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Dimensions of teacher interest and their relations to occupational well-being and instructional practices

Abstract

This study introduced a new questionnaire on subject, didactic, and educational teacher interest and analyzed their relations to occupational well-being (burn-out, enjoyment, flow) and instructional practices in a sample of 281 teachers from elementary and both low- and high-achievement secondary schools. Results of confirmatory factor analysis verified the three-dimensional structure of the newly developed interest measure. Evidence for the construct validity of the interest measure was provided by structural equation analyses showing that teachers' occupational well-being and instructional practices were predicted by their interests, even when controlling for self-efficacy beliefs. Specifically, both didactic and educational interest contributed to lower levels of burnout and predicted beneficial instructional practices (e.g., cognitive stimulation). In addition, subject and educational interest were the main predictors of enjoyment and flow in class.

Keywords

Teacher motivation; Teacher interest; Occupational well-being; Instructional behavior

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Dimensionen des Lehrerinteresses und ihre Beziehung zu beruflichem Erleben und zu Unterrichtspraktiken

Zusammenfassung

Es wird über die Entwicklung eines neuen Fragebogens zur Erfassung des fachlichen, didaktischen und erzieherischen Interesses von Lehrkräften berichtet. In einer Stichprobe von 281 Lehrkräften verschiedener Grund-, Haupt- und Gymnasialschulen wurden die Zusammenhänge der drei Interessendimensionen mit der beruflichen Erlebensqualität (Burnout, Vergnügen, Flow) und dem Instruktionsverhalten untersucht. Konfirmatorische Faktorenanalysen bestätigten die dreidimensionale Struktur des neuen Fragebogens. Belege für die Konstruktvalidität ergaben sich aufgrund von Strukturgleichungsanalysen, die zeigten, dass das Interesse Beiträge zur Vorhersage von beruflichem Erleben und Instruktionsverhalten leistet, auch wenn Selbstwirksamkeitsüberzeugungen kontrolliert wurden. Im Einzelnen gingen das didaktische und das erzieherische Interesse mit geringerem Burnout einher und erwiesen sich als Prädiktoren förderlichen Instruktionsverhaltens (z. B. kognitive Aktivierung). Darüber hinaus trugen das fachliche und das erzieherische Interesse zur Vorhersage von Vergnügen und Flow im Unterricht bei.

Schlagworte

Lehrermotivation; Lehrerinteresse; Berufliches Erleben; Instruktionsverhalten

1. Introduction

Relatively poor performance in international large-scale student assessment studies such as the Programme for International Student Assessment (PISA) has led researchers in several countries to intensify research not only on the competence of teachers (e.g., Krauss et al., 2008) but also on their *motivation* (e.g., Watt & Richardson, 2008). Accordingly, several authors have applied extant motivational theories to the context of teaching (e.g., Fernet, Senécal, Guay, Marsh, & Dowson, 2008; Kunter et al., 2008; Retelsdorf, Butler, Streblov, & Schiefele, 2010). Alongside self-efficacy beliefs (e.g., Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998), recent research on teacher motivation has mainly focused on goal orientations (e.g., Butler, 2007), intrinsic/extrinsic motivation (e.g., Pelletier, Séguin-Levesque, & Legault, 2002), and enthusiasm (Kunter et al., 2008). In these studies, motivation was primarily investigated in relation to occupational well-being (e.g., burnout) and teaching behavior (e.g., mastery-oriented practices). These outcome variables are regarded to be of crucial importance for teachers and their impact on students (e.g., Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008; Schutz & Zembylas, 2009; Vandenberghe & Huberman, 1999).

In the following, we first report past research on the relations between teacher motivation, occupational well-being (particularly burnout), and instructional practices. Then, we go on to describe our conception of teacher interest and distinguish it from previously investigated constructs of teacher motivation. Finally, we present the goals, design, and hypotheses of the present research.

1.1 Past research

1.1.1 Teacher motivation and occupational well-being

Numerous studies have investigated the conditions underlying burnout in teachers (Barth, 1997; Sosnowsky, 2007; Vandenberghe & Huberman, 1999). According to Maslach and Jackson (1986; Maslach & Leiter, 1999), burnout is characterized by three core symptoms: *emotional exhaustion* (the feeling of being drained, frustrated, and overworked), *lack of accomplishment* (a feeling of restricted productivity and low ability to cope with challenges), and *depersonalization* (a feeling of indifference toward one's students). Explanations of burnout have drawn particularly on the transactional stress model of Lazarus (1991; see also Kyriacou, 2001), in which the appraisal of one's own resources plays an important role. Job demands only become stressful when personal resources are overstretched (Lazarus, 1991). Earlier research has identified *teacher self-efficacy* as an essential motivational determinant of the appraisal of one's own resources and the resulting perception of burnout or stress (e.g., Abele & Candova, 2007; Caprara, Barbaranelli, Steca, & Malone, 2006; Ross, 1998; Schmitz & Schwarzer, 2000, 2002; Tschannen-Moran et al., 1998; Yoon, 2002). Self-efficacious teachers believe that they are capable of increasing students' performance and motivation and, consequently, develop less burnout and experience less stress.

More recently, Klassen et al. (2009) distinguished between self-efficacy for instructional strategies (teacher's confidence to use effective instructional strategies), self-efficacy for student engagement (teacher's confidence to engage all students in learning), and self-efficacy for classroom management (teacher's confidence to manage student conduct and classroom behaviors). These facets of self-efficacy were used to predict *job satisfaction* in five different countries. The results revealed small to medium correlations that were similar across the three facets of self-efficacy and the five countries.

Retelsdorf et al. (2010) have identified teachers' *mastery goal orientation* as an important protective factor against burnout (see also Papaioannou & Christodoulidis, 2007). Teachers with a mastery goal orientation are characterized by a striving to learn and develop professional competence, whereas other teachers may pursue, for example, the goal to demonstrate superior teaching ability (ability-approach goal orientation). Butler (2007) has suggested a further aspect that could also contribute to lower reports on stress in teachers with mastery goals: their more positive attitude toward help-seeking behavior.

The importance of teacher motivation in relation to stress is also supported by Fernet et al. (2008). Drawing on Deci and Ryan's (1985) differentiation between intrinsic motivation, self- and non-self-determined extrinsic motivation, and amotivation, they have developed a questionnaire on teacher motivation that also distinguishes between six domains of teacher work (e.g., lesson preparation, teaching, administrative tasks). Their results confirm that intrinsic motivation (i.e., wanting to do the work for its own sake because it is enjoyable) and self-determined extrinsic motivation (i.e., wanting to do the work because of identifying with its extrinsic consequences) contribute to a reduction of burnout across all work domains, whereas non-self-determined extrinsic motivation (i.e., being motivated to act because of direct or internalized external pressure) and amotivation (i.e., lack of any intention to accomplish one's work) facilitate burnout.

Kunter, Frenzel, Nagy, Baumert, and Pekrun (2011) have analyzed the association between teacher enthusiasm and both burnout and job satisfaction. Based on Kunter et al. (2008), the authors distinguish *teaching enthusiasm* from *subject enthusiasm*. Teaching enthusiasm refers to the enjoyment of teaching, whereas subject enthusiasm refers to being excited by one's subject. The findings provide evidence for significant associations between teaching and subject enthusiasm, on the one side, and burnout and job satisfaction, on the other side.

1.1.2 Teacher motivation and instructional practices

Previous research has indicated that teacher motivation may have both direct and indirect effects on instructional practices. *Indirect* effects could be mediated particularly by stress and burnout, because recent studies have indicated that high stress has a particularly negative impact on teacher performance. For example, Klusmann et al. (2008; see also Klusmann, Kunter, Trautwein, & Baumert, 2006) have shown that the group of least stressed teachers ("health-oriented" teachers with a strong commitment to their work and high levels of coping capacity and subjective well-being; cf. Kieschke & Schaarschmidt, 2008) differs from the group of most stressed teachers ("risk type B" with burnout symptoms, i.e., low work commitment, low coping capacity, and negative feeling states) particularly through stronger cognitive stimulation, slower interaction tempo, and greater social support. However, they found no effects of teacher stress on classroom management. These findings confirm Maslach and Leiter's (1999) assumption that burnout impairs a teacher's ability to take an adaptive approach to the students' cognitive and social needs.

Some studies have also examined *direct* relations between motivational teacher characteristics and the quality of lessons. For example, Ross (1998) has reported on a series of empirical studies confirming that *self-efficacious* teachers apply more elaborate instruction methods (e.g., cooperative learning, activity-based methods) and have a more open attitude toward new methods. There are also positive relations between self-efficacy and either adaptive or supportive teaching behavior (e.g., tolerating mistakes, adopting a mastery orientation, paying particular atten-

tion to weaker students; see Tschannen-Moran et al., 1998; Wolters & Daugherty, 2007).

Pelletier et al. (2002) have shown that the greater their self-determined motivation (intrinsic and identified motivation), the more teachers are disposed toward autonomy-supporting (vs. controlling) classroom behavior. Long and Woolfolk Hoy (2006) have found a substantive relation between teachers' subject interest and their instructional effectiveness (e.g., competence, clarity), with both measures being based on student ratings. Retelsdorf et al. (2010) and Butler and Shibaz (2008) have confirmed that the instructional practices of teachers with mastery goals are characterized by cognitive stimulation, mastery-oriented support, and encouragement of student questions and help-seeking behavior. Finally, Kunter et al.'s (2008) findings support the assumption that teaching enthusiasm is associated with both teacher-rated *and* student-rated higher quality instructional behavior (e.g., monitoring, autonomy support), whereas subject enthusiasm only predicted teachers' self-reports of instructional behavior.

1.2 Conceptualization of teacher interest

In the past, research on the role of interest in promoting educational outcomes has focused primarily on *student interest*. Prior research has demonstrated, for example, that interest fosters students' attention, quality of learning, course grades, and future course enrollment (Ainley, Hidi, & Berndorff, 2002; Hidi, 2006; Schiefele, 2009). This rich tradition of research on student interest suggests that including interest as a component of teacher motivation may be fruitful for explaining relevant teacher outcomes. However, there has been very little work applying theoretical models of interest to teachers (cf. Watt & Richardson, 2008). Specifically, there is a lack of research on basic issues related to teacher interest, including the nature and structure of teacher interest, the development of reliable and valid psychometric instruments, and the relationship between teacher interest and school characteristics, teacher outcomes, and student outcomes (Hulleman, 2010).

According to the person-object theory of interest, individual interest needs to be distinguished from situational interest (see Hidi, Renninger, & Krapp, 2004; Schiefele, 2009). Situational interest describes a transitory state triggered by the situation, and is of no further relevance in our context. Individual interest, in contrast, is a relatively permanent attraction to certain topics (e.g., school subjects, specific knowledge fields). This attraction is characterized by value-related and feeling-related valence beliefs (Schiefele, 2009). *Value-related* valence beliefs refer to the personal significance of an object (e.g., its relevance for personal self-fulfillment), whereas *feeling-related* valence beliefs represent the link between an object and the occurrence of positive emotions (e.g., enjoyment). Both feeling-related and value-related valence beliefs are intrinsic in nature: They relate directly to a given interest object and are not based on the relation of this object to other objects or domains. Thus, we only speak of interest, for example, if a teacher values

didactics because he or she enjoys the use of effective teaching methods, and not because competence in that domain helps him or her to get a better job position.

The major aspect in our conception of teacher interest is the proposition that there is not just an interest in the contents of a *subject* but also an interest in the domains of *didactics* and *education*. By *subject interest*, we understand the interest in the subject matter taught (e.g., mathematics). This subject matter covers not only what is taught in class (curricular content) but also aspects of the broader subject (e.g., that are acquired during teacher education). *Didactic interest* refers to a teacher's interest in teaching methods, in literature on didactics, and on how best to prepare teaching content. *Educational interest* refers to the interest in educational aspects or issues in the teaching profession. This may cover, for example, discussions on educational or childrearing goals, on imparting values and social competencies, and on how to deal appropriately with difficult students or difficult class situations.

This differentiation into three dimensions of teacher interest is similar to the components of professional knowledge distinguished in the literature. Current models of teachers' professional knowledge (e.g., Baumert & Kunter, 2006; Krauss et al., 2008; Phelps & Schilling, 2004) are based on Shulman's work (1986, 1987) and include three main categories of relevant teachers' knowledge: *content knowledge* (domain-specific subject matter knowledge), *pedagogical content knowledge* (the knowledge needed for teaching a specific subject and to make it comprehensible to others), and *general pedagogical knowledge* (referring mainly to principles and strategies of classroom management and organization, but also, for example, to knowledge on human development, on learning, and on diagnosing and evaluating students' learning). Recent research strongly focuses on teachers' knowledge of content and pedagogical content, and – for example – examines whether these categories of knowledge represent separate dimensions (cf. Krauss et al., 2008). Referring to that literature, we maintain two related interest dimensions, namely interest in subject matter (*subject interest*) and interest in teaching and didactic issues (*didactic interest*). It should be noted that pedagogical content knowledge is conceptualized as a *subject-specific* component of teachers' professional knowledge (Krauss et al., 2008; Shulman, 1986). This characteristic is also reflected in our conception of didactic interest. Accordingly, teachers have to indicate their didactic interest always with respect to a particular subject (see below).

Among the other categories of knowledge identified by Shulman (1987), two appear to be quite relevant for our third interest dimension (*educational interest*): general pedagogical knowledge, as it refers to classroom management and organization, and *knowledge of educational ends, purposes, and values*. These two components are rather similar in that they both address issues of educating students. Thus, we propose that interest in educational topics (such as educational goals and values, or ways to deal with difficult class situations) shows some overlap with these two components of teacher knowledge. It is important to note, however, that the conception of general pedagogical knowledge is broader than our understanding of educational interest. Particularly, general pedagogical knowledge not only re-

fers to educational issues, such as classroom management or fostering students' personal development, but also to general knowledge of human development and various aspects of student learning. In contrast, our conception of educational interest is focused on the issue of educating students.

Finally, it is noteworthy that the three dimensions of teacher interest are in accordance with the main task domains of the teaching profession: teaching and educating (e.g., Terhart, 2000). There is a close and obvious correspondence between these tasks and didactic and educational interest. In addition to didactic interest, subject interest also refers to the task domain of teaching because teaching involves not only the application of instructional methods but, above all, the conveying of subject matter knowledge.

1.3 Teacher interest and related concepts of teacher motivation

Our conception of teacher interests shows some potential overlap with other constructs of teacher motivation, particularly self-efficacy, intrinsic motivation, enthusiasm, and mastery goal orientation. In our view, however, there are substantial differences which suggest that it is worthwhile to further pursue the role of teacher interests as a condition of teacher outcomes.

Interest and self-efficacy. In terms of motivation theory, self-efficacy refers to the expectancy component of motivation, whereas interest refers to the value component of motivation (Wigfield, Eccles, Schiefele, Roeser, & Davis-Kean, 2006). These two components are theorized to affect the strength of current (predominantly intrinsic) motivation. Accordingly, past research on student motivation has provided evidence that interest and self-efficacy (or self-concept) explain partly independent portions of variance in student outcome variables (e.g., Köller, Baumert, & Schnabel, 2001). More specifically, interest was found to be a particularly strong predictor of academic choice behavior (e.g., Eccles, 2005; Schiefele, 2009). The latter finding is important because in the present study we seek to predict the performance of specific instructional behaviors of teachers.

Interest and intrinsic motivation. According to expectancy-value models of motivation (cf. Wigfield et al., 2006), interest as a value concept possibly determines the occurrence of intrinsic motivation and enthusiasm (although repeated incidents of intrinsic motivation or enthusiasm may show a reverse impact on interest). Further differences become apparent when taking a closer look at Fernet et al.'s (2008) approach to teachers' intrinsic motivation. This approach extends the earlier work of Pelletier et al. (2002). Fernet et al. (2008) distinguish between components of intrinsic motivation pertaining to six domains of teacher work: (a) class preparation (e.g., deciding on instruction material), (b) teaching (e.g., presenting instruction), (c) evaluation of students (e.g., correcting exams), (d) classroom management (e.g., managing students' interruptions), (e) administrative tasks (e.g., participating in meetings with parents), and (f) complementary tasks (e.g., involvement in committees). Each of these components is measured by three items in-

dicating how much the respondent likes or enjoys the respective activity. Four of the six components are related to our dimensions of interest, namely intrinsic motivation for *class preparation*, for *teaching*, for *student evaluation*, and for *class management*. The first three components refer to didactic interest, whereas class management captures only one potential aspect of educational interest (see above). Thus, it may be concluded that Fernet et al.'s (2008) conception of intrinsic teacher motivation basically captures teachers' intrinsic motivation to perform teaching-related activities. The aspects of subject and educational interest are not at all or only partially addressed. Furthermore, we suggest that neither administrative nor complementary tasks constitute relevant and independent domains of teacher interest.

Interest and enthusiasm. As was described above, Kunter et al. (2008, 2011) proposed the conceptions of teaching enthusiasm (enjoyment of teaching) and subject enthusiasm (enjoyment of the subject). The first component is very similar to Fernet et al.'s (2008) conception of intrinsic motivation pertaining to class preparation and teaching. The second component has not been captured by Fernet et al., but clearly overlaps with our conception of subject interest. However, we suggest applying the construct of "interest" instead of "enthusiasm" because "interest" represents a well-established and well-defined motivational construct (e.g., Hidi et al., 2004; Schiefele, 2009) that seems to fully cover the meaning of "enthusiasm". Thereby, enthusiasm apparently corresponds to the feeling-related component of interest, but does not capture the value-related component.

Interest and mastery goal orientation. Butler (2007) distinguishes between four goal orientations (mastery, ability-approach, ability-avoidance, work-avoidance). Positive associations with teacher outcome variables have been only reported for mastery goals (see above). Teachers' mastery goal orientation is defined as the desire to increase one's professional competence. This orientation is measured by asking the respondents how successful they feel in the case of competence-related events (e.g., "students ask unexpected and challenging questions that really make me think"). However, this measure is not clearly related to a particular domain of teachers' competence. Thus, there is no distinction between the issues of subject matter, teaching, and education. Instead, goal orientations are more generally related to teachers' vaguely defined professional competence.

It was only recently, however, that Nitsche, Dickhäuser, Fasching, and Dresel (2011) proposed a revised conceptualization of teacher goals and differentiated between mastery goals (termed "learning goals" by Nitsche et al.) pertaining to pedagogical knowledge, content knowledge, and pedagogical content knowledge. This conceptualization is close to our distinction between educational, subject, and didactic interest. However, operational definitions are rather different, with the exception of a close correspondence between *content mastery goals* and subject interest. Specifically, *pedagogical mastery goals* are mainly related to complicated or critical class situations and do not address more general educational issues as is the case in our measure of educational interest. Furthermore, *pedagogical content mastery goals* refer to the "process of knowledge transfer" but do not address

teaching methods or didactic competence more directly. Finally, the three components of mastery goals loaded on the same higher-order factor and were used by the authors as a composite measure of mastery goal orientation in successive analyses.

There is an undeniable overlap between the present conception of teacher interest (particularly subject interest and didactic interest) and other constructs of teacher motivation. However, the above analysis suggests that teacher interest can be distinguished from other constructs of teacher motivation with respect to its operational definition and to its theoretical status as a value concept that potentially determines intrinsic motivation, enthusiasm, and mastery goal orientation. This implies the possibility of models to be developed in the future in which teacher interests function, for example, as predictors of intrinsic motivation or mastery goals, which in turn mediate the effects of interest on other outcome variables (e.g., use of particular instructional practices). A similar model has been proposed and examined by Harackiewicz, Durik, Barron, Linnenbrink-Garcia, and Tauer (2008) in a sample of college students. These authors have demonstrated an indirect longitudinal effect of initial interest in psychology on final course grades that was mediated by mastery goals and situational interest. Also, initial interest negatively predicted ability-avoidance goals which in turn contributed to lower grades. Furthermore, initial interest showed both direct effects and indirect effects (mediated by mastery goals and situational interest) on the number of psychology courses taken over a period of several semesters.

Taken together, we expect that teacher interests contribute to the prediction of other motivational constructs as well as teachers' experience and behavior. This assumption needs to be examined by future research. As a first step, the present study involves a comparison of teacher interests and teacher self-efficacy in predicting teachers' occupational well-being and self-reported instructional practices.

1.4 Research questions and hypotheses

Essentially, two main issues were addressed in the present study: *First*, it was tested whether the proposed dimensions of teacher interest can be measured reliably and confirmed as distinctive factors. *Second*, we investigated the construct validity of the interest measure by analyzing differences between different school tracks and examining the relations between teacher interests and both occupational well-being and instructional practices. To test the predictive power of teacher interests in light of competing factors, we included teacher self-efficacy as an additional predictor, because previous research has confirmed it to be a highly important component of teachers' motivation. Significant contributions of teacher interests to the prediction of the dependent variables above and beyond the effects of self-efficacy would underline the relevance of the interest dimensions.

School track differences in teacher interests. We assumed that teachers working in different school tracks will differ in their levels of educational and subject in-

terest but not in their levels of didactic interest. Specifically, we predicted a stronger subject interest in teachers working in high-achievement secondary schools (*Gymnasium*), because these schools place more emphasis on subject matter rather than on bringing up students. Moreover, in Germany, high-achievement secondary school teachers have learned about their subject in more depth during teacher training (see Baumert & Kunter, 2006; Brunner et al., 2006). In contrast, educational aspects of teaching are more dominant in elementary teachers' training and their daily school work. Therefore, we predicted stronger levels of educational interest in elementary school teachers. In line with this, Brookhart and Freeman (1992) have found that pre-service elementary school teachers tend to associate educational goals with their career choice, whereas future secondary school teachers more frequently report subject-related motives. Regarding didactic interest, we anticipate – despite the knowledge advantages found in high-achievement secondary school teachers (Brunner et al., 2006) – no effects of school track, because imparting the curriculum is equally central to all school tracks, and all teachers should have a similar interest in it.

Relations between teacher interests and occupational well-being. As the next step of testing the construct validity of the teacher interest questionnaire, we examined the relations between teacher interests and occupational well-being. In order to assess occupational well-being, measures of burnout and both enjoyment and flow were included. The research on burnout has been recently complemented by an increasing number of studies dealing with teacher emotions (Schutz & Zembylas, 2009). Of particular interest to our study is the work of Frenzel and Goetz (e.g., Frenzel, Goetz, Lüdtke, Pekrun, & Sutton, 2009; Goetz, Hall, Frenzel, & Pekrun, 2006), because of their focus on both positive and negative emotional experiences of students *and* teachers (e.g., enjoyment, boredom). In line with this research, alongside scales on burnout, we also applied two scales assessing *positive* dimensions of teachers' emotional experience in class. These dimensions refer to the experience of enjoyment and flow (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005; Deci & Ryan, 2002; Goetz et al., 2006). Both aspects of experience tap how far teaching involves positive activity-inherent incentives. The first dimension, the experience of enjoyment, involves feelings of joy, excitement, or challenge while teaching. The second dimension, the experience of flow, represents a particularly strong type of intrinsic incentive, namely, becoming completely absorbed in what one is doing.

We supposed that teachers' didactic and educational interest and self-efficacy contribute significantly to the prediction of all three burnout components (emotional exhaustion, lack of accomplishment, depersonalization). Significant contributions of didactic and educational interest were expected because the teachers' major problems in their daily classes and the stress these elicit are probably located in teaching the curriculum and classroom management. Subject competence should take a secondary role here.

Regarding the prediction of enjoyment and flow during class, we also hypothesized that self-efficacy will make significant positive contributions. This was as-

sumed because both enjoyment and flow are encouraged by experiencing one's own competence (cf. Deci & Ryan, 2002). In addition, we anticipated that all three interest dimensions will be associated with the experience of enjoyment and flow, because the class offers more intrinsic incentives and is more likely to make it possible to experience flow when the teacher has a strong interest in the didactic and educational organization of lessons as well as the subject matter.

Relations between teacher interests and instructional practices. Finally, we tested the hypothesis that self-efficacy and teacher interests predict self-reported instructional practices that promote learning and motivation. Our selection of instructional variables was based on research showing that students learn better and are more motivated when (a) lessons are cognitively stimulating and encourage cognitive autonomy, (b) students are treated according to their level of achievement (*internal differentiation* within class), and (c) emphasis is placed on mastery of the demands of learning and on individual progress, and not on competing for good grades (mastery-oriented vs. performance-oriented practices; e.g., Baumert et al., 2004; Clausen, 2002; Helmke, 2003; Klusmann et al., 2008; Kunter et al., 2008; Mischo & Rheinberg, 1995). We anticipated not only that self-efficacy would predict the use of effective instructional measures, but that didactic interest will play a key role, because this form of interest refers explicitly to the domain of classroom instruction. More specifically, with increasing didactic interest, teachers should be more willing to acquire didactic knowledge (e.g., by reading didactic literature) and be more likely to show the high level of commitment necessary for implementing appropriate instructional practices (cf. Kunter et al., 2008). Similarly, subject interest is assumed to be associated with higher levels of content knowledge and, thus, should be predictive of cognitive activation. This assumption is corroborated by Baumert et al. (2010) and Kunter et al. (2008). Baumert et al.'s (2010) findings suggest that content knowledge is a prerequisite for pedagogical content knowledge and both are associated with cognitive activation. In addition, Kunter et al. (2008) have observed a significant relation between subject enthusiasm and cognitive autonomy support. Furthermore, we expected that educational interest contributes to the prediction of mastery-oriented practices because of its focus on the individual development of students. Finally, with respect to performance-oriented instruction, we presumed significant *negative* associations with both didactic interest and self-efficacy.

2. Method

2.1 Participants and procedure

A total of 70 schools (25 elementary schools, 20 low-achievement secondary schools ["Hauptschule"], and 25 high-achievement secondary schools ["Gymnasium"]) were contacted by telephone and asked to participate. School principals were given detailed information on the goals of the study and the contents of

the questionnaire. Thirty-three of these schools (47.1 %) declared their willingness to participate. Questionnaires were sent to all members of staff in these schools, and they were asked to complete these anonymously and return them by post. The response rate across all participating schools was 30.9 %. Although a high number of elementary schools participated in the study, the number of elementary school teachers was comparatively low because German elementary schools usually have fewer teaching staff than the two other school tracks (see Table 1). After the end of the study, all participating schools received a detailed report on the constructs studied and a descriptive analysis of the results for the entire sample.

The sample in the present study comprised 287 teachers from 33 schools. Because six teachers failed to complete more than 20 % of the items, they were dropped from the analysis, leaving an analyzable dataset of 281 teachers. Data on gender, age, and number of years working as a teacher are presented separately for each school track in Table 1. As to be anticipated, gender frequencies differed significantly across the three school tracks, $\chi^2(2, n = 277) = 16.20, p < .01$. The proportion of female teachers was highest in elementary schools, second highest in low-achievement secondary schools, and lowest in high-achievement secondary schools. The mean age also differed significantly between the three teacher groups, $F(2, 274) = 4.28, p < .05$. Low-achievement secondary school teachers were the oldest of all three groups. Although teaching experience varied greatly in the sample from 6 months to 41 years, only 68 (24.2 %) of the participants had less than 10 years professional experience, so the samples were composed of mostly experienced teachers. Professional experience did not differ significantly between the three school tracks, $F(2, 274) = 1.29, ns$.

Table 1: Description of the sample

	Elementary school		Low-achievement secondary school		High-achievement secondary school		Total	
Number of schools	17	(51.5%)	10	(30.3 %)	6	(18.2 %)	33	(100 %)
Number of teachers	71	(25.3%)	133	(47.3 %)	77	(27.4 %)	281	(100 %)
Males	9	(12.7%)	39	(29.3 %)	32	(41.6 %)	80	(28.5 %)
Females	61	(85.9%)	94	(70.7 %)	42	(54.5 %)	197	(70.1 %)
Age ^a	46.23	(10.16) ^b	49.36	(8.40)	45.72	(11.34) ^c	47.60	(9.82)
Years of teaching ^a	20.21	(10.94) ^b	20.96	(11.93) ^d	18.27	(11.83) ^e	20.03	(11.67)

Note. There were four missing values for gender, age, and years of teaching.

^aMean values, standard deviations in parentheses. ^b $n = 70$. ^c $n = 74$. ^d $n = 131$. ^e $n = 76$.

Reports on the main teaching subject revealed that German was most frequent ($n = 62$; 22.1 %), followed by mathematics ($n = 56$; 19.9 %), English ($n = 33$; 11.7 %), and the natural sciences (physics, chemistry or biology: $n = 22$; 7.8 %). The remaining teachers were distributed across all other subjects (e.g., sport, music, history, French). Before working on the questionnaire, the teachers were in-

structed to answer all questions with respect to their major teaching subject. (This procedure is also applicable to elementary teachers, because in Germany they usually focus their teaching on either German or mathematics. Besides their major subject, they usually teach at least one more subject, such as music.)

In general, school principals simply told teachers that they were free to participate. However, in one low-achievement secondary school, the school principal ordered teachers to complete the questionnaire as part of an internal school evaluation. The resulting response rate of 100 % gave us an opportunity to compare reports from a complete low-achievement secondary school teaching staff ($n = 26$) with those from teachers from incomplete school teaching staffs ($n = 107$) and estimate the bias due to voluntary participation. A comparison of the mean scores of all study variables did not reveal any significant difference between the two subsamples, indicating that a systematic bias due to voluntary participation is not likely.

The present study is part of a larger research project. Parts of this project, which do not overlap with the present data analyses, have been reported by Retelsdorf et al. (2010).

2.2 Instruments

Items in all scales (described in detail below) required responses on 4-point rating scales ranging from 1 (*very true*) to 4 (*not at all true*). For statistical analyses, all items were coded with a high score indicating a strong level on the given construct. More details on the scales (e.g., reliabilities) are reported in Table 3. All scales were pretested for internal consistency in a sample of 135 teacher training students. Based on the results, only a few items (belonging to the scales on interest, self-efficacy, or enjoyment) had to be deleted because of low item-test correlations.

In order to test the assumed dimensional structure of teacher interest, we performed a confirmatory factor analysis (CFA). In addition, we also examined the factorial validity of the scales measuring burnout, experience in class, and instructional practices. Before testing a structural model, it is necessary to establish factorial validity for all instruments with a given sample (Byrne, 1994).

The analyses of all measurement and structural models were conducted by means of *Mplus* 6.11 (Muthen & Muthen, 1998-2010). Following Muthen and Muthen (1998-2010), individual items were defined as ordered categorical variables. In this case, the default estimator of *Mplus* is a weighted least squares estimator (WLSMV) that is robust to non-normality. (As is shown in Table 3, some variables in the present study deviate from a normal distribution.) The Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) were used to assess model fit (cf. Kline, 2005). A *good* level of fit is indicated when CFI and TLI values exceed .95 and when RMSEA is

below .06. The fit of a model is still *acceptable* when CFI and TLI fall between .90 and .95 and when RMSEA is below .08 (cf. Hu & Bentler, 1999).

2.2.1 Interest

The development of the questionnaire to assess *subject*, *didactic*, and *educational interest* in teachers was based on the person-object theory of interest and an earlier questionnaire on study interest (see Schiefele, 2009; Schiefele, Krapp, Wild, & Winteler, 1993). We formulated eight items for subject interest and seven items each for didactic and educational interest. These items referred to both feeling-related and value-related valence beliefs, and addressed the intrinsic character of interest (cf. Section 1.2). The two items referring to career choice (subject interest scale, Item 1; educational interest scale, Item 2; cf. Table 2) may be criticized because the reasons of teachers' career choice date back several years or decades and, therefore, are subject to substantial changes. In contrast to that objection, career choice items were successfully used in the earlier questionnaire on study interest (Schiefele et al., 1993) and function quite well in the present instrument (see below and Table 2). Despite these positive findings, career choice items may be replaced in future versions of the present questionnaire.

We applied an item-level multiple-group CFA for binary variables to examine (a) the assumed three-factor structure of the interest scale and (b) the measurement invariance of these factors across teachers from different school tracks (cf. Kline, 2005; Wu, Li, & Zumbo, 2007). The measurement of a factor is said to be *strongly invariant*, if the measurement model (factor loadings and intercepts) linking the observed items with the unobserved factor does not differ between groups. Thus, factor loadings and intercepts were constrained to be equal across school tracks.

The tested model did not attain an acceptable fit with the data, $\chi^2(96) = 179.51$, $p < .01$, CFI = .86, TLI = .91, RMSEA = .10. Results were even worse for alternative models with either one factor, $\chi^2(90) = 251.63$, $p < .01$, CFI = .72, TLI = .81, RMSEA = .14, or two factors (didactic and educational interest were combined into a common factor because of their assumed close relation), $\chi^2(96) = 233.03$, $p < .01$, CFI = .76, TLI = .85, RMSEA = .13. Therefore, we decided to analyze the three-factor model more closely. With the help of modification indices (MI), we identified eight items with significant loadings on additional factors (MI > 10). After removing these items stepwise, the model fit improved to an acceptable level, $\chi^2(67) = 97.49$, $p < .01$, CFI = .93, TLI = .95, RMSEA = .07. In the adjusted model, all items showed moderate or high factor loadings (> .50). Taken together, these analyses confirm the three-factorial structure of the interest scale and its validity for teachers from different school tracks. The final subscales, factor loadings, and reliabilities are depicted in Tables 2 and 3.

Table 2: The teacher interest scale

Items	Factor loadings		
	Factor 1	Factor 2	Factor 3
Subject interest			
1. I chose my subject because I find it interesting. ($r_{it} = .52$)	.62		
2. To be honest, I am sometimes not very interested in the subject that I teach. (-) ($r_{it} = .47$)	.68		
3. Dealing with the contents and problems of my subject is certainly not one of my favorite activities. (-) ($r_{it} = .40$)	.62		
4. Being involved with my subject puts me in a good mood. ($r_{it} = .51$)	.70		
5. It is personally important to me that I teach this subject. ($r_{it} = .67$)	.88		
Didactic interest			
1. I like to read up on new teaching methods even in my spare time. ($r_{it} = .56$)		.64	
2. I place a strong personal value on thinking about teaching methods. ($r_{it} = .67$)		.84	
3. I like to think about ways of making my teaching more effective and motivating. ($r_{it} = .62$)		.89	
4. It is important to me to ensure that my teaching methods are always up to date. ($r_{it} = .64$)		.79	
Educational interest			
1. I think that it is important to take a developmental approach when dealing with problem students. ($r_{it} = .56$)			.74
2. My decision to become a teacher was mostly due to my interest in helping students to grow up into successful adults. ($r_{it} = .58$)			.72
3. My educational competence in handling students is at least as important to me as my knowledge about the subject I teach. ($r_{it} = .57$)			.75
4. The most interesting aspect of my work is helping students develop as people. ($r_{it} = .64$)			.80
5. I am particularly interested in helping students develop habits of work and character. ($r_{it} = .72$)			.87

Note. These are translations of the German-language items. As such they aim to convey the content rather than serve as items for direct use in English.

$N = 281$. (-): Items requiring reverse coding, r_{it} = Item-test correlation.

The resulting three-factorial structure of the teacher interest scale was validated in an additional sample of 238 teachers from elementary schools ($n = 78$) and low-achievement ($n = 79$) as well as high-achievement secondary schools ($n = 81$). Again, a multiple-group CFA model assuming strong measurement invariance was tested. However, instead of the estimator WLSMV, the estimator MLR (which is also robust to non-normality) was applied because several items did not show the full range of response categories within each of the three teacher subgroups and, thus, could not be defined as categorical variables. The results confirmed the three-

factorial model of teacher interest, $\chi^2(226) = 301.17, p < .01, CFI = .91, TLI = .91, RMSEA = .07$.

2.2.2 Self-efficacy

We used a slightly modified version of a questionnaire developed by Schwarzer and Schmitz (1999) to assess *teachers' self-efficacy*. This questionnaire asks teachers to rate their ability to cope successfully with the demands of their work (e.g., "I can teach even the most problematic students what they will need for their exams"). For two of the original items, we slightly changed the syntax to make these items more comprehensible. As a result of the pretest with teacher education students, two items with low item-test correlations were deleted. We added a new item to represent the content of the deleted items. Despite these modifications, the validity of the original scale should not have changed. In support of this claim, the correlations of the 8-item measure of self-efficacy in the pretest and the 7-item measure of self-efficacy in the main study with all other variables were nearly identical.

2.2.3 Occupational well-being

Burnout. Burnout was assessed with Enzmann and Kleiber's (1989) German adaptation of the Maslach Burnout Inventory (MBI; Maslach & Jackson, 1986). This is a well-established instrument applied to a range of occupational groups in burnout research. The MBI contains three subscales assessing the core symptoms of the burnout syndrome: *emotional exhaustion* (e.g., "I feel fatigued when I get up in the morning and have to face another day at school"), *lack of accomplishment* (e.g., "I deal very effectively with the problems of my students", reversely coded), and *depersonalization* (e.g., "I don't really care what happens to some students"). An item-level CFA model of the MBI resulted in a moderate fit, $\chi^2(70) = 231.21, p < .01, CFI = .90, TLI = .96, RMSEA = .09$. Modification indices revealed two problematic items (from the *emotional exhaustion* and *lack of accomplishment* subscales) with significant cross-loadings. Deleting these items improved the fit of the model, $\chi^2(63) = 177.49, p < .01, CFI = .92, TLI = .96, RMSEA = .08$. Thus, we decided to exclude these items from all further analyses. Within the revised CFA model, factor loadings for all items were above .50, with only two exceptions (loadings of .32 and .42). The correlations between the original and the revised subscales were .99 (emotional exhaustion) and .98 (lack of accomplishment). This justifies the assumption that the revised subscales preserved the construct reflected by the original subscales.

Enjoyment and flow. The experience of enjoyment was assessed with a translated and slightly adapted version of the subscale "Interest/Enjoyment" from the Intrinsic Motivation Inventory (IMI; McAuley, Duncan, & Tammen, 1989). This scale taps the degree to which teachers generally experience activity-inherent or

intrinsic incentives during their work (e.g., “I usually enjoy teaching”). The experience of flow while teaching was assessed on the basis of questionnaires from Rheinberg, Vollmeyer, and Engeser (2003) and Schiefele and Roussakis (2006). Items were reformulated and related to concrete classroom situations (e.g., “While I am teaching, I forget everything else around me”). Care was taken to use only items referring directly to the subjective experience of flow and not to the conditions of the flow state (particularly the fit between task demands and ability). The proposed two-dimensional structure of experience in class (enjoyment, flow) was examined by means of an item-level CFA. This analysis demonstrated good fit, $\chi^2(28) = 103.17, p < .01, CFI = .97, TLI = .98, RMSEA = .10$.¹ All items exhibited moderate or high factor loadings ($> .50$). Substantial cross-loadings (as indicated by modification indices) were not observed.

2.2.4 Instructional practices

The assessment of instructional practices was based on scales from the PISA study (cf. Kunter et al., 2002) and the Pattern of Adaptive Learning Scales (PALS; Midgley et al., 2000). Because the PISA scales are intended for students, they had to be reformulated so that teachers could answer them. We translated the PAL scales into German. As part of the pretest with teacher training students, four relatively independent instruction factors were identified by means of an exploratory factor analysis: *Mastery-oriented instruction* (e.g., “I make a special effort to recognize students’ individual progress, even if they are below grade level”), *internal differentiation* (e.g., “I adjust the difficulty of my questions in the classroom to how good a student is”), *performance-oriented instruction* (e.g., “I display the work of the highest achieving students as an example”), and *cognitive stimulation and autonomy* (e.g., “I get my students to work out different ways to handle a task in small groups, and then I bring them together to discuss these”). Although mastery-oriented instruction and internal differentiation appear to represent similar dimensions, they turned out to be only moderately correlated (see Table 4). Whereas mastery-oriented instruction refers to the use of individual reference norms when evaluating students’ achievement, internal differentiation focuses on the use of individualized task requirements or difficulty levels.

An item-level CFA model of the assumed factorial structure demonstrated moderate fit, $\chi^2(79) = 240.13, p < .01, CFI = .90, TLI = .93, RMSEA = .09$. Modification indices identified two items from the mastery-oriented instruction scale with significant cross-loadings. Deletion of these items improved the fit of the model, $\chi^2(72) = 176.10, p < .01, CFI = .93, TLI = .95, RMSEA = .07$. Thus, these

1 In this case, RMSEA is above the recommended critical value of .08. It should be noted, however, that RMSEA tends to be higher for less complex models with fewer variables (Hair, Black, Babin, & Anderson, 2010). Thus, we computed the Standardized Root Mean Square Residual (SRMR) as an alternative fit index, because it is less dependent on model complexity (and sample size). The obtained SRMR value of .06 was below the critical level of .08 (Hu & Bentler, 1999).

items were excluded from all further analyses. In the revised CFA model, factor loadings for all items were above .48. As indicated by a correlation of .90, the revised and the original mastery-oriented instruction subscale seem to represent the same construct.

2.2.5 Handling of missing data

Missing values were estimated with the expectation-maximization (EM) algorithm computed by means of the statistical software NORM 2.03 (Schafer, 1999; see also Graham, 2009). On average, only 2.6 % of the sample had missing values for each variable. Repeated patterns of missing values across individual cases were not detected. Thus, we concluded that missing values in our data set were most likely missing completely at random (MCAR: the probability that an observation X_i is missing is unrelated to the value of X_i or to the value of any other variables) or at least missing at random (MAR: the probability that an observation X_i is missing is unrelated to the value of X_i).

3. Results

3.1 Descriptive statistics and intercorrelations

Mean scores, standard deviations, skewness, and kurtosis of all variables in the study are presented in Table 3. Intercorrelations are reported in Table 4. Significant gender differences in mean scores were not found. Non-normality of distributions was indicated for eight variables (according to a guideline suggested by Miles & Shevlin, 2001; see Table 3).

Table 3: Descriptive statistics of all study variables

Scales	<i>k</i> ^a	<i>M</i>	<i>SD</i>	Skewness ^b	Kurtosis ^c	α
Interest						
Subject interest	5	3.22	.54	-.46 ^d	-.18	.75
Didactic interest	4	3.07	.57	-.11	-.57	.80
Educational interest	5	3.24	.56	-.54 ^d	-.07	.82
Self-efficacy	7	2.93	.43	-.31 ^d	.15	.76
Burnout						
Emotional exhaustion	8	1.84	.53	.59 ^d	.41	.83
Lack of accomplishment	7	1.89	.41	.27	-.01	.77
Depersonalization	5	1.63	.46	.58 ^d	-.05	.62
Experience in class						
Enjoyment	7	3.51	.50	-1.11 ^d	1.68 ^d	.90
Flow	6	3.29	.46	-.27	-.73 ^d	.74
Instructional practices						
Mastery-oriented	4	3.33	.44	-.10	-.23	.71
Internal differentiation	4	2.81	.51	.21	.44	.63
Performance-oriented	5	2.07	.56	.34 ^d	.29	.74
Cognitive stimulation	11	2.99	.42	.20	-.22	.85

Note. The theoretical range of values for all scales is 1–4. *N* = 281. ^aNumber of items. ^bCritical value: 2*standard error of skewness = |.29|. ^cCritical value: 2*standard error of kurtosis = |.58|. ^dExceeds the corresponding critical value.

Table 4: Spearman rank correlations between all study variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Subject interest	1.00											
2. Didactic interest	.36**	1.00										
3. Educational interest	.22**	.40**	1.00									
4. Self-efficacy	.27**	.26**	.50**	1.00								
5. Emotional exhaustion	-.30**	-.29**	-.27**	-.33**	1.00							
6. Lack of accomplishment	-.31**	-.28**	-.52**	-.66**	.51**	1.00						
7. Depersonalization	-.30**	-.30**	-.38**	-.46**	.59**	.59**	1.00					
8. Enjoyment	.47**	.45**	.55**	.48**	-.51**	-.60**	-.51**	1.00				
9. Flow	.42**	.36**	.24**	.23**	-.14*	-.24**	-.24**	.41**	1.00			
10. Mastery-oriented IP	.16**	.29**	.42**	.34**	-.11	-.40**	-.30**	.33**	.25**	1.00		
11. Internal differentiation	.00	.23**	.24**	.24**	.01	-.22**	-.16**	.21**	.10	.29**	1.00	
12. Performance-oriented IP	.03	-.04	-.05	-.04	.04	.15*	.06	-.09	-.00	-.07	-.02	1.00
13. Cognitive stimulation	.26**	.32**	.31**	.34**	-.14*	-.32**	-.20**	.36**	.21**	.44**	.39**	-.11

Note. *N* = 281. IP = Instructional practices. **p* < .05 (two-tailed). ***p* < .01 (two-tailed).

3.2 School track differences in teacher interest

The first test of the present model of interest dimensions refers to the assumed differences between different school tracks. Means and standard deviations for the interest dimensions within the three school tracks are presented in Table 5. To test whether teachers' interests differed according to school track, we performed a two-factor MANOVA (with gender as the second between-subjects factor). The findings showed a significant main effect for school track, $F(6, 538) = 8.27, p < .01, \eta^2 = .08$, but not for gender, $F(3, 269) = 1.72, ns$. Subsequent one-factor ANOVAs revealed significant main effects of school track for both subject and educational interest, but not for didactic interest (see Table 5). In line with the hypotheses, high-achievement secondary school teachers showed significantly higher subject interest than low-achievement secondary and elementary school teachers (a priori contrast, $t = 5.82, df = 278, p < .01$). Furthermore, elementary school teachers exhibited, as was expected, higher educational interest than high-achievement and low-achievement secondary school teachers (a priori contrast, $t = 2.34, df = 278, p < .05$). By means of additional post hoc tests (Scheffé), differences between individual school tracks were examined. The results confirmed the analyses of a priori contrasts with one exception (see also Table 5): low-achievement secondary teachers were not significantly different from other teacher groups pertaining to educational interest.

Table 5: School track differences in teacher interest

	Elementary school (<i>n</i> = 71)		Low-achievement sec. school (<i>n</i> = 133)		High-achievement sec. school (<i>n</i> = 77)		Effects of school track	
	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>F</i> (2, 278)	ANOVA eta ²
Subject interest	3.02	(.56)	3.17	(.53)	3.49	(.39)	17.54**	.112
Didactic interest	3.13	(.58)	3.06	(.56)	3.04	(.58)	0.50	.004
Educational interest	3.36	(.50)	3.25	(.55)	3.10	(.61)	4.14*	.029

* $p < .05$. ** $p < .01$.

3.3 Testing the model to predict occupational well-being and instructional practices

The next step in analyzing the construct validity of our measure of teacher interest involved the analysis of the hypothesized predictive relations between the three dimensions of interest and both occupational well-being and self-reported instructional practices. We tested these relations by means of a structural equation model for latent variables (represented at the item level) in which the three interest dimensions and self-efficacy represent the exogenous variables that were expected to

contribute to the prediction of the components of occupational well-being and instructional practices. Because performance-oriented instruction did not correlate with the exogenous variables (see Table 4), it was dropped from the model test.

The analyses of the measurement and structural models were performed with *Mplus* 6.11 (Muthen & Muthen, 1998–2010; cf. Section 2.2). The structural model contains correlative paths among all predictors and among all dependent variables. To control for the influence of school track, each latent variable in the model was regressed on two dummy-coded school track variables (first variable: 0 = elementary or low-achievement secondary school, 1 = high-achievement secondary school; second variable: 0 = low- or high-achievement secondary school, 1 = elementary school). This ruled out the possibility that differences in the variables due to school track would impact on the parameters estimated in the model.²

The measurement model showed a good fit with the data and did not require modification, $\chi^2(152) = 346.08$, $p < .01$, CFI = .92, TLI = .95, RMSEA = .07. The fit of the structural model also was satisfactory, $\chi^2(161) = 357.21$, $p < .01$, CFI = .92, TLI = .95, RMSEA = .07. An examination of the structural coefficients revealed a total of eight nonsignificant paths. None of the paths constrained at zero actually did pass the level of significance. For ease of presentation, the resulting structural model is presented separately for the prediction of occupational well-being (see Figure 1) and instructional practices (see Figure 2). The results confirmed self-efficacy as a strong predictor of burnout. This applied particularly to lack of accomplishment. Despite the substantial contributions of self-efficacy, didactic interest also explained significant portions of variance in emotional exhaustion and depersonalization. In addition, higher educational interest was accompanied by lower lack of accomplishment. As expected, the paths from subject interest to burnout were not significant. However, there were strong associations between educational interest and enjoyment as well as between subject interest and flow. Further significant paths led from self-efficacy, didactic interest, and subject interest to enjoyment. In contrast to expectations, flow was only predicted by subject interest.

2 A multi-group model did not work out, presumably due to the small size of subgroups.

Figure 1: Structural equation model part 1: Prediction of occupational well-being. Only significant standardized path coefficients are shown. Not included are the significant residual correlations between emotional exhaustion and mastery-oriented instruction (.10, $p < .05$), internal differentiation (.16, $p < .01$), and cognitive stimulation (.14, $p < .01$) as well as between depersonalization and cognitive stimulation (.14, $p < .01$). * $p < .05$. ** $p < .01$.

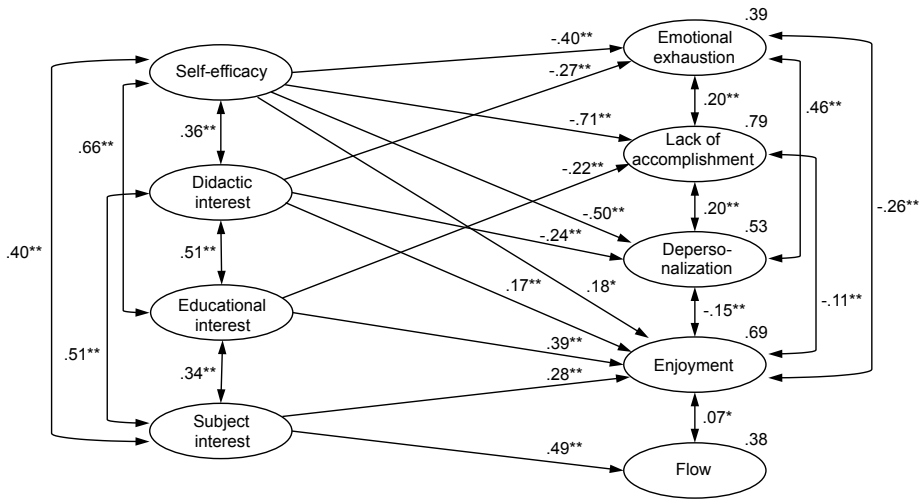
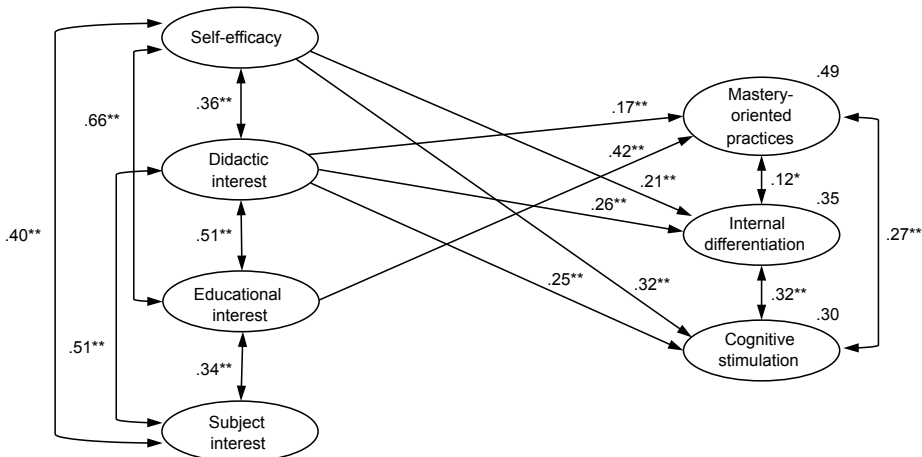


Figure 2: Structural equation model part 2: Prediction of instructional practices. Only significant standardized path coefficients are shown. Not included are the significant residual correlations between emotional exhaustion and mastery-oriented instruction (.10, $p < .05$), internal differentiation (.16, $p < .01$), and cognitive stimulation (.14, $p < .01$) as well as between depersonalization and cognitive stimulation (.14, $p < .01$). * $p < .05$. ** $p < .01$.



As was hypothesized, didactic interest and self-efficacy were associated significantly with internal differentiation and cognitive stimulation. In addition, mastery-oriented instruction was significantly predicted by didactic and educational interest. In contrast to expectations, subject interest did not contribute to the prediction of cognitive stimulation.

4. Discussion

The present study was based on the assumption that teachers' occupational interests are significant predictors of their experiences and activities in the classroom. Our first aim was to construct a new questionnaire to assess subject, didactic, and educational interest. In support of that aim, the subscales of this questionnaire showed a sufficient level of internal consistency. Moreover, the significant correlations between the interest dimensions and self-efficacy as well as the various aspects of occupational well-being and instructional practices supported the subscales' construct validity. Further evidence comes from the findings on differences between school tracks. As predicted, high-achievement secondary school teachers showed the strongest subject interest, whereas elementary school teachers expressed the strongest educational interest. Also in line with expectations, school tracks did not differ in terms of didactic interest.

The test of the theoretical model to predict occupational well-being and instructional behavior showed a good fit with the empirical data. On the one hand, we confirmed the crucial role of self-efficacy for burnout (e.g., Caprara et al., 2006). However, the strong path from self-efficacy to lack of accomplishment ($\beta = -.70$) and a comparison of the items in the two scales indicate a notable overlapping of constructs. This underlines even more strongly the significant contribution of educational interest to predicting lack of accomplishment independently of the dominant role of self-efficacy.

On the other hand, we were able to confirm that burnout is significantly related to didactic and educational interest but not to subject interest. Whereas higher levels of educational interest were associated with lower levels of lack of accomplishment, higher didactic interest was accompanied by lower emotional exhaustion and depersonalization. In both cases, significant contributions were made even after statistically controlling for self-efficacy. Because didactic interest was associated with two burnout dimensions, it may be attributed a particularly important role in protecting against burnout. The significant contribution of educational interest to the perception of lack of accomplishment may be due to the fact that the latter refers specifically to aspects of the interaction with students (see Section 2.2.3).

Our intention has been not only to study negative aspects of teachers' experience but also its positive forms. Therefore, we used scales to assess enjoyment and flow in the class. According to expectations, all of the predictors contributed to the experience of enjoyment in class. However, in contrast with our assumptions, the

experience of flow was only predicted by subject interest. This pattern of relations suggests that teachers' enjoyment of teaching is associated with several motivational factors, whereas the experience of flow (i.e., becoming deeply absorbed in the activity of teaching) is particularly related with the extent of valuing the subject matter taught. Thus, for example, when high educational and didactic interest is combined with low subject interest, the teacher is probably enjoying his or her teaching activities but may not attain the more positive and intense experience of deep absorption while teaching.

Findings on the prediction of self-reported instructional practices are also broadly in line with our hypotheses. As was expected, self-efficacy and didactic interest proved to be the only significant predictors of internal differentiation and cognitive stimulation. The more self-efficacious teachers considered themselves to be and the stronger their interest in didactic issues, the more they reported using methods of internal differentiation and cognitive stimulation. In addition, mastery-oriented practices were significantly predicted by educational and didactic interest, but not by self-efficacy. The particularly pronounced contribution of educational interest to mastery-oriented practices may be explained by the emphasis of educational interest on helping students to develop or improve both academically and personally. This obviously fits well with the instructional practice of fostering students' mastery of academic challenges, for example by recognizing students' individual progress or by emphasizing the strengths of weaker students.

The present findings suggest not only that it is meaningful to differentiate various occupational interests in teachers, but also that these interests have the potential of complementing previously studied features of teacher motivation as significant variables determining burnout and instructional behavior. As a first step, the present results confirm that teacher interests contribute significantly to the involved criterion measures above and beyond teacher self-efficacy. Didactic and educational interest may adopt key roles here, because they promote not only occupational well-being but also the preference for effective instruction methods. However, findings also revealed that the subject interest of teachers should not be neglected. This is particularly true for predicting the experience of positive emotional states while teaching.

There are at least three major limitations of the present findings. First, teachers' instruction behavior was assessed with self-reports. As Kunter and Baumert (2006) have recently shown, both teacher and student ratings of instruction are subject to specific biases. Although there are also indications that such ratings have a degree of validity compared with ratings by external observers (e.g., Mayer, 1999; Porter, 2002), the agreement between teacher and student ratings is mostly very low (Clausen, 2002). As Kunter and Baumert (2006) have demonstrated, agreement is greater when the behavior to be rated is easy to observe (e.g., classroom disruptions vs. appraisals of the adaptedness of teacher-student interaction). These authors have also found evidence that teacher ratings are not subject to a self-serving bias. Instead, data show that teachers and students each take their own particular perspective on the class and thus rate instructional events differently. In the

light of their perspectives, each set of ratings is valid (e.g., there is a substantial correlation between teacher judgments on the efficiency of classroom management and teacher enjoyment; cf. Kunter & Baumert, 2006). Nonetheless, an important consequence for future research will be to assess instructional practices from the student perspective and on the basis of classroom observation.

The second restriction of our study relates to its cross-sectional character. This makes it impossible to dispel uncertainty about the direction of postulated effects. Whereas it is less probable for instructional behavior to influence teacher interests, a causal effect of burnout and experience in class on the interests of teachers seems to be just as plausible as our postulated effect of teacher interest on burnout and experience. Obviously, longitudinal studies are needed to corroborate the causal direction of the relations between these variables.

A longitudinal design would also make it possible to clarify further questions on the mediating processes involved in the impact of teacher interest on instructional practices. We suggest that teachers' knowledge may function as a possible mediator. For example, didactic interest could lead to the acquisition of corresponding knowledge that, in turn, facilitates the use of appropriate teaching methods. However, from a theoretical perspective, a reciprocal relation between interest and knowledge is also conceivable. Hence, here as well, a longitudinal design could generate important findings.

The third restriction pertains to the neglect of other teacher motivation variables beyond self-efficacy. Thus, it remains an open question whether teacher interests are able to explain unique portions of variance in teachers' job experience and instructional behavior above and beyond other motivation factors (e.g., mastery goal orientation). However, as we have argued above, teacher interests are likely to be antecedents of intrinsic motivation, enthusiasm, and mastery goals. Therefore, indirect effects of teacher interests on teacher outcome variables – mediated, for example, by mastery goals (cf. Harackiewicz et al., 2008) – should also be considered in future studies.

As well as overcoming the above described limitations, future research should also take account of possible effects of teacher interest on students. First, student motivation should be included (e.g., Wild, Enzle, & Hawkins, 1992). Second, it would be important to ask whether teacher interests impact on student achievement. Studies on the relation between teacher motivation – with the exception of teacher self-efficacy (e.g., Caprara et al., 2006) – and student achievement are largely missing. In both cases, it would be interesting to test whether our dimensions of teacher interest are able to predict student learning or achievement in addition to other components of teacher motivation.

A further important issue refers to social desirability (e.g., Paulhus, Bruce, & Trapnell, 1995). The positive response pattern obtained in the present study (see Table 3, particularly the high mean value for enjoyment in class) raises the question of whether social desirability could have biased the teachers' responses and the results. Thus, in future studies, it is to be recommended to control for social desirability.

On a more conceptual level, we suggest to complement the present conceptualization of teacher interests. Our interest approach strongly draws on Shulman's (1986, 1987) work on teachers' professional knowledge. As we have discussed previously (see Section 1.2), teachers' knowledge comprises more aspects than are represented in our three-dimensional interest model. This applies particularly to *general pedagogical knowledge* which not only refers to aspects of educating students (e.g., classroom management, educational values) but also to knowledge on human development, on learning, and on evaluating students' learning. These latter aspects are not represented in our interest model, although they are likely to be relevant for teachers' work with students. Thus, it seems worthwhile for future research to develop interest components that address these additional areas of professional knowledge.

Potentially, the present findings have important practical consequences. In particular, it is possible that all three dimensions of teacher interest complement self-efficacy beliefs as important protective factors against burnout or stress symptoms and serve as a source of positive motivation. How can this protective effect be explained? As already suggested above, interest could contribute to the acquisition of professional knowledge (e.g., on classroom management) that makes teaching easier and more effective. This will minimize stress, and facilitate the experience of intrinsic incentives during teaching. It is also conceivable that didactic interest in particular motivates teachers to apply more favorable or appropriate instruction methods. Here as well, knowledge could be involved as an intermediate process. In addition, irrespective of knowledge, didactic interest could lead to better decisions on the choice of methods, simply because there is a greater interest in such methodological issues. If this interest is lacking, a teacher with much didactic knowledge may well base his or her choice of methods on other criteria such as the amount of effort required or the guidelines of the school principal.

The findings reported here may also have consequences for teacher education. On the one hand, it seems necessary to consider and simultaneously promote not only self-efficacy but also subject, didactic, and educational interests in future teachers. This could foster their self-regulated acquisition of professional knowledge, and prevent them from being guided by short-term considerations when choosing instructional methods. Instead, they will be enabled to select methods that are favorable in the long run – not only for their students but also for their own experience and competence.

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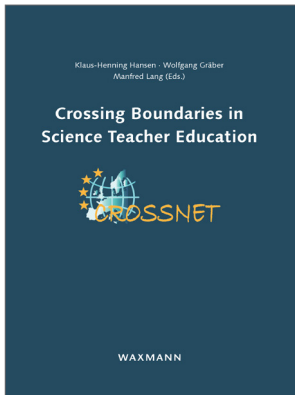
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Crossing Boundaries in Science Teacher Education

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This book presents the outcomes of a transnational EU project about innovation in science teacher education. Guiding questions were how teachers, policy makers and teacher educators collaborate in the process of change and how local background projects respond to opportunities for the exchange of experiences and reflection in terms of a common theoretical framework: the idea of boundary crossing. The book is based on a series of local case studies conducted by local coordinators and contracted teachers. The case studies are supplemented by a cross-case analysis of common and distinct features in the projects and an essay about the relationship between boundary crossing, transformative learning and curriculum theory. Main outcomes are suggestions to improve school-based reform in and collaboration for science education.



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