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Working Hours, Work Activities, Work Experience and Job Satisfaction of Teachers at Vocational Schools: Conclusions for the (Un)Attractiveness of the Teaching Profession

Abstract

Considering the teacher shortage in Germany as well as internationally, the attractiveness of the teaching profession is an important issue. Based on a questionnaire and a diary study from 2022 we are investigating the working hours, work activities, and associated work experiences of full-time teachers at vocational schools and draw conclusions for the attractiveness of the profession. Results show that the working hours of full-time teachers are 10-25 % higher than prescribed. Significant time is spent on non-teaching tasks. High perceived stress is reported especially for teaching and for miscellaneous activities. Job satisfaction is negatively correlated with stress and positively with informal learning. The findings underline the high workload of vocational teachers and suggest that stress and opportunities for learning play important roles in their job satisfaction. These insights offer a foundation for policy interventions aimed at improving working conditions and the attractiveness of the profession.

Arbeitszeiten, Arbeitstätigkeiten, Arbeitserleben und Berufszufriedenheit von Lehrkräften an beruflichen Schulen: Rückschlüsse für die (Un-)Attraktivität des Lehrberufs

In Anbetracht des Lehrkräftemangels in Deutschland sowie auch international ist die Attraktivität des Lehrerberufs ein wichtiges Thema. Auf Basis einer Fragebogen- und Tagebuchstudie aus 2022 untersuchen wir die Arbeitszeiten, die Arbeitstätigkeiten und das damit verbundene Arbeitserleben von Vollzeitlehrkräften an beruflichen Schulen und ziehen auf dieser Basis Rückschlüsse für die Attraktivität des Lehrberufs. Die Ergebnisse zeigen, dass die Arbeitszeit von Vollzeitlehrkräften 10-25 % höher ist als gesetzlich vorgesehen. Vor allem für unterrichtsfremde Tätigkeiten wird viel Zeit aufgewendet. Hoher wahrgenommener Stress wird insbesondere für das Unterrichten und für sonstige Tätigkeiten angegeben. Die Arbeitszufriedenheit ist negativ mit Stress und positiv mit wahrgenommenem informellem Lernen korreliert. Die Ergebnisse unterstreichen die hohe Arbeitsbelastung von Berufsschullehrkräften und legen nahe, dass Stress und informelle Lernmöglichkeiten eine wichtige Rolle für die Arbeitszufriedenheit spielen. Diese Erkenntnisse bieten eine Grundlage für politische Maßnahmen, die darauf abzielen, die Arbeitsbedingungen und die Attraktivität des Lehrberufs zu verbessern.

Schlüsselwörter: *teachers' working hours, teacher satisfaction, stress and coping, informal learning, diary method*

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1 Introduction

Teacher shortage is a growing problem in many countries (Education GPS, 2024, Marín Blanco et al., 2023). Teacher shortage endangers the provision of teaching and the quality of teaching (Köller et al., 2023). According to prognoses, in Germany there will be a shortage of about 25,000 teachers until 2025. In vocational schools and vocational subjects within the upper-level secondary schools, a shortage of about 5,355 teachers is expected (Köller et al., 2023). As a consequence, the attractiveness of teaching and the job satisfaction of teachers receive growing attention (Education GPS, 2024, Marín Blanco et al., 2023). Marín Blanco et al. (2023) identify working conditions and teacher attrition as the main factors for the attractiveness of the teaching profession. In their framework, Marín Blanco et al. (2023) list salary, workload, flexibility, classroom climate, school environment and resources, such as social needs support, as indicators for teachers' work conditions. The central role of workload for job satisfaction and retention is also highlighted by other studies (Li & Yao, 2022; Toropova et al., 2021; Hardwig & Mußmann, 2018). However, teachers' working hours are hardly regulated and difficult to record (Hardwig & Mußmann, 2018; Kreuzfeld et al., 2022). There have been repeated studies on this topic since the 1960s (Kreuzfeld et al., 2022), but data on teachers in vocational education and training (VET) is scarce. The available data hints in the direction that "upper-level secondary school teachers work the longest of all teachers" (Kreuzfeld et al., 2022, p. 2). Beyond the absolute working hours, the particular work activities of teachers with and without additional management functions have also been investigated in several studies (Hardwig & Mußmann, 2018; Mußmann et al., 2020; Mußmann et al., 2023; OECD, 2019; Kreuzfeld & Felsing, 2022; te Braak et al., 2022; Thompson et al., 2023; Creagh, 2023). This distinction is important because teachers with management roles, e. g., principals or heads of departments, often take on a broader range of responsibilities beyond teaching, including administrative tasks, personal management, and contributing to school development. The results confirm the increase of non-teaching activities that is also subject to political debates (Mußmann et al., 2020). While workload and stress affect teacher attrition (Thompson et al., 2023), little is known about which work activities in particular are perceived as stressful. Furthermore, the perception of stress during a work activity does not necessarily lead to dissatisfaction in the long run. Short-term coping might help decrease the negative effects of stress and furthermore, stressful work activities may also provide important opportunities for informal learning. However, there are no empirical studies on these dynamics in the field of VET. As argued, measuring teachers' time use is challenging. Furthermore, retrospective measures of time, such as questionnaires and interviews, are affected by biases, like memory effects (Rausch et al., 2022; Kyvik et al., 2013). Experience sampling and other in situ data collection methods are close to the process of interest and provide a higher validity (Rausch et al., 2022). Unraveling the interrelations of working hours, management functions, stress, coping and learning on job satisfaction will help understand some of the reasons for the increasing teacher shortage and will point to possible measures to close the gap. Marín Blanco et al. (2023) provide an overview of studies on teacher shortage and teacher retention. They show that there has been substantial research. However, additional insights in the VET domain as well as on individual factors of teacher retention can inform policy decisions and serve as a basis for targeted interventions.

The following research questions are tackled using combined data from a questionnaire survey and a diary study conducted in 2022:

(1) How many hours do teachers at vocational schools work? (2) How are the working hours of teachers distributed across work activities? (3) How are different work activities of teachers perceived regarding stress, coping and informal learning? (4) What are the interrelations of working hours, management functions, stress, coping and learning on job satisfaction?

The paper is structured as follows. First, we present current research on teachers' working hours, work experience and job satisfaction and how these constructs are related to the attractiveness of the teaching profession. In the method section, we present our attempt at recording the working hours of teachers as precisely as possible, applying a method triangulation consisting of two studies. Then, the results are presented and discussed. Finally, a conclusion is drawn and implications for teachers and policy makers are presented.

2 Theoretical Background

2.1 Characteristics of the Teaching Profession

In Germany, a typical characteristic of the teaching profession is working in two different locations; namely teaching at the school and working at home. This often leads to the conception of teachers only working part-time, as the other part of their working hours are spent at home (Rothland, 2013). Another characteristic is the general openness of many teachers' tasks, as one could always do, prepare and learn more. Therefore, it is up to the individual to decide when the teaching and educational objectives are achieved (Rothland, 2013). Furthermore, the success of their work, measured in the students' learning growth, is not directly related to the teaching activities, but is largely dependent on the student (Aprea & Lohner, 2019). In comparison to many other occupations, the teaching profession also lacks career options. In Germany, differences in salary are mostly due to years in the profession and do not reflect specific achievements of the individual teacher (Rothland, 2013). Finally, Rothland (2013) stresses the incompletely regulated working time as another characteristic of the teaching profession. The division of the workplaces increases this problem, as only the time teaching in front of a class is determined by the teaching load, the time spent on preparation and reviewing the lessons is mostly up to the individual teacher (Aprea & Lohner, 2019).

2.2 Teachers' Working Hours in Germany

High working hours as a part of the working conditions may affect the attractiveness of the teaching profession (Marín Blanco et al., 2023). In Germany, the work of teachers can be divided into a determined part and an obligatory part (Mußmann et al., 2020). Teachers' working hours are partly specified by the teaching load stating the number of lessons of 45 minutes a teacher has to teach per week (§1 LehrArbZV BW, 2014/19.07.2022; Hardwig & Mußmann, 2018). Currently, the teaching load of teachers at vocational schools in Baden-Württemberg is settled at either 25, 27 or 28 hours per week (Sekretariat der Ständigen Konferenz der Kultus-

minister der Länder in der Bundesrepublik Deutschland, 2021; §2 LehrArbZV BW). Besides this settled time, teachers are flexible in their working time regarding tasks such as lesson planning and reflection of lessons, administrative activities, preparation of exams and in-service training (Rothland, 2013). In Baden-Württemberg, the working time of civil servants is settled at 41 hours per week (§ 4 AzUVO, 2006/29.11.2005). However, because of the described freedom in how teachers organize their flexible hours, the actual working hours are often longer (Hardwig & Mußmann, 2018). Since the 1960s, there have been several studies on teacher working hours in different types of schools in Germany (Kreuzfeld et al., 2022). Kreuzfeld and colleagues (2022) report a mean of 42.8 hours from their questionnaire survey and 45.2 hours from their diary study. Te Braak et al. (2022) report 42.8 hours in their questionnaire study and 42.05 hours in their diary study. Furthermore, Kreuzfeld et al. (2022) state that due to “the increase in extra-curricular tasks, it has been observed that the proportion of time for actual teaching has decreased in the more recent studies” (Kreuzfeld et al., 2022, p. 2). The proportion of working time actually spent teaching averages 43 % in OECD countries but varies between 32 % in Poland and Turkey and 63 % in Scotland (Kreuzfeld et al., 2022). As teaching itself often does not even make up half of the working time, it is challenging to measure the working hours of teachers. Especially in comparison to other occupational groups, it is difficult to determine the exact number (Kreuzfeld et al., 2022). Similar to the study presented in this article, Thompson et al. (2023) conducted a pilot study using the Teacher Time Use app and experience sampling methodology. They use it to get a more detailed understanding of “teachers’ subjective experience of time” (p. 1647) to expand the so far mostly quantitative insights. Results therefore focus on the perceived work intensity. The perceived unpredictable aspects of the teaching profession were at the same time perceived as typical by participants. Their study emphasizes that workload is only one of the factors impacting the attractiveness of the teacher profession. Another factor is the perceived work intensity, or the perceived stress perceived at work or at a specific activity (see Beck, 2017). “Research indicates that the effects of workload and work intensification negatively impact teachers, in relation to health, wellbeing, and attrition” (Creagh et al., 2023, p. 1). Therefore, the next section will focus on perceived stress in the teaching profession.

2.3 Work Experience: Stress, Coping and Learning in Everyday Work Activities in the Teaching Profession

2.3.1 Stress

Teacher stress is of crucial importance for the attractiveness of the profession (Thompson et al., 2023). Teachers perceive stress when they don’t meet the demands in their work. This leads to the perception of the situation as a “threat to their self-esteem or well-being” (Kyriacou, 2001, p. 28). This mismatch between demands and resources is the idea behind the transactional model of stress (Lazarus & Folkman, 1984). According to this model, the perception of stress is subjective and the result of an appraisal process called cognitive appraisal (Lazarus & Folkman, 1984; Smith & Lazarus, 1990). Kyriacou names the main sources of teacher stress as “(1) teaching pupils who lack motivation; (2) maintaining discipline; (3) time pressures and workload; (4) coping with change; (5) being evaluated by others; (6) dealings with colleagues; (7)

self-esteem and status; (8) administration and management; (9) role conflict and ambiguity; (10) poor working conditions” (2001, p. 29). These sources are in line with the characteristics of the teaching profession illustrated by Rothland (2013). Furthermore, time pressure and high workloads have been found to be one of the main factors related to stress in the teaching profession (Kreuzfeld et al., 2022). High levels of stress can lead to mental health problems, psychosomatic diseases, and general issues, “such as exhaustion, fatigue, headache, and tension”, with teachers being affected more often than other professions (Scheuch et al., 2015, p. 347; Aprea & Lohner, 2019). In the long term, these issues decrease the attractiveness of the teacher profession and can lead to teachers leaving the profession. Thompson et al. (2023) state that the teaching profession is no longer considered an attractive career, partially due to problems with teachers’ stress, burnout and well-being (McIntyre et al., 2017; Collie, 2021; Van Droogenbroeck et al., 2021). Thereby, stress in the profession can increase the issue of teacher shortage.

2.3.2 *Coping*

This section focuses on coping and illustrates different coping mechanisms for dealing with the possible stressors presented above. Lazarus and Folkman “define coping as constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (1984, p. 141). According to the researchers, there are two forms of coping: emotion-focused coping intends to release the felt pressure and strain whereas problem-based coping is concerned with solving the problem behind the stressors. If the situation is appraised optimistically as a challenge, a problem-focused coping strategy is more likely to be chosen. If the person does not see the chance to change the situation but rather sees themselves forced to accept it, emotion-focused coping is chosen. Both coping strategies have their merit in dealing with stressors and both can be applied simultaneously. Emotional-focused coping entails “avoidance, minimization, distancing, selective attention, positive comparisons, and wresting positive values from negative values” (Lazarus & Folkman, 1984, p. 150). Problem-focused coping includes problem-solving strategies such as “defining the problem, generating alternative solutions, weighing the alternatives [...], choosing among them, and acting” (Lazarus & Folkman, 1984, p. 152).

Similarly, the job demand control model considers psychological stress as a result of the distinct demands in a job situation and job decision latitude, i. e. the “range of decision-making freedom” (Karasek, 1979, p. 287). The demands of a job situation include potential stressors, such as a high workload, unexpected tasks, and other job-related psychological stressors. Combining the two factors, job demands and job decision latitude results in a two-by-two matrix. Karasek made two predictions in this model: 1) The strain hypothesis claims that strain rises with growing job demands and declining job decision latitude. According to the 2) learning hypothesis, high job decision latitude and high job demands define an active job and lead to growth in competence. In contrast, a passive job is characterized by both low job decision latitude and low job demands. It is assumed to lead to a drop in competence, such as problem-solving skills (Karasek, 1979).

2.3.3 *Learning from Everyday Work Activities*

In workplace learning, researchers typically differentiate between formal, non-formal and informal learning (e. g., Coombs & Ahmed, 1974; Imants & van Veen, 2010). Formal learning is typically defined as structured learning in pedagogical settings such as university teacher training. In these settings, learning occurs intentionally and is planned (Marsick & Watkins, 2015; UNESCO Institute for Statistics, 2012). Non-formal learning is “institutionalized, intentional and planned” as well (UNESCO Institute for Statistics, 2012, p. 11) but in contrast to formal learning, it is not part of the national qualifications framework but includes training and development in companies (Bilger et al., 2013, p. 20) such as information resources for further teacher training. In contrast, informal learning is unintentional and experiential. It occurs as a by-product of other activities such as working (e. g., Marsick & Watkins, 2015, p. 6; UNESCO Institute for Statistics, 2012, p. 19). This learning is also referred to as implicit learning (Eraut, 2004) or incidental learning (Marsick & Watkins, 2015). Though less conscious, this informal learning is considered as a vital source of teachers’ professional development. Work task characteristics that foster informal workplace learning include newness, complexity, collaboration and so forth (Hoekstra, 2007; Lohman, 2003; Rausch, 2013; Kwakman, 2003) many of which, as discussed above, are also likely to cause stress (Karasek, 1979).

2.4 **Job Satisfaction in the Teaching Profession**

Job satisfaction is of central importance for the attractiveness of the teaching profession and teacher retention. In this article, we propose the definition for teachers’ job satisfaction by Mostafa and Pál (2018). They define it as “a sense of fulfillment and gratification resulting from being a teacher and from working in a particular teaching job” (Mostafa & Pál, 2018, p. 15). Several studies have shown that teachers’ job satisfaction is an important factor for teachers’ well-being, turnover rates, retention and is related to the instructional quality which influences the students’ learning outcomes (Klassen & Chiu, 2011; Nguyen et al., 2020; Zhang & Zeller, 2016; Klusmann et al., 2008; Fütterer et al., 2023). Therefore, teachers’ job satisfaction not only has a direct effect on teachers themselves, “but also for their teaching (i. e., teachers’ job performance) and ultimately student learning” (Fütterer et al., 2023, p. 2). Given the increasing teacher shortage, job satisfaction of teachers deserves closer attention. It plays not only an important role in teacher retention, but also contributes to teacher well-being (Toropova et al., 2021) which both in turn affect the attractiveness of the teaching profession.

3 **Methods**

3.1 **Research Design and Sample**

A research programme (AARL-BS) was initiated to investigate the relations between working hours, work activities, work experience and job satisfaction of teachers at vocational schools. Data was collected in two studies, an online survey study and an app-based diary study. This allowed for balancing the advantages and disadvantages of the respective methods regarding

the estimation of working hours and the measuring of work experience, in particular. Participation was voluntary and all participants provided written informed consent.

3.1.1 Questionnaire Study

The survey study was conducted from February to November 2022. A sample of 1,146 full-time teachers participated in the survey study, 74.3 % of which held no further management function beyond their teaching duties. The mean age was 46.98 years and 39.1 % of the sample is female. The distribution of the survey sample is representative for vocational teachers in the German federal state of Baden-Wuerttemberg with regard to gender, age composition, level of employment, and administrative district.

In the survey study, data on teachers' working time, the distribution of the working hours between different tasks, working conditions, job satisfaction, and further constructs were collected. The questionnaire was developed on the basis of a comprehensive literature review (Aprea & Sarochan, 2023) and intensive consultations with representatives of the Association of Vocational School Teachers in Baden-Württemberg (BLV).

3.1.2 Diary Study

The diary study took place from mid-March to mid-October 2022, including weekends and vacation periods, excluding four weeks during the summer holiday. A multi-cohort design was chosen to reduce participant burden. Each of the five cohorts held the diary for one week and paused for four weeks. The diary app was implemented using mQuest by the German online service provider Cluetec (Karlsruhe). Only teachers with full-time employment were included in the analysis for this paper. Teachers working part-time and teachers in training were excluded due to small cell sizes and consistency. Diary entries from 145 full-time teachers were included, 75.2 % of which without a management function. The mean age is 44.99 years and 46.9 % of the sample is female. After intensive data preparation and filtering, the analysis is based on 10.327 activities that were reported in the diary app.

The participants were requested to record all work-related activities by selecting the respective work activity from a given list of activities, indicating start and end time and answering one item each for experienced stress, coping, and learning related to the respective task. In addition, in a weekly review, the participants were requested to indicate the working hours for each day of the past week. During a cohort's diary period, three daily notifications reminded the participants to record their work activities.

3.2 Measures and Data Analysis

3.2.1 Working Hours

In the survey study, participants were asked to indicate their working hours for a typical full school week. The wording was in line with other studies allowing for comparisons (e. g., the OECD's "Teaching and Learning International Survey (TALIS)"). In addition, working hours

were estimated on the basis of the diary entries, which required several steps of data preparation, plausibility checks and filtering (for details see Aprea et al., 2023).

Based on the data collected from both studies, the following three estimates for the amount of working time in a school week are thus available: 1) the estimated working hours for a typical week for the entire sample of the survey study, 2) the estimated working hours for a typical week for a matched sample, and 3) the estimated working hours based on the diary data. A weekly working time of 41 hours, the regular working hours for comparable civil servants, is used as a benchmark, resulting in an annual working time of 1,804 hours. As an estimate for the actual annual working hours, the week estimate based on the diary data was used, as we consider this estimate to be most reliable and conservative at the same time (see Aprea et al., 2023).

3.2.2 Distribution of Working Hours across Work Activities

In the diary app, the participants were provided a list of 29 work activities, based on a work activity framework that was derived from literature review and intensive, iterative consultations with practitioners. The category “miscellaneous activity” was selected in less than five per cent of the collected data, confirming the complete coverage of typical work activities. The list of work activities included standard work activities such as teaching; preparation, reflection and assessment; and interaction with students outside the classroom; further activities such as participation in committees and teams; formal training and administrative activities; and management-related work activities such as personnel management; leadership of committees and teams; and official interaction with external parties & administrative bodies.

3.2.3 Perception of Stress, Coping, and Informal Learning across the Work Activities

Afterwards, the perception of stress, coping and learning at the given work activity are evaluated by the participants. (1) Stress, (2) coping and (3) learning are each designed with an 8-point Likert-scale with 0 as the lowest and 7 as the highest value. To avoid influencing entries with a default value, “-1” is set as the default value in these three items and must be changed to proceed. All three questions are depicted with a slider to set the value and a brief explanation: (1) Did you find this work activity stressful? (0 = not at all stressful; 7 = very stressful; -1 = invalid entry); (2) How well were you able to cope with this stress? (0 = not coped well at all; 7 = coped very well; -1 = invalid entry); (3) Did you learn anything new for your job during this work activity? (0 = learned nothing at all; 7 = learned very much; -1 = invalid entry). Based on theoretical assumptions, participants could only evaluate their coping for work activities with a stress-level above 0.

3.2.4 Effects of Working Hours, Management Function, Stress, Coping, and Learning on Job Satisfaction

The variable job satisfaction stemmed from the questionnaire survey where it was measured by a single item (“If you look at everything that plays a role in your work as a teacher at vocational schools: How satisfied are you with your current professional situation overall?”) on a 5-point Likert scale (1 = very unsatisfied to 5 = very satisfied).

3.2.5 Data Analysis

Descriptive statistics were calculated to address RQ1 to RQ3. Regarding RQ4, a multiple linear regression analysis was conducted to investigate the statistical prediction of job satisfaction based on working hours, management function, stress, coping, and learning. Interaction terms were checked. However, moderators showed no significant effects, so no interactions were included in the final analysis.

4 Findings

4.1 Working Hours of Teachers at Vocational Schools

Table 1 shows the estimation of weekly working hours for full-time teachers at vocational schools divided into teachers with and without a management function. These results exclude holidays and are only referring to school weeks.

Table 1: Estimation of Weekly Working Hours of Full-time Teachers at Vocational Schools in School Weeks with and without management function

Sub-group	Questionnaire study		Questionnaire Study (matched sample)		Diary Study	
	n	M (SD)	n	M (SD)	n	M (SD)
Teachers without management function	792	46.0 (9.88)	109	47.8 (7.13)	109	44.2 (10.76)
Teachers with management function	288	51.0 (9.71)	36	51.3 (6.06)	36	49.7 (10.33)

Methodologically, it can be seen that the retrospective estimates based on the questionnaire study are each slightly higher than the estimates obtained from the diary study. In addition, the higher estimates of weekly working hours in the matched sub-sample compared with the overall sample indicate slight self-selection effects among those who tend to estimate their typical weekly working hours somewhat higher. Within the matched subsample ($n = 213$), the weekly working hours from the questionnaire study and the weekly working hours based on the job records show a correlation of $r = .66$, which can also be interpreted as an indication of high reliability and internal validity of the data basis in comparison to similar studies (Kreuzfeld et al., 2022).

The total working hours of full-time teachers without a management function are 10.31 % to 16.45 % higher than the target working hours specified for civil servants of 41 hours per week, depending on the estimation method. For full-time teachers with a management function, the working hours are 21.22 % to 25.12 % higher.

Table 2 shows the estimates of the annual working hours of full-time teachers without and with a management function based on the activity records in the diary study. It can be seen that the

estimate of annual working hours for both sub-samples is above the target annual working time of 1,804 hours. Full-time teachers without a management function have annual working hours that are 125 hours or around 7 % higher. Full-time teachers with a managerial function work 362 hours or around 20 % more per year.

Table 2: Estimation of the annual working hours of full-time teachers at vocational schools without and with a management function on the basis of the activity records in the diary study

Working hours in period	Number of weeks	Teachers without a management function		Teachers with a management function	
		Number of Hours	Subtotal	Number of Hours	Subtotal
Regular school weeks (minus public holidays)	36.86	44.2	1,630	49.7	1,830
Vacations and public holidays during school weeks	10.29	29.1	299	32.6	336
Weeks without working hours (conservative calculation)	5	0	0	0	0
Annual working hours	52.14		1,929		2,166

Notes. Exact determination of school days and public holidays for 2022

4.2 Distribution of Working Hours across Teachers' Work Activities

The distribution of working hours across the three work activities, 1) teaching, 2) teaching-related activities and 3) non-teaching activities for teachers without a management function is depicted in table 2. As can be seen above, there are differences in the working times for the three different survey methods. However, the differences between the questionnaire study and the diary study are remarkable, especially for the categories teaching and non-teaching activities. A possible explanation for this are weeks during exam periods or with study trips in which the time spent teaching is lower. Another possible explanation could be that teachers have block teaching and logged a week without teaching in the diary study. A more detailed inspection of the work activities for teachers with and without a management function can be found in table 5.

Table 3: Weekly Working Hours by Work Activities for Teachers without Management Function

No.	Work Activity	Questionnaire Study		Questionnaire Study (matched)		Diary Study	
		M (SD)	Percent	M (SD)	Percent	M (SD)	Percent
1	Teaching	18.89 (5.58)	40.88	18.39 (5.58)	38.82	12.77 (5.95)	28.87
2	Teaching-related Activities	15.10 (7.53)	32.68	15.56 (6.34)	32.84	12.03 (7.48)	27.20
3	Non-teaching Activities	12.22 (10.49)	26.44	13.43 (8.46)	28.33	19.42 (12.52)	43.92
Sum		46.21 (12.21)	100.00	47.38 (6.64)	100.00	44.22 (10.76)	100.00

Notes. n (Questionnaire Study) = 366; n (Questionnaire Study matched) = 52; n (Diary Study) = 109

The same calculations have been done for teachers with a management function. This is depicted in table 4.

Table 4: Weekly Working Hours by Work Activities for Teachers with Management Function

No.	Work Activity	Questionnaire Study		Questionnaire Study (matched)		Diary Study	
		M (SD)	Percent	M (SD)	Percent	M (SD)	Percent
1	Teaching	10.38 (7.85)	20.00	11.70 (6.96)	22.62	7.17 (4.80)	14.43
2	Teaching-related Activities					5.00 (5.12)	10.07
3	Non-teaching activities	41.53 (11.98)	80.00	40.00 (9.00)	77.38	37.49 (12.69)	75.50
Sum		51.92 (10.00)	100.00	51.70 (5.78)	100.00	49.66 (10.33)	100.00

Notes. n (Questionnaire Study) = 245; n (Questionnaire Study matched) = 29; n (Diary Study) = 36

For the questionnaire study, the focus for teachers with a management function was on the specific tasks within the management team. Therefore, there is no data available for the category teaching-related activities.

Table 5 contains a more detailed breakdown of the work activities for teachers with and without a management function with a total of 12 different activities. For teachers without a management function, the majority of non-teaching activities are other activities (12.15 %). These include activities that do not occur on a daily basis and/or are not part of the teachers' "core business" (for further descriptions see Aprea et al., 2024). Participation in committees and teams (8.86 %) and administrative activities (8.4 %) each account for a further large proportion. The remaining working hours are divided between other non-teaching activities. Teachers with a management function spend the majority of their total working hours on personnel manage-

ment (16.99 %) and administrative activities (15.37 %). Teaching accounts for 14.43 %, official interactions with external parties & administrative bodies account for 11.95 % and preparation, reflection of lessons and assessment account for 10.07 %. The remaining work activity is distributed among other non-teaching activities.

Table 5: Weekly Working hours by Work Activities for Teachers with and without Management Function (Diary Study)

No.	Work Activity	Teachers without Management Function		Teachers with Management Function	
		M (SD)	Percent	M (SD)	Percent
1	Teaching	12.77 (5.95)	28.87	7.17 (4.8)	14.43
2	Preparation, reflection and assessment	12.03 (7.48)	27.20	5.00 (5.12)	10.07
3	Interaction with students outside the classroom	0.54 (0.94)	1.22	0.51 (0.88)	1.03
4	Administrative activities	3.72 (3.66)	8.40	7.80 (8.10)	15.70
5	Official interaction with colleagues	2.36 (2.20)	5.33	3.51 (3.13)	7.07
6	Formal training	1.22 (3.19)	2.76	0.39 (1.35)	0.78
7	Non-formal training	0.49 (1.73)	1.10	0.21 (0.93)	0.41
8	Participation in committees and teams	3.92 (5.90)	8.86	2.25 (3.17)	4.54
9	Personnel management	0.82 (3.56)	1.85	8.44 (8.31)	16.99
10	Leadership of committees and teams	0.33 (1.65)	0.75	4.16 (4.75)	8.37
11	Official interaction with external parties & administrative bodies	0.66 (2.08)	1.49	5.94 (5.66)	11.95
12	Miscellaneous activities	5.37 (8.55)	12.15	4.30 (6.99)	8.66
Sum		44.22 (10.76)	100.00	49.66 (10.33)	100.00

4.3 Perception of Teachers' Work Activities Regarding Stress, Coping and Learning

Table 6 shows the stress, coping and learning teachers perceive during each of the 12 work activities. In descending order, the three work activities with the highest perceived stress were miscellaneous activities ($M = 1.64$, $SD = 1.89$), teaching ($M = 1.59$, $SD = 1.72$), leadership of committees and teams ($M = 1.51$, $SD = 1.70$). The lowest stress was perceived in non-formal

training ($M = 1.00$, $SD = 1.45$), official interaction with colleagues ($M = 1.03$, $SD = 1.54$), and administrative activities ($M = 1.13$, $SD = 1.54$).

Regarding coping, the three work activities with the highest perceived values in descending order were official interaction with external parties & administrative bodies ($M = 3.08$, $SD = 2.86$), teaching ($M = 2.93$, $SD = 2.69$), interaction with students outside the classroom ($M = 2.92$, $SD = 2.84$). The lowest coping was perceived in official interaction with colleagues ($M = 2.51$, $SD = 2.81$), leadership of committees and teams ($M = 2.51$, $SD = 2.52$), non-formal training ($M = 2.63$, $SD = 2.78$).

Besides non-formal training ($M = 3.32$, $SD = 2.24$) and formal training ($M = 3.08$, $SD = 2.42$), the three work activities perceived as the most conducive to learning in descending order were participation in committees and teams ($M = 1.17$, $SD = 1.76$), leadership of committees and teams ($M = 1.08$, $SD = 1.65$), and official interaction with external parties & administrative bodies ($M = 0.97$, $SD = 1.57$). The activities perceived as the least conducive to learning were administrative activities ($M = 0.44$, $SD = 1.03$), interaction with students outside the classroom ($M = 0.52$, $SD = 1.11$), personnel management ($M = 0.58$, $SD = 1.13$).

Table 6: Perceived Stress, Coping, and Learning With Regard to Work Activities

No.	Work Activity	Stress		Coping		Learning	
		M (SD)	Mn	M (SD)	Mn	M (SD)	Mn
1	Teaching	1.59 (1.72)	1.00	2.93 (2.69)	3.00	0.75 (1.31)	0.00
2	Preparation, reflection and assessment	1.37 (1.66)	1.00	2.69 (2.72)	2.00	0.72 (1.34)	0.00
3	Interaction with students outside the classroom	1.30 (1.67)	1.00	2.92 (2.84)	2.00	0.52 (1.11)	0.00
4	Administrative activities	1.13 (1.54)	0.00	2.79 (2.86)	2.00	0.44 (1.03)	0.00
5	Official interaction with colleagues	1.03 (1.54)	0.00	2.51 (2.81)	1.00	0.87 (1.52)	0.00
6	Formal training	1.50 (1.75)	1.00	2.64 (2.69)	2.00	3.08 (2.42)	3.00
7	Non-formal training	1.00 (1.45)	0.00	2.63 (2.78)	1.00	3.32 (2.24)	4.00
8	Participation in committees and teams	1.49 (1.77)	1.00	2.65 (2.69)	2.00	1.17 (1.76)	0.00
9	Personnel management	1.45 (1.68)	1.00	2.69 (2.60)	2.00	0.58 (1.13)	0.00
10	Leadership of committees and teams	1.51 (1.70)	1.00	2.51 (2.52)	2.00	1.08 (1.65)	0.00
11	Official interaction with external parties & administrative bodies	1.35 (1.69)	1.00	3.08 (2.86)	3.00	0.97 (1.57)	0.00
12	Miscellaneous activities	1.64 (1.89)	1.00	2.67 (2.74)	2.00	0.76 (1.49)	0.00

4.4 Effects of Working Hours, Management Function, Stress, Coping, and Learning on Job Satisfaction

Table 7 shows the correlations for job satisfaction and the included predictor variables working hours, management function, stress, coping, and learning. The correlations between job satisfaction and the predictor variables are mostly not significant, with only stress and learning showing a significant correlation ($p < .05$). There are weak correlations between job satisfaction and stress ($r = -.18$), and learning ($r = .19$), respectively (Cohen, 1988).

Table 7: Pearson's Correlations for Job Satisfaction and Predictor Variables

Variable	1	2	3	4	5	6
1. Job satisfaction	—	—	—	—	—	—
2. Working hours	-.03	—	—	—	—	—
3. Management function	-.02	.32***	—	—	—	—
4. Stress	-.18*	.08	-.12	—	—	—
5. Coping	-.00	.05	-.01	.64***	—	—
6. Learning	.19*	-.02	-.07	.57***	.50***	—

Notes. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The results of the calculated multiple linear regression analysis are depicted in table 8, with the model fit statistics depicted in table 9. The results indicate that the included predictors explain 13.7 % of the variance ($F(5,139) = 5.573$, $p < .001$). It was found that stress significantly predicted job satisfaction ($\beta = -.375$, $p < .001$), as did learning ($\beta = .319$, $p < 0.001$). Working hours ($\beta = .023$, $p = .721$), management function ($\beta = -.103$, $p = .483$), and coping ($\beta = .078$, $p = .326$) did not significantly predict job satisfaction.

Table 8: Effect of Working Hours, Management function, Stress, Coping and Learning on Job Satisfaction (Multiple Linear Regression)

Effect	Estimate	SE	95 % CI		p
			LL	UL	
Intercept	3.557***	0.069	3.420	3.694	<0.001
Working hours	0.023	0.063	-0.102	0.148	0.721
Management Function	-0.103	0.146	-0.392	0.186	0.483
Stress	-0.375***	0.085	-0.544	-0.207	<0.001
Coping	0.078	0.079	-0.079	0.235	0.326
Learning	0.319***	0.074	0.173	0.466	<0.001

Notes. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; predictor variables were z-standardized; the VIF was calculated for all variables and was at most 2.06, the remaining assumptions were checked, and no issues were found

Table 9: Model Fit Statistics: Effect of Working Hours, Management function, Stress, Coping and Learning on Job satisfaction (Multiple Linear Regression)

Fit Measure	Value
Number of obs.	145
R ²	0.167
R ² adj.	0.137
AIC / BIC	320.0 / 340.9
Log.Lik.	-153.015
F	5.573
RMSE	0.70

5 Discussion

In this section, we discuss the findings in relation to the four research questions presented in the introduction. Firstly, we found that the annual working hours of both groups of teachers (i. e., with and without management responsibilities) exceed the working hours of about 1,800 hours per year, as foreseen by law. Particularly striking are the 20 % higher working hours of teachers with management functions. It is up to those responsible for educational practice and policy to judge these working hours, but the results clearly contradict the idea of the teaching profession being a part-time job mentioned above. The reported data are averages, and the relatively high standard deviations indicate that there are also teachers who invest significantly less working time, but on the other hand there are also teachers who invest significantly more working time. Overall, these findings are largely consistent with the results from comparable studies with teachers from other school sectors (e. g., Mußmann et al., 2023; Kreuzfeld et al., 2022).

In the distribution of working hours by type of activity, the proportion of non-teaching or administrative activities for teachers with a management function is high, as might be expected. These activities are spread across a wide range of activity categories. However, non-teaching activities also account for a considerable proportion of the working time of teachers without a management function, and here the wide variety of activities in the teaching profession is similarly evident.

Regarding stress, coping, and informal learning, the analyses show that teaching and leadership of committees and teams are perceived as the most stressful among the activities. They contain the sources of teacher stress illustrated in the theory chapter, e. g., teaching with its many facets, including motivating students, collaboration with colleagues. At the same time, perceived coping has one of the highest values in the activity teaching. Thus, teachers stated that they can cope with the stress they experience during teaching. Regarding learning as expected, non-formal and formal learning had the highest values of perceived learning. Other activities perceived as conducive to learning involve collaboration and exchange with colleagues and other parties. These results are consistent with existing studies stating newness and collaboration as fostering

workplace learning as stated in the theory chapter (e. g., Hoekstra, 2007; Kwakman, 2003; Lohmann, 2003; Rausch, 2013).

The regression analysis regarding predictors of job satisfaction showed significant differences only for stress and informal learning. Stress has a negative effect on job satisfaction, whereas learning has a positive effect, as expected. This yields a foundation for policy decisions to improve teacher job satisfaction by providing a learning inducing atmosphere and taking measures to reduce teacher stress.

In sum, our study could thus indicate relevant results, which are also relevant for the attractiveness of the teaching profession. However, like any other research, our studies have limitations. Although the sample is representative, it is not a random selection, i. e. self-selection effects cannot be completely ruled out. In addition, all working time values reported here are ultimately based on self-reports: self-reports on estimated typical weekly working hours in the questionnaire, self-reports on working hours on the individual days of the previous week and self-reports on the type and duration of specific activities on the current day in the diary study. However, in our opinion, the well-developed design of the study, the extensive data preparation steps and plausibility checks based on the various data sources speak for a very high validity and reliability of the working time values reported here. We have also opted for a conservative approach. This means that an underestimation of the actual working hours of teachers at vocational schools cannot be ruled out, whereas we consider an overestimation to be rather unlikely. Furthermore, the data collection took place in 2022, a time with special circumstances due to the ongoing COVID19 pandemic. Therefore, follow-up studies should be conducted. Even though the results of this study are representative for Baden-Württemberg, conclusions cannot directly be extended to other federal states. Further studies are necessary to investigate national similarities and possible differences.

6 Conclusion

In this article we reported the total working hours of teachers at vocational schools in Baden-Württemberg, Germany and how they are distributed across different activities. We found that teachers with and without management function work more than foreseen by law. As our project shows, working time studies among teachers at vocational schools are time-consuming but feasible. Regarding work experience, our findings give rise to the assumption that teachers' job satisfaction may be increased by minimizing teacher stress and supporting teacher's informal learning opportunities. The strengths of the study are the representativeness of the questionnaire sample, the detailed recording of activities in the diary study and the good fit between the two sub-studies. With the presented findings, this article provides insights on vocational teachers' working hours, work activities, work experience and job satisfaction. Based on these findings, first conclusions regarding the attractiveness of the teaching profession may be drawn as follows: To improve the attractiveness of the teaching profession, working part-time could be a solution to the high working hours and stress of teachers. The recently passed law, however, makes it more difficult for teachers to work part-time. Considering the results of our study, this law and its impact on the attractiveness of the teaching profession might be reconsidered.

As described above, the teaching load model in Baden-Württemberg only determines the hours in front of a class. Therefore, the hours spent outside of the classroom, especially for non-teaching activities, is neither regulated nor recorded. A first step to make the working time visible and record possible overtime is taken in Saxony and Bremen, where recording teachers' working time is in discussion. As shown in this study, this is feasible but connected with a high additional burden. Thus, the endeavor has to be well planned, and appropriate methods have to be chosen.

A further option might be more flexible working time models. The change of the LehrArbZV in June 2024 allows for more flexibility by enabling different working time models: "In order to test working time models, the Ministry of Education and Cultural Affairs may, in consultation with the Ministry of Finance, allow temporary exceptions to this regulation" (§ 9).

Finally, we can derive implications for further studies. As this study only entails descriptive and correlation analyses, we cannot make statements on the causality of effects. In this regard, longitudinal data on the predictor variables and further studies are needed. Furthermore, data from this study allows for more research on protective factors of teachers. A deeper understanding of this could help derive implications for teacher training and the organization of the workplace of teachers to make it more attractive. Finally, our statements on attractiveness are to be considered with caution, as we did not directly ask teachers for it neither in the questionnaire nor the diary study. A more direct approach could entail asking teachers about factors they see as (un)attractive in the profession.

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