



## Research paper

# Everyday, every week, all at once? An experience sampling study on teachers' professional development for the classroom, team, and school

Miriam Compagnoni<sup>a,\*</sup>, Beat Rechsteiner<sup>a</sup>, Flurin Gotsch<sup>a</sup>, Urs Grob<sup>a</sup>, Andrea Wullschleger<sup>b</sup>, Katharina Maag Merki<sup>a</sup>

<sup>a</sup> University of Zurich, Switzerland

<sup>b</sup> University of Applied Sciences and Arts Northwestern Switzerland, Switzerland

## ARTICLE INFO

## Keywords:

Teacher professional development  
Experience sampling  
Job satisfaction  
Professional well-being learning benefits

## ABSTRACT

In a 21-day study, 753 Swiss primary school teachers reported their daily professional development activities concerning the classroom, team, and school. Using experience sampling, we examined their effect on teachers' well-being and experienced learning benefits for students, team, and school. Professional development activities for teaching occurred on 41% of workdays but were rare for team and school. Multilevel analyses highlighted both inter- and intraindividual associations with benefits and well-being. On days with professional development activities for the classroom, teachers reported increased stress but also recognized learning benefits. Teachers engaging in more professional development activities overall showed higher well-being and benefits.

## 1. Introduction

Teachers are pivotal agents in schools, as they significantly shape children's learning and developmental paths through the learning opportunities they provide and how these can be co-constructively utilized by learners (Mitchell & Sackney, 2011; Rickards, Hattie, & Reid, 2020; Vieluf, Praetorius, Rakoczy, Kleinknecht, & Pietsch, 2020). Teachers' professional competencies are therefore central to ensuring the successful education of students (Creemers, Kyriakides, & Antoniou, 2013; Darling-Hammond, Hyster, & Gardner, 2017; Dreer, 2023) and need to adapt to the constantly changing demands of the world. Consequently, teachers must also engage in continuous development themselves; they must "learn and grow as they face the challenges, successes and mysteries of teaching and learning" (Mitchell & Sackney, 2019, p. 2). Teachers' professional development (PD) is thus crucial for them to adapt to the diverse demands of everyday school life and to ensure that they possess the necessary competencies to effectively teach, support students, and drive school development in the dynamic world of education (Desimone, 2009; Kyndt, Gijbels, Grosemans, & Donche, 2016; Lecat, Spaltman, Beusaert, Raemdonck, & Kyndt, 2020). Teachers also need to develop and reflect on not only their own competencies and pedagogical work in the classroom but also the pedagogical work in their team and school (Camburn & Han, 2017; Mitchell & Sackney,

2019; Wullschleger, Vörös, Rechsteiner, Rickenbacher, & Maag Merki, 2023).

Although the importance of high-quality, continuous PD for stakeholders at all levels appears to be undisputed (Argyris, 2017; Mitchell & Sackney, 2019; Schön, 1983), a systematic review by Kyndt et al. (2016) pointed to some research deficits, such as a dominance of qualitative research methods adopting an exploratory approach and a neglect of combining individual and organizational PD. Further, research has predominantly focused on comparing various PD tools or interventions in the classroom (e.g., instructional coaching; Kreis & Staub, 2011) or on examining interindividual differences among teachers using one-time self-reports (i.e., Jerrim & Sims, 2021; Yoon & Kim, 2022). As a result, there is a lack of reliable quantitative data on primary school teachers' day-to-day PD (Bolger & Laurenceau, 2013; Ohly, Sonntag, Niessen, & Zapf, 2010; Reis & Gable, 2000). There is a particular lack of research on PD in relation to teachers' work in their teams and at their schools and on whether day-to-day PD is beneficial for students' learning, the team, and school. This gap in the literature has prompted our choice of the title of this paper, inspired by the award-winning film, *Everything Everywhere All at Once*. We ask: Does PD occur every day, or perhaps less frequently, only every week? Do teachers reflect on and develop their teaching, team, and school simultaneously, and does this yield perceived benefits for learning, teaching, team, and school

\* Corresponding author. Freiestrasse 36, 8032, Zurich, Switzerland.

E-mail addresses: [mcompagnoni@ife.uzh.ch](mailto:mcompagnoni@ife.uzh.ch) (M. Compagnoni), [beat.rechsteiner@ife.uzh.ch](mailto:beat.rechsteiner@ife.uzh.ch) (B. Rechsteiner), [flurin.gotsch@ife.uzh.ch](mailto:flurin.gotsch@ife.uzh.ch) (F. Gotsch), [grob@ife.uzh.ch](mailto:grob@ife.uzh.ch) (U. Grob), [andrea.wullschleger@fhnw.ch](mailto:andrea.wullschleger@fhnw.ch) (A. Wullschleger), [kmaag@ife.uzh.ch](mailto:kmaag@ife.uzh.ch) (K. Maag Merki).

<https://doi.org/10.1016/j.tate.2024.104771>

Received 19 October 2023; Received in revised form 10 July 2024; Accepted 1 September 2024

0742-051X/© 2024 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

improvement all at once? Furthermore, the evidence on interactions between day-to-day PD and perceived learning benefits and well-being is inconclusive. Previous studies point to positive or inconclusive effects (Burns & Schaefer, 2003; Hoekstra & Korthagen, 2011; Jerrim & Sims, 2021; Pöysä, Pakarinen, & Lerkkanen, 2022; Wyss & Mahler, 2021) as well as negative effects (Jerrim & Sims, 2021). However, as most studies do not disentangle inter- and intra-personal effects, drawing conclusions is difficult.

Therefore, this paper extends previous research in different ways. First, we used daily self-reports over 3 weeks, which allowed us to investigate the number and type of teachers' PD activities in their everyday work life. Specifically, this study explores the extent to which teachers engage in PD of their work in their classroom but also on their team and at their school. Whereas previous research mostly recorded teachers' activities retrospectively after longer periods with self-report measures, the use of experience sampling methods here allowed for a more valid assessment. Second, teachers reported daily PD activities as well as perceived learning benefits and well-being. We were therefore able to not only compare teachers interindividually but also extend previous work by identifying intraindividual mechanisms when examining the associations between PD activities and their outcomes on a personal level.

### 1.1. Teachers' PD for their work in classroom, team, and school

Technological, societal, and environmental changes make continuous PD of teachers central to ensuring successful education of students (Creemers et al., 2013; Darling-Hammond et al., 2017). Today, lifelong learning is becoming the standard in all kinds of professional fields (Jeong, Han, Lee, Sunalai, & Yoon, 2018). Teachers who support student learning need to become professional learners themselves and continuously develop their professional competencies (Day & Sachs, 2004; Desimone, 2009; Hoekstra, Brekelmans, Beijaard, & Korthagen, 2009).

PD has been broadly defined as learning activities aimed at developing teachers' skills, knowledge, and expertise (Borko, 2004). However, PD can be examined from various theoretical perspectives. It can be approached from an educational science standpoint, viewing PD as a self-regulation process (Zimmerman, 2011), or from a socio-constructive and organizational learning perspective embedded within a learning community (Mitchell & Sackney, 2011). Different perspectives provide a nuanced view of the construct and clarify its relevance in the school context.

From the *perspective of educational science*, PD is an iterative, self-regulated learning process of teachers, because only monitoring, reflection on, and regulation of personal, behavioral, and environmental processes make adaptive learning processes possible (Maag Merki, Wullschleger, et al., 2022b; Svojanovsky, 2017; Zimmerman & Bembenutty, 2013). In particular, the final stage in the cycle of self-regulated learning (reflection as "looking back") sets the stage for further development and new learning cycles (Nguyen, Fernandez, Karsenti, & Charlin, 2014; von Aufschnaiter, Fraij, & Kost, 2019; Wyss & Mahler, 2021). Reflection therefore is pivotal, as development of teachers' competencies is only possible through reflection on cognitive content, such as knowledge or ideas, as well as on non-cognitive content, including beliefs, emotions, or motivation (Dewey, 1932; Lenske & Lohse-Bossenz, 2023; Rahm & Lunkenbein, 2014; Wyss, 2013). Teachers' PD is inherently linked to both reflection and development, encompassing both retrospection and foresight.

From the *perspective of schools as learning communities*, PD is the activities of a group of people who take an active, reflective, collaborative, learning-oriented approach to challenges related to teaching and learning (Kruse, Louis, & Bryk, 1994; Mitchell & Sackney, 2011). This definition emphasizes reflection as central to PD in teaching, but more importantly, and central to this paper, it highlights that PD also includes the team and school. High-quality school improvement is therefore only possible through teachers' purposeful development and reflection upon

their competencies as teachers, on the competencies of the students, and on teaching as a co-constructive process at the level of the classroom (see, i.e., the definition in the meta-analysis by Sims et al. (2021), with its focus solely on teaching ability) but also through considering the pedagogical development of the team and the school (Maag Merki, 2017). PD thus also aims at the development of interpersonal relationships and collective practices and at the development of organizational structures and systems that enable and promote personal and collective learning (Mitchell & Sackney, 2011).

PD takes place both formally and informally with the aim of supporting student learning (Hoekstra & Korthagen, 2011; Jacobs & Park, 2009; Kyndt et al., 2016). Formal learning activities include structured, more classroom-like settings with specific goals, time slots, and support, such as courses, supervision, or lectures (Kyndt et al., 2016; Lecat, Beausaert, & Raemdonck, 2018) offered by schools or teacher training colleges. Informal learning is more teacher-initiated, although a clear definition of informal learning is lacking (Lecat et al., 2020): Some definitions focus on characteristics (e.g., implicit, spontaneous), others on stimulus (e.g., disturbances, challenges), or on activities (up to 20 different categories, such as feedback or reflection; for an overview see Kyndt et al., 2016). The importance of teacher-initiated informal learning that occurs in day-to-day practice is increasingly emphasized (Hoekstra & Korthagen, 2011; Jacobs & Park, 2009; Lecat et al., 2020).

In this study we draw on different perspectives and define teachers' PD as encompassing both formal and informal learning activities that occur within educational organizations. These activities are part of a continuous, self-regulated learning cycle that includes not only the reflection on but also the development of professional competencies of teachers, teams, and schools with the ultimate goal to collectively improve student learning.

### 1.2. PD in teachers' everyday work life

Primary school teachers face significant time constraints due to their extensive teaching load, various administrative and organizational tasks, and coordination with various actors (Grosemans, Boon, Verclairen, Dochy, & Kyndt, 2015; Jurasaitė-Harbisson & Rex, 2010; Kyndt, Dochy, & Nijs, 2009; Lohman, 2005). In the German-speaking part of Switzerland, where this study was conducted, primary school teachers with a full workload teach around 28 teaching periods per week, with each lesson lasting 45 min in most cantons (for specific timetables of Swiss public schools, see IDES, 2023). As most teachers teach multiple subjects to one class of students, they need to prepare for each period separately, which adds to the high workload (Brägger, 2019). Consequently, time for PD of their work in the classroom, team, and school (Mitchell & Sackney, 2011) is limited, despite the notion of teacher as a "reflective practitioner" (Schön, 1983).

Up to now, studies that look at PD in teachers everyday work life are mostly descriptive and focus on setting (i.e., formal and informal settings, Kyndt et al., 2009; Leslie, Aring, & Brand, 1998), social context (i.e., if PD is performed individually or with others, Jeong et al., 2018; Kyndt et al., 2016), or content (for a list, see Camburn & Han, 2017). PD activities can focus on either administrative or pedagogical work, have a strongly internal focus on developing one's own abilities but also an external focus on individual learners with the goal of understanding their cultural backgrounds or developmental milestones (Fat'hi & Behzadpour, 2011; von Aufschnaiter et al., 2019). For example, PD of work in the classroom can refer to self-reflection, teaching methods, or selection of learning materials; PD of work for the team can refer to collaboration, common assessment standards, or alignment of materials; for the school, it can refer to PD of school climate or school goals. In Kyndt et al.'s (2016) review, the five most frequently identified contents of PD are: reading professional literature, observation, collaboration with colleagues, reflection, and learning-by-doing through experience. Moreover, a large-scale comparative study in the United States found that although teachers in everyday learning settings spend and analyze

considerable time experimenting with different teaching methods, little time is spent on introspection and further development (Camburn & Han, 2017), which would be important for profound and sustainable developmental processes (Nguyen et al., 2014). Several studies confirm that low-complexity superficial reflections are more common than complex reflections with a strong internal orientation or broad multi-perspective focus (Camburn & Han, 2017; Gutierrez, 2015; Körkkö, 2021; Körkkö, Kyrö-Ämmälä, & Turunen, 2016; Wyss & Mahler, 2021).

However, we argue that to understand PD in teachers' everyday life it is important to not only look at traits such as stable interindividual differences between teachers (to be or not be a reflective practitioner with a strong internal orientation and a broad focus) but also take into account daily situational factors and therefore intraindividual differences.

*Interindividual differences:* Previous studies have focused mainly on interindividual factors and identified personal characteristics and motivational factors that promote or hinder PD. Research on antecedents of PD suggests that more experienced teachers generally seem to be less motivated to learn in their daily practice (Kyndt et al., 2016; Richter, Kunter, Klusmann, Lüdtke, & Baumert, 2011; Yoon & Kim, 2022). Results on gender effects are inconclusive but suggest that they are culturally influenced; as nowadays, gender effects seem to be less explicit than in the past (Kyndt et al., 2016). Most studies (e.g., Richter et al., 2011, in a German sample) found that female teachers were more involved in PD activities than male teachers. In contrast, for the United States, the reverse pattern was observed (Yoon & Kim, 2022). It must be noted that in these few studies, the differences might also be attributed to other factors, such as the educational level or the subjects taught. Motivational factors such as teachers' willingness to learn and improve their practice have been identified as essential antecedents of (informal) workplace learning (Kyndt et al., 2016; Wyss, 2013). School-level factors such as supportive leadership may foster PD (Gremigni & Domenici, 1977; Jeong et al., 2018; Kyndt et al., 2016), but as only about 4% of the variance in reflective practice can be attributed to differences between schools (Camburn & Han, 2017), these effects may be rather small.

*Intraindividual differences:* As daily PD is influenced by various situational factors (i.e., weekday; Maag Merki, Wullschleger, et al., 2022a, b), it is important to look also at the state component of PD. As research on self-regulated learning shows that situations that challenge routines require an adaptation (Maag Merki, Wullschleger, et al., 2022a,b; Panadero, 2017), it makes sense that if teachers experience days as challenging and stressful, the need for PD would increase. However, experiencing challenges is only mentioned once in Kyndt et al.'s (2016) systematic review of teachers' informal learning, which might be explained by the neglect of daily situational factors in previous studies.

In summary, although the importance of continuous PD is widely acknowledged from a theoretical standpoint (Argyris, 2017; Mitchell & Sackney, 2019; Schön, 1983) and there are a lot of insights on the quality and content of PD (i.e., Camburn & Han, 2017; Sims et al., 2021; Wyss, 2013), the predominant research focus has been on interindividual differences (i.e., Kyndt et al., 2016; Yoon & Kim, 2022). As a result, there is a lack of robust quantitative data on current practice collected close to everyday life. With this lack of attention to teachers' daily experiences, situational within-person effects may have been overlooked.

### 1.3. Assessment of PD

Most studies on teacher PD used a qualitative approach with semi-structured interviews (Lecat et al., 2020). The few quantitative studies captured teachers' reflective practice and pedagogical development mostly retrospectively as part of a one-time survey; there are doubts about the robustness of these results due to social desirability, retrospective and response bias, and the mostly generic capture of PD, which is closer to trait concepts than to state concepts (Daumiller, Fasching, Dickhäuser, & Dresel, 2023; Silvia & Cotter, 2021). Or as Silvia, Cotter,

and Christensen (2017) put it, "People generally have no idea what they typically do. If you ask people [...] they will always give you an answer. But that answer will, at best, be loosely related to what actually happens" (p. 279). Methodological approaches in which teachers regularly provide information about concrete everyday activities and practice, have been recommended (Lecat et al., 2020; Silvia & Cotter, 2021). Using the experience sampling method (ESM), participants are assessed close to real-time with very short questionnaires, reducing retrospective and response biases (Myin-Germeys & Kuppens, 2022). ESM therefore reduces memory lapses and decision heuristics, encourages spontaneous responses, and lowers the pressure to respond in socially desirable ways. Additionally, ESM allows for the collection of detailed, context-specific information on professional development activities as they occur. In Kyndt et al. (2016) systematic review on teachers' informal work-place learning, only four diary studies of the 42 studies selected used written reports. However, no quantitative experience sampling or daily diary methods were reported for primary schools. Furthermore, previous studies mostly focused on teachers in training (Rahm & Lunkenbein, 2014; Svojanovsky, 2017; Wyss, 2013) or teachers teaching at the secondary, tertiary, or university/college level (Lecat et al., 2020). Therefore, research on daily PD of primary teachers remains rather scarce (Grosemans et al., 2015; Hoekstra & Korthagen, 2011; Lecat et al., 2020).

Against this background, it remains unclear how often PD takes place in primary teachers' everyday work, and whether it focuses not only on their work in the classroom but also on PD of their work on the team and at their school. Also, previous studies rely primarily on an interpersonal variable-centered approach (i.e., the relationship between well-being and teaching experience), which is the traditional and most prevalent approach in the social sciences (Howard & Hoffman, 2018) and neglect within-person associations over time. A within-person approach can explain the relationship between PD activities and well-being in a given participant (e.g., teacher) independent of a person-specific mean or trait.

The present study aims to contribute to the international research by looking at what happens in teachers' daily lives by examining quantity and focus in their daily practice using experience sampling methods (Bolger & Laurenceau, 2013; Silvia & Cotter, 2021). Currently, there is limited knowledge on the typical PD activities of teachers and how teachers' daily behaviors impact factors such as well-being and benefits for the students, the team, and the school.

### 1.4. Outcomes of PD in teachers' everyday work life

The question of how often PD activities take place in everyday work life is inevitably linked to the question of the quality of PD and its impact. After all, PD is only meaningful if it has the desired effect, which in the school context is always ultimately improving children's learning. However, teachers' professional competencies and well-being are crucial facilitators of children's learning (i.e., Dreer, 2023; Rickards et al., 2020). PD activities should also have a positive impact on both teaching effectiveness and teachers' well-being.

There is a large body of research on different PD interventions that focuses on different PD activities that have positive effects on diverse student achievements (Basma & Savage, 2018; Blank & De las Alas, 2009; Creemers et al., 2013; Rahm & Lunkenbein, 2014; Sims et al., 2021; Thurlings & den Brok, 2017; Van Veen, Zwart, & Meirink, 2012). Further, studies that do not focus on interventions but instead elaborate elements of effective PD in general (Darling-Hammond et al., 2017) show that PD has positive effects on teacher learning outcomes. The impact of PD on student outcomes is mainly thought to occur through the improvement of teachers' professional competencies (Desimone, 2009). Effects on changes in teaching skills, new teaching methods, and better content knowledge of teachers are well discussed (Hoekstra et al., 2009; Kyndt et al., 2016), but this is not so much the case for changes in other professional competencies such as teachers' attitudes, values, and identity, however. And there is almost no research available on positive

effects of PD for collaborative work in teams or schools.

Further, PD aims not only at improving teachers' professional competencies but also at improving teachers' professional well-being, which is also positively associated with student achievement (Banerjee, Stearns, Moller, & Mickelson, 2017; Dicke et al., 2020; Pöysä et al., 2022), better instructional quality (See systematic review of Hascher & Waber, 2021), a lower risk of professional burnout (Shirazizadeh & Moradkhani, 2018), and a stronger commitment to take on more responsibility for the school (Rechsteiner, Compagnoni, Merki, & Wullschleger, 2022).

Professional well-being (Linton, Dieppe, & Medina-Lara, 2016) is a complex concept that encompasses work-related stress and job satisfaction. Work-related stress is associated with a hedonic approach (Deci & Ryan, 2008), where well-being is viewed as the absence of negative affect. Job satisfaction, on the other hand, is more closely related to an eudemonic perspective, where professional well-being is viewed as the presence of positive affect (Waterman, 1993). Teachers experience higher levels of stress than many other professions, which can lead to burnout and lower teacher retention rates (Pogere, López-Sangil, García-Señorán, & González, 2019) and lower job satisfaction (Collie, Malmberg, Martin, Sammons, & Morin, 2020; Collie & Mansfield, 2022; Simbula, Panari, Guglielmi, & Fraccaroli, 2012). As job resources, workload, and disruptive student behavior are recognized as sources of stress (Caprara, Barbaranelli, Steca, & Malone, 2006; Dicke et al., 2020; Jerrim & Sims, 2021; Klassen & Tze, 2014), the individual's assessment of the stressor determines its negative impact (Jerrim & Sims, 2021).

PD in everyday teaching can help teachers manage workload, set goals, and motivate themselves (Burns & Schaefer, 2003; Hoekstra & Korthagen, 2011). However, the relationship between PD and work-related stress may be reversed, as PD requires time resources, which can increase workload and stress (Sandmeier, Baeriswyl, Krause, & Muehlhausen, 2022). Jerrim and Sims (2021) took a closer look at the relationship between teacher workload and well-being and found that it was not teaching hours per se that caused teachers stress but rather non-instructional activities such as grading and planning. Further, they reported that time spent on PD or collaborating with colleagues led to a reduction in stress, but this association varies between countries. Understanding what influences teacher well-being is urgent due to teacher shortages, low job satisfaction, and high turnover rates—both in Switzerland, where this study was conducted, and beyond. Or as a current U.S. online report shows: “American K-12 teachers feel overworked and dissatisfied in their jobs and are struggling with diminished mental health and wellness support” (Merrimack College, 2023).

In summary, studies have reported several positive outcomes of PD on student learning and teacher competencies. But as there are few studies that have quantitatively assessed the benefits of day-to-day PD activities in primary schools, we do not know whether PD activities in everyday work life are associated with greater benefits for students and teachers, and whether PD activities for the team and school are equally beneficial (Maag Merki, Wullschleger, et al., 2022a,b). An approach is needed that not only systematically examines the different benefits of PD activities for student and teacher learning but also involves teams and schools as learning communities, as this is the only way to achieve sustainable high quality school improvement (i.e., Goddard, Goddard, & Tschannen-Moran, 2007; Horn, Garner, Chen, & Frank, 2020). Furthermore, the evidence on the association between PD and well-being is ambivalent regarding the effects on stress and job satisfaction, as PD generally seems to be associated with better well-being interindividually, but situational changes, such as stressful situations, seem to promote PD and might therefore be associated with lower well-being intraindividually.

## 2. Research questions

To clarify the issues raised, an approach is needed that captures teachers' PD of their work in the classroom, team, and school (Maag

Merki, Wullschleger, et al., 2022b; Mitchell & Sackney, 2011); is close to teachers' daily work (Kyndt et al., 2016; Lecat et al., 2020); is manageable for teachers with little time (Myin-Germeys & Kuppens, 2022); integrates outcomes for learning and well-being within and between teachers (Hoekstra & Korthagen, 2011; Kyndt et al., 2016; Sims et al., 2021). This study therefore addresses three separate research questions.

- (1) What is the teachers' extent of engagement in PD activities for the classroom, team, and school in everyday work life? As we cannot make any assumptions about the absolute frequency of PD activities in everyday work life, in a first step, we will describe how PD relates to other contents of non-instructional activities. As Maag Merki (2017) suggests that the idea of PD encompassing the entire school as a multi-level system is not yet fully realized, we assume that PD activities for the classroom are more frequent than those for the team or school. Additionally, based on research on teacher PD (i.e., Camburn & Han, 2017; Kyndt et al., 2016), we assume that PD related to classroom work focuses more on teaching and less on more complex areas with a stronger internal orientation, such as reflection on teachers' competencies.
- (2) What are the inter- and intrapersonal associations between teacher's daily PD activities and learning benefits? Based on work on the relevance of PD for student outcomes through improving teachers' competencies (i.e., Darling-Hammond et al., 2017; Desimone, 2009), at the interpersonal level it is hypothesized that teachers who engage in more PD activities across all workdays report greater learning benefits. Although the predominant focus of previous studies has been on interindividual associations (Kyndt et al., 2016), we similarly assumed that teachers report greater learning benefits on days when engaging in PD activities than on days without such activities, because reflection on one's own professional competence to improve teaching has been internalized as a central concept from teacher training on (Lenske & Lohse-Bossenz, 2023). Further, it is hypothesized that these relations are content-specific (Camburn & Han, 2017), indicating a stronger association between PD activities and outcomes when there is a match between the specific content of the activity and the desired outcome. For instance, PD for the school is expected to have a higher level of association with school-related benefits.
- (3) What are the inter- and intrapersonal associations between teacher's daily PD activities and well-being? It is hypothesized that teachers experience lower levels of well-being (lower satisfaction, higher stress levels) on days when engaging in PD activities, as the pedagogical reflection prompted by challenging situations may negatively impact their well-being (Sandmeier et al., 2022). Conversely, at the interpersonal level, it is hypothesized that teachers who engage in more PD activities across all days during the study period report higher levels of well-being (higher job satisfaction, lower stress levels), as previous research showed mostly positive relations between teachers' PD and well-being (i.e., Burns & Schaefer, 2003; Hoekstra & Korthagen, 2011; Jerrim & Sims, 2021).

## 3. Methods

### 3.1. Study design and sample

This longitudinal study examined the PD patterns of primary school teachers at 56 primary schools in the German-speaking part of Switzerland using ESM. In the study, 753 primary school teachers (Grades 1 to 6) filled out a daily online logbook on their mobile phones over a three-week period (one week in November, one week in December, and one week in January) reporting the activities they carried out in addition to teaching. The selection of the three survey weeks was proposed to the schools by the research team and guided by multiple

**Table 1**  
Contents of teacher's non-instructional activities.

	$N_{\text{activities}}^a$	$M(SD)^{bd}$	$\text{Prop.}^{cd}$
<i>School</i>			
Reflection and development of pedagogical work	543	0.72 (1.34)	0.03
Reflection and development of organizational and administrative work	628	0.83 (1.56)	0.03
Pedagogical work	754	1.00 (1.57)	0.04
Organizational and administrative work	2435	3.23 (3.46)	0.11
<i>Team</i>			
Reflection and development of pedagogical work	1016	1.35 (1.64)	0.05
Reflection and development of organizational and administrative work	827	1.10 (1.55)	0.04
Pedagogical work	1514	2.01 (2.37)	0.08
Organizational and administrative work	2764	3.67 (3.08)	0.13
<i>Classroom</i>			
Reflection and development of professional attitudes and pedagogical knowledge	1544	2.05 (2.86)	0.07
Reflection and development for support for individual students	3290	4.37 (4.09)	0.15
Reflection and development of one's own teaching skills	2923	3.88 (3.88)	0.14
Reflection and development of organizational and administrative tasks	1551	2.06 (2.82)	0.08
Support planning for individual students	2873	3.82 (4.03)	0.13
Organizational and administrative tasks for one's own class or individual students	6232	8.28 (5.45)	0.30
Preparation and follow-up of lessons (incl. excursions, special events with class or learning group), correction, assessment	10929	14.51 (5.02)	0.53

Notes.

<sup>a</sup> = total number of activities with specific content in all recorded activities (n = 23,240).

<sup>b</sup> = Grand mean, refers to the average of the teacher's mean for the specific content over the study duration.

<sup>c</sup> = Grand mean of proportion of all activities per teacher, which indicates the ratio of activities with corresponding content for each teacher.

<sup>d</sup> = based on the teachers' workdays.

factors: ensuring equal intervals between them across all schools, avoiding the start or end of the school year by choosing the 2nd quarter to steer clear of busy periods, and accommodating unique schedules in consultation with schools, such as varying school holidays.

Of the initially registered 1087 teachers, 95% (n = 1033) participated in the experience sampling. After the 'beep' at 5 p.m., they were given 24 h to complete a questionnaire on the given workday (n = 11,259 days). Teachers could indicate that they had not worked that day (n = 3224 days), which would terminate the entry. Based on simulation studies by [Nezlek \(2020\)](#), we excluded teachers with a response rate below 50% (n = 185) and teachers with fewer than 9 workdays over the 3 weeks (n = 95). Our analyses of missing data revealed that the 280 teachers excluded based on these criteria were more likely to be younger, part-time teachers with less teaching experience. They were also less likely to take part in formal training courses and less likely to have a high responsibility role in activities to develop their school.

To recruit schools, we endeavored to reach out to primary schools in the German-speaking region of Switzerland as comprehensively as possible, extending requests for support to cantonal representatives and various associations. If a school was interested in participating, the principal had to discuss participation with the school team. The school could only participate if the team agreed to participate. Participating schools and teachers were provided with an interim report and a final report, detailing their school's results and offering a comparison with other schools in the sample. Upon completion of the study, participating schools were invited to a concluding event to discuss the study findings. Moreover, schools received a modest compensation of CHF 100 for their 'coffee fund.'

The sampled schools showed variation in location, size, and socio-economic status, with a slight overrepresentation of urban and larger schools compared to the national average. However, the students in the schools accurately reflected Switzerland's social diversity and teachers were representative employees for Swiss schools. The 753 primary teachers in our final sample were spread across 56 schools, with an average of 28 teachers per school (range = 1 to 59). They were on average 41.8 years old (SD = 11.7, range = 21 to 67); 86% were women, which matched the population distribution of teachers in the German-speaking cantons of Switzerland ([Bundesamt für Statistik, 2021](#)). The mean teaching experience was 16.6 years (SD = 11.3, range = 0 to 44); 52% of the teachers worked close to a full-time schedule (more than 75%); 71% of the teachers reported that they had classroom teaching

responsibilities. In Switzerland, primary school teachers are mostly generalists with classroom responsibilities, teaching most subjects themselves and delegating only a few subjects to school subject teachers (e.g., sports, foreign language). Three schools were located in large agglomerations, 23 schools in medium to small agglomerations, 17 schools in suburban areas, and 13 schools in rural areas ([Bundesamt für Statistik, 2012](#)).

After using a filter question to ensure that teachers had worked for the school on that day, the number of periods (including field trips, special events with the class, catch-up time) (M = 5.04 periods per workday, SD = 0.81) and the number of work-related activities that they were engaged in during non-instructional time over the 3 weeks were assessed and averaged per teacher (M = 30.86, SD = 15.40). Teachers were not required to describe the content of the activities in an open response format but could choose from 15 pre-defined contents in a multiple-choice format (e.g., specifically preparing and following up on lessons) (see [Table 1](#); [Fig. 1](#)). This approach allowed quantitative comparison between teachers close to their daily work, with certain trade-offs regarding the exact content of the activity. Once the teacher entered an activity, the instrument was programmed to ask for further activities. After recording the activities on a given day, teachers were asked to rate the workday as a whole in terms of job satisfaction, stress levels, and perceived benefits for their students' learning, their teaching, their team, and their school. These constructs were assessed with single items, a procedure often employed in experience sampling studies ([Myin-Germeys & Kuppens, 2022](#); [Schmidt, Kramer, Brose, Schmiedek, & Neubauer, 2021](#)) to avoid overburdening participating teachers. It is crucial to maintain high levels of daily completion and commitment to the study. Multiple studies indicate that single-item measures provide validity similar to that of multiple-item measures (e.g., [Cheung and Lucas \(2014\)](#) for life satisfaction and [Elo, Leppänen, and Jahkola \(2003\)](#) for work-related stress). Moreover, single items have been shown to be more parsimonious and more satisfying for participants when answering the same questionnaire repeatedly ([Allen, Iliescu, & Greiff, 2022](#)), resulting in better overall response rates ([Wanous, Reichers, & Hudy, 1997](#)).

### 3.2. Measures

*Teachers' non-instructional activities.* Teachers recorded all non-instructional work-related activities for each workday. What qualified

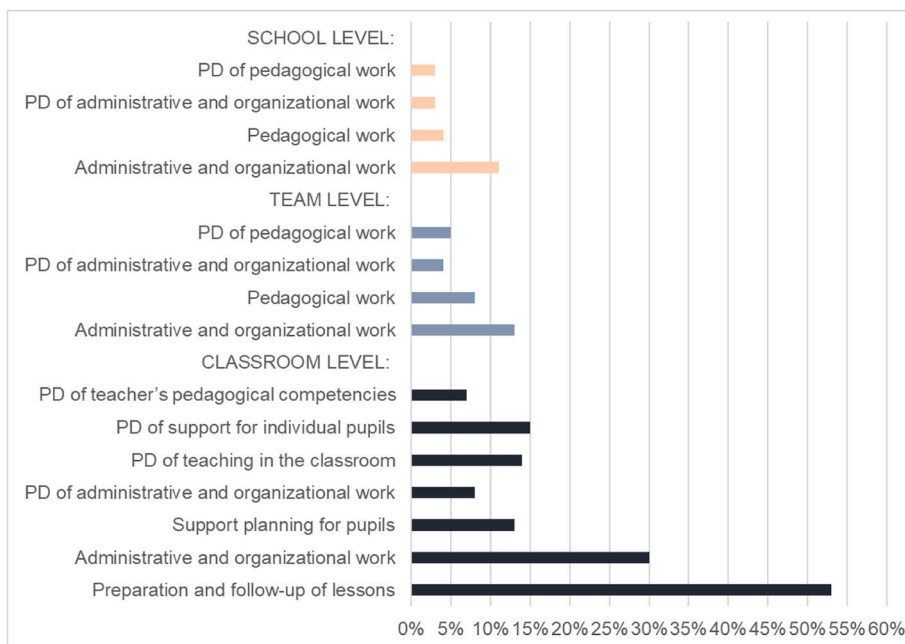


Fig. 1. Content of teacher's non-instructional activities.

as an activity was determined by the teachers themselves, but the content was standardized: For each activity, teachers chose one or more of the following contents for each dimension (classroom, team, school): administrative work; pedagogical work; reflection and development of administrative work; and, most important for our paper, 'reflection and development of pedagogical work' (see Table 1). The contents were selected based on the professional mandate of Swiss teachers (Feller et al., 2020) and theoretical considerations (see Introduction) and validated and adapted based on a pilot study (Maag Merki, Wullschleger, et al., 2022a,b). In discussion group sessions, teachers and researchers involved in the pilot study ensured that for all non-instructional activities, the chosen contents were feasible and understandable for teachers in practice. For instance, when grading homework and entering it into the electronic student dossier (activity), a teacher could indicate that this activity involves reflection and development to support individual students (content) as well as administrative work (content). It was also essential to ensure that the items were not overly extensive and thus could be completed in a few minutes per day. This development process resulted in 15 contents (see Table 1) organized along three dimensions (Mitchell & Sackney, 2011): activities for the classroom, team, and/or whole school. Teachers defined their primary working team in advance. Based on the results of the pilot study, at the classroom dimension "reflection and development of pedagogical work" was further divided into sub-areas: reflection and development for the support of individual students, reflection and development of the teacher's own pedagogical competencies, and reflection and development of their own teaching. For 'teaching,' we used the German word *Unterricht*, which refers to teaching periods in the classroom setting and is therefore more closely related to the materials used and teaching behavior. Teachers' assessment of their competencies indicated a broader focus that included their knowledge, values, motivation, self-regulated learning, and pedagogical and subject-specific skills. For each content Table 1 shows the total number of entries. In addition, for each teacher the individual proportion of activities with a given content was calculated and a grand mean computed (e.g., if teachers indicated 30 activities in the 3 weeks, and they checked 3 of them as containing PD or their own teaching, they received a value of 0.10, indicating that 10% of the reported activities contained PD for their own teaching).

The initial descriptive analyses were of all the contents of the non-instructional activities of teachers. Our subsequent analyses concentrated solely on the contents "reflection and development of pedagogical work" for classroom, team, and school. To disentangle inter- and intraindividual effects, we collapsed activities for each teacher at the day level and report them here only when the activities of a day included reflection and development of pedagogical work for the classroom, team, or school (see next section). This was necessary, as teachers could report different contents for the same activity; therefore, some assessed few activities per day but reported many contents per activity, whereas others assessed several activities with only one content each.

*Professional development* (PD) was computed for each teacher and dimension at the day level (1 = workday included activities with reflection and development of pedagogical work, 0 = workday included no activities with reflection and development of pedagogical work, NA = no workday/missing value). We assessed PD across the three dimensions separately: PD classroom (three activities), PD team (one activity), and PD school (one activity), emphasizing in the instruction for an item that a PD activity included both reflection and/or development of pedagogical work (see previous section) PD classroom included activities with the contents "reflection and development of support for individual students," teacher's own pedagogical competencies, or their own teaching. PD classroom and PD school included activities with the content "reflection and development of pedagogical work for the team" (or school, respectively). A workday was defined as a day on which any activity outside of teaching was documented. The personal means for each teacher were calculated for PD classroom, PD team, and PD school across all workdays ( $PD_{between}$ ), as well as the daily deviation of the teachers from their personal means ( $PD_{within}$ ). PD classroom indicated the proportion of workdays with at least one activity that included PD for the classroom ( $PD_{between}$ :  $M = 0.41$ ,  $SD = 0.23$ ,  $CI95_{between} [0.40; 0.43]$ ,  $CI95_{within} [0.02; 0.81]$ ). PD team indicated the proportion of workdays with at least one activity that included PD for the team ( $PD_{between}$ :  $M = 0.08$ ,  $SD = 0.10$ ,  $CI95_{between} [0.08; 0.09]$ ,  $CI95_{within} [-0.05; 0.22]$ ); and PD school indicated the proportion of workdays with at least one activity that included PD for the school ( $PD_{between}$ :  $M = 0.05$ ,  $SD = 0.08$ ,  $CI95_{between} [0.04; 0.05]$ ,  $CI95_{within} [-0.07; 0.16]$ ).

Teachers' well-being was assessed each day after completion of the activity by one question each about their perceived job satisfaction and

work-related stress (Linton et al., 2016). Job satisfaction was assessed each day by a single item: “How satisfied are you with this day, all in all?” on a 10-point Likert scale from 1 = not at all satisfied to 10 = completely satisfied. The personal mean for each teacher was calculated over the 3 weeks and averaged across all days ( $M = 7.86, SD = 0.99, CI_{95\text{between}} [7.79; 7.93]$ ). Fig. 3 shows the complexity of the data using the example of the relation between daily PD for classroom and job satisfaction. Work-related stress was assessed by asking teachers how burdensome (in German *belastend*) the day was. Again, this was assessed by a single item: “How burdensome was this day for you, all work-related things considered?” on a 10-point Likert scale from 1 = not at all burdensome to 10 = extremely burdensome. For each teacher, the personal mean was calculated over the 3 weeks and averaged across all workdays ( $M = 4.35, SD = 1.70, CI_{95\text{between}} [4.23; 4.47]$ ). Fig. 4 shows the complexity of the data using the example of the intraindividual relation between daily PD for classroom and work-related stress.

Learning benefit was assessed daily by asking teachers to reflect on their day and consider how beneficial they felt the day was for the students’ learning (student benefit), their own learning as teachers (teaching benefit), and their development in the team (team benefit) and school (school benefit). There were 4 items ranging from 1 = not at all beneficial to 10 = extremely beneficial. The mean scores over all the workdays over the 3-week period were as follows: for student benefit  $M = 7.22, SD = 1.16, CI_{95\text{between}} [7.14; 7.31]$ , for teaching benefit  $M = 7.03, SD = 1.29, CI_{95\text{between}} [6.93; 7.12]$ , for team benefit  $M = 5.43, SD = 1.70, CI_{95\text{between}} [5.31; 5.55]$ , and for school benefit  $M = 4.80, SD = 1.85, CI_{95\text{between}} [4.67; 4.94]$ .

Time-invariant covariates. Teachers’ personal characteristics including gender (0 = female, 1 = male), teaching experience in years,

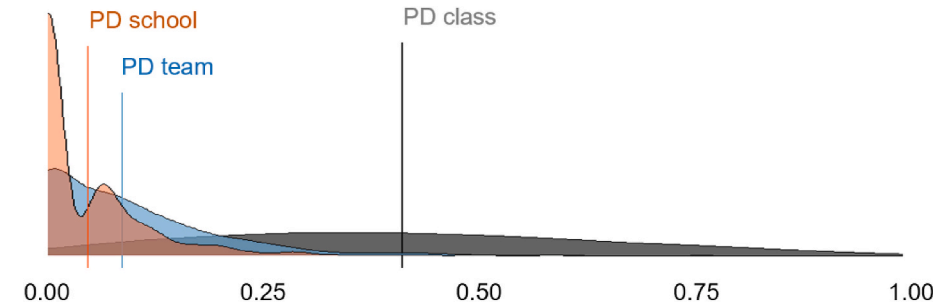
workload as percentage of full-time job (0 = less than 75%, 1 = more/equal 75%) were covariates in the analyses. Willingness for PD was assessed as a motivational characteristic with 5 statements (e.g., “I attend formal PD even if it is not compulsory, or I keep up to date with new didactic material”) based on Sleegers, Thoonen, Oort, and Peetsma (2014) on a 6-point Likert scale from 1 = not at all true to 6 = completely true,  $M = 4.48, SD = 0.74, \text{Alpha} = 0.75$ . PD supportive leadership was assessed with 4 statements (e.g., “Our school leadership encourages us to think about how our school can improve”) based on Sleegers et al. (2014) on a 6-point Likert scale from 1 = not at all true to 6 = completely true,  $M = 4.71, SD = 0.82, \text{Alpha} = 0.86$ . Total activity volume and number of workdays were included as additional covariates to control for potential composition effects.

### 3.3. Analytic approach

R studio version 4.2.2 (R Core Team, 2022) was used for all descriptive and inferential analyses. Several visual representations were included to gain a better understanding of teachers’ PD activities using ggplot2 (Wickham, 2016). As the data on the content of teachers’ non-instructional activities for team and school are not normally distributed, for research question 1 (RQ1), Wilcoxon rank sum tests were used as a non-parametric test with the rank-biserial correlation coefficient as a measure of effect size to statistically validate differences in teachers’ PD. To disentangle intra- and interindividual effects of PD on benefit (RQ2) and well-being (RQ3), the R package esmpack was used to analyze multilevel longitudinal data (Viechtbauer & Constantin, 2023), as our data represent a two-level structure in which daily measures are nested within teachers. Bolger and Laurenceau (2013) state that ICCs

**Table 2**  
Means, standard deviations, ICCs, density plots, and between-person-correlations among study variables.

	<i>M</i>	<i>SD</i>	ICC <sup>a</sup>	ICC <sup>b</sup>	PD school	PD team	PD classroom
<i>Daily professional development</i> <sup>c</sup>							
PD school	0.045	0.079	0.084	0.010	–	.43***	.27***
PD team	0.085	0.102	0.064	0.006	–	–	.38***
PD classroom	0.413	0.234	0.168	0.012	–	–	–
<i>Daily outcomes</i> <sup>c</sup>							
Benefit student learning	7.223	1.160	0.283	0.037	–.03	.06 <sup>o</sup>	.19***
Benefit teacher learning	7.025	1.288	0.352	0.042	–.02	.08*	.21***
Benefit team learning	5.432	1.701	0.334	0.046	.08*	.23***	.15***
Benefit school learning	4.804	1.848	0.425	0.051	.13***	.20***	.12***
Job satisfaction	7.865	0.987	0.305	0.057	–.10***	–.01	.10***
Work-related stress	4.346	1.704	0.379	0.052	.04	.04	.04
<i>Covariates</i>							
Gender (1: female, 2: male)	1.139	0.347			.10***	–.01	.01
Workload (0: <75%, 1: ≥75%)	0.524	0.500			.05	.03	.10***
Teaching experience	16.551	11.259			–.01	.06	.08*
Supportive leadership	4.711	0.816			.07 <sup>o</sup>	.06	.01
Willingness for PD	4.479	0.739			.03	.09*	.11***
n activities	30.863	15.406			.15***	.13***	.29***



Notes.  
<sup>a</sup> Intra class correlation coefficient for teachers.  
<sup>b</sup> Intra class correlation coefficient for school.  
<sup>c</sup> based on the teachers’ workdays when they completed the daily questionnaire. \*\*\* $p < .001$ , \*\* $p < .01$ , \* $p < .05$ , <sup>o</sup> $p < .10$ ; Means and standard deviations were averaged per teacher. Between-person Pearson correlations were calculated. Density plot shows daily PD for school, team, and classroom (0 = never, 1 = on all workdays).

between 0.2 and 0.4 are typical in ESM studies.

We used multilevel models with daily PD activities, well-being, and benefits (level 1) nested within teachers (level 2). The ICCs for PD, well-being, and benefits (Table 2, ICCs from 0.166 to 0.425) suggested that it was appropriate to disentangle within- and between-teacher variance. It should be noted that for dichotomous variables, the ICC can only be understood as an approximation. Regarding the nesting of teachers in schools, ICCs from 0.010 to 0.057 (Table 2) suggested that there was very little clustering within the data. In other words, the differences between teachers were relatively large compared to the very small differences between schools. Although further computations to account for nesting within schools were therefore deemed not necessary, we included school as an additional random effect in the linear mixed-effects model for PD activities. We conducted model comparisons to ensure the stability of our results, and this was confirmed.

The lmer function was used to fit a multi-level model, accommodating both fixed and random effects to address the non-independence of observations by estimating variance at different levels: within teachers (Level 1) and between teachers (Level 2), who are nested within schools (Level 3). Each dependent variable—job satisfaction and work-related stress (well-being), and perceived benefits for students, teachers, teams, or schools—was measured daily and analyzed separately in different models. Teachers' daily PD activities for classroom, team, and school were included both as a time-varying predictor (Level 1;  $PD_{within}$ ; centered on the person mean) and a person-level predictor (Level 2;  $PD_{between}$ ) as fixed effects, to allow these effects to be interpreted as pure intrapersonal and interpersonal effects, respectively (Wang & Maxwell, 2015). Random effects (intercept and slope) were specified for each teacher (level 2) nested in schools (level 3), with random slopes for  $PD_{within}$  across teachers (level 2) and schools (level 3) to account for within-person variability across schools and teachers. In addition, each teacher's gender, teaching experience, workload, activity volume, willingness for PD, and leadership support were included as time-invariant covariates (level 2), and whether the assessment took place on the weekend or during the week<sup>1</sup> (level 1), as we expected this to affect well-being and benefits. As the intraindividual variance for PD might be higher if teachers reported more activities, the number of activities was included as a further covariate.

## 4. Results

### 4.1. PD in teachers' daily non-instructional activities

The first aim of this paper was to explore the extent to which teachers engage in PD in their daily work for the classroom (student, teaching, and teacher competencies), team, and school. Looking at all the contents of non-instructional activities reported by teachers over the 3 weeks (Table 1), three patterns emerged (see Fig. 1): First, most of the activities included contents for classroom, followed by team and finally school. It is important to note that the content always corresponded to the proportion per teacher of all activities they entered, as an activity often covered several contents. The values in Table 1 represent the aggregated grand means of teachers' individual means. Second, at the team and school dimension, administrative and organizational content predominated over pedagogical content in teachers' non-instructional activities. At the classroom dimension, more than 50% of contents involved preparing and following up lessons (followed by 30% administrative and organizational work). As for teachers' PD contents, 7%–15% of teachers' non-instructional activities involved reflection and development of professional competencies, teaching, or supporting students (classroom

dimension), 5% of activities involved pedagogical PD for the team, and less than 3% involved PD for the school (Table 1). Of all teachers, 113 (15%) never reported an activity that included PD for their teaching; 264 (35%) never reported PD for their competencies; and 95 (13%) never reported PD for their students. Almost 40% ( $n = 298$ ) never reported an activity involving PD for the team, and 61% ( $n = 456$ ) never reported PD for their school (see also density plots in Table 2).

As for PD activities for the classroom, team, and school aggregated at the daily level, teachers on average reported engaging in activities that included PD for the classroom on  $M = 41\%$ , for their team on  $M = 8\%$ , and for their school on  $M = 5\%$  of their workdays (see Fig. 2). The Wilcoxon rank sum test with continuity correction testing the difference in ranks between PD activities for the classroom and team suggested that the effect was statistically significant and large ( $W = 514063$ ,  $p < .001$ ;  $r$  (rank biserial) = 0.81, [0.79, 0.83]), also when compared to PD school ( $W = 536369$ ,  $p < .000$ ;  $r$  (rank biserial) = 0.89 [0.88, 0.90]), but with no meaningful difference when comparing PD team and school ( $W = 355496$ ,  $p < .001$ ;  $r$  (rank biserial) = 0.00 [-0.06, 0.06]). In addition, Fig. 2 shows that teachers engaged in PD on weekends—although to a lesser extent, which was considered in further analyses.

Further, frequency analyses revealed that 40% of teachers reported no team PD and 61% no school PD at all in the 3 weeks, which makes the interpretation of within-person associations for team PD and school PD not feasible; implications are discussed below. However, in the following we look at the between-person associations of PD team and school with well-being and benefits.

### 4.2. Intra- and interindividual effects of PD for work in the classroom on benefits and well-being

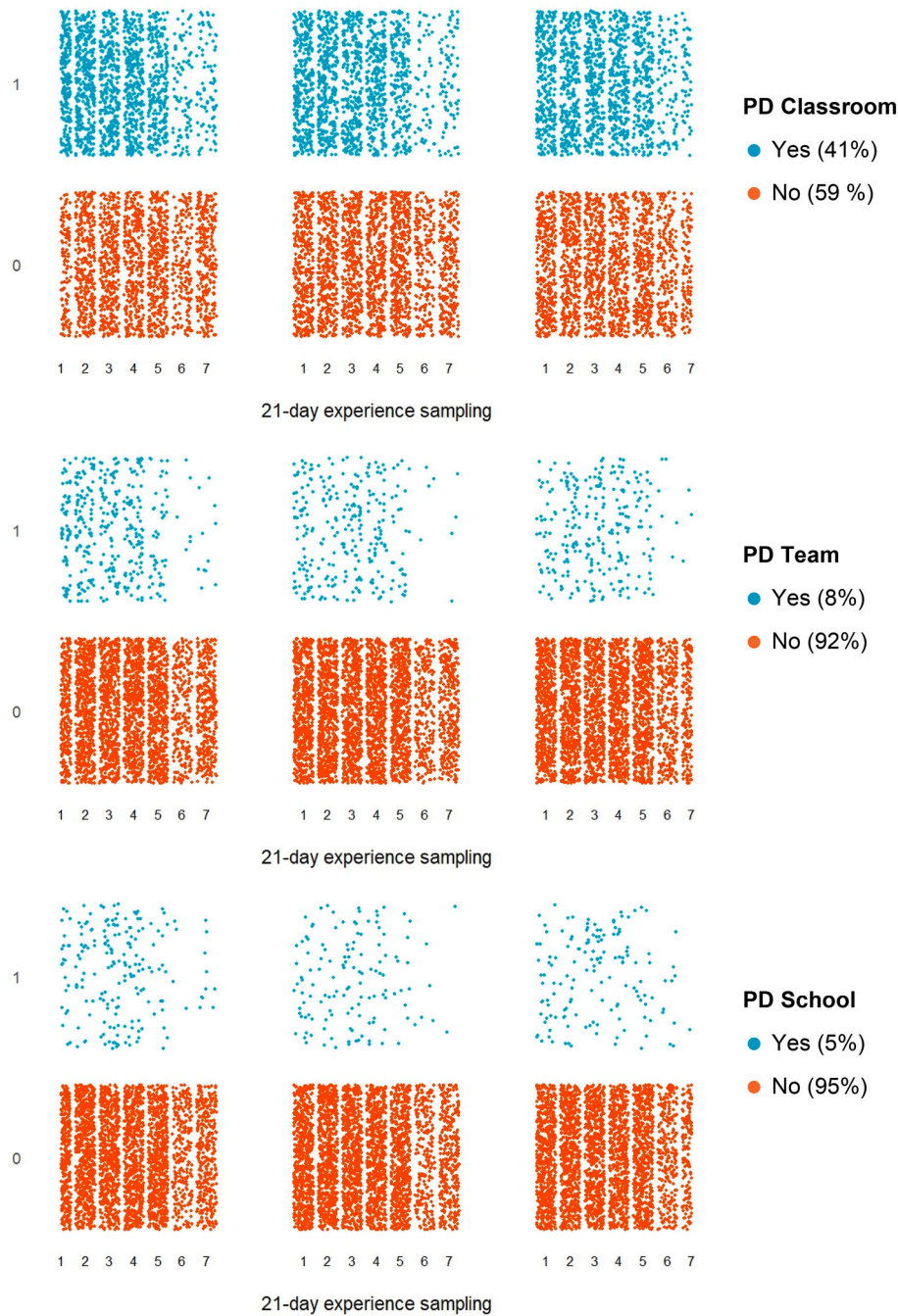
Six multilevel models for each PD classroom, PD team, and PD school with daily activities (level 1) nested in teachers (level 2) were used with the following dependent variables: job satisfaction and work-related stress (well-being), learning benefits for students, teachers, teams, or schools. Teachers' daily PD was included both as a time-varying predictor ( $PD_{within}$ ) and as a person-level predictor ( $PD_{between}$ ), as were the covariates (teacher's gender, teaching experience, workload, willingness for PD, leadership support, and volume of activities). For the perceived benefits of the day for learning (within-person level), results for PD classroom (Table 3) showed that on days with PD, teachers reported higher benefits for student learning ( $\beta = .22$ ,  $p < .001$ ), their teaching ( $\beta = .23$ ,  $p < .001$ ), and the team ( $\beta = .10$ ,  $p < .001$ ) than on days without PD. No greater benefit was reported for the school ( $\beta = .01$ ,  $p = .81$ ). At the between-person level, PD significantly predicted all benefit variables; in other words, teachers who engaged in more reflection and development on average across all workdays reported more benefits for student learning ( $\beta = .21$ ,  $p < .001$ ), their teaching ( $\beta = .28$ ,  $p < .001$ ), the team ( $\beta = .21$ ,  $p < .001$ ), and the school ( $\beta = .14$ ,  $p = .047$ ).

Regarding well-being, as Table 4 shows, intraindividual differences in daily PD did not affect daily job satisfaction ( $\beta = .017$ ,  $p = .314$ ) but were related to higher intraindividual stress levels ( $\beta = .208$ ,  $p < .001$ ). Interindividually, at the between-person level, teachers with more PD across all days during the study duration reported higher job satisfaction ( $\beta = .090$ ,  $p = .013$ ) but not lower stress levels ( $\beta = .005$ ,  $p = .933$ ).

As the interpretation of within-person associations for team PD and school PD was not feasible (see above), multilevel models without random slopes for intraindividual effects were computed with team and school PD as a person-level predictor only (see Appendix below for results of these multilevel models). Teachers who reported more workdays with PD for the team generally perceived higher daily benefits for the team ( $\beta = .364$ ,  $SE = 0.060$ ,  $p < .001$ ) and the school ( $\beta = .314$ ,  $SE = 0.066$ ,  $p < .001$ ), as was hypothesized. As expected, they did not report higher benefits for students ( $\beta = -.041$ ,  $SE = 0.042$ ,  $p = .339$ ) and their teaching ( $\beta = .073$ ,  $SE = 0.047$ ,  $p = .121$ ). Contrary to expectations, teachers who reported more days with PD activities for their team did

<sup>1</sup> Multilevel models for class were also computed with a dataset excluding experience sampling data for weekends. Across all models, parameter estimates remained very similar, and the same conclusions regarding our hypotheses can be drawn (see Appendix).





**Fig. 2.** Workdays with teachers' professional development (PD) for classroom, team, and school over the 21-day study period.

not show higher well-being (stress:  $\beta = .058$ ,  $SE = 0.063$ ,  $p = .355$ , satisfaction:  $\beta = -.014$ ,  $SE = 0.035$ ,  $p = .699$ ) over the three-week period. Looking at PD activities for the school, a similar content-specific pattern emerged, with higher daily benefits for the school ( $\beta = .179$ ,  $SE = 0.068$ ,  $p = .009$ ) but not for the team ( $\beta = .082$ ,  $SE = 0.062$ ,  $p = .189$ ), their teaching ( $\beta = -.034$ ,  $SE = 0.048$ ,  $p = .480$ ), or students ( $\beta = -.041$ ,  $SE = 0.042$ ,  $p = .339$ ). Contrary to expectations, teachers who reported more workdays with school PD activities had on average significantly lower job satisfaction, although with a small effect size ( $\beta = -.093$ ,  $SE = 0.036$ ,  $p = .010$ ). However, they did not experience more work-related stress ( $\beta = .030$ ,  $SE = 0.064$ ,  $p = .633$ ).

## 5. Discussion

Schools, as learning communities, can become a force for positive change when teachers engage in PD for their work in their classrooms, their team, and their school with the ultimate goal of promoting student learning (Camburn & Han, 2017; Mitchell & Sackney, 2019; Wullschleger et al., 2023). This study explored the extent to which teachers engage in self-reported PD during their non-instructional activities. By conducting 21 days of experience sampling, the study results provide unique and valuable quantitative insights into teachers' everyday working lives. Importantly, the results reveal the small role that teachers' perceived PD concerning their work in teams and schools plays in their everyday work life, despite the decades of work on schools as learning communities (Emmerich & Maag Merki, 2014; Mitchell &

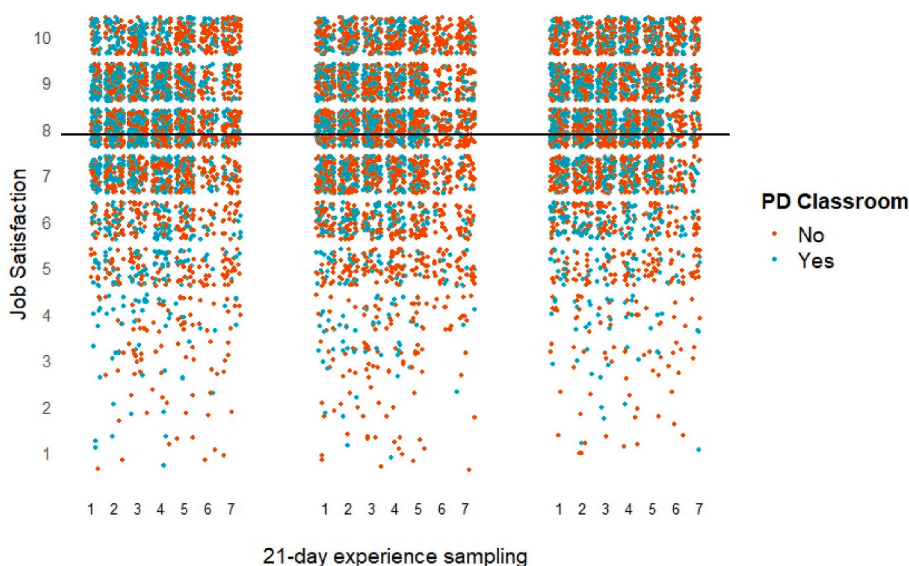


Fig. 3. Job satisfaction and professional development (PD) for the classroom over the 21-day study period. Notes: Black line = between-person mean for job satisfaction ( $M = 7.86$ ). Points = teacher's individual daily job satisfaction.

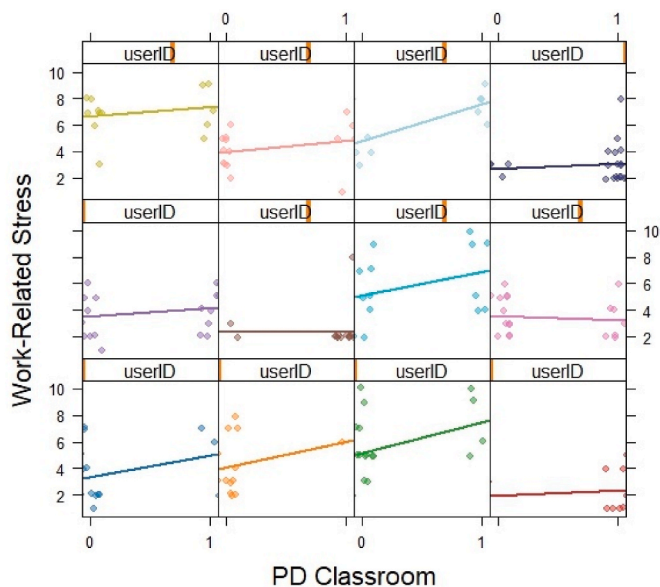


Fig. 4. Intraindividual relation between stress and professional development (PD) for the classroom in a random sample of 18 teachers. Notes: 0 = days with no PD classroom, 1 = days with PD classroom.

Sackney, 2011). In addition, this study represents a significant advance in the field by revealing that ESM enrich our understanding of the relationship between perceived PD, well-being, and benefits for learning and teaching. It highlights the need to disentangle inter- and intraindividual variance to gain a more comprehensive understanding of the extent to which relationships are due to more stable personal characteristics (trait) or intraindividual daily changes (state).

Teachers' everyday PD. Although it has been argued for over a decade that effective educational change requires PD not only for teachers' work in the classroom but also for their work in the team and school (Emmerich & Maag Merki, 2014; Gibbons, Kazemi, & Lewis, 2017; Mitchell & Sackney, 2011), our findings suggest that PD activities for the team and school are still rare in teachers' working life. Specifically, 40% of teachers reported no activities involving PD for their team, and 61% reported no activities involving PD for their school on all their reported

workdays over the 3-week period. In contrast, every teacher in the sample reported PD for their work in the classroom at least once over the study period. On average, teachers reflected on their teaching, their students, or their professional competencies as teachers on 41% of their workdays.

Looking at the level of workdays but also at all activities that teachers reported, PD for teachers' work in the classroom is still rare, and i.e., only 14% of all reported non-instructional activities included PD for their teaching (Table 1). As on average 30 activities were reported over the 3 weeks, this means that teachers reflected on their teaching on average in 4 of these activities. The findings of this experience sampling study therefore contrast somehow with the notion of teachers as reflective practitioners (Schön, 1983). The results could mean that a share of 7–15% of non-instructional activities with PD activities for the classroom is perceived as very high by teachers, but it could also point towards the validity problems of one-time questionnaires. Problems of social desirability and response and recall bias have been identified several times (Daumiller et al., 2023; Silvia & Cotter, 2021) and seem to be confirmed by our results. Although we explicitly asked about reflection and development in the daily assessments, it is also possible that reflection takes place 'in the mind' and teachers did not link it to the non-instructional activities.

As expected, the data also show that teachers reported less reflection and development of teacher competencies than of PD related to teaching or students. This is consistent with the assumption that reflection at deeper levels and on teachers' beliefs and personality is more complex and rarer (Nguyen et al., 2014; von Aufschnaiter et al., 2019). Several studies found that teachers are more likely to reflect on student learning or experiment with new material and may be less likely to engage in deeper changes related to developing their own professional competencies (Camburn & Han, 2017; Hoekstra et al., 2009). One possible explanation for this is that many teachers assume that teachers' professional competencies are relatively stable and difficult to change (Rechsteiner, Compagnoni, Wullschleger, & Maag Merki, 2021). Our quantitative data reveals how often (or rarely) we can anticipate teachers engaging in reflective and developmental practices for their teaching, student learning, and their competencies. Taking a step further, we inquire into why pedagogical reflection and development were not indicated by teachers in the majority of their non-instructional activities, such as lesson preparation or grading. Indeed, how can activities like lesson preparation or grading truly contribute to teachers'

**Table 3**  
Four multilevel models on effects of teachers inter- and intraindividual daily professional development for the classroom on learning benefit.

	Benefit Student			Benefit Teaching			Benefit Team			Benefit School		
	$\beta$	SE	p	$\beta$	SE	p	$\beta$	SE	p	$\beta$	SE	p
(Intercept)	7.11	.05	.00	6.96	.05	.00	5.22	.07	.00	4.64	.07	.00
PD <sub>within</sub> <sup>a</sup>	<b>.22</b>	<b>.02</b>	<b>.00</b>	<b>.23</b>	<b>.02</b>	<b>.00</b>	<b>.10</b>	<b>.03</b>	<b>.00</b>	.01	.02	.81
PD <sub>between</sub> <sup>b</sup>	<b>.21</b>	<b>.04</b>	<b>.00</b>	<b>.28</b>	<b>.05</b>	<b>.00</b>	<b>.21</b>	<b>.06</b>	<b>.00</b>	<b>.14</b>	<b>.07</b>	<b>.05</b>
Weekend <sup>c</sup>	-.30	.02	.00	-.14	.02	.00	-.63	.03	.00	-.49	.03	.00
Gender <sup>d</sup>	-.13	.04	.00	-.15	.05	.00	.00	.06	.96	.06	.07	.40
Workload <sup>d</sup>	.10	.04	.02	.06	.05	.23	-.13	.07	.05	-.09	.07	.23
Experience <sup>d</sup>	.16	.04	.00	.07	.05	.13	.01	.07	.92	.03	.07	.64
Leadership <sup>d</sup>	.12	.04	.00	.16	.05	.00	.27	.06	.00	.27	.07	.00
Willingness <sup>d</sup>	.24	.04	.00	.29	.05	.00	.30	.07	.00	.41	.07	.00
n activities <sup>d</sup>	-.04	.04	.40	-.15	.05	.00	.10	.07	.13	.10	.07	.16
Num.Obs.	10166			10169			10083			10061		
R <sup>2</sup> Marg.	.075			.078			.080			.080		
R <sup>2</sup> Cond.	.342			.380			.322			.355		
Level 1												
SD residual	1.646			1.610			2.180			2.005		
Level 2												
SD intercept	0.971			1.114			1.465			1.658		
SD slope (PD)	0.593			0.497			0.460			0.520		
Level 3												
SD intercept	0.128			0.152			0.233			0.053		
SD slope (PD)	0.082			0.009			0.155			0.149		

Note.

- <sup>a</sup> Within-person mean-centered PD, representing the day-to-day variability in PD experienced by each teacher.
- <sup>b</sup> Between-person means of PD, indicating each teacher's average PD.
- <sup>c</sup> Day-level variable, represented at level 1 in the multilevel model.
- <sup>d</sup> Time-invariant variables, represented at level 2 in the multilevel model.

Random Effects Structure: The model includes random effects for PD<sub>within</sub> across schools and teachers, with teachers nested within schools. This allows the model to account for variability in the effect of PD (slopes). Num.Obs.: number of observations. R<sup>2</sup> Marginal: Variance explained by the fixed factors. R<sup>2</sup> Conditional: Variance explained by the entire model (including both fixed and random factors). Values in bold indicate statistical significance at  $p < .05$  (two-tailed).

**Table 4**  
Two multilevel models on effects of teachers inter- and intraindividual daily professional development for the classroom on well-being.

	Job Satisfaction				Work-related Stress			
	$\beta$	b	SE	p	$\beta$	b	SE	p
(Intercept)	7.885	6.085	0.311	.000	4.077	4.436	0.548	.000
PD <sub>within</sub> <sup>a,c</sup>	.017	0.038	0.037	.314	<b>.208</b>	<b>0.477</b>	<b>0.055</b>	<b>.000</b>
PD <sub>between</sub> <sup>b,d</sup>	<b>.090</b>	<b>0.386</b>	<b>0.155</b>	<b>.013</b>	.005	0.023	0.275	.933
Weekend <sup>c</sup>	<b>.051</b>	<b>0.115</b>	<b>0.040</b>	<b>.004</b>	-.689	-1.544	0.056	.000
Gender <sup>d</sup>	-.104	-0.303	0.104	.004	.268	0.783	0.184	.000
Workload <sup>d</sup>	.059	0.119	0.076	.119	.115	0.231	0.135	.087
Experience <sup>d</sup>	.159	0.014	0.003	.000	-.039	-0.003	0.006	.566
Leadership <sup>d</sup>	.150	0.184	0.044	.000	-.162	-0.199	0.078	.011
Willingness <sup>d</sup>	.170	0.231	0.051	.000	-.057	-0.077	0.091	.394
n activities <sup>d</sup>	-.122	-0.008	0.002	.001	<b>.192</b>	<b>0.012</b>	<b>0.004</b>	<b>.005</b>
Num.Obs.		10184				10182		
R <sup>2</sup> Marginal		.045				.091		
R <sup>2</sup> Conditional		.317				.402		
Level 1 (within-person)								
SD residual		1.382				1.957		
Level 2 (between-person)								
SD intercept		0.821				1.520		
SD slope (PD)		0.404				0.435		
Level 3 (school level)								
SD intercept		0.236				0.360		
SD slope (PD)		0.074				0.174		

Note

- <sup>a</sup> Within-person mean-centered PD, representing the day-to-day variability in PD experienced by each teacher.
- <sup>b</sup> Between-person means of PD, indicating each teacher's average PD
- <sup>c</sup> Day-level variable, represented at level 1 in the multilevel model.
- <sup>d</sup> Time-invariant variables, represented at level 2 in the multilevel model.

Random Effects Structure: The model includes random effects for PD<sub>within</sub> across schools and teachers, with teachers nested within schools. This allows the model to account for variability in the effect of PD (slopes). Num.Obs.: number of observations. R<sup>2</sup> Marginal: Variance explained by the fixed factors. R<sup>2</sup> Conditional: Variance explained by the entire model (including both fixed and random factors). Values in bold indicate statistical significance at  $p < .05$  (two-tailed).

meaningful learning without incorporating reflection on student progress and considering their own competencies as a teacher? There is therefore a need for a shift in the perception of teaching as a profession in which promoting learning for pupils, teachers, teams, and schools is inherent in almost every aspect of the job.

*Intra- and interindividual relationships between teachers' PD activities for work in the classroom, team, and school and teachers' well-being and learning benefits.* The results reveal content-specific perceived benefits of PD, as teachers who reported more PD days for their team and school perceived higher daily benefits for their team and school but not for their students or well-being over the 3-week period. This may be an indication that teachers do not yet fully view their schools as learning communities, whereas the benefits for the team and school should also transfer to the classroom. Interestingly, only teachers who reported more PD days for the school reported lower job satisfaction. It may be that teachers who reported more PD days for the school perceived the school's focus on PD as an additional expectation and adding to their workload; perhaps they had to participate in school steering groups or did not find the PD activities relevant or useful to children's learning, which could lead to lower job satisfaction. This finding may be particularly pronounced for primary school teachers in Switzerland. As generalists, they are responsible for teaching multiple subjects, with workloads that can extend up to 32 lessons across a diverse range of school subjects each week, and managing a wide array of classroom duties, including supporting students with special needs (Sahli Lozano, Cramerli, & Adeifio Gosteli, 2021). This particular context might intensify the negative impact of PD for the school on job satisfaction, as it could divert resources and time from teachers' numerous, frequently urgent responsibilities. However, it is also possible that other factors related to the nature or quality of educational PD for schools influence this relationship; further research is needed to draw concrete practical conclusions for schools and their practitioners.

As described above, PD activities for the team are rare, and a majority of teachers did not report engaging in PD for the school even once in the study period. To look at intraindividual variance or to capture variation over time, in future studies a less fine-grained analysis with longer intervals or event-based sampling might be more appropriate. Further, cross-sectional surveys might be sufficient until team- and school-level PD becomes more common in schools. However, for PD for the classroom, our results highlight the importance of disentangling inter- and intraindividual effects of daily PD on well-being and perceived benefits. If we look only at the between level, as the vast majority of studies have done, we would conclude that the more teachers engage in PD, the more they perceive their days to be beneficial to their students, their teaching, the team, and the school – and that they are more satisfied with their jobs and do not perceive more stress. This is in line with other studies that found that PD is positively related to well-being and learning benefits (i.e., Burns & Schaefer, 2003; Hoekstra & Korthagen, 2011; Kyndt et al., 2016; Sims et al., 2021). It could be argued that the amount of PD in a teacher's work life is based on a more or less stable personality trait, together with better well-being and a more positive view of their work. The results could even be interpreted as suggesting that teachers only take time out of their teaching to engage in PD when they have less work-related stress and are more satisfied with their work. However, the intraindividual relationships show that teachers perceive days when they invest time in PD as more beneficial for their students, their teaching, the team, and the school but also as more stressful, regardless of any trait-like tendency for PD. Therefore, we cautiously conclude that it is worthwhile for all teachers to integrate PD into non-instructional activities, as it might pay off in greater benefits, especially for students and for themselves as teachers. Although days with PD are perceived as more stressful, this does not seem to translate into lower overall well-being over the 3 weeks; on the contrary, more PD is associated with higher well-being. The relationship with stress may therefore be indicative of an interaction—with challenges being a trigger for PD but also a sign that PD is demanding but

worthwhile. Well-being was not operationalized as a one-dimensional scale with satisfaction at one end and stress at the other, which seems reasonable in the light of the results, as PD is positively related to job satisfaction but not negatively related to work-related stress. The positive correlation found in our data between self-reported non-instructional PD activities and perceived well-being is similar to that found by Jerrim and Sims (2021) and indicates that despite the additional effort required for PD, professional development and well-being positively influence each other in the long term.

### 5.1. Limitations and further considerations

Some limitations must be noted. To address potential issues stemming from social desirability, retrospective bias, and response bias (Daumiller et al., 2023; Silvia & Cotter, 2021), we deliberately adopted ESM to assess teachers' daily PD activities in proximity to their daily work. However, a mixed-method design holds promise by combining data on the quantity of PD within non-instructional activities with qualitative data. This approach is poised to offer a comprehensive understanding that not only delves into the frequency of PD but also captures the nuanced quality of reflective practices and development for classroom, team, and school.

QQ plots of the multi-level regression models show heavier tails, which suggests that in the lower regions, for teachers with very little PD to no PD, normally distributed data cannot be assumed, and results must be interpreted cautiously, as data have smaller values than expected based on the reference distribution. Additionally, although our study provides longitudinal data, we cannot establish cause and effect relationships between teachers' PD and their well-being and perceived benefits. As half of the teachers work less than 75% of full-time, i.e., not on consecutive days, and the survey did not take place in 3 consecutive weeks, even the calculation of delayed effects could not shed more light on possible time variant effects. Further, while the inclusion of random effects at Level 3 in our multilevel model captures the complexity of the data structure, the current focus on key aspects relevant to our primary research questions has limited the scope of interpretation for these effects, reserving their detailed analysis for future studies.

As a shortcoming of the study, the point can be raised that we did not use objective measures to assess stressors, activities, or learning. Although professional resources such as workload or social support and disruptive pupil behavior have long been recognized as major sources of stress for all teachers, it is only the individual's assessment of the stressor that matters (Collie et al., 2020; Jerrim & Sims, 2021). The same is true, to some extent, of PD activities, which need to be adapted to teachers' particular prior knowledge and situations. We focused here on the quantity and different levels of PD. However, qualitative studies can provide a more detailed picture of quality and content of PD. In terms of learning outcomes, it would certainly be desirable for future studies to assess long-term effects on the competency development of learners, teachers, teams, and schools. The subjective global assessment of daily benefits provides a slightly different but also valuable perspective, especially in the context that teachers' self-efficacy expectations are one of the strongest predictors of teaching performance (Klassen, Tze, Betts, & Gordon, 2011; Klassen & Tze, 2014), student achievement, and well-being (Caprara et al., 2006).

### 5.2. Conclusions

Whereas previous research underscored the significance of teachers' PD activities for classroom, team, and school to enhance student learning and effective school improvement, this study on day-to-day teacher activities reveals a notable disparity: Teachers' self-reported engagement in PD activities primarily centers on the classroom level, and opportunities for PD activities for the team and school in everyday school life remain limited. Further, this study emphasizes the importance of disentangling within and between effects when studying the

relationship between PD and well-being. Although PD is associated with lower perceived well-being on a daily basis, investing more time in PD has a positive impact on teachers' perception of learning benefits and job satisfaction in the long run without increasing their overall stress level. Still, more reported PD activities for the school slightly reduced perceived job satisfaction. Future research should explore ways to facilitate PD for teams and schools without adversely affecting teachers' job satisfaction. This study suggests it is important to empower teachers as change agents through daily pedagogical reflection and development on their part. In conclusion, we initiated this paper by probing the question of the frequency of PD—"Every day, every week, all at once?" Although PD in the classroom context occurs for most teachers nearly every day and week, there is still a substantial journey ahead before PD becomes inherently integrated 'all at once' to include PD for teams and schools, woven into the fabric of the daily school routine.

**Funding**

This work was supported by the Swiss National Science Foundation, Switzerland [grant number 100019\_175872/1].

**Appendix A**

**Table A1**

Multilevel models on effects of teachers inter- and intraindividual daily professional development (PD) for the classroom on learning benefits with dataset excluding weekend.

	Student benefit			Teaching benefit			Team benefit			School benefit		
	$\beta$	SE	p	$\beta$	SE	p	$\beta$	SE	p	$\beta$	SE	p
(Intercept)	7.20	0.05	.00	7.00	0.05	.00	5.40	0.07	.00	4.78	0.07	.00
PD between	.21	.04	.00	.28	.05	.00	.21	.06	.00	.14	.07	.05
PD within <sup>a</sup>	.26	.02	.00	.25	.02	.00	.19	.03	.00	.07	.02	.00
Gender	-.13	.04	.00	-.15	.05	.00	.00	.06	.94	.06	.07	.40
Workload	.10	.04	.01	.06	.05	.23	-.13	.07	.05	-.08	.07	.25
Experience	.15	.04	.00	.07	.05	.17	-.02	.07	.75	.01	.07	.89
Leadership	.12	.04	.00	.16	.05	.00	.27	.06	.00	.28	.07	.00
Willingness	.24	.04	.00	.29	.05	.00	.30	.07	.00	.41	.07	.00
n activities	-.05	.04	.27	-.15	.05	.00	.08	.07	.25	.08	0.07	.30

Notes.

<sup>a</sup> person-mean centered.

**Table A2**

Multilevel models on effects of teachers inter- and intraindividual daily professional development (PD) for the classroom on learning benefits with dataset excluding weekend.

	Satisfaction			Stress		
	$\beta$	SE	p	$\beta$	SE	p
(Intercept)	7.870	0.048	.000	4.275	0.079	.000
PD between	.091	.036	.013	-.001	.064	.993
PD within <sup>a</sup>	.010	.016	.540	.303	.025	.000
Gender	-.105	.036	.003	.267	.063	.000
Workload	.059	.038	.122	.116	.067	.084
Experience	.161	.038	.000	-.075	.068	.273
Leadership	.149	.036	.000	-.149	.063	.019
Willingness	.169	.038	.000	-.069	.067	.299
n activities	-.119	.038	.002	.149	.067	.028

Note.

<sup>a</sup> person-mean centered.

**CRedit authorship contribution statement**

**Miriam Compagnoni:** Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Beat Rechsteiner:** Writing – review & editing, Validation, Project administration, Methodology, Investigation, Data curation. **Flurin Gotsch:** Writing – review & editing, Validation. **Urs Grob:** Writing – review & editing, Methodology. **Andrea Wullschleger:** Writing – review & editing, Supervision, Project administration, Investigation, Data curation. **Katharina Maag Merki:** Writing – review & editing, Supervision, Resources, Project administration, Investigation, Funding acquisition.

**Declaration of competing interest**

No competing interests to declare.

**Data availability**

The authors do not have permission to share data. R Code will be made available on request.

Appendix B

**Table B1**  
Correlations of all between-person variables and time-invariant variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. PD school	–	<b>.433</b>	<b>.270</b>	–.027	–.021	<b>.083</b>	<b>.129</b>	–.097	.045	<b>.101</b>	.045	–.011	.065	.027	<b>.149</b>
2. PD team	<b>.354</b>	–	<b>.381</b>	.064	<b>.080</b>	<b>.232</b>	<b>.203</b>	–.014	.038	–.011	.031	.055	.061	<b>.086</b>	<b>.134</b>
3. PD class	<b>.225</b>	<b>.350</b>	–	<b>.194</b>	<b>.207</b>	<b>.154</b>	<b>.119</b>	<b>.100</b>	.039	.008	<b>.096</b>	<b>.077</b>	.013	<b>.106</b>	<b>.292</b>
4. Benefit student learning	–.010	.062	<b>.193</b>	–	<b>.820</b>	<b>.519</b>	<b>.497</b>	<b>.621</b>	–.083	–.089	–.007	<b>.211</b>	<b>.142</b>	<b>.313</b>	.021
5. Benefit teacher learning	–.003	.060	<b>.208</b>	<b>.812</b>	–	<b>.590</b>	<b>.580</b>	<b>.615</b>	–.083	–.151	–.039	<b>.125</b>	<b>.159</b>	<b>.280</b>	–.038
6. Benefit team learning	<b>.094</b>	<b>.232</b>	<b>.161</b>	<b>.506</b>	<b>.575</b>	–	<b>.869</b>	<b>.352</b>	.040	–.037	–.093	<b>.085</b>	<b>.196</b>	<b>.232</b>	<b>.103</b>
7. Benefit school learning	<b>.137</b>	<b>.192</b>	<b>.122</b>	<b>.486</b>	<b>.566</b>	<b>.869</b>	–	<b>.335</b>	.064	.005	–.059	<b>.106</b>	<b>.184</b>	<b>.263</b>	<b>.082</b>
8. Job satisfaction	–.050	–.005	<b>.097</b>	<b>.625</b>	<b>.608</b>	<b>.340</b>	<b>.322</b>	–	–.391	–.114	–.062	<b>.195</b>	<b>.167</b>	<b>.251</b>	–.039
9. Work-related stress	.061	.038	.043	–.108	–.110	.028	.046	–.412	–	<b>.194</b>	<b>.137</b>	–.066	–.094	–.074	<b>.110</b>
10. Gender	<b>.077</b>	–.010	–.005	–.075	–.149	–.041	–.003	–.115	<b>.196</b>	–	<b>.215</b>	.019	.017	–.078	<b>.113</b>
11. Workload	.023	.027	<b>.087</b>	–.008	–.041	–.095	–.065	–.073	<b>.138</b>	<b>.215</b>	–	–.246	–.047	–.108	<b>.202</b>
12. Teaching experience	.011	.063	<b>.074</b>	<b>.214</b>	<b>.123</b>	<b>.097</b>	<b>.119</b>	<b>.213</b>	–.079	.009	–.278	–	–.061	<b>.333</b>	.062
13. Supportive leadership	.045	.052	.011	<b>.146</b>	<b>.139</b>	<b>.196</b>	<b>.179</b>	<b>.152</b>	–.093	.003	–.044	–.051	–	<b>.146</b>	.000
14. Willingness for PD	.053	<b>.101</b>	<b>.119</b>	<b>.313</b>	<b>.277</b>	<b>.239</b>	<b>.249</b>	<b>.263</b>	–.074	–.063	–.115	<b>.345</b>	<b>.150</b>	–	<b>.108</b>
15. n activities	<b>.074</b>	<b>.158</b>	<b>.259</b>	.020	–.057	<b>.097</b>	.070	–.040	<b>.113</b>	<b>.074</b>	<b>.198</b>	.053	.001	<b>.099</b>	–

Note. Pearson correlations above diagonal, Spearman correlations below; values in bold indicate statistical significance at  $p < .05$  (two-tailed).

Appendix C

```
R-Code Multilevel Model
library(esmpack)
library(lme4)
library(modelsummary)
# estimate average satisfaction on teacher level
satis <- lme(day_satisfaction ~ 1, random = ~1 | userID, data = data_day01, na.action = na.omit)
# intercept variance, error variance
round(getVarCov(satis)[1,1], digits = 3)
round(sigma(satis)^2, digits = 3)
# ICC (intra class correlation coefficient for teachers)
round(getVarCov(satis)[1,1]/(getVarCov(satis)[1,1] + sigma(satis)^2), digits = 3)
# estimate average satisfaction on school level
satis2 <- lme(day_satisfaction ~ 1, random = ~1 | schoolID, data = data_day01, na.action = na.omit)
# intercept variance, error variance
round(getVarCov(satis2)[1,1], digits = 3)
round(sigma(satis2)^2, digits = 3)
# ICC (intra class correlation coefficient for school)
round(getVarCov(satis2)[1,1]/(getVarCov(satis2)[1,1] + sigma(satis2)^2), digits = 3)
#disentangling the within- and between-person associations between PD and satisfaction
satis_PD <- lme(day_satisfaction ~ mPD + cPD + gender + workload + experience + leadership + willingness + weekend + activity_n,
random = ~ cPD | schoolID/userID, data = data, na.action = na.omit)
summary(satis_PD)
VarCorr(satis_PD)
# Standardize predictor variables
data[, c("zmPD", "zcPD", "zggender", "zworkload", "zexperience", "zleadership", "zwillingness", "zweekend", "zactivity_n")] <- lapply(data[, c("mPD", "cPD", "gender", "workload", "experience", "leadership", "willigness", "weekend", "activity_n")], scale)
# Fit linear mixed effects model with standardized predictors
zsatis_PD <- lme(day_satisfaction ~ zmPD + zcPD + zggender + zworkload + zexperience + zleadership + zsearch + zweekend + zactivity_n,
random = ~ zcPD | schoolID/userID, data = data, na.action = na.omit)
summary(zsatis_PD)
modelsummary(zsatis_PD)
```

Appendix D

Table D1

Six multilevel models on effects of teachers professional development (PD) for the school on different outcomes.

	Benefit School	Benefit Team	Benefit Teaching	Benefit Student	Stress	Satisfaction
(Intercept)	4.643*** (0.068)	5.216*** (0.071)	6.952*** (0.054)	7.100*** (0.049)	4.061*** (0.082)	7.887*** (0.048)
PD School <sup>2</sup>	0.179** (0.068)	0.082 (0.062)	-0.034 (0.048)	-0.041 (0.042)	0.030 (0.064)	-0.093** (0.036)
Weekend <sup>1</sup>	-0.487*** (0.026)	-0.648*** (0.028)	-0.186*** (0.021)	-0.345*** (0.021)	-0.741*** (0.025)	0.046** (0.017)
Gender <sup>2</sup>	0.036 (0.069)	-0.019 (0.063)	-0.163*** (0.048)	-0.103 (0.043)	0.265*** (0.064)	-0.094** (0.036)
Workload <sup>2</sup>	-0.073 (0.072)	-0.123 (0.067)	0.096 (0.051)	0.131*** (0.045)	0.117 (0.068)	0.062 (0.038)
Experience <sup>2</sup>	0.047 (0.074)	0.022 (0.068)	0.104* (0.052)	0.205*** (0.046)	-0.031 (0.069)	0.159*** (0.039)
Leadership <sup>2</sup>	0.260*** (0.068)	0.260*** (0.063)	0.174*** (0.048)	0.138*** (0.042)	-0.169*** (0.064)	0.154*** (0.036)
Willingness <sup>2</sup>	0.421*** (0.072)	0.321*** (0.066)	0.313*** (0.051)	0.284*** (0.045)	-0.064 (0.067)	0.186*** (0.038)
n activities <sup>2</sup>	0.111 (0.071)	0.166* (0.065)	-0.084 (0.050)	-0.013 (0.044)	0.204*** (0.067)	-0.083* (0.037)
SD Level 3 (Intercept)	0.072	0.241	0.174	0.170	0.363	0.230
SD Level 2 (Intercept)	1.653	1.475	1.135	0.977	1.520	0.819
SD Level 1 (Residuals)	2.020	2.193	1.642	1.683	1.980	1.394
Num.Obs.	10063	10085	10171	10168	10184	10186
R <sup>2</sup> Marginal	.112	.099	.075	.084	.124	.062

Note. Num.Obs.: number of observations. R<sup>2</sup> Marginal: Variance explained by the fixed factors. Coefficients displayed are unstandardized. Numbers in parentheses are standard errors. \*p < .05, \*\*p < .01, \*\*\*p < .001.

<sup>1</sup> Day-level variable, represented at level 1 in the multilevel model.

<sup>2</sup> Person-level and time-invariant variables, represented at level 2 in the multilevel model.

Table D2

Six multilevel models on effects of teachers professional development (PD) for the team on different outcomes.

	Benefit School	Benefit Team	Benefit Teaching	Benefit Student	Stress	Satisfaction
(Intercept)	4.643*** (0.072)	5.208*** (0.075)	6.951*** (0.054)	7.100*** (0.049)	4.062*** (0.081)	7.885*** (0.048)
PD Team <sup>2</sup>	0.314*** (0.066)	0.364*** (0.060)	0.073 (0.047)	-0.041 (0.042)	0.058 (0.063)	-0.014 (0.035)
Weekend <sup>1</sup>	-0.487*** (0.026)	-0.648*** (0.028)	-0.186*** (0.021)	-0.345*** (0.021)	-0.741*** (0.025)	0.046** (0.017)
Gender <sup>2</sup>	0.060 (0.067)	-0.003 (0.061)	-0.165*** (0.048)	-0.103* (0.043)	0.269*** (0.064)	-0.103** (0.036)
Workload <sup>2</sup>	-0.075 (0.072)	-0.124 (0.065)	0.096 (0.051)	0.131** (0.045)	0.115 (0.068)	0.064 (0.038)
Experience <sup>2</sup>	0.029 (0.073)	0.007 (0.066)	0.102* (0.052)	0.205*** (0.046)	-0.034 (0.069)	0.162*** (0.039)
Leadership <sup>2</sup>	0.249*** (0.067)	0.241*** (0.061)	0.168*** (0.048)	0.138** (0.042)	-0.170** (0.064)	0.150*** (0.036)
Willingness <sup>2</sup>	0.408*** (0.072)	0.304*** (0.065)	0.308*** (0.051)	0.284*** (0.045)	-0.067 (0.067)	0.185*** (0.038)
n activities <sup>2</sup>	0.090 (0.070)	0.123 (0.063)	-0.100* (0.050)	-0.013 (0.044)	0.200** (0.066)	-0.096* (0.037)
SD Level 3 (Intercept)	0.188	0.308	0.182	0.170	0.360	0.227
SD Level 2 (Intercept)	1.624	1.424	1.132	0.977	1.520	0.825
SD Level 1 (Residuals)	2.020	2.193	1.642	1.683	1.980	1.394
Num.Obs.	10063	10085	10171	10168	10184	10186
R <sup>2</sup> Marginal	.123	.119	.077	.084	.125	.058

Note. Num.Obs.: number of observations. R<sup>2</sup> Marginal: Variance explained by the fixed factors. Coefficients displayed are unstandardized. Numbers in parentheses are standard errors. \*p < .05, \*\*p < .01, \*\*\*p < .001.

<sup>1</sup> Day-level variable, represented at level 1 in the multilevel model.

<sup>2</sup> Person-level and time-invariant variables, represented at level 2 in the multilevel model.

References

Allen, M. S., Iliescu, D., & Greiff, S. (2022). Single item measures in psychological science: A call to action. *European Journal of Psychological Assessment*, 38(1), 1–5.  
 Argyris, C. (2017). *Integrating the individual and the organization*. Routledge. <https://doi.org/10.4324/9780203788417>

Banerjee, N., Stearns, E., Moller, S., & Mickelson, R. A. (2017). Teacher job satisfaction and student achievement: The roles of teacher professional community and teacher collaboration in schools. *American Journal of Education*, 123(2), 203–241. <https://doi.org/10.1086/689932>  
 Basma, B., & Savage, R. (2018). Teacher professional development and student literacy growth: A systematic review and meta-analysis. *Educational Psychology Review*, 30, 457–481.

- Blank, R. K., & De las Alas, N. (2009). Effects of teacher professional development on gains in student achievement: How meta analysis provides scientific evidence useful to education leaders. *PERIC*.
- Bolger, N., & Laurenceau, J.-P. (2013). *Intensive longitudinal methods an introduction to diary and experience sampling research*. Guilford Press.
- Borko, H. (2004). Professional development and teacher learning: Mapping the terrain. *Educational Researcher*, 33(8), 3–15.
- Bräger, M. (2019). *LCH Arbeitszeiterhebung 2019 [LCH working time survey 2019]. Lehrerinnen und Lehrer Schweiz LCH*.
- Bundesamt für Statistik [BFS]. (2012). *Gemeindetypologie 2012 mit 9 Kategorien [Municipality typology 2012 with 9 categories]*. [https://www.atlas.bfs.admin.ch/map/s/13/de/12360\\_12482\\_3191\\_227/20593.html](https://www.atlas.bfs.admin.ch/map/s/13/de/12360_12482_3191_227/20593.html).
- Bundesamt für Statistik [BFS]. (2021). *Schulpersonal 2019/20: Obligatorische Schule, Sekundarstufe II und Tertiärstufe (höhere Fachschulen)*. <https://www.bfs.admin.ch/bfs/en/home/statistics/catalogues-databases/tables.assetdetail.16444027.html>.
- Burns, J. Z., & Schaefer, K. (2003). Informal learning: An exploratory study of unstructured learning experiences of T&I teachers enrolled in an alternative teacher education program. *Journal of Industrial Teacher Education*, 40(3), 6–24.
- Camburn, E. M., & Han, S. W. (2017). Teachers' professional learning experiences and their engagement in reflective practice: A replication study. *School Effectiveness and School Improvement*, 28(4), 527–554. <https://doi.org/10.1080/09243453.2017.1302968>
- Caprara, G. V., Barbaranelli, C., Steca, P., & Malone, P. S. (2006). Teachers' self-efficacy beliefs as determinants of job satisfaction and students' academic achievement: A study at the school level. *Journal of School Psychology*, 44(6), 473–490.
- Cheung, F., & Lucas, R. E. (2014). Assessing the validity of single-item life satisfaction measures: Results from three large samples. *Quality of Life Research*, 23, 2809–2818.
- Collie, R. J., Malmberg, L. E., Martin, A. J., Sammons, P., & Morin, A. J. S. (2020). A multilevel person-centered examination of teachers' workplace demands and resources: Links with work-related well-being. *Frontiers in Psychology*, 11. <https://doi.org/10.3389/fpsyg.2020.00626>. Article 626.
- Collie, R. J., & Mansfield, C. F. (2022). Teacher and school stress profiles: A multilevel examination and associations with work-related outcomes. *Teaching and Teacher Education*, 116. <https://doi.org/10.1016/j.tate.2022.103759>
- Creemers, B. P. M., Kyriakides, L., & Antoniou, P. (2013). *Teacher professional development for improving quality of teaching*. Springer.
- Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute, Palo Alto.
- Daumiller, M., Fasching, M. S., Dickhäuser, O., & Dresel, M. (2023). Teachers' achievement goals and teaching practices: A standardized lesson diary approach. *Teaching and Teacher Education*, 127. <https://doi.org/10.1016/j.tate.2023.104079>
- Day, C., & Sachs, J. (2004). Professionalism, performativity and empowerment: Discourses in the politics, policies and purposes of continuing professional development. In *International handbook on the continuing professional development of teachers* (pp. 3–32). Open University Press.
- Deci, E. L., & Ryan, R. M. (2008). Hedonia, eudaimonia, and well-being: An introduction. *Journal of Happiness Studies*, 9, 1–11.
- Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher*, 38(3), 181–199.
- Dewey, J. (1932). Introduction. In F. M. Alexander (Ed.), *The use of the self*. Integral Press.
- Dicke, T., Marsh, H. W., Parker, P. D., Guo, J., Riley, P., & Waldeyer, J. (2020). Job satisfaction of teachers and their principals in relation to climate and student achievement. *Journal of Educational Psychology*, 112(5), 1061–1073. <https://doi.org/10.1037/edu0000409>
- Dreer, B. (2023). On the outcomes of teacher wellbeing: A systematic review of research. *Frontiers in Psychology*, 14, Article 1205179. <https://doi.org/10.3389/fpsyg.2023.1205179>
- Elo, A. L., Leppänen, A., & Jahkola, A. (2003). Validity of a single-item measure of stress symptoms. *Scandinavian Journal of Work, Environment & Health*, 29(6), 444–451.
- Emmerich, M., & Maag Merki, K. (2014). Die Entwicklung von Schule: Theorie-Forschung-Praxis. *Enzyklopädie Erziehungswissenschaft Online*.
- Fat'hi, J., & Behzadpour, F. (2011). Beyond method: The rise of reflective teaching. *International Journal of English Linguistics*, 1(2), 241.
- Feller, R., Lussi, I., Bucher, N., Prinzing, O., Schwander, M., Ritz, A., et al. (2020). *Neu definierter Berufsauftrag für Lehrpersonen der Volksschulen des Kantons Zürich. Evaluationsbericht zuhanden der Bildungsdirektion des Kantons Zürich [Newly defined professional mandate for Teachers of public schools in the Canton of Zurich: Evaluation report for the Department of Education of the Canton of Zurich]*. Interface Politikstudien Forschung Beratung.
- Gibbons, L. K., Kazemi, E., & Lewis, R. M. (2017). Developing collective capacity to improve mathematics instruction: Coaching as a lever for school-wide improvement. *The Journal of Mathematical Behavior*, 46, 231–250. <https://doi.org/10.1016/j.jmathb.2016.12.002>
- Goddard, Y. L., Goddard, R. D., & Tschannen-Moran, M. (2007). A theoretical and empirical investigation of teacher collaboration for school improvement and student achievement in public elementary schools. *Teachers College Record*, 109(4), 877–896.
- Gremigni, V., & Domenici, L. (1977). On the role of specialized, peripheral cells during embryonic development of subitaneous eggs in the turbellarian *Mesostoma ehrenbergii* (Focke): In ultrastructural and autoradiographic investigation. *Acta Embryologica Experimentalis*, 2, 251–265.
- Grosemans, I., Boon, A., Verclairen, C., Dochy, F., & Kyndt, E. (2015). Informal learning of primary school teachers: Considering the role of teaching experience and school culture. *Teaching and Teacher Education*, 47, 151–161. <https://doi.org/10.1016/j.tate.2014.12.011>
- Gutierrez, S. B. (2015). Teachers' reflective practice in lesson study: A tool for improving instructional practice. *Alberta Journal of Educational Research*, 61(3), 314–328.
- Hascher, T., & Waber, J. (2021). Teacher well-being: A systematic review of the research literature from the year 2000–2019. *Educational Research Review*, 34. <https://doi.org/10.1016/j.edurev.2021.100411>
- Hoekstra, A., Brekelmans, M., Beijaard, D., & Korthagen, F. (2009). Experienced teachers' informal learning: Learning activities and changes in behavior and cognition. *Teaching and Teacher Education*, 25(5), 663–673. <https://doi.org/10.1016/j.tate.2008.12.007>
- Hoekstra, A., & Korthagen, F. (2011). Teacher learning in a context of educational change: Informal learning versus systematically supported learning. *Journal of Teacher Education*, 62(1), 76–92.
- Horn, I., Garner, B., Chen, I.-C., & Frank, K. A. (2020). Seeing colleagues as learning resources: The influence of mathematics teacher meetings on advice-seeking social networks. *AERA Open*, 6(2), 1–19. <https://doi.org/10.1177/2332858420914898>
- Howard, M. C., & Hoffman, M. E. (2018). Variable-centered, person-centered, and person-specific approaches: Where theory meets the method. *Organizational Research Methods*, 21(4), 846–876.
- IDES. (2023). IDES-Dossier. Studententafeln der Volksschule: Primarstufe und Sekundarstufe I Schuljahr 2023-2024 [IDES-Dossier. Timetables of public schools: Primary and lower secondary levels, school year 2023-2024] (Corrected on January 9, 2024) <https://edudoc.ch/record/232443?ln=de>.
- Jacobs, R. L., & Park, Y. (2009). A proposed conceptual framework of workplace learning: Implications for theory development and research in human resource development. *Human Resource Development Review*, 8(2), 133–150.
- Jeong, S., Han, S. J., Lee, J., Sunalai, S., & Yoon, S. W. (2018). Integrative literature review on informal learning: Antecedents, conceptualizations, and future directions. *Human Resource Development Review*, 17(2), 128–152. <https://doi.org/10.1177/1534484318772242>
- Jerrim, J., & Sims, S. (2021). When is high workload bad for teacher wellbeing? Accounting for the non-linear contribution of specific teaching tasks. *Teaching and Teacher Education*, 105. <https://doi.org/10.1016/j.tate.2021.103395>
- Jurasaitė-Harbison, E., & Rex, L. A. (2010). School cultures as contexts for informal teacher learning. *Teaching and Teacher Education*, 26(2), 267–277.
- Klassen, R. M., & Tze, V. M. (2014). Teachers' self-efficacy, personality, and teaching effectiveness: A meta-analysis. *Educational Research Review*, 12, 59–76.
- Klassen, R. M., Tze, V. M. C., Betts, S. M., & Gordon, K. A. (2011). Teacher efficacy research 1998–2009: Signs of progress or unfulfilled promise? *Educational Psychology Review*, 23(1), 21–43. <https://doi.org/10.1007/s10648-010-9141-8>
- Körkkö, M. (2021). Towards meaningful reflection and a holistic approach: Creating a reflection framework in teacher education. *Scandinavian Journal of Educational Research*, 65(2), 258–275. <https://doi.org/10.1080/00313831.2019.1676306>
- Körkkö, M., Kyrö-Ammälä, O., & Turunen, T. (2016). Professional development through reflection in teacher education. *Teaching and Teacher Education*, 55, 198–206.
- Kreis, A., & Staub, F. C. (2011). Fachspezifisches Unterrichtskoaching im Praktikum [Subject-specific teaching coaching in the internship]. *Zeitschrift für Erziehungswissenschaft*, 14(1), 61–83.
- Kruse, S., Louis, K., & Bryk, A. (1994). *Building professional community in schools. Issues in Restructuring schools, issue report No. 6 (spring 1994)*.
- Kyndt, E., Dochy, F., & Nijs, H. (2009). Learning conditions for non-formal and informal workplace learning. *Journal of Workplace Learning*, 21(5), 369–383.
- Kyndt, E., Gijbels, D., Grosemans, I., & Donche, V. (2016). Teachers' everyday professional development: Mapping informal learning activities, antecedents, and learning outcomes. *Review of Educational Research*, 86(4), 1111–1150. <https://doi.org/10.3102/0034654315627864>
- Lecat, A., Beusaert, S., & Raemdonck, I. (2018). On the relation between teachers' (in) formal learning and innovative working behavior: The mediating role of employability. *Vocations and Learning*, 11(3), 529–554. <https://doi.org/10.1007/s12186-018-9199-x>
- Lecat, A., Spaltman, Y., Beusaert, S., Raemdonck, I., & Kyndt, E. (2020). Two decades of research on teachers' informal learning: A literature review on definitions and measures. *Educational Research Review*, 30. <https://doi.org/10.1016/j.edurev.2020.100324>
- Lenske, G., & Lohse-Bossenz, H. (2023). Stichwort: Reflexion im Pädagogischen Kontext [Reflection in the pedagogical context]. *Zeitschrift für Erziehungswissenschaft*, 26(5), 1133–1164.
- Leslie, B., Aring, M. K., & Brand, B. (1998). Informal learning: The new frontier of employee & organizational development. *Economic Development Review*, 15(4), 12.
- Linton, M. J., Dieppe, P., & Medina-Lara, A. (2016). Review of 99 self-report measures for assessing well-being in adults: Exploring dimensions of well-being and developments over time. *BMJ Open*, 6(7), Article e010641. <https://doi.org/10.1136/bmjopen-2015-010641>
- Lohman, M. C. (2005). A survey of factors influencing the engagement of two professional groups in informal workplace learning activities. *Human Resource Development Quarterly*, 16(4), 501–527. <https://doi.org/10.1002/hrdq.1153>
- Maag Merki, K. (2017). School Improvement Capacity als ein Forschungsfeld der Schulentwicklungs- und Schuleffektivitätsforschung. Theoretische und methodische Herausforderungen [School improvement capacity as a research field of school development and school effectiveness research: Theoretical and methodological challenges]. In U. Steffens, K. Maag Merki, & H. Fend (Eds.), *Beiträge zur Schulentwicklung. Aktuelle Befunde und Perspektiven der Schulqualitäts- und Schulentwicklungsforschung. Grundlagen der Qualität von Schule 2* (pp. 267–284). Waxmann Verlag GmbH.
- Maag Merki, K., Grob, U., Rechsteiner, B., Rickenbacher, A., & Wullschleger, A. (2022a). Preconditions of teachers' collaborative practice. *Frontline Learning Research*, 10(1). <https://doi.org/10.14786/flr.v10i1.911>



- Maag Merki, K., Wullschleger, A., & Rechsteiner, B. (2022b). Adapting routines in schools when facing challenging situations: Extending previous theories on routines by considering theories on self-regulated and collectively regulated learning. *Journal of Educational Change*. <https://doi.org/10.1007/s10833-022-09459-1>
- Merrimack College. (2023). 2023 American teacher survey. <https://www.merrimack.edu/academics/education-and-social-policy/about/merrimack-college-teacher-survey/>.
- Mitchell, C., & Sackney, L. (2011). *Profound improvement: Building learning-community capacity on living-system principles* (2nd ed.). Routledge.
- Mitchell, C., & Sackney, L. (2019). *Sustainable improvement: Building learning communities that endure*. Brill.
- The open handbook of experience sampling methodology: A step-by-step guide to designing, conducting, and analyzing ESM studies. In Myin-Germeys, L., & Kuppens, P. (Eds.), *Leuven: Center for research on experience sampling and Ambulatory methods Leuven* (2nd ed.), (2022).
- Nezlek, J. (2020). Diary studies in social and personality psychology: An introduction with some recommendations and suggestions. *Social Psychological Bulletin*, 15(2), 1–19.
- Nguyen, Q. D., Fernandez, N., Karsenti, T., & Charlin, B. (2014). What is reflection? A conceptual analysis of major definitions and a proposal of a five-component model. *Medical Education*, 48(12), 1176–1189.
- Ohly, S., Sonnentag, S., Niessen, C., & Zapf, D. (2010). Diary studies in organizational research. *Journal of Personnel Psychology*, 9(2), 79–93.
- Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, 8, 422. <https://doi.org/10.3389/fpsyg.2017.00422>
- Pogore, E. F., López-Sangil, M. C., García-Señorán, M. M., & González, A. (2019). Teachers' job stressors and coping strategies: Their structural relationships with emotional exhaustion and autonomy support. *Teaching and Teacher Education*, 85, 269–280. <https://doi.org/10.1016/j.tate.2019.07.001>
- Pöysä, S., Pakarinen, E., & Lerkkanen, M.-K. (2022). Profiles of work engagement and work-related effort and reward among teachers: Associations to occupational well-being and leader–follower relationship during the COVID-19 pandemic. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.861300>
- R Core Team. (2022). R: A language and environment for statistical computing. *R Foundation for Statistical Computing*.
- Rahm, S., & Lunkenbein, M. (2014). Anbahnung von Reflexivität im Praktikum: Empirische Befunde zur Wirkung von Beobachtungsaufgaben im Grundschulpraktikum [Initiating reflectivity in internships: Empirical findings on the impact of observation tasks in primary school internships]. In K.-H. Arnold, A. Gröschner, & T. Hascher (Eds.), *Schulpraktika in der Lehrerbildung. Theoretische Grundlagen, Konzeptionen, Prozesse und Effekte* (pp. 237–256). Waxmann.
- Rechsteiner, B., Compagnoni, M., Merki, K. M., & Wullschleger, A. (2022). "Title does not dictate behavior": Associations of formal, structural, and behavioral brokerage with school staff members' professional well-being. *Frontiers in Psychology*, 13. <https://doi.org/10.3389/fpsyg.2022.885616>
- Rechsteiner, B., Compagnoni, M., Wullschleger, A., & Maag Merki, K. (2021). Teachers' implicit theories of professional abilities in the domain of school improvement. *Frontiers in Education*, 6. <https://doi.org/10.3389/educ.2021.635473>
- Reis, H. T., & Gable, S. L. (2000). Event-sampling and other methods for studying everyday experience. In H. T. Reis, & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 190–222). Cambridge University Press.
- Richter, D., Kunter, M., Klusmann, U., Lüdtke, O., & Baumert, J. (2011). Professional development across the teaching career: Teachers' uptake of formal and informal learning opportunities. *Teaching and Teacher Education*, 27(1), 116–126. <https://doi.org/10.1016/j.tate.2010.07.008>
- Rickards, F., Hattie, J., & Reid, C. (2020). *The turning point for the teaching profession: Growing expertise and evaluative thinking*. Routledge. <https://doi.org/10.4324/9781003080831>
- Sahli Lozano, C. S., Cramer, S., & Adeifio Gosteli, D. A. (2021). *Integrative und separate schulische Massnahmen in der Schweiz (InSeMa): Kantonale Vergabe- und Umsetzungsrichtlinien*. Edition SZH/CSPS.
- Sandmeier, A., Baeriswyl, S., Krause, A., & Muehlhausen, J. (2022). Work until you drop: Effects of work overload, prolonging working hours, and autonomy need satisfaction on exhaustion in teachers. *Teaching and Teacher Education*, 118. <https://doi.org/10.1016/j.tate.2022.103843>
- Schmidt, A., Kramer, A. C., Brose, A., Schmiedek, F., & Neubauer, A. B. (2021). Distance learning, parent-child interactions, and affective well-being of parents and children during the COVID-19 pandemic: A daily diary study. *Developmental Psychology*, 57(10), 1719–1734. <https://doi.org/10.1037/dev0001232>
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Basic Books.
- Shirazizadeh, M., & Moradkhani, S. (2018). Minimizing burnout through reflection: The rocky road ahead of EFL teachers. *Teaching English Language*, 12(1), 135–154.
- Silvia, P. J., & Cotter, K. N. (2021). *Researching daily life: A guide to experience sampling and daily diary methods*. American Psychological Association. <https://doi.org/10.1037/0000236-000>
- Silvia, P. J., Cotter, K. N., & Christensen, A. P. (2017). The creative self in context: Experience sampling and the ecology of everyday creativity. In M. Karwowski, & J. C. Kaufman (Eds.), *The creative self: Effect of beliefs, self-efficacy, mindset, and identity* (pp. 275–288). Elsevier Academic Press. <https://doi.org/10.1016/B978-0-12-809790-8.00015-7>.
- Simbula, S., Panari, C., Guglielmi, D., & Fraccaroli, F. (2012). Teachers' well-being and effectiveness: The role of the interplay between job demands and job resources. *Procedia - Social and Behavioral Sciences*, 69, 729–738. <https://doi.org/10.1016/j.sbspro.2012.11.467>
- Sims, S., Fletcher-Wood, H., O'Mara-Eves, A., Cottingham, S., Stansfield, C., Van Herwegen, J., et al. (2021). *What are the characteristics of teacher professional development that increase pupil achievement? Protocol for a systematic review*. Education Endowment Foundation.
- Sleegers, P. J. C., Thoonen, E. E. J., Oort, F. J., & Peetsma, T. T. D. (2014). Changing classroom practices: The role of school-wide capacity for sustainable improvement. *Journal of Educational Administration*, 52(5), 617–652. <https://doi.org/10.1108/JEA-11-2013-0126>
- Svojanovsky, P. (2017). Supporting student teachers' reflection as a paradigm shift process. *Teaching and Teacher Education*, 66, 338–348. <https://doi.org/10.1016/j.tate.2017.05.001>
- Thurlings, M., & den Brok, P. (2017). Learning outcomes of teacher professional development activities: A meta-study. *Educational Review*, 69(5), 554–576. <https://doi.org/10.1080/00131911.2017.1281226>
- Van Veen, K., Zwart, R., & Meirink, J. (2012). What makes teacher professional development effective? A literature review. In M. Kooy, & K. van Veen (Eds.), *Routledge research in education: Vol. 62. Teacher learning that matters: International perspectives* (pp. 3–21). Routledge.
- Viechtbauer, W., & Constantini, M. (2023). esmpack: Functions that facilitate preparation and management of ESM/EMA data. *R package version*, 0, 1–18.
- Vieluf, S., Praetorius, A. K., Rakoczy, K., Kleinknecht, M., & Pietsch, M. (2020). Angebots-Nutzungs-Modelle der Wirkweise des Unterrichts: Ein kritischer Vergleich verschiedener Modellvarianten. *Zeitschrift für Pädagogik*, 62(1), 63–80.
- von Aufschnaiter, C., Fraij, A., & Kost, D. (2019). Reflexion und Reflexivität in der Lehrerbildung [Reflection and Reflexivity in Teacher Education]. *Herausforderung Lehrer\*innenbildung-Zeitschrift zur Konzeption, Gestaltung und Diskussion*, 2(1), 144–159. <https://doi.org/10.4119/UNIBI/hlz-144>
- Wang, L. P., & Maxwell, S. E. (2015). On disaggregating between-person and within-person effects with longitudinal data using multilevel models. *Psychological Methods*, 20(1), 63–83. <https://doi.org/10.1037/met0000030>
- Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are the single item measures? *Journal of Applied Psychology*, 82, 247–252. <https://doi.org/10.1037/0021-9010.82.2.247>
- Waterman, A. S. (1993). Two conceptions of happiness: Contrasts of personal expressiveness (eudaimonia) and hedonic enjoyment. *Journal of Personality and Social Psychology*, 64(4), 678.
- Wickham, H. (2016). *ggplot2: Elegant graphics for data analysis*. Springer.
- Wullschleger, A., Vörös, A., Rechsteiner, B., Rickenbacher, A., & Maag Merki, K. (2023). Improving teaching, teamwork, and school organization: Collaboration networks in school teams. *Teaching and Teacher Education*, 121, Article 103909. <https://doi.org/10.1016/j.tate.2022.103909>
- Wyss, C. (2013). *Unterricht und Reflexion: Eine multiperspektivische Untersuchung der Unterrichts- und Reflexionskompetenz von Lehrkräften [Teaching and reflection: A multi-perspective study of teachers' teaching and reflection competence]*. Waxmann.
- Wyss, C., & Mahler, S. (2021). Mythos Reflexion: Theoretische und praxisbezogene Erkenntnisse in der Lehrer\*innenbildung [Myth of reflection: Theoretical and practical insights in teacher education]. *Journal für LehrerInnenbildung*, 21(1), 16–25. <https://doi.org/10.35468/jlb-01-2021-01>
- Yoon, I., & Kim, M. (2022). Dynamic patterns of teachers' professional development participation and their relations with socio-demographic characteristics, teacher self-efficacy, and job satisfaction. *Teaching and Teacher Education*, 109, Article 103565. <https://doi.org/10.1016/j.tate.2021.103565>
- Zimmerman, B. J. (2011). *Handbook of self-regulation of learning and performance*. Routledge.
- Zimmerman, B. J., & Bembenutty, H. (2013). *Applications of self-regulated learning across diverse disciplines: A tribute to Barry J. Zimmerman*. Information Age Publishing.