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Tensions experienced by teachers when participating in a professional learning community

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ABSTRACT

This article explores which tensions teachers experience during one year of participation in a professional learning community (PLC). Tensions are more or less temporal negative feelings of stress, loss of self-efficacy or anxiety caused by conflicting personal features and workplace affordances. A qualitative study including two semi-structured interviews with 18 teachers participating for one year in a PLC revealed that 15 out of 18 teachers experience one or more tensions. More specifically, eight different tensions are identified, in which tensions concerning high work pressure and a lack of shared learning are most commonly reported. The results further indicate temporal, contextual and personal nature of tensions. It is concluded that tensions are often caused by negatively perceived learning cultures in schools.

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Professional learning communities; teacher tensions; affordances; learning culture

Introduction

It is a consistent finding that the quality of teachers' instruction is positively related to learners' achievement (Hattie 2009) as well as to school improvement (Jackson and Temperley 2007). The importance of enhancing teacher quality is, for example, prompted by the urgent need to prepare students better for ever-changing future jobs, technological developments, and societal endeavours (Schleicher 2012), taking individual differences between students into account (Lawrence Brown 2004; Tomlinson 2014). Teacher quality and school improvement are often enhanced by different policy-driven or school-based professional development initiatives on a career-long basis (Desimone 2009), like professional learning communities (further referred to as PLCs). PLCs are increasingly used in for example the Netherlands (Prenger *et al.* 2017), Germany (Warwas and Helm 2018), Belgium (Vanblaere and Devos 2016), China (Lee *et al.* 2011), Australia (Owen 2014), and the U.S. (Little 2012) and are assumed to improve the quality of teachers, for example by helping them to keep their expertise up-to-date and to improve practices in their schools (Dogan *et al.* 2016).

This study addresses PLCs as a group of teachers from different schools who work toward individual outcomes aiming to enhance professional development and school improvement (Binkhorst *et al.* 2015). Such PLCs are either subject-related (e.g. math or English) or thematic (e.g. excellence in education). Teachers are guided by coaches and supervisors, who are often appointed at teacher education institutes. Teachers are often financially and practically supported for participation in PLCs, and this way of enhancing teacher quality is an example of between-school professionalization (Chapman and Muijs 2014). Policy instruments, for example PLCs in the Netherlands, are being deployed to improve the

quality of teachers by helping them to become teachers with agentic capacity who can take leadership roles when it comes to, for example, professional development and even school improvement (Supovitz 2002). Participation of teachers in PLCs is financially supported by the Dutch government's Ministry of Education, Culture and Science for the period of 2014–2017. The national policy, officially initiated since August 2013, (Ministerie van OCW, 2013) aimed to enhance professional development of teachers, school improvement, and ultimately the overall quality of the teaching profession in the Netherlands. Teachers could individually request a personal budget for one year of participation in a PLC. This request needed formal approval from school management. The national policy for participation of teachers in PLCs includes explicit guidelines for features of the PLCs (e.g. meetings on a regular basis, supervision of processes and expertise, transfer to schools, and working on temporal and final products), the participants (e.g. working in secondary education, 10–15 teachers from identical subject domains), and aimed impact (e.g. higher quality of lessons, development of new products, and sharing knowledge and experiences). In this project, process supervision and subject expertise are initially separated. Each PLC has one or two process supervisors, each established from a teacher education institute.

Theoretical framework

PLCs are a complex form of enhancing teacher quality and school improvement, since they impose transfer of the learning in the PLCs to workplace learning, namely to teachers' own, diverse school contexts (Vescio *et al.* 2008). Workplaces are seen here as *'as learning environments that are negotiated and constructed by individuals, albeit mediated by what is afforded and regulated by the workplace, as well as the cultural norms and practices being exercised through the work practice'* (Billett 2004, p. 320). Transferring developed insights or product to own workplaces (e.g. using new pedagogical approaches with pupils or subject teams, and vice versa transferring feedback and insights from experiences in the schools into PLCs, is affected by affordances in workplaces (Vangrieken *et al.* 2015). Affordances refer to cultural (e.g. ideas, values, beliefs), structural (e.g. relationships, roles, power, trust), or material (e.g. resources, physical environment) conditions and the degree to which they are available or flexible. As Billett (2002a, 2002b) has generally shown that people's learning in workplaces depends considerably on the degree to which they have opportunities to participate in the diverse practices of these communities and how they choose to respond to the workplace affordances. However, although workplaces and their affordances affect teacher participation in schools, the intensity and possibilities of such affordances depends on specific personal features of teachers (Tynjälä 2013). Personal features refer to characteristics of teachers which affect the way how they regulate affordances of their workplaces, like expectations, needs, and motives for their own professional development and school improvement. (Hoekstra *et al.* 2009) show in their case study that teachers do not passively undergo workplace affordances like degrees of autonomy or reflective dialogue, but that they perceive, interpret and sometimes actively shape such affordances. It is assumed that the interaction between such workplace affordances and personal features of teachers cause tensions (Billett 2009). This article addresses tensions of teachers participating in PLCs as more or less temporal negative feelings of stress, loss of self-efficacy or anxiety caused by conflicting workplace affordances and personal features of teachers. Affordances and personal features do not cause tensions in themselves, but certain combinations of personal features and affordances cause feelings of conflict or frictions and thus a perceived tension. For example, Schaap and De Bruijn (2018) showed that participating in PLCs inherently includes tensions between professional learning and work pressure, between participation in the PLC and the primary process of teaching, between professional development and school improvement, and between individual and collective learning.

Problem statement

It is important to understand which tensions occur when teachers participate in PLCs. The current body of knowledge regarding PLCs predominantly focuses on frameworks to identify learning processes within PLCs (Admiraal *et al.* 2012), characteristics of PLCs (Hindin, Morocco, Mott, &

Aguilar, 2007), effects of existing teams that are marked as PLCs on student results (Lomos *et al.* 2011), in the context of large organizational innovations (Owen 2015) or on the relationship between schools as PLCs and school outcomes (Sigurdardóttir 2010). However, most of this research neglects the complex interactions between workplace affordances and personal features (Tynjälä 2013). Interestingly, research in other domains shows that tensions could play an important role in learning processes and outcomes (Illeris 2009), for example in the domain of teacher learning (Clandinin, Murphy, Huber, & Murray Orr, 2009), teacher agency in large-scale organizational innovations (Pyhältö *et al.* 2014), and crossing boundaries between different professional contexts (Akkerman and Bruining 2016). In the context of participating in a PLC, a perceived lack of alignment between participation in a PLC and working in a school can cause tensions. Interestingly, despite their importance in other domains, tensions are not often explicitly investigated in the context of PLCs. Hairoon, Wee Pin Goh, Siew Kheng Chua and Wang (2017) postulate that more research is needed to the complex interactions between the contexts, conditions and impact of PLCs. This article explores therefore the manifestation of tensions when participating in PLCs. The main research question of this study is: what types of tensions can be identified when teachers participate in PLCs for one school year?

Tensions were explored by studying teachers who participated one school year in a network PLC, aimed to contribute to the body of knowledge concerning teachers' professional development by exploring which tensions teachers experience while participating in a PLC as an external network, an increasing way of enhancing teacher quality. Scientifically, the concept of tensions is still relatively unexplored, and therefore a descriptive study has the potential to reveal how tensions actually manifest themselves in specific school/PLC contexts. The results of this study can also contribute to practically enhancing the impact of PLCs when tensions could be identified earlier in the course of participating in them. It could give teachers, PLC supervisors, and coaches in schools input for understanding tensions and dealing better with them in order to increase or enhance professional development and school improvement.

Method

Research design

The study uses an explorative and qualitative design in which 18 teachers in six different PLCs are interviewed two times (Denzin and Lincoln 2000). The duration of one year matches the natural design of working in school years as well as participation in PLCs, since budgets are personal and granted for one year. Two semi-structured interviews per teacher are conducted (i.e. 36 interviews in total) to reveal in-depth information concerning tensions experienced when teachers participate in PLCs. Note here that this design is not aimed to reveal longitudinal issues or to detect changes in teacher tensions, but rather primarily focuses on explore tensions teachers experience in the context of PLC participation. The interviews are obtained at the start (i.e. October/November) and end (i.e. April/May) of a schoolyear. In October/November, most PLCs already organized two or three plenary meeting. The start interviews are not obtained in August/September, since no PLC-meetings are organized at that moment. April/May is a more appropriate period for interviewing, because for example school exams often take place in June/July.

Participants

The participants teach different subjects in secondary education in the Netherlands and often have broad professional experience (Table 1). The research project complied with the standards of the Organization for Scientific Educational Research in the Netherlands, including guidelines and criteria for anonymously collecting as well as processing data and voluntary participation in scientific research. Further, an ethics proposal is drafted based on legal standards and privacy

Table 1. Main features of the 18 participants.

Teacher	PLC	Subject	Experience ^a
Jack	1	History	10
Milou	1	History	18
Danique	1	History	13
Jason	2	English	4
Sanne	2	Art history	11
Mara	2	Vocational orientation	12
Joy	2	Greek	10
Dylan	3	History	15
Adam	3	Economics	25
Hope	4	Math	30
Dina	4	Math	2
William	4	Math	30
Ruben	4	Math	30
Sofie	5	Biology	10
Ethan	5	Science	20
Jill	5	Civics	15
Jenna	6	Dutch language	10
Roy	6	History	23

codes in general in the Netherlands. All participants agreed with the guidelines and approved the form regarding legal privacy codes orally.

In total, eight male and 10 female teachers participated, with an average of 15.4 years of experience in secondary education (ranging from two to 30 years). [Appendix 1](#) describes the six PLCs. Two PLCs are subject-specific (i.e. PLC 1 and 4), two PLCs focus on practice-based research (i.e. PLC 2 and 3), and two PLCs are focus on a general topic (i.e. PLC 5 and 6).

Instrumentation for data collection

The data for the study are obtained via semi-structured interviews conducted by the first and second author. Since this current study is part of a larger national research project in the Netherlands, the interviews included more elements than exploring tensions. This research is funded by the National Council Educational Research, a department of the Ministry of Education, Culture and Science. The interviews at the start of the schoolyear are primarily focus on how participation is initiated, experiences with participation in the PLC at that moment (i.e. two or three months) and on further expectations. The interviews at the end of the schoolyear are primarily retrospective in nature and subsequently focus on experiences with participating in the PLC and its relation to own development and school improvement. The interviews include four main topics: (1) personal characteristics and background of teachers; (2) perceived features of the PLC as learning environment; (3) possibilities within the PLC and in the context of the PLC (between PLC and school); and (4) perceived impact of participation in the PLC for professional development and school improvement (see [Appendix 2](#)). Those four main topics are prospectively (i.e. start) and retrospectively (i.e. end) addressed.

The interviews are developed by our research team, which consists of all authors of this article. Three pilot interviews are conducted with experienced teachers who did not participated in the further study. In addition to some changes in sequence of questions, we improved the interview by adding questions about the personal learning history of the teachers and the specific context in which they work (in terms of the role of their subject teams and their direct supervisors). The sequence of the questions in the interviews depends on the interactions and the input of the participants, and therefore had no strict order. Within each main theme, we stimulate teachers to look back in the last period of learning and working in the PLC and to look forward to the upcoming period by revealing tensions, how they possibly develop or expected tensions (Smagorinsky *et al.* 2004). We use different

signal words for prompting teachers to articulate their tensions, without explicitly referring to tensions (e.g. which could have had a more negative connotation). Signal words were, for example, constraints, feelings of stress, or challenging situations.

The second interview at the end of the school year starts with a brief summary of the first interview, as provided by the interviewer. We aim to encourage teachers to reflect on the year of participating in the PLC and to reflect on the first interview. Participants are able to reflect upon and add to the summary, which forms the basis for the rest of the interview. The average duration of the first interview is 43 min and of the second interview 33 min.

Analysis

Generally, the 36 semi-structured interviews are inductively analysed. The main unit of analysis are the tensions experienced by individual teachers participating in a PLC since one individual teacher might experience more than one tension during the school year. The specific analysis contained the following steps:

- (1) Reading and rereading the interview manuscripts in order to identify tensions as experienced by teachers by looking for conflicting personal as well as contextual affordances and constraints. This results in tensions about workload and work pressure, tensions about the need for shared learning, and about doubts concerning oneself as teacher. These three types of conflicts (i.e. workload tensions, shared learning tensions, and intrapersonal tensions) are used as a frame of reference for studying tensions of teachers participating in PLCs.
- (2) Selecting and grouping teacher fragments and utterances per main tension as identified in the data (Miles and Huberman 1994). The tensions concerning work pressure and shared learning all include personal features and affordances, referring to discrepancies between teachers' own motives, intentions, involvements, and needs versus actual situations or contextual constraints. The intrapersonal tensions include two conflicting personal features.
- (3) Developing a coding scheme by identifying different conflicting personal features and affordances, using the three types of tensions as a first frame of reference. The first two authors organized three meetings in which the five interviews were independently read, interpreted, and analysed. During this second step we concluded that the three main tensions were too general and that new and more specific tensions were experienced by the teachers. Ultimately, eight specific tensions are identified (see Table 2).
- (4) The final coding scheme is used to code all selected fragments from the 36 interviews. The coding of the features per teacher is performed for both interviews. No other tensions are identified at this stage. Personal features and affordances are coded as conflicting when teachers: (1) show negative feelings (e.g. low well-being, stress, uncertainty) about the possibilities for professional development and school improvement, (2) express doubts about the impact of their participation of the PLC, or (3) perceive a contrast between the PLC and the school in terms of possibilities for learning and development. Examples from the original data for illustrating teacher tensions are selected, using the following criteria: the excerpts (1) are representative for the tension experienced, (2) indicate at least conflicting personal features and affordances, or (3) include indications for its temporal manifestation (e.g. at the start or end of the school year).
- (5) All coded fragments and utterances per teacher as well as the final distribution of the teachers per tension at the two moments of measurement are checked by two researchers (Miles and Huberman 1994).



Table 2. Categories, elements, and descriptions of the eight tensions identified.

Category	Elements			Description
	Personal features	Affordances		
Work pressure tensions	1	Personal involvement with pupil learning and development.	High work pressure in primary process of teaching (quantitative).	Teachers participate in the PLC because they are highly involved with the development and learning of their pupils. Simultaneously, teachers experience high work pressure due to a high volume of lessons, lesson preparation, educational administration, and other extra tasks. This often results in investing their own time and working at night and on the weekend, which causes feelings of tension.
	2	Need for time and space for one's own development.	Intensive and unpredictable activities during and between lessons (qualitative).	Participating in a PLC often means that teachers need time and space for (re)considering their own practices and development, for instance, for reflection, collaboration, and experimentation in the classroom. Tensions arise when teachers experience emotionally intensive situations every day, for instance interactions with individual or groups of pupils, parents, or colleagues.
	3	Motivation and feeling responsible for enhancing pupil learning.	Lack of structural and practical resources.	Teachers are motivated to enhance development and learning of their pupils via the PLC and feel strongly responsible for this. However, they perceive a lack of structural and practical resources for their development in their school, for example SHRM policy, professional development activities, or in subject teams. The tension occurs when teachers experience lack of resources as hindering them in enhancing learning of their pupils.
Shared learning tensions	4	Personal features Need for a shared vision on learning (pupils and teachers).	Affordances Different and/or inflexible visions.	Description Teachers need a shared vision in the school concerning the learning of pupils as well as that of teachers, for example, to transfer what they have learned in the PLC further in the school. This accounts for visions of teacher colleagues as well as visions of school leaders. The tensions originates when participating teachers perceive more inflexible visions in the school.
	5	Need for appreciation and positive feedback.	No involvement or investment.	PLCs are often focused on improving educational practices. This implies at least appreciation of the members' effort as well as (positive) feedback from their colleagues (individual or in teams) or school leaders. The tension occurs when participating teachers experience a lack of involvement, interest, or investment.
	6	Need for collaborative and agentic learning in own school.	Conservative learning culture in subject teams and schools.	To connect the PLC to actual developments in the school, teachers participating in PLCs need collaborative efforts in their school. The tension occurs when participating teachers perceive a more conservative, closed, or individually oriented learning culture in their school (as a contrast to the learning culture in the PLC).
Intra-personal tensions	7	Personal features Motivation for having impact with participation for the school.	Conflicting personal features Doubting about impact of participation in a PLC for school improvement.	Description Teachers experience this tension when they are, on the one hand, motivated to improve their own development (i.e. becoming a better teacher via participation in the PLC) and school improvement, but have some doubts about the actual impact of participation in the PLC. Such doubts are often caused by perceived inadequacies in their own capabilities to connect the PLC with developments in the school.
	8	Motivation for learning to teach.	Discrepancy between actual and required knowledge and doubting about one's own abilities.	Teachers feel uncertain about whether they are capable enough to link the PLC to their school or whether they can learn or develop knowledge and skills in the PLC required in the school, even when they are at the same time motivated to learn to become an even better teacher (just by participating in the PLC). The tension can occur when teachers perceive low self-efficacy, high expectations in the school, or few opportunities for their own development.

Results

An overview of which tensions are reported by teachers is presented in Table 3. Underlined names refer to teachers who reported identical tensions at the start and end of the school year. After Table 3, we illustrate each of the eight tensions, by using quotes from the 36 interviews (see Tables 4–6). Sometimes teachers articulate feelings of tensions more explicitly or more implicitly. We have therefore mark the words that indicated tensions in more explicit or implicit ways.

Table 3 generally shows that 15 out of 18 teachers (83,3%) experience one or more tensions. This means that three out of the 18 participating teachers did not report any tensions at all, namely Joy (PLC 2) and Jack and Danique (both PLC 1). Tensions concerning work pressure and shared learning are most commonly reported. Intrapersonal tensions are relatively less mentioned. Three specific tensions are experienced most often: motivation versus lack of resources (i.e. third tension, work pressure), need for appreciation versus no involvement, and need for collaborative learning versus conservative learning culture (i.e. fifth and sixth tensions, respectively, both shared learning). The results further indicate that tensions are experienced both at the start and end of the school year. They also show that, when teachers report tensions, they experience more than one tension. In other words, teachers can experience multiple tensions in the context of participating in a PLC. Four teachers in the study experience four different tensions (i.e. Mara, Sofie, Jill, and Jenna), while three teachers experience more than four tensions (i.e. Adam, Ruben, and Ethan). Four out of the 15 teachers who report any tensions during the school year report identical tensions at the beginning and end of their participation, namely Milou, Ethan, Jenna (i.e. third tension), and Ruben (i.e. fifth tension).

Work pressure tensions

The illustrations of the first tensions show that participating in a PLC has consequences for the way schools and work are organized (Table 4). Participating in a PLC is for some teachers an extra task that is difficult to align with daily activities. For instance, Hope invests her own time, since she is motivated to make something out of her participation. The tension arises for her even more since she did not have the feeling that anyone else was interested. Also Mara (PLC 2) experienced a tension, mainly due to a high work pressure (first tension): *‘My motivation is sometimes high, sometimes low. It changes continue. It is very busy in my school, and therefore it is difficult for me to work on my research. Often, I have some weeks I’m not able to work on it or to attend PLC-meetings’* (start, Mara, PLC 2, vocational orientations).

Milou (PLC 1) experiences both at the start and end of the school year a tension due to a discrepancy between her motivation for enhancing the learning of her pupils and facilities in the school (third tension). At the start of the school year she explains: *‘Yes, the learning culture in the PLC is different than the culture in my subject team. This is mainly due to part-time employments and our different working schedules ... It are just practical reasons, which decreases our time to talk with each other. When we talk, it is often about our pupils, their assessments, and their progress. But not about content related issues or enhancing meaningful learning in our subject’* (start, Milou, PLC 1, History). Such a lack of resources is also reflected in the interview at the end of the school year, in which Milou shows a need for such resources since she is dedicated to implement the outcomes of the PLC in the school (see Table 4).

Roy (teacher in PLC 6) shows that the second tension arises when he becomes involved in school improvements as an integral element of participating in the PLC. He reflects that he experiences a lack of structural time and space for professional development and school improvement. The primary process, not in terms of the volume of lessons or activities (i.e. the first tension) but in terms of intensity and responsibility, demands mental energy, and it seems therefore that participating in a PLC and accompanying responsibilities is a major cause of this tension. The perceived lack of structural and practical resources by the third tension is commonly mentioned by teachers

Table 3. Overview of the identified tensions at the start and end of the schoolyear.

	Tension	Start schoolyear	End schoolyear
Work pressure	1 Involvement with pupil learning vs. high work pressure	<i>Ruben, Dina, Mara</i>	<i>Adam, Hope, Dylan</i>
	2 Need for time and space vs. intensity of work	<i>Roy</i>	<i>Sofie, Ruben</i>
	3 Motivation pupil learning vs. lack of resources	<i>Adam, Milou, Sofie, Ruben, Ethan, Jenna</i>	<i>William, Jason, Milou, Hope, Jill, Ethan, Mara, Jenna</i>
Shared learning	4 Shared vision vs. inflexible learning culture	<i>Dylan, Sofie, Jill</i>	<i>Mara</i>
	5 Appreciation vs. no involvement	<i>Adam, Hope, Sofie, Ruben, Jill, Dina</i>	<i>Sanne, Dylan, Ruben, Ethan, Jenna</i>
	6 Collaborative learning vs. conservative context	<i>William, Ruben, Jill, Ethan</i>	<i>Sanne, Adam, Milou, Roy, Jenna</i>
Intra-personal	7 Intention for impact vs. doubting impact	-	<i>Jason, Adam, Mara</i>
	8 Motivation for learning vs. own knowledge discrepancy	<i>Sanne, William, Ethan</i>	-

Table 4. Illustrations of work pressure tensions.

Elements		
Personal features	Affordances	Example
Personal involvement with pupil learning and development.	High work pressure in primary process of teaching (quantitative).	<i>'The impact on school improvement is small. There is no time to share my experiences in the PLC with others in the school. It's only running, running, running... My participation in the PLC is a kind of spare time employment. I get no hours for my participation. And you know what, I don't have the idea that anyone is interested' (end, Hope, PLC 4, Math, 30 years of experience).</i>
Need for time and space concerning one's own development.	Intensive and unpredictable activities during and between lessons (qualitative).	<i>'I think that, if you will keep your lessons up-to-date and use digital tools adequately, it costs a lot of time. So, my conclusion is: doing both is not an option. You cannot say: I develop innovative lessons and at the same time I develop new learning arrangements for the school just by participating in a PLC. As a teacher you do not have such time. You have to deal with individual pupils, with all their different stories. You feel responsible for them ... And in our team meetings, we only discuss practical things, assessments, organization of lessons, rooms, etc. Sometimes I think: where is the dialogue about the core of our profession?' (start, Roy, PLC 6, History, 23 years of experience).</i>
Motivation and feeling responsible for enhancing pupil learning.	Lack of structural and practical resources.	<i>'On the one hand, I really like to implement and apply what I've learned in the PLC to my school and to exchange experiences. But on the other hand, it is very difficult to realize that. We have a small team, we all work on a part-time basis, and we have different classes to teach. So you need to be very careful with your limited time and space' (end, Milou, PLC 1, History, 18 years of experience).</i>

participating in different PLCs. For instance, Sofie (PLC 5) experienced that such a lack of resources and work pressure affected her motivation (second tension): *'My motivation increased this month, just because my pupils past their exams. Before, my motivation decreased because of preparing them. I had no time to apply the insights developed in the PLC to the school. As a consequence, I did not feel the relevance of it, just because I needed to read more about it'* (end, Sofie, PLC 5, Biology).

Shared learning tensions

Table 5 illustrates that high work pressure and a conservative learning culture in school cause tensions. For example, Jill (PLC 5) tried to increase enthusiasm among her colleagues, but with few result (fourth tension): *'It was really frustrating for me. I thought: well, you get something really nice from a colleague, why do you not take a closer look? For me personally, I always do that when a colleague is positive about something... My colleagues say then to me: I don't have time, energy, and no possibilities etcetera. It is really frustrating'* (start, Jill, PLC 5, Civics).

Ruben (PLC 4) shows both at the start and end of the school year a tension concerning his need for appreciation and no involvement (fifth tension). In the first interview he explains: *'I went to my school leader and he agreed with my participation in the PLC, but he did not realized that this costs 60 working ours. I never received those hours, so participation was a personal free time deployment. And you know what, I do not feel that they are interested'* (start, Ruben, PLC 4, Math). Ruben reflects at the end of the school year that this has impact on the extent to which he was able to connect the PLC with his school: *'Consequently, I was not able to enhance further development of our school or subject team. I have tried many things, but you know what: my colleagues are not interested, so even my school leader. Or in other words: I do not have the feeling they are'* (end, Ruben, PLC 4, Math). In such way, participation in a PLC becomes a more individual endeavour.

The example of the sixth tension in Table 5 show a contrast between the learning culture preferred by, for example, Jill and the actual learning culture. Sanne, for example, experiences this as follows: *'I experienced the PLC as a nice environment, as contrast to my school. Of course, I have tried something. I talked with my colleagues in the subject team. But this was often not about the PLC and my research. In my school, we are not activated and motivated to learn from each other and to create possibilities for it. This is absolutely not the case. I think that's a shame. We talk with each other and we have good intentions, but when we actually need to change, nothing will happen'* (end, Sanne, PLC 2, Art history). Interestingly, the preferred learning culture is here more experienced in the PLCs than in the school.

Table 5. Illustrations of shared learning tensions.

Elements		
Personal features	Affordances	Examples
Need for a shared vision on learning (pupils and teachers).	Different and/or inflexible visions.	<i>'It is also difficult because teachers in general are also fairly conservative. We also have a high work pressure here. That is why I'm a little bit sceptical about the impact of the PLC. But what I experience with the PLC is just outside school actually. And maybe that is even better'</i> (end, Mara, PLC 3, vocational orientation, 12 years of experience).
Need for appreciation and positive feedback.	No involvement or investment.	<i>'I don't think that my schoolleader as realized what I'm doing and need to do. Also my colleagues do not ask for it. I do not have the feeling that anyone is interested in what I'm doing, not at all'</i> (start, Hope, PLC 4, Math, 30 years of experience).
Need for collaborative and agentic learning in one's own school.	Conservative learning culture in subject teams and schools.	<i>'The PLC is very open and safe, everyone feels challenged to speak out loud. In my school, that is often not the case. I do not tell my colleagues what keeps me busy... The doors of the classrooms often stay closed in our school, what happens in the classrooms stays in the classrooms. So, collective reflection does not take place. It frustrates me, but it also surprises me'</i> (start, Jill, PLC 2, Greek, 10 years of experience).

Intrapersonal tensions

The interviews reveal that intrapersonal tensions can include different conflicting personal features (e.g. doubting about one's own skills or anxiety for making choices). Interestingly, no teachers report intrapersonal tensions during the school year.

Table 6 shows, for example, that Jason reflects on the period halfway through the school year in which he participated in the PLC. He is doubtful whether he could adequately finish the PLC because a lot of work had to be done in a relatively short period. He thought that he could handle it by himself, but finally he needed to get some rest for a couple of weeks. Also Mara (PLC 2) have doubts about the impact of her participation in the PLC (seventh tension): *'I'm the only teacher in my school who participated in the PLC the whole year. As a consequence, it has no sound body in our school, so I'm very vulnerable. It would be nice if more colleagues would join me. But now I'm the only one'* (end, Mara, PLC 2, Vocational orientation). It also shows that tensions include elements like motivation and low self-efficacy (see teacher Ethan, Table 6).

The interviews with Sanne (PLC 2) and William (PLC 4) show that doubting about own competencies can increase a tension, because they are at the same time motivated to link the PLC to the school (eight tension). For instance, Sanne postulated at the start of the year: *'I was confronted with the need for academic writing, which is something completely different than I'm used to, for example preparing lessons. . . Additionally, we learned a lot in the PLC so I now need to apply those new insights'* (start, Sanne, PLC 2, Art history). William explains: *'I'm currently*

Table 6. Illustrations of intrapersonal tensions.

Elements		Examples
Personal features	Conflicting personal elements	
Motivation for having impact with participation for the school.	Doubting about impact of participation in a PLC for school improvement.	<i>'I was doubtful whether I was able to finish all my work, including all the lessons I had to give. I had to implement games in my lessons, precisely at a moment in which the PLC demanded a lot of effort. Nothing was certain at that moment. Ultimately it all went well, but I had some tension about it, yes ... My direct supervisor advised me at that moment to go home, I wasn't able to do anything for about two weeks. I had to coach my pupils to their final exams, the PLC was at that moment not my primary concern. Although I was motivated to finish it. That was a tension I continuously felt'</i> (end, Jason, PLC 2, English, 4 years of experience).
Motivation for learning to teach.	Discrepancy between actual and required knowledge and doubting about one's own abilities.	<i>'Personally, it is almost uncertainty. I need to work with realistic goals. At a certain moment I set for myself a goal to apply developed materials in the PLC in my lessons. Just step by step. Does it work? Fine. Doesn't it work? It doesn't. But too often I'm too ambitious in my goals ... Therefore it was really nice to receive some feedback from a colleague ... I need to think in really small and realistic steps'</i> (start, Ethan, PLC 5, Science, 20 years of experience).

learning how to use ICT in my Math-lessons. Personally, I'm not using any ICT in general, I'm skeptical about it and also research confirms my critical stance. But nowadays I'm more and more forced to use ICT, but I often do not how' (start, William, PLC 4, Math).

Conclusions and discussion

This article shows that tensions occur when teachers intend to improve pupils' learning and their school as organization, after being inspired by their PLC and simultaneously doubt about their own learning abilities for obtaining it or transferring it to the school. For example, tensions originate when teachers are highly motivated to enhance pupil learning, enhanced by ideas developed in the PLC, but the perceived work pressure in the school decreases the possibilities for it (Smylie 2013) and when teachers need input and feedback from colleagues in the context of transferring ideas developed in the PLC to the context of the teacher's own school, but perceives a lack of cooperation and involvement of colleagues and/or school leaders (DeRue and Ashford 2010). Moreover, this study reveals eight tensions of teacher participating in PLCs are identified and their personal, contextual, and temporal nature is confirmed. Firstly, with no exception, all of the personal features identified in the eight tensions involve teacher personal commitment and motivational elements for pupil learning, school improvement, or teachers' own development (Smylie and Denny 1990). Personal involvement refer to intentions or actions to enhance school improvement (Coburn 2004), creating new structures (Spillane, Parise, & Scherer, 2011), or enhancing school improvement (Penuel *et al.* 2009). Such personal commitment often indicate that teacher participation in PLCs can have impact in schools, despite of a lack of for instance clear communication with school leaders or possibilities for new pedagogies in subject teams.

Secondly, besides personal involvement or commitment, tensions are caused by affordances of the workplaces in the schools. Moreover, it generally implies that tensions are temporal results from the interplay between different personal features and contextual affordances (Bryson *et al.* 2006). Tensions according to work pressure as well as to the need for shared learning are caused by a lack of shared practices in schools, or at least teachers did not perceive them or have access to them (Poell *et al.* 2004). It seems worthwhile to explore how shared practices in schools can foster alignment between participation in PLCs, teacher professional development and school improvement (Youngs and King 2002), since shared and meaningful practices in schools are key elements of strong learning cultures in schools (Vanblaere and Devos 2016). Moreover, perceiving a contrast between the PLC and the school as strong learning environment could also cause tensions (Ellström *et al.* 2008). Teachers in our study often report that the learning culture in the PLC is more positive, open, and constructive than the learning culture in their school. In other words, they have a stronger sense of being a meaningful learning community in the context of the PLC (i.e. as organized professional network), which is a key element for the impact of PLCs (Admiraal *et al.* 2012). Our results thus points in the direction that tensions and a strong learning culture affect each other positively. Based on the notions of organizational learning, a distinction is made between weaker and stronger learning cultures (Nikolova *et al.* 2014). A strong learning culture in a school includes teachers' collaborative agentic activities or shared practices (Vanblaere and Devos 2016). These shared practices are formal and informal activities in the school that afford teachers to learn from and with each other. The results thus show strong indications for the role of the learning culture, both positively and more negatively, which confirm the impact of the organizational capacity of PLCs (Slegers *et al.* 2013).

Thirdly, besides its personal (e.g. commitment) and contextual (e.g. learning culture in schools) nature the results further reveal insight into the temporal nature of tensions. Moreover, the results indicate different ways of its temporal nature. Firstly, four out of the 15 teachers report identical tensions both at the start and at the end of the school year (i.e. Milou, Ethan, Jenna and Ruben). This could indicate that their tensions have a more stable or nature, meaning that they exist for a longer period and that they are often maintained by the context (e.g. learning culture) and their way of dealing with the context. Secondly, all other tensions occurred just one moment in time, which indicate a more dynamic nature, meaning that they exists in a shorter or specific period in the school year. Thirdly, intrapersonal tensions seem to have a different temporal nature than the work pressure and shared learning tensions. Namely, the seventh tensions referring to the personal

intention to have impact and doubts or concerns about how to have such impact is only identified at the end of the school year. The other way around, the eight tension concerning motivation for learning and doubt about own competencies is only identified at the start of the school year.

The tensions as experienced could have affect the impact of participation in the PLCs on for example teacher development and school improvement, both in a more positive and a more negative way. This seems to account primarily for shared learning tensions and work pressure tensions. Negative impact is for example shown by Milou (PLC 1), who experiences during the school year a tension between her motivation for pupil learning and a lack of resources. Her interviews indeed show that her participation affected her motivation and learning of her pupils positively, but that a lack of resources put high pressure on her agency and often costs a lot of negative energy. On the other hand, for example Ruben (PLC 4) and also Ethan (PLC 5) experiences a lack of interests of both colleagues and school leaders, which decreases impact of their participation on especially further development in his school. Ethan experiences too much freedom or autonomy; he feels that everything is good, independent from for example a clear vision. Also Mara (PLC 2) experiences no commitment in her school and in combination with a high work pressure, her participation in the PLC has only impact on her own development. On the other hand, the intrapersonal tensions seem not to have impact on participation in the PLC or in connecting the PLC to the school, but indeed increase teacher awareness of their own needs and learning goals as well as learning intention. Teachers like Milou (PLC 1), Jason and Mara (both PLC 2) show that their tensions sometimes cause negative feelings, but also gives them a reason to further cultivate insights from the PLC into their schools in order to enhance pupil learning or to further affect the learning culture in schools. (Hoekstra *et al.* 2009) refers this as interactions between social practices and individual agency (Priestley *et al.* 2015). For example, Milou perceives a high work pressure in the school, but the culture in the school is changing and her school leader shows active commitment and she talks a lot with parents of pupils and mentors. This gives her more self-confidence. Further research can investigate more explicitly how and which experienced tensions relate to which types of impact, for instance on teacher development or school improvement (Frost and Durrant 2002).

The design and results of our study give reason to investigate tensions in the context of participation in PLCs in more detail. Our results show that at least some tensions are not mutually exclusive. For example, tensions caused by a lack of involvement or by a more conservative learning culture often include indications for a lack of resources within schools (Englert and Tarrant 1995). Or, personal features like a need for feedback and appreciation can be related to affordances like a lack of resources in the school. In other words, our results only suggest that conflicting personal features and affordances cause tensions, but we cannot conclude that they are exclusive or dichotomous in nature. Indeed, our classification of eight tensions grouped in three main categories can be used in future studies towards teacher professional development, in the context of PLCs but also, for example, in the context of teacher research projects, initial teacher education trajectories, or traineeships. Such contexts have in common that teachers are expected to learn, work, and connect in at least two different contexts. One could, for example, question whether the eight different tensions can be recognized when teachers participate in PLCs which are organized in schools. Moreover, the approach in this article primarily focuses on tensions on a personal level (i.e. tensions experienced by teachers). For example, our study shows that teacher in PLCs 3, 4 and 5 experience more tensions than teachers in other PLCs, respectively 8, 14 and 13 tensions. It could be of interest to compare tensions as experienced between PLCs, in order to identify differences or similarities and the impact of for example the conglomeration and learning culture within PLCs. Our study used self-reported qualitative data, aiming to explore teacher perceptions, experiences, and voices regarding their tensions, a relatively ill-defined. The results therefore need to be handled with care, for example taking the specific contexts of the teachers and their individual differences and context into account. Future research can use other designs (e.g. longitudinal) and other ways of revealing tensions (e.g. mixed methods via observations or vignettes, see further Hairon *et al.* 2017). For example,

our two-measurement approach using two semi-structured interviews does not allow to gain insight into how tensions change, which tensions occur at a specific moment in time, or develop over time which impact tensions have on for example teachers professional development or well-being and stress. Longitudinal studies using more than two measurement can reveal more about the temporal and contextual nature of tensions.

The eight tensions found can also be used as input for developing a questionnaire to reveal tensions more quantitatively. This could be interesting for gain more insight into the intra-personal tensions. Illeris (2009) refers to this type of tensions as intra-psychological tensions, often occurring when no external factors contribute to the tension, for example self-doubts or concerns emerging from self-reflection which are highly influential in teacher participation. In our study, intrapersonal tensions are to a lesser extent observed than the work pressure tensions and shared learning tensions, which could have its clarification in our methodological approach. Using questionnaires could reveal more information about how for example doubts about one's capabilities for further professional development (e.g. when teachers are highly motivated to develop themselves) or differences between teachers' actual and ideal image of themselves are in conflict with each other.

To conclude, our study shows that tensions are highly personal and context-dependent, with different temporal manifestations. The context of working and learning in PLCs is a complex context which often causes feelings of tension, just because of teachers' strong sense of responsibility and motivation to improve themselves and their pupils. The PLC as learning environment is no cause of tensions, the contrast between PLCs and own schools as learning environments indeed causes different tensions. In order to improve the impact of participation in PLCs, it is worthwhile to pay more attention to the alignment of PLCs and schools.

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Appendix 1.

Main features of the six PLCs

PLC	Orientation	Composition	Other features
1	Focus on enhancing integration of young immigrants in the Netherlands from a historical perspective.	15 participants and two supervisors. Participants are conducting research by themselves, in order to improve supervision of their students' research projects.	This PLC works on a manual as the main outcome of the PLC. Sometimes they meet on Saturdays, and most of the participants are history teachers.
2	Focus on practice-based teacher research.	PLC with seven participants and two supervisors.	All members of the PLC work at the same school. Sometimes, collective meetings are organized with the members of PLC 3.
3	Focus on practice-based teacher research.	PLC with 10 participants and two supervisors.	All members of the PLC work at the same school. Sometimes, collective meetings are organized with the members of PLC 2.
4	Focus on developing a new vision on math education.	PLC with 11 participants and two supervisors. Both PLC supervisors are experts on the subject of the PLC (i.e. former math teachers).	50% of the costs for participation is financed by external funding, 50% by the schools where the teachers work.
5	Focus on improving teachers' general pedagogical and digital skills in agricultural education.	PLC with 10 participants and two supervisors.	Besides the main scope, explicit attention is paid to the relation between professional identity of subject teachers and school culture.
6	Focus on the development of students' excellence in education.	PLC with six participants and one supervisor.	Sometimes external experts are invited during the meetings.

Appendix 2.

Interview protocol

Main topic	Main research questions ^a	Specific interview questions
1. Personal characteristics	<ul style="list-style-type: none"> – <i>Can you tell us what kind of teacher you are? Think of age, subject, and experience.</i> – <i>What are your expectations in participating in the PLC?</i> – <i>What are your motives for participating in the PLC?</i> 	<ul style="list-style-type: none"> – <i>To what extent have your expectations changed during the year?</i> – <i>How was your participation for the PLC initiated?</i> – <i>Can you give an example of changes and/or initiation?</i>
2. PLC	<ul style="list-style-type: none"> – <i>How would you describe the learning culture and atmosphere in the PLC?</i> – <i>How did you learn in the PLC? To what extent is there a collective learning process?</i> – <i>What are the collective learning outcomes of the PLC? What forms did it take?</i> 	<ul style="list-style-type: none"> – <i>To what extent did the learning culture and atmosphere in the PLC change?</i> – <i>Did you experienced dilemmas or conflicts during your participation in the PLC?</i> – <i>Can you give an example of such a learning outcome?</i>
3. Tensions ^b	<ul style="list-style-type: none"> – <i>To what extent do you experience possibilities in the PLC for your professional development?</i> – <i>To what extent do you experience possibilities in the school for your professional development and for school improvement?</i> – <i>To what extent was it possible for you to increase possibilities in the school?</i> – <i>To what extent was it possible for you to link the PLC and the school?</i> 	<ul style="list-style-type: none"> – <i>To what extent did such possibilities increase or decrease?</i> – <i>Did you experience dilemmas or conflicts when increasing possibilities? Within the school, within the PLC, or between the school and the PLC?</i> – <i>What are some significant differences between the possibilities in the PLC and in the school?</i> – <i>What was the involvement of your colleagues and school administration?</i>
4. Impact	<ul style="list-style-type: none"> – <i>To what extent did you change through participating in a PLC?</i> – <i>What changed or improved in the school as a consequence of your participation in the PLC?</i> 	<ul style="list-style-type: none"> – <i>Did the impact change during your participation?</i> – <i>Can you give an example of what you learned and what the impact was?</i> – <i>What are you confronted with when trying to change or improve practices in your school?</i>
Evaluation	<ul style="list-style-type: none"> – <i>That's the interview. When you look back at the questions and answers you give, is there anything you'd like to add?</i> – <i>What do you think, did the interview give us an overview of the most important processes according to your participation in the PLC?</i> 	

^a Note to the interviewer: Ask each main research question to all participants. Ask specific interview questions only when needed (e.g. when teachers find it difficult to reflect or when answers stay more abstract than concrete). The way questions are formulated in the present or past depends on the time in which the interview occurred (i.e. start- or end of the school year).

^b Note to the reviewer: We do not use the word 'tensions' as a concept, since it could be differently interpreted or could have negative associations.

Introduction. This current study is part of a larger policy-driven research project in which teacher agency is explored in different professional development initiatives like professional learning communities, traineeships, and PhD programs for teachers. Also, teachers' and schoolleaders' beliefs concerning possibilities for professional development and school improvement are explored. We appreciate your contribution to this project. The interview includes four main topics:

- (1) Personal characteristics and background of teachers: tasks, motives, and expectations;
- (2) Perceived features of the PLC as learning environment: features of the PLC as group, collective learning processes, and outcomes;
- (3) Tensions: perceived possibilities for professional development and school improvement in the context of the PLC and the school; and
- (4) Perceived impact of participation in the PLC for professional development and school improvement.

Practical issues to inform the participants at the start of the interview:

- We will interview you twice during this school year and the course of your participation in a PLC. This is interview number 1 or 2.
- The interview takes approximately 45–60 min.
- The interview will be recorded for research purposes only, is that a problem?
- All information will be handled with care: results are for example only, and are used for research purposes in an anonymous manner.