. Resources for the Teaching Profession and Long-Term Internship

There has been a paradigm shift in research on the occupational well-being of teachers (Döring-Seipel & Dauber, 2010). This shift aligns with the salutogenetic approach which emphasizes the origins of well-being rather than solely focusing on the origins of illness (pathogenesis) (Antonovsky, 1996). Resources contributing to well-being can be categorized as either internal such as personality traits and other physical or psychological attributes, or external, including social or organizational factors (Becker, 2006; Richter et al., 2013). In the context of teaching, job resources include job control, good relationships with students, colleagues and the principal, an innovative school climate, scope for action and autonomy and transparency in decision-making (Bakker & de Vries, 2021; Hakanen et al., 2006; Rothland & Klusmann, 2016).

The importance of resources in fulfilling the needs of the teaching profession is well recognised and is a rapidly expanding field of study while their relevance for pre-service teachers during long-term internships remains relatively understudied. Existing research indicates that pre-service teachers primarily rely on mentor teachers and fellow university students for resources (Römer, Rothland, & Straub, 2018). Emphasis is placed on the quality rather than the quantity of mentorship, underscoring the power of a constructive and appreciative approach to guidance (Becker, Waldis, & Staub, 2019; Bruns, Küth, Scholl, & Schüle, 2021; Richter et al., 2013). Fellow university students can contribute through the exchange of materials and by providing emotional support (Römer et al., 2018). In addition, self-efficacy has been recognized as a resource to alleviate feelings of burnout among pre-service teachers during their practical experiences (Clark & Newberry, 2019; Fives et al., 2007). The following sections highlight these resources: self-efficacy and mentoring along with the novel concept of a task-related sense of coherence in the context of the long-term internship.

2.3. Task-Related Sense of Coherence

One empirically well-established personal resource is Antonovsky's (1996) sense of coherence (SoC) which is the central element of Antonovsky's salutogenic model. People with a SoC perceive their environment as comprehensible, manageable, and meaningful. As a result, they manage stressful situations and unfavourable life events effectively. Comprehensibility entails experiencing challenges as structured, predictable and explainable with a sense that things happen for a reason. Manageability refers to the perception of having different strategies to deal with demands and meaningfulness refers to challenges being seen as worthy of investment and commitment. Numerous studies have found a direct or indirect link between SoC and improved health and psychological well-being. SoC is negatively related to anxiety, depression, burnout and hopelessness and positively related to optimism, resilience, control and coping (Eriksson & Lindström, 2008). These positive associations have also been verified in the workplace and the teaching profession (Palm & Eriksson, 2018; Vogt, Hakanen, Jenny, & Bauer, 2016). In university students, SoC could even predict better academic outcomes (Grayson, 2008) and fewer difficulties in student lives (Hochwälder & Saied, 2018; Shankland et al., 2019) and a health-promoting lifestyle (Binkowska-Bury & Januszewicz, 2010).

SoC is usually understood and measured as a non-specific global orientation. However, it can also be applied to specific domains such as school, work, university or family (Antonovsky & Sourani, 1988; Dadaczynski, Paulus, &

Horstmann, 2020; Rivera, García-Moya, Moreno, & Ramos, 2013; Vogt, Jenny, & Bauer, 2013). Therefore, it can also be understood as a work- or task-related internal resource. Some recent studies have investigated a work-related SoC in relation to health and satisfaction at the workplace (Dadaczynski et al., 2020; Van der Westhuizen, 2018). Bauer, Vogt, Inauen, and Jenny (2015) found positive relationships between a work-related SoC and positive health outcomes among different types of employees. Van der Westhuizen (2018) and Eberz, Becker, and Antoni (2011) demonstrated that a work-related SoC has a greater explanatory value for work-related health outcomes than the general concept of SoC. SoC in teaching situations has also been tested in student teachers in Israel and has been shown to act as a buffer against burnout during a first-year student school-based internship (Bracha & Bocos, 2015).

2.4. Teacher Self-Efficacy

Self-efficacy is another commonly synthesized internal resource in the context of teachers' well-being as well as teacher effectiveness and student learning. It describes the personal belief of coping with new arising demands through one's competencies (Bandura, 1997). In contrast to SoC, teacher self-efficacy is the belief in one's ability to achieve educational goals in terms of student engagement, classroom management, and instructional strategies. Self-efficacy is usually assessed as a domain-specific concept (Tschannen-Moran & Hoy, 2001). Many studies have demonstrated that teachers who hold such optimistic beliefs about their teaching abilities show higher levels of well-being and job satisfaction, lower levels of distress and improved student learning outcomes (Aloe, Amo, & Shanahan, 2014; Bardach, Klassen, & Perry, 2022; Dicke et al., 2014; Jentsch, Hoferichter, Blömeke, König, & Kaiser, 2023; Zee & Koomen, 2016). Pre-service teachers also appear to benefit from self-efficacy during their studies (Chesnut and Burley, 2015) particularly during their long-term internship (Böhnert et al., 2018). A series of research studies have reported a negative relationship between teacher self-efficacy and symptoms of burnout during the extended teaching internship (Fives et al., 2007; Kücholl et al., 2019). Bach and Hagenauer (2022) also found a relationship between teacher self-efficacy and joy and a negative relationship with negative emotions. Further research has shown that practical periods in student-teacher education are times when self-efficacy increases (Böhnert et al., 2018; Klassen & Durksen, 2014; Porsch & Gollub, 2018). However, a small amount of research contradicts this notion and has found a decrease in self-efficacy during teaching internships (Garvis, Pendergast, & Keogh, 2012; Schulte, Bögeholz, & Watermann, 2008). These conflicting findings could be due to inadequate study designs or pre-service teachers' recognition of their own shortcomings when reflecting on their personal teaching skills (Pfitzner-Eden, 2016; Rupp & Becker, 2021). However, current research suggests that long-term internships are a crucial source of self-efficacy development during teacher training (Bardach et al., 2022; Böhnert et al., 2018; Pfitzner-Eden, 2016). Pre-service teachers can engage in regular teaching activities, get beyond early obstacles, and succeed in the classroom while being able to observe and learn from the benefits of effective teaching practices. In addition, they receive feedback and supervision from mentors and the university (Clark & Newberry, 2019). SoC and self-efficacy can be treated as separate yet correlating constructs (Davidson, Feldman, & Margalit, 2012; Posadzki & Glass, 2009). Both share similar underlying principles with the dimension of manageability being closely related to self-efficacy. However, SoC also incorporates the components of comprehensibility and meaningfulness and may allow for a deeper analysis of demands (Posadzki & Glass, 2009).

2.5. Mentoring

Mentoring as an external resource refers to the way in which pre-service and novice teachers are supervised by school-based teachers. For example, mentors can support pre-service teachers by creating learning opportunities by involving them in teaching processes and lesson planning and providing emotional and instructional support and feedback (Mok & Staub, 2021). The central role of mentors in teacher education programs is well recognized both in Germany and globally (Cohen et al., 2013; Ellis et al., 2020; Hobson et al., 2009; Ulrich et al., 2020). Mentors also

play a role in the psychological well-being of their mentees as well as contributing to the professional development of pre-service teachers and their teaching skills (Fives et al., 2007; Hobson et al., 2009; Ulrich et al., 2020). Mentors can alleviate the experience of emotional exhaustion through emotional encouragement and informal recognition, such as giving advice and showing appreciation (Darge, Valtin, Kramer, Ligtoet, & König, 2018; Ellis et al., 2020; Richter, Kunter, Luedtke, Klusmann, & Baumert, 2011; Römer et al., 2018; Voss & Kunter, 2020).

Various studies have suggested that a competent mentor should also provide practical and technical support in addition to providing emotional support (Ambrosetti et al., 2014; Izadinia, 2016). Instrumental support involves providing pre-service teachers with materials and advice for lesson preparation and the lesson itself. This type of mentoring support has not yet received much attention in the academic literature (Richter et al., 2011). However, the few studies available suggest that instrumental support is particularly valuable for the learning processes relevant to teachers' professional development (König, Darge, Klemen, & Seifert, 2018) and less relevant for their psychological well-being (Darge et al., 2018). Furthermore, previous research has shown that a constructivist approach to mentoring is more beneficial than a transmissive approach (Becker et al., 2019; Beckmann & Ehmke, 2020; Bruns et al., 2021; Ellis et al., 2020; Richter et al., 2013). Constructivist-oriented mentoring means that pre-service teachers and mentors understand their collaboration as dynamic and bidirectional in which both parties are actively and equally involved. The pre-service teachers' development and professionalization are generated through dialogue and reciprocal exchange of ideas and knowledge. In contrast, transmissive mentoring describes a hierarchical relationship in which the mentor merely transfers his or her knowledge and gives advice (Richter et al., 2013). Several studies have highlighted a positive relationship between constructivist mentoring and novice teachers' enthusiasm, job satisfaction, and reduced symptoms of psychological strain (Burger, Bellhäuser, & Imhof, 2021; Richter et al., 2013; Voss & Kunter, 2020). Bruns et al. (2021); Jähne, Dehne, Klauf, and Gröschner (2022) and Varol, Weiher, Wenzel, and Horz (2023) found similar effects among pre-service teachers during their internships.

3. RESEARCH QUESTIONS

This study aims to analyze the protective influence of different internal and external resources on the occupational well-being of pre-service teachers during their long-term internship based on the findings presented in the previous sections. On the theoretical basis of the JD-R model, this study seeks to understand how teachers' self-efficacy and task-related SoC as internal resources and different mentoring styles as external resources can increase the experience of engagement and at the same time, reduce the experience of strain. The present study is the first to apply a task-related SoC to the context of a long-term internship and to determine whether it can serve as a valuable resource alongside self-efficacy and mentoring. The following research questions were addressed:

Research Question 1: *What is the prevalence of pre-service teachers' internal and external resources during their long-term internship and how do these resources develop from the beginning to the end of the internship?*

Research Question 2: *To what extent do internal and external resources predict outcomes of negative strain (emotional exhaustion) and symptoms of well-being (engagement)?*

4. METHODOLOGY

4.1. Research Design

Descriptive statistics (means and standard deviations) from two measurement points were utilized to address the first research question regarding the prevalence and development of internal and external resources during the long-term internship. Changes in resources over time were examined using paired t-tests for dependent samples with repeated measures. Statistical analysis was performed with SPSS version 28. A two-tailed p-value was examined and interpreted given the exploratory nature of the research question. All analyses were based on a significance level of $p < .05$.

Structural equation models were calculated using Mplus version 6 for the second question regarding the prediction of positive and negative strain by the different resources (Muthen & Muthen, 2011). These structural equation models were computed using a cross-sectional design because data on stress experience could only be collected at the second measurement point. The models were formulated based on the JD-R model. The high correlations between resource scales can lead to problems of multicollinearity and suppression effects in structural equation modeling (Kline & Little, 2016). Separate models were computed for each form of resource to mitigate these effects. The different resources were modeled as latent independent variables and emotional exhaustion and engagement were entered as latent dependent variables. Confirmatory factor analyses were first conducted for each of the three resources (teacher self-efficacy, task-related SoC, and mentoring) as well as for engagement and emotional exhaustion to empirically test the hypothesized models. As suggested in the literature (Hu & Bentler, 1999; Kline & Little, 2016) the acceptance of the models was evaluated using the following goodness-of-fit statistics: a Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) of at least .90 and a root mean square error of approximation (RMSEA) of no more than .08.

4.2. Research Population

In 2022, all students in the master's program in teaching at primary and secondary schools at Leuphana University in Lüneburg, Germany were asked to participate in an online survey about the long-term internship. The long-term internship is the last of three internships and the longest and most intensive. For approximately four months, students spend 15 hours a week in their assigned school where they are required to participate in the design of 64 teaching units in their two chosen subjects. They receive support from both the university and the school mentors with the university visiting at least three times for each subject. Additionally, they must visit accompanying seminars every two weeks, record their professional development in a portfolio and design their research project. Participation in the survey was mandatory but could be refused without explanation. The survey was administered at the following two time points: a few days before the start and a few days before the end of the 18-week internship semester. The total number of participants was 213 students, 196 (92%) completed the survey at one measurement point, and 178 (84%) completed the survey at both points. Among all respondents, 84% were female and the mean age was 24.7 years. 74% reported wanting to teach in a primary school for grades 1-6 (6-9 years old) while 26% wanted to work in a secondary school for grades 6-10 (10-16 years old).

The pre-service teachers continued their two subjects from the bachelor's program into the master's program with most students in this sample having German (43%) and Mathematics (24.4%) as their first subjects. Their second subjects included German (12%), religion (11%), art (12%), and general sciences (26%) which can only be studied for primary school teaching.

Participants completed identical questionnaires that included questions on demographic information, teaching skills, mentoring, and work-related well-being and satisfaction. Only the questions used to analyze this study are listed and discussed below.

4.3. Instruments

4.3.1. Teacher Self-Efficacy

The personal resource of self-efficacy was measured using an adaptation of Schmitz and Schwarzer's (2000) teacher self-efficacy scale. Based on the COACTIV study Baumert et al. (2009) 5 items of the original scale were used in the current study covering aspects of general job performance, coping with stress and emotions, and engaging in job-related interactions. An example item is as follows: "when I try really hard, I can reach even the most difficult students." All remaining items of all scales are displayed in Appendix 1. The response format was a four-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*).

4.3.2. Task-related Sense of Coherence

This study attempted to capture a context-specific measure in relation to the main tasks of a long-term internship in contrast to the existing global instrument of SoC. Therefore, five tasks were identified that encompass the responsibilities of pre-service teachers in preparing and reflecting on their individual lesson units as well as engaging in shared reflection and discussion with mentors about these units. These five distinct tasks are listed in Table 1.

Table 1. Tasks in the long-term internship to which the SOC relates

No.	The following five tasks were rated in relation to comprehensibility, manageability, and meaningfulness.
1.	Planning your lessons is an activity.
2.	Reflecting on teaching is an activity.
3.	Conducting one's lessons is an activity.
4.	Justifying my lesson plan in a conversation is an activity.
5.	Getting feedback on my lesson in a debriefing session and responding to it is an activity.

Based on the approach of Dadaczynski et al. (2020) each task was presented as an incomplete sentence and rated for comprehensibility (*where I can understand what is expected of me*), manageability (*which I can handle well*), and meaningfulness (*which is beneficial for my learning during the internship*). Responses were scored on a 4-point Likert scale ranging from 1 (*not true*) to 4 (*true*).

4.3.3. Mentoring

The external resource of mentoring was measured by addressing the following three aspects of mentoring: emotional, instrumental (Richter et al., 2011) and the degree of constructivist support (Becker et al., 2019). Emotional support is about help in the form of closeness and comfort and the opportunity to discuss challenges faced during the internship. An example item is: *"I can talk to my mentor about everyday problems during the internship."* Instrumental support involves providing resources and materials relevant to the pre-service teachers' tasks during their training. This may include providing teaching materials or sharing lesson preparations, e.g., *"my mentor is a great help to me when it comes to teaching methods and content."* The third aspect of mentoring involves a constructivist mentoring style where the mentor and the university student meet on equal terms. Both the expert and the mentor consider the progress of the university student and school students as their shared responsibility, avoiding any hierarchical relationship. An example item is: *"we adapted and developed the lesson plan together."* Each mentoring aspect was assessed by asking the pre-service teachers to rate their interaction with their mentor by the end of the internship. It was only at the second measurement point that meaningful statements on the support by mentors were possible. Each aspect was measured with three items and participants had to respond on a four-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*).

4.3.4. Emotional Exhaustion

Pre-service teachers' experience of negative strain was measured by four items corresponding to the factor of emotional exhaustion which is a widely used measure developed by Maslach and Jackson (1981). Emotional exhaustion is one of the three subscales of the Maslach Burnout Inventory MBI (along with depersonalization and professional accomplishment) and is considered the most important one (Klusmann, Aldrup, Schmidt, & Lüdtkke, 2021). The current assessment refers to the scale used in the BilWiss study (Kunter et al., 2016) where four of the nine items were collected. These four items were adapted to the internship context and had to be answered using a four-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). An example item is *"Sometimes I feel really depressed at the end of an internship day."* Both this instrument and engagement were measured only at the end of the internship.

4.3.5. Engagement

In contrast to negative strain, positive strain was measured using the ultra-short version (UWES-3) of the Utrecht Work Engagement Scale (Schaufeli, Bakker, & Salanova, 2003). Schaufeli, Shimazu, Hakanen, Salanova, and De Witte (2017) demonstrated that the UWES-3 is a reliable and valid measure of work engagement and serves as a feasible alternative to the more extensive 9-item version. The three items were adapted to fit the internship context. An example item is “*at the internship, I feel bursting with energy.*” Responses were rated on a four-point Likert scale, ranging from 1 (*very rarely*) to 4 (*very often*).

4.4. Validity and Reliability Tests

Confirmatory factor analysis of the teacher self-efficacy scale indicated a good model fit ($\chi^2 = 5.53$, $df = 5$, $p > .05$, CFI = .99, TLI = .99, RMSEA = .02, SRMR = .03). The instrument showed acceptable internal consistency at both measurement points ($\alpha = .69$ and .66).

The analysis of the theoretically proposed one-dimensional model of *task-related SoC* revealed an acceptable model fit ($\chi^2 = 141.86$, $df = 73$, $p < .05$, CFI = .94, TLI = .91, RMSEA = .07, SRMR = .005). As an alternative approach, a three-dimensional model was explored with a factor for each dimension (comprehensibility, manageability, meaningfulness). However, the results of this model indicated a weaker fit (CFI = .85, TLI = .79, RMSEA = .10, SRMR = .007). Reliability was good at both measurement points ($\alpha = .87$).

The analysis of the theoretically assumed three-dimensional model of *mentoring* (emotional, instrumental, and constructivist) demonstrated a good model fit ($\chi^2 = 43.41$, $df = 22$, $p > .05$, CFI = .98, TLI = .97, RMSEA = .07, SRMR = .004). As an alternative a unidimensional model was examined in which a common factor represented all items. The results of this model indicated a poor model fit (CFI = .86, TLI = .81, RMSEA = .18, SRMR = .006). The three instruments showed good reliability at the post-test ($\alpha = .85 - .88$).

The *emotional exhaustion* scale showed a very good model fit (CFI = 1.00, TLI = 1.00) and good internal consistency ($\alpha = .83$). Similarly, the confirmatory factor analysis of the *engagement* scale indicated a very good model fit (CFI = 1.00, TLI = 1.00). The reliability of this instrument was good in the post-test ($\alpha = .83$).

5. RESULTS

Research Question 1: What is the prevalence of pre-service teachers' internal and external resources during their long-term internship and how do these resources develop from the beginning to the end of the internship?

Descriptive statistics are presented in Table 2. On average, all resources were reported at a relatively high level at both measurement points. The same applies to engagement at the end of the internship ($M = 2.82$, $SD = .73$) while emotional exhaustion is relatively low ($M = 2.23$, $SD = .72$).

Table 2. Descriptive statistics of resources and symptoms strain at both measurements time points (t1 and t2).

Scales	N	Nr. of items	Min.	Max.	<i>M</i>	<i>SD</i>	α
Task-related SoC t1	203	15	2.27	4.00	3.48	0.36	0.87
Task-related SoC t2	196	15	2.53	4.00	3.63	0.33	0.87
Teacher self-efficacy t1	197	5	2.00	4.00	3.13	0.41	0.69
Teacher self-efficacy t2	198	5	1.80	4.00	3.29	0.38	0.66
Mentoring emotional t2	196	3	1.00	4.00	3.47	0.70	0.85
Mentoring instrumental t2	196	3	1.00	4.00	3.35	0.78	0.88
Mentoring constructivist t2	181	3	1.33	4.00	3.53	0.61	0.85
Emotional exhaustion t2	194	4	1.00	4.00	2.23	0.72	0.83
Engagement t2	194	3	1.00	4.00	2.82	0.73	0.83

There was a significant increase in teacher self-efficacy at the end of the internship semester ($t = -5.62$, $p < .001$, $n = 185$). Pre-service teachers felt more self-efficient at the end of the internship ($M = 3.29$, $SD = .38$) compared to

the beginning of the internship ($M = 3.13$, $SD = .41$) with a medium effect ($r = .41$; Cohen, 1988). Likewise, there was also a significant increase with a medium effect ($r = .42$) for the resource of task-related SoC ($t = -5.75$, $p < .001$, $n = 187$) with pre-service teachers reporting a lower task-related SoC at the beginning ($M = 3.48$, $SD = .36$) compared to the end of the internship ($M = 3.63$, $SD = .33$).

Research Question 2: To what extent do internal and external resources predict outcomes of negative strain (emotional exhaustion) and symptoms of well-being (engagement)?

The latent intercorrelations of the variables measured at the end of the internship are displayed in Table 3. The intercorrelations of the resources with emotional exhaustion and engagement were all significant and mainly ranged from moderate to strong. Emotional exhaustion correlated negatively with all resources, most strongly with emotional support from mentors ($r = -.539$, $p < .001$). Furthermore, engagement was most strongly correlated with emotional support ($r = .624$, $p < .001$). All forms of mentoring did not correlate with self-efficacy. In contrast, emotional and instrumental support from mentors did significantly positively correlate with task-related SoC, although at a moderate level ($r = .225$ and $.283$).

Table 3. Latent intercorrelations of variables at measurement point 2.

Scale	1 Task-related SoC_t2	2 Teacher self- efficacy_t2	3 Mentoring Emotional	4 Mentoring instrumental	5 Mentoring constructivist	6 Emotional exhaustion t2	7 Engagement t2
1 Task-related SoCt2	-	0.567***	0.283***	0.225**	0.152	-0.423***	0.411***
2 Teacher self-efficacy t2	-	-	0.169	0.168	0.168	0.411***	0.544***
3 Mentoring emotional t2	-	.	-	0.739***	0.721***	-0.539***	0.624***
4 Mentoring instrumental t2	-	-	-	-	0.776***	-0.450***	0.527***
5 Mentoring constructivist t2	-	-	-	-	-	-0.358***	0.452***
6 Emotional exhaustion t2	-	-	-	-	-	-	-0.750***
7 Engagement t2	-	-	-	-	-	-	-

Note: *** = $p < 0.001$, ** = $p < 0.01$.

Three specified models for each resource are shown in Figures 1 to 3. The specified model of the relationship between emotional exhaustion, engagement and self-efficacy had a good model fit with $\chi^2 = 74.60$, $df = 49$, $p < .05$, CFI = .97, TLI = .96, RMSEA = .05, SRMR = .05. The resource of teacher-self efficacy was negatively related to emotional exhaustion ($\beta = -.40$, $p < .001$). The more self-efficient pre-service teachers felt in their internship, the less emotionally exhausted they felt. At the same time, teacher self-efficacy was positively related to engagement meaning that the more self-efficient students felt, the more engaged they were in their internship ($\beta = .54$, $p < .001$). In this model, 30% of the variance in engagement and 16% of the variance in emotional exhaustion can be explained.

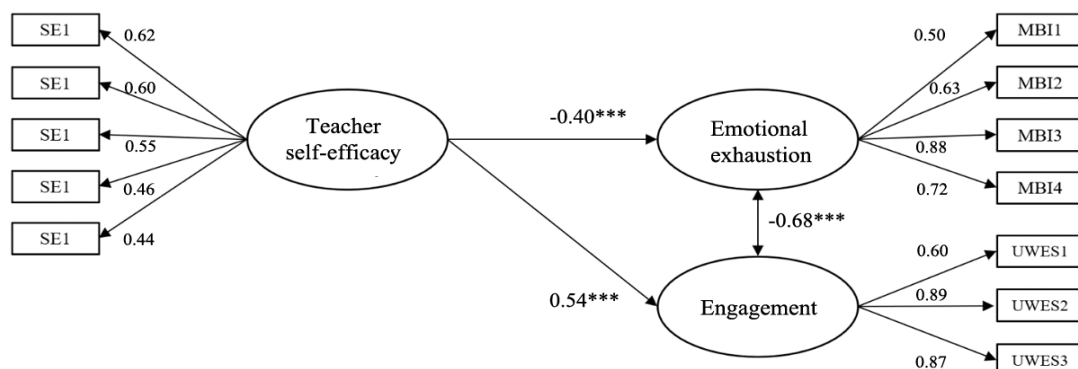


Figure 1. Path analysis of the pre-service teachers' self-efficacy on emotional exhaustion and engagement.

Note: *** = $p < 0.001$.

The specified model examining the relationship between emotional exhaustion, engagement, and task-related SoC demonstrated an acceptable fit with $\chi^2 = 265.90$, $df = 185$, $p < .001$, CFI = .95, TLI = .94, RMSEA = .05, and SRMR = .06. Task-related SoC was significantly and negatively associated with emotional exhaustion ($\beta = -.43$, $p < .001$). At the same time, it is positively associated with engagement ($\beta = .42$, $p < .001$). This model explains 18% of the variance in engagement and emotional exhaustion.

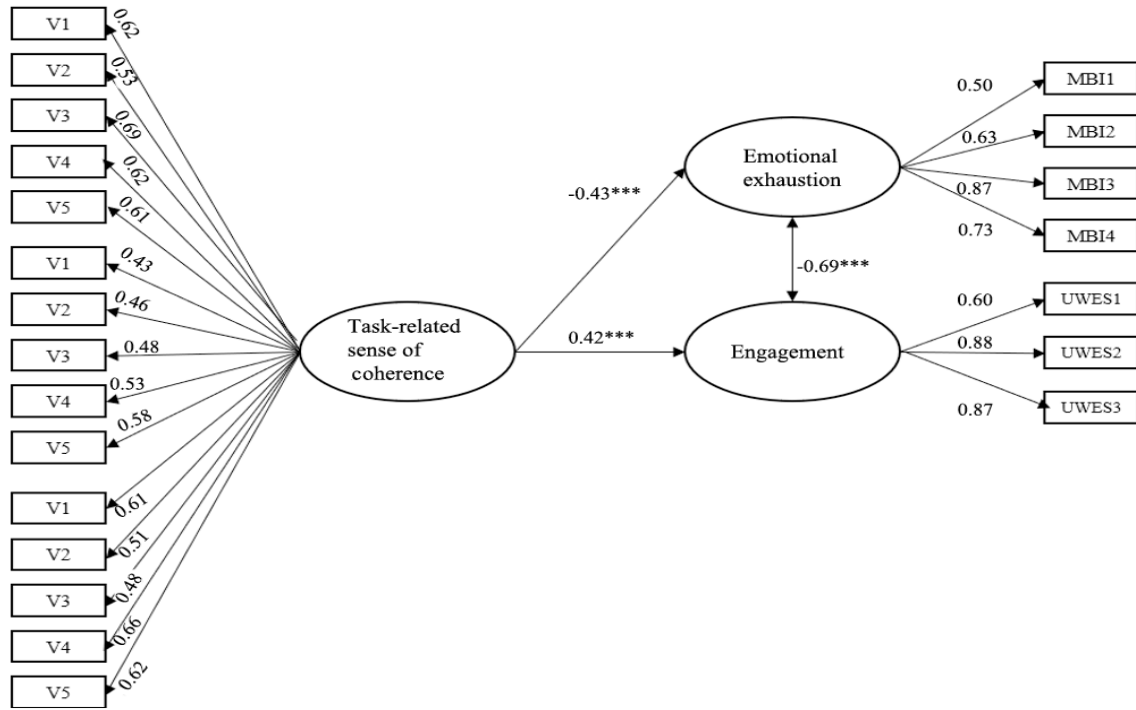


Figure 2. Path analysis of the pre-service teachers' task-related SOC on their emotional exhaustion and engagement.

Note: *** = $p < 0.001$.

The final model with the resource of mentoring had an acceptable model fit with $\chi^2 = 169.12$, $df = 92$, $p < .001$, CFI = .96, TLI = .95, RMSEA = .07, SRMR = .05. In this model, only one of the three mentoring aspects was significantly associated with symptoms of negative and positive strain. Emotional mentoring was negatively related to emotional exhaustion ($\beta = -.51$, $p < .001$) and positively to engagement ($\beta = .54$, $p < .001$). In total, the model explains 31% of the variance in emotional exhaustion and 40 % of the variance in engagement.

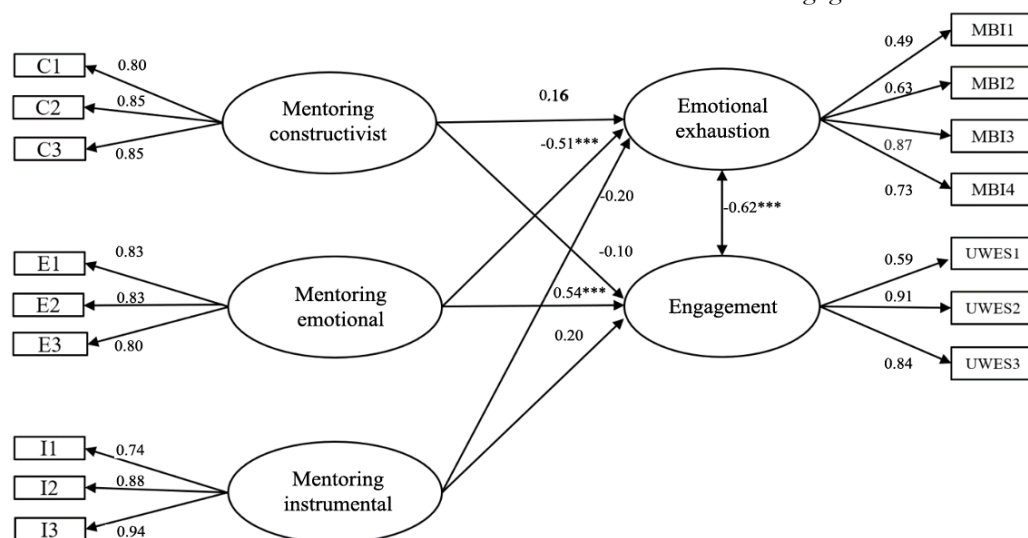


Figure 3. Path analysis of the pre-service teachers' mentoring experiences on their emotional exhaustion and engagement.

Note: *** = $p < 0.001$.

6. DISCUSSION

This study investigated whether internal and external resources have the potential to mitigate emotional exhaustion and enhance engagement among pre-service teachers during their long-term internships based on the theoretical framework of the JD-R model. It is crucial to know which resources play a role in contributing to the occupational well-being of pre-service teachers during this time as the long-term internship can be considered the longest and most intensive exposure of pre-service teachers to the teaching profession (Cohen et al., 2013). In this way, targeted interventions to help pre-service teachers adequately cope with the demands of the internship can be identified and addressed in future training programs. The present study contributes to the existing literature by incorporating a previously unexplored resource such as a task-related sense of coherence. In addition to this resource, the present study examined some more established resources, teacher self-efficacy, and different mentoring approaches. The first research question examined the extent to which different resources were evident in pre-service teachers during their long-term internship and how internal resources (self-efficacy and task-related SoC) developed from the beginning to the end of the internship. The results indicate that all resources tended to be high at the start of the internship and that the internal resources measured at both points increased from the beginning to the end. The positive change in self-efficacy during the pre-service teacher internship is consistent with several previous studies that have shown a gradual increase in self-efficacy during internships (Böhnert et al., 2018; Ding, Rohlf, & Spinath, 2019; Klassen & Durksen, 2014; Porsch & Gollub, 2018). Teaching internships address all sources of self-efficacy (mastery experiences, verbal persuasion, model learning, and affective cues) because they provide an ideal opportunity for pre-service teachers to develop self-efficacy beliefs (Bandura, 1997; Clark & Newberry, 2019). During the internship, pre-service teachers have the opportunity to experience successes and failures in different activities of the teaching profession and to observe and learn from knowledgeable others while receiving feedback on their performance (Pfitzner-Eden, 2016). Similarly, task-related SoC increased throughout the placement. Task-related SoC and self-efficacy both share the component of believing in one's competencies to cope with specific tasks and demands in the teaching profession. Therefore, they are likely to develop similarly. However, task-related SoC also incorporates the dimensions of meaningfulness and comprehensibility. It appears that the long-term internship also enhances pre-service teachers' belief in the worthiness and comprehensibility of specific internship tasks. Furthermore, this study supports the notion that the long-term internship is primarily perceived as an enriching and enjoyable time given the prevalence of occupational well-being (emotional exhaustion and engagement) at the end of the internship (Darge et al., 2018; Hascher & Hagenauer, 2016). The analysis of the second research question revealed a positive relationship between occupational well-being and internal resources (teacher self-efficacy and task-related SoC) as well as the external resource of mentoring. The present study showed that task-related SoC is a noteworthy resource that deserves further exploration. The more pre-service teachers felt a SoC towards internship-related tasks, the stronger their engagement and the lower their emotional exhaustion was by the end of the internship. These results support previous findings showing that a work-related SoC has a supportive effect on mental health (Bauer et al., 2015; Grødal, Innstrand, Haugan, & André, 2019; Van der Westhuizen, 2018; Vogt et al., 2013). A similar measure of SoC may be equally valuable just as the domain-specific measure of self-efficacy is plausible and well-established (Eberz et al., 2011). However, it should be noted that most previous studies dealing with a domain-specific measure of SoC used the work-SoC scale developed by Bauer et al. (2015) and Vogt et al. (2013). For example, this scale uses bipolar pairs of adjectives, asking whether the work is perceived as either structured or unstructured (comprehensibility) and whether it is easy to influence or impossible to influence (manageability). The present study used a task-related measure based on Dadaczynski et al. (2020) which limits the comparability of the mentioned studies. It would be interesting to apply the work-SoC scale by Bauer et al. (2015) to the long-term internship as well to gain a deeper understanding of how the different SoC dimensions differ in pre-service teachers at this time. However, the advantage of using a measure of SoC in relation to specific internship activities is that it allows for a more specific

analysis and the derivation of targeted interventions aimed at these activities. In this way, according to the current study, there are health benefits when a pre-service teacher believes that defending their lesson plan in a conversation is understandable, feasible and significant. The results of this study are consistent with previous findings showing how these resources have a protective effect against the potential adverse effects of workplace demands and enhance the well-being of pre-service teachers during their placement with regard to the resources of teacher self-efficacy and mentoring (Bardach et al., 2022; Ellis et al., 2020; Kücholl et al., 2019; Zee & Koomen, 2016). The findings on the protective effect of self-efficacy support the proposition made by Bardach et al. (2022) and Mok, Rupp, and Holzberger (2023) to promote self-efficacy beliefs in the early stages of teacher education with the internship phase being particularly valuable. This is especially important given that there is still a lack of research on the development and potential of interventions that address the professionalization of teachers in managing their stress by strengthening personal resources (Bardach et al., 2022; Celebi, Krahe, & Spoerer, 2014). Existing research also makes a clear relationship between self-efficacy and mentoring with mentors being an essential source of pre-service teachers' self-efficacy beliefs (Ding et al., 2019; Fives et al., 2007; Richter et al., 2013). While this relationship was not the focus of the present study, it supports the idea that mentors serve as an integral external resource for the well-being of preservice teachers which is consistent with established research (Fives et al., 2007; Hobson et al., 2009; Ulrich et al., 2020). The following three different mentoring styles were surveyed: emotional, instrumental, and constructivist. Previous studies have shown that mentors are particularly helpful as conversational partners providing emotional and instrumental support (Darge et al., 2018; König et al., 2018). Emotional support served as the strongest predictor of engagement and emotional exhaustion which is consistent with the findings of Römer et al. (2018). Pre-service teachers seek emotional support that fosters a supportive, trusting, and nurturing atmosphere that facilitates their progress without the pressure of constant evaluation. This approach is also associated with increasing their self-efficacy as demonstrated in studies by Davis and Fantozzi (2016) and Hartl, Holzberger, Hugo, Wolf, and Kunter (2022).

6.1. Practical Implications

Expanding on the above-mentioned findings, practical implications indicate that it is beneficial to more actively integrate pre-service teachers' circumstantial resources like internship activities and mentors.

Although the feeling of SoC (sense of coherence) originates internally, it can be promoted externally and offer insights about which internship activities warrant heightened attention. In this way, linking the different components of SoC to activities aligns with the growing perspective in health research, emphasizing the consideration of both circumstances and individual behavior for well-being and professional development. Consequently, it should be ensured that pre-service teachers can better cope with demanding tasks by communicating the tasks to them in an understandable and, above all, meaningful way in the long-term internship. Targeted measures to maintain or enhance this feeling could include providing pre-service teachers with more transparency, role clarity, and autonomy (Broetje, Bauer, & Jenny, 2020). According to Hoffenbartal and Bocos (2015) and as initially emphasized by Antonovsky (1996) the aspect of meaningfulness should be mainly promoted. In its preparatory and accompanying seminars for the internship, the university should emphasize the meaning and purpose of the various tasks, such as preparing one's own lessons, receiving feedback, etc. (this should go beyond the tasks described in this study) and discuss this transparently with the university students. Pre-service teachers often complain about the heavy workload during the long-term internship (Krawiec et al., 2020; Lawson et al., 2015), so it seems sensible to make students aware that all these tasks have a purpose. Furthermore, the university should ensure that mentors are properly trained based on empirically proven standards. Such mentor preparation programs should emphasize the importance of being emotionally available, appreciative, and supportive of interns (Izadinia, 2016; Mena, Hennissen, & Loughran, 2017). They should also provide clear directives on conducting structured, research-informed pre- and post-lesson discussions, engaging students appropriately in teaching, and

demonstrating effective teaching methods themselves. In this way, mentors can not only provide emotional support but also enhance preservice teachers' self-efficacy and support their sense of coherence throughout the long-term internship.

6.2. Limitations and Suggestions for Further Research

In addition to the limitations mentioned above, there are several other factors to be considered. First, most of the results are based on cross-sectional data which limits the ability to draw causal conclusions. In the future, longitudinal studies are needed to examine the relationships between these constructs in more detail. Another factor to consider is the rather low reliability of the teacher self-efficacy scale. Teachers' self-efficacy expectations were not measured based on ten items, as in Schmitz and Schwarzer (2000) but only based on five items which may explain the only sufficient reliability. It may be helpful to replicate the findings with the original scale and a larger sample size since the sample size of the present study was relatively small for applying structural equation modeling. The generalizability is limited to universities with a similar structure of the long-term internship.

About task-related SoC, it is important to note that only a few of the internship activities of pre-service teachers were included in the present study. However, using only five tasks may not fully represent the diverse range of challenges that must be mastered during a long-term internship. Therefore, conducting a replication study with a more extensive set of tasks and demands would be desirable. This would allow for the derivation of more specific implications for practice. As SoC was measured task-specific, it might also be helpful to measure teaching self-efficacy in relation to the same internship tasks. In this way, it would become more apparent how task-related SoC and task-related self-efficacy may contribute differently to occupational well-being.

7. CONCLUSION

This study advances our understanding of how internal and external resources contribute to the occupational well-being of pre-service teachers during their school-based internships. Fostering the well-being of pre-service teachers is crucial for their health and professional development during these highly demanding placements as well as for their sustained success and retention in the teaching profession.

The present study's findings not only support existing evidence on the protective and health-promoting effects of self-efficacy and emotional mentoring but also break new ground by introducing a novel resource: task-related sense of coherence (SoC). By assisting pre-service teachers in perceiving their internship-related activities as comprehensible, meaningful, and manageable, they can be further supported both professionally and in terms of well-being. Future research is necessary to validate the health-promoting effects of task-related SoC and to delve deeper into its mechanisms, particularly in comparison to the closely related construct of self-efficacy.

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Institutional Review Board Statement: According to the German Research Foundation (DFG) guidelines, ethical approval is required for a study if: (1) participants experience significant emotional or physical distress, (2) participants cannot be fully informed about the aims of the study, or (3) participants are patients undergoing procedures such as functional magnetic resonance imaging (fMRI) or transcranial magnetic stimulation (TMS) during the study (https://www.dfg.de/foerderung/faq/geistes_sozialwissenschaften/).

Transparency: The authors state that the manuscript is honest, truthful, and transparent, that no key aspects of the investigation have been omitted, and that any differences from the study as planned have been clarified. This study followed all writing ethics.

Competing Interests: The authors declare that they have no competing interests.

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Appendix 1. Remaining scales and corresponding items.

Teacher self-efficacy
1. I am convinced that I am able to teach successfully all relevant subject content to even the most difficult students.
2. When I try really hard, I am able to reach even the most difficult students.
3. I am convinced that, as time goes by, I will continue to become more and more capable of helping to address my students' needs.
4. Even if I am disrupted while teaching, I am confident that I can maintain my composure and continue to teach well.
5. I am confident in my ability to be responsive to my students' needs, even if I am having a bad day.
Emotional mentoring
1. I can talk to my mentor about everyday problems during the internship.
2. My mentor understands when things aren't going well during the internship.
3. My mentor cheers me up when I receive bad feedback.
Instrumental mentoring
1. I regularly exchange materials with my mentor.
2. My mentor has already given me good suggestions on how to proceed in the classroom.
3. My mentor is a great help when it comes to teaching methods and content.
Constructivist mentoring
1. The cooperating teacher offered suggestions for lesson design.
2. We discussed different options for designing the lesson.
3. We adapted and developed the lesson plan together.
Emotional exhaustion
1. I often feel exhausted during my internship.
2. I feel overwhelmed by the internship.
3. I often notice how lethargic I am during my internship.
4. Sometimes I feel really depressed at the end of an internship day.
Engagement
1. At my work, I feel bursting with energy.
2. I am enthusiastic about my internship.
3. I am immersed in my internship.

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