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ORIGINAL PAPER

How school culture affects teachers' classroom implementation of learning from professional development

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Abstract
A core element of almost all educational improvement efforts is an intention to improve teacher practice in order to enhance student- and system-level outcomes. To this end, a range of strategies are deployed to facilitate teacher professional learning and development, with great investments of time, financial, and human resources. However, the environments in which teachers learn and their impact on teachers' implementation of new learning remain underexamined. By considering how the psychosocial learning environments present in schools affect the teacher development process, there is scope to enhance the impacts of professional development. This study explored how aspects of school climate and culture (that is, the learning environments that teachers experience) affect teachers' classroom implementation of their professional learning. Qualitative data were gathered from 36 teachers in New Zealand through focus groups and analysed via reflexive thematic analysis following a latent inductive approach. Five areas of school climate and culture were identified that, according to the teachers, affected their implementation of new professional learning. These areas were: leadership engagement/actions; the change environment; relationships; beliefs and attitudes related to TPLD; and all being on the same page. Understanding the roles these five areas play provides insights into how school leaders and policymakers can seek to shape the learning environments that surround teachers' daily classroom practice in order to facilitate learning and improvement for all.

Keywords Teacher professional learning · Professional development · School culture · School climate · School leadership · Implementation

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Introduction

It can be extremely challenging to ensure that investments in teacher professional learning and development (TPLD) opportunities lead to enhanced teaching and learning outcomes (Hill et al., 2013; Lauer et al., 2014; McChesney, 2022; McChesney & Aldridge, 2019, 2021; TNTP, 2015). The trajectory from TPLD opportunities to teacher and student impacts is complex and affected by a range of factors that are not yet adequately understood (McChesney & Aldridge, 2021). To deepen our understanding of how various factors affect the impacts arising from TPLD opportunities, further research is required.

This article examines the influence of school climate and culture on teachers' implementation of new learning (arising from TPLD opportunities) in their classroom practice. The general importance of school environments for educational improvement efforts is well-known (e.g. Drago-Severson 2012; Gruenert & Whitaker, 2015; Lee & Louis, 2019; Stoll, 2000). However, this article offers more specific insights into how particular aspects of the environment in which teachers learn shape a key outcome of that learning (changed classroom practice).

The research question addressed in this article is: *What aspects of the school climate or culture affect teachers' classroom implementation of new learning gained through professional learning and development opportunities?* Thus, the present article is interested only in situations where a teacher has (a) engaged in some TPLD opportunity/ies and (b) gained some new learning, knowledge, insight, or understanding from that engagement.

The extent to which—and the reasons why—TPLD opportunities may or may not actually lead to teacher learning are beyond the scope of this paper; the focus here is on whether teachers *implement* their new learning by changing their classroom practice. Similarly, the relationships between changed classroom practice and student outcomes are also beyond the scope of this paper. The paper focuses on a specific part of the TPLD-to-impact trajectory (as conceptualised by McChesney & Aldridge 2021), seeking to offer more detailed understandings of factors affecting teachers' implementation of new learning. Importantly, whereas policy statements and associated research offer a 'top-down' picture of TPLD systems and intentions, this study focused on people's lived experiences related to TPLD, shifting the focus from "what *should* happen" to "what *actually* happens" (McChesney & Aldridge, 2021, p. 849).

The paper makes a unique contribution by bringing together three distinct fields: learning environments, teacher professional development, and implementation science. Learning environments research seeks to understand how the environments within which people are situated affect learning. Implementation science—a relatively new discipline, particularly in relation to education (Century & Cassata, 2016)—seeks to document, evaluate, and understand the implementation of new approaches or innovations, including identifying factors that affect the success of these change efforts. Some, but relatively limited, research has linked teacher professional development with the field of learning environments (e.g. Soebari & Aldridge 2015); however, almost none has linked teacher professional development with implementation science. In this paper, it is hoped that insights arising from the combination of these three fields may help to address the "wicked problem" (Opfer & Pedder, 2011, p. 379) of how best to maximise the outcomes of professional learning and development.

Background

Teacher professional learning and development

In this article, professional learning and development is understood to refer to any activities that cause, or are intended to cause, teacher learning (McChesney, 2017). Thus, TPLD includes activities such as workshops, coaching, and further study as well as informal teacher collaboration, learning through the use of teaching resources or exemplars, and professional reading. This definition deliberately suspends the assumption that all TPLD activities or opportunities will necessarily result in teacher learning.

Recent research has highlighted the complexities associated with the extent to which TPLD leads to positive teaching and learning impacts. The previous assumption that the design of TPLD was the key driver for subsequent impact has been increasingly challenged (Bobis et al., 2020; Hill et al., 2013; Jacob et al., 2017; Kennedy, 2016; McChesney, 2022). Instead, there have been calls for increased consideration of the complexity of teacher learning (Boylan et al., 2018; Clarke & Hollingsworth, 2002; Strom & Viesca, 2021), the role of teacher-related factors (Carpendale et al., 2021; Clarke & Hollingsworth, 2002; Kennedy, 2014), and the role of contextual factors (Cameron et al., 2013; McChesney & Aldridge, 2021; Opfer & Pedder, 2011).

In response to these calls, the present study was informed by McChesney and Aldridge's (2021) conceptual model for the trajectory from teacher TPLD to impacts. This model is unique in that it is.

> informed by data that reflected teachers' perceptions of what actually happened in relation to the impacts of professional development. [This] model thus differs from past models that have primarily emerged from theorising about what we think should happen. Second, [this] model depicts how progression among the stages of the model occurs and offers insights into what can 'get in the way'. (p. 13)

McChesney and Aldridge's (2021) model suggests that a series of 'filters' restrict the progression from TPLD to impact. One such filter—termed "implementation barriers" (p. 841)—lies between teachers' *learning* from TPLD and their subsequent *implementation* of that new learning in their classroom practice. Participants in McChesney and Aldridge's study highlighted the overall importance of school-level factors in affecting TPLD's impacts. However, that study was not able to clarify the specific nature of the school-level factors that posed implementation barriers. The present study, therefore, extended existing literature by exploring some of those school-level implementation barriers.

Successful implementation of educational improvements

Implementation research in education is a relatively young field (Albers & Pattuwage, 2017; Century & Cassata, 2016). It seeks to look beyond decisions about desired or expected educational changes and/or the communication and promotion of those changes. Instead, implementation research aims to carefully examine "what happens next—*what* is actually enacted, *how* an innovation is enacted, and *why* the contexts, conditions, characteristics, and other influences shape innovation enactment as they do" (Century & Cassata, 2016, p. 172).

Implementation research recognises that it is not typically the change or 'solution' itself that is effective or ineffective. Rather, the way a change is implemented in each individual context shapes the resulting outcomes as "task and organization factors combine to create … variability" (Bryk, 2015, p. 473; see also Bryk et al., 2015).

Past research has identified factors at the individual teacher, school, and system levels that all affect the successful implementation of educational improvements (Albers & Pattuwage, 2017; Century & Cassata, 2016; Lee & Louis, 2019). Given the school-level focus of the present article, this section focuses on what we know about school-level factors affecting the implementation of educational improvement.

Characteristics of particular school settings are known to affect the implementation of educational change. Some of these characteristics are relatively objective, such as class size, available resources, the nature of the physical space/s, timetabling, and school structures and systems. Other school characteristics are more subjective (but no less real or important), such as the attitudes, values, and behaviours that are prevalent within the school or the approaches taken to leadership, decision-making, and administration (Daniëls et al., 2019; Murphy et al., 2007). The characteristics of particular cohorts of students also affect teachers' implementation of change as teachers actively monitor and assess whether they feel a recommended innovation is appropriate for their students (McChesney & Aldridge, 2021). Together, the above factors constitute general characteristics of a particular school environment. They form the 'backdrop' for change and improvement efforts, but they also influence those efforts.

Change management strategies are further school-level factors that affect the implementation of change. Such strategies may include resourcing, strategic planning, active monitoring of change, coaching, support systems, and evaluation mechanisms (Fullan, 2014; Fullan & Quinn, 2016). Both the presence and the absence of such change management strategies can influence teachers' implementation of change; however, strategies need to reflect and respond to the existing landscape of the specific school context in order to be effective (Bryk et al., 2015; Drysdale et al., 2009; Mourshed et al., 2010).

School characteristics and change management strategies both highlight the important role that school leaders play in facilitating the implementation of educational change (Drysdale et al., 2009). Arguably, it is school leaders who have the greatest influence on both the school characteristics and the presence, absence, and nature of any change management strategies. The extent to which leaders actively leverage these factors to influence change efforts can be characterised using three categories: "letting it happen", "helping it happen", or "making it happen" (Lyon, n.d., p. 2).

A further school-level factor that affects the implementation of educational change is the school culture (Lee & Louis, 2019). This element is discussed in the next section.

School culture, school climate, and educational improvement

School culture and school climate are related constructs that have been defined in a range of ways within both literature and professional practice. Both refer to aspects of what it is like to be, learn, or work at a particular school, and sometimes the terms have been used interchangeably (Aldridge & Ala'i, 2013; Gruenert, 2008; Kaplan & Owings, 2013). In professional contexts, school culture has often been described simply as "the way we do things around here" (Kaplan & Owings, 2013, p. 7; Stoll, 2000, p. 9). Wang & Degol (2016,

p. 315) suggest that the term school climate encompasses "virtually every aspect of the school experience," including aspects related to safety, community, academic climate, and the institutional environment.

Research literature, however, often differentiates school culture from school climate. Gruenert & Whitaker (2015) argue that school climate describes *what we do* (our values and beliefs in action) and may change relatively rapidly within the bounds of the existing culture, whereas school culture describes *why we do it* (our underlying values and beliefs) and only changes slowly. This position echoes Schein's (1985, p. 9) seminal statement that the culture of any organisation is

> a pattern of basic assumptions—invented, discovered, or developed by a given group as it learns to cope with problems … that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.

An organisation or school's *climate* thus concerns the more visible manifestations of the underlying culture: the "patterns of people's experiences of school life … norms, goals, values, interpersonal relationships, teaching and learning practices, and organizational structures" (Thapa et al., 2012, p. 2). These aspects of climate are heavily shaped by the organisation or school's underlying *culture*, which acts as the "software of the mind" shaping people's behaviours (Hofstede et al., 2010, p. 5).

Much attention has been paid to the links between school environments and educational improvement. Gruenert (2008) has argued that it is much easier to change the *climate* of a school than to shift the underlying *culture*, meaning that school climate could be used as a lever to begin shifting school culture. Various tools have thus been developed to support the measurement of school climate (e.g. Aldridge & Ala'i 2013; Aldridge & Fraser, 2017; Jin, 2021; Ramelow et al., 2015), and research has identified associations between school climates and a range of outcomes for both students (Aldridge & McChesney, 2018; Kutsyuruba et al., 2015; Thapa et al., 2013; Wang & Degol, 2016) and staff (Aldridge & Fraser, 2017; Collie et al., 2012; Gray et al., 2017; Skaalvik & Skaalvik, 2011).

School culture and climate have important links to teacher TPLD (Timperley, 2008) and school improvement (Bryk et al., 2015; Lee & Louis, 2019). These links arise because

> professional learning is strongly shaped by the context in which the teacher practises. This is usually the classroom, which, in turn, is strongly influenced by the wider school culture and the community and society in which the school is situated. Teachers' daily experiences in their practice context shape their understandings, and their understandings shape their experiences. (Timperley, 2008, p. 6).

Building on this understanding, key threads of recent work have considered how schools can become "learning organisations" (Kools et al., 2020; Kools & Stoll, 2016) or "networked improvement communities" (Bryk, 2015); how professional learning communities can be developed within schools to support school improvement (Darling-Hammond et al., 2017; Jensen et al., 2016; Lee & Louis, 2019); how teachers can be supported to engage in collaborative inquiry (Bayliss, 2012; Capps et al., 2012; Colton et al., 2015; Timperley et al., 2014); and the role of school leaders in establishing these kinds of teacher learning

environments (Drago-Severson, 2012; Kaser & Halbert, 2017). All this work emphasises the importance of the environments in which teachers learn, exploring the characteristics and structures that characterise learning organisations and/or professional learning communities (Bryk, 2015; Bryk et al., 2015; Colton et al., 2015; Jensen et al., 2016; Kools et al., 2020; Kools & Stoll, 2016). The present study contributes further to developing these understandings.

Methodology

This article explores the relationship between the school environment and one specific aspect of educational improvement: changed classroom practice following TPLD. Rather than focusing solely on either school climate or school culture, we took an inductive approach, seeking to identify school-level factors—which might reflect *either* climate or culture—that, in teachers' views, affected their implementation of new learning from TPLD.

Our research can be situated within Century and Cassata's (2016) taxonomy of implementation research methodologies. They note that, at the highest level, implementation studies either seek to evaluate the fidelity of an innovation's implementation or to understand "implementation as conducted (i.e. what actually happened?)" (p. 190). This study sits within the latter category. Century & Cassata (2016) then identify a range of possible lines of inquiry within that category; of these, this study focused on "explor[ing] the contextual factors that support or inhibit innovation use" (p. 190).

Data came from $n=36$ New Zealand teachers (29 female and 7 male[1]; 25 from primary/intermediate schools and 11 from secondary schools) who participated in one of eight focus groups. Six teachers self-identified as early-career; eight came from schools in rural locations. All were teachers with ongoing employment at a single school (i.e. not casual/day relief teachers).

Within the focus groups, the teachers were introduced to McChesney and Aldridge's (2021) model of the trajectory from TPLD opportunities to various forms of impact as well as the definition of TPLD noted earlier in the paper. Teachers responded to the model and discussed factors that, in their experience, had acted as barriers at each stage of the model. The teachers also collaboratively completed a written brainstorm activity identifying barriers at each stage of the model.

The focus group sessions were audio recorded and transcribed, and the brainstorms were digitised in a consistent format[2]. Reflexive thematic analysis was then conducted, in two stages. First, all the data were coded using NVivo software both *inductively* to identify broad themes and constructs within the data and *deductively* using the pre-existing components of McChesney and Aldridge's (2021) conceptual model (for example, applying codes such as "implementation barriers" and "teacher learning"). Data that had been coded as relating to both school climate or culture and the implementation of new learning from TPLD was then extracted. A second round of finer-grained coding and reflexive thematic analysis fol-

[1] For comparison to the population figures for the New Zealand teaching workforce, see https://www.educationcounts.govt.nz/statistics/teacher-numbers.

[2] As some focus groups had been held in-person and others online, formats were inconsistent. In-person focus groups had used post-it notes and a large printed template to record the brainstorm activity whereas the online focus groups had used a collaborative Google Document.

lowed, using inductive codes. As a result, five aspects of the school environment were identified that (in teachers' views) affected the extent to which teachers changed their classroom practice following new learning from TPLD. The next section presents these findings with supporting quotes from the data.

Results

Leadership engagement and actions

All eight focus groups highlighted the importance of school leaders' engagement and actions for their implementation of new learning from TPLD. Implementation was facilitated when school leaders were supportive of the changes being advocated within TPLD [FG1[3]]; conversely, implementation was restricted if "*I've gone out and done this PD and it shows this, and so I'd like to put that in place, but it doesn't line up with … the principal's view*" [FG7; also FG5]. Leaders played an important role in providing resourcing, systems, and structures that all supported teachers' implementation of new learning from TPLD [FG1, FG3, FG4, FG7]; where this provision was not present, teachers' implementation was inhibited [FG1]. Teachers noted that, to facilitate classroom implementation, school leaders needed to maintain this support and resourcing beyond the initial TPLD experience [FG1, FG5].

Leaders also supported teachers' implementation of learning from TPLD through fostering a culture of trust and safety within which teachers could learn, experiment, and take risks with new practices: "*It's that professional trust, and that stems from management*" [FG2]. However, teachers described some leaders' counterproductive ways of trying to build a safe environment, which inhibited meaningful learning and change:

> *Quite often the first thing they [leaders] start with is by basically reassuring people they're already doing this stuff anyway … And that was the comforting lie that everyone really enjoyed, "Oh, yeah, I'm already doing it, I've just got to write it down." Rather than the unpleasant truth which was nobody was doing it. Either because they [leaders] didn't understand it or they didn't value it, and they didn't feel people could take the criticism … So let's repackage it, let's make it nice and clean, make it look like you're already doing it instead of addressing where the issues are*. [FG7]

The expectations and processes that leaders put in place around accountability and teacher appraisal affected teachers' implementation of new learning from TPLD. Teachers shared that these processes could make them feel critiqued and watched: "*You feel like you're constantly being [watched] … people look at you no matter what*" [FG2]. Implementation was also affected by the extent to which teacher appraisal expectations aligned with TPLD focuses [FG1, FG6].

[3] Audit trail: Codes FG1-FG8 indicate the focus group/s within which points were expressed or from which direct quotations are taken.

The change environment

The second aspect of the school environment that affected teachers' implementation of TPLD learning related to the pace, scale, and infrastructure associated with change efforts in their particular school context. Although these things are likely to be largely determined by school leaders, they are expressed here as a distinct theme because the teachers' comments typically referred to the change environment itself rather than the leaders' role in shaping the environment.

A common issue raised by teachers was the tendency to move on to a new TPLD focus before teachers had sufficiently implemented and embedded classroom practices from previous TPLD [FG1, FG8]: "*As soon as everyone's done a lesson or two using the [new] structures or resources or whatever, they then want to move you on, because we've done this, tick it off, now let's move on to something else*" [FG8]. Teachers felt that school-level goals and priorities changed too rapidly, bringing in new TPLD focuses too soon [FG1, FG3, FG5, FG8]:

> *Before you can get a chance to implement it or try it out, there's another change, so that [previous] PD's dropped and then suddenly there's another one rolled out … All the time, it seems to be that you don't actually get the chance to implement it.* [FG1]

Teachers described the challenges of having too many simultaneous but distinct TPLD and improvement efforts: "*change fatigue*" [FG4], "*overload*" [FG4], feeling "*overwhelmed*" [FG6], lacking "*time and brain capacity to take on intended PLD*" [FG7], and having "*just too much to focus on at once*" [FG6; also FG3]. This overload inhibited implementation: "*We might be looking at six different things all at once, and then nothing gets effectively implemented because the school's picked too many things to focus on*" [FG8; also FG3]. This overload was particularly problematic for early-career teachers, who had to quickly familiarise themselves with much of a school's previous TPLD in order to fit in with current practices: "*It's a little too much for him [a beginning teacher] to try and implement in his first year of teaching everything that's gone on prior*" [FG7].

Time factors affected teachers' implementation of new learning from TPLD. Teachers reported needing time to undertake the additional practical work involved in implementing new learning [FG1, FG2, FG3, FG4, FG6, FG7, FG8]; time to collaborate with colleagues [FG2, FG5]; and time to process their new learning individually: "*I need to sit somewhere and actually go deep, and I can't go deep because I don't have time*" [FG4; also FG1, FG6, FG7]. The "*crowded curriculum*" [FG7, also FG3] restricted teachers' opportunities to implement some new learning from TPLD, as class time was needed for other priorities. Teachers also struggled to focus on improving their classroom practice when they had too many extra-curricular responsibilities [FG4] or when "*staff are feeling tired/stressed/overworked and just don't have mental space for something else*" [FG6].

One focus group commented that a sense of urgency around ensuring students were continually advancing could inhibit sustained implementation of new learning. They felt teachers could be too quick to discard new practices if positive outcomes were not observed immediately:

There's that sense that we've got to keep moving, and we've got to keep accelerating, and we've got to keep [the student/s] moving up the levels, and we can't afford to stop for a moment in case the moss starts to grow back under our feet, so you're constantly pushing and running. So there's that mindset that you don't have time to wait for something to work. You know, I don't have time to invest in this [new] thing; if they're not making progress and I've been doing this for two days, well, shit, I'm going to have to ditch it and go back to what I was doing because at least I know I've got some [student achievement] gains there. [FG4]

Attitudes towards change

The third aspect of the school environment that appeared to affect teachers' implementation of TPLD learning related to the attitudes towards change that were held amongst staff. For implementation to occur, it was essential for teachers to acknowledge the need for change and to be "*ready to learn/challenge existing beliefs they may have*" [FG6; also FG1]. Teachers in all eight focus groups acknowledged the concept of "*buy in*" as being a prerequisite for implementation, although one teacher raised a counter-view that "*Regardless of your own individual needs, you are part of an institution that has a general direction and strategic plan … You do have to actually buy into the whole school PD*" [FG2].

Buy-in and openness to change were not always present when TPLD priorities had been set by leadership (either at the school level or for individual teachers through appraisal processes). In these situations, teachers sometimes felt they had not had a voice [FG3, FG6, FG7, FG8] or that the TPLD priority was not relevant for their own learning or their students' needs [FG7, FG8]. This inhibited teachers' implementation of what they had learned through TPLD: "*Your barrier's going to go up quite quickly, because you don't have that buy-in, you don't have that option to get to voice what you think you need and want, and your kids need and want"* [FG3].

Staff dynamics

The fourth aspect of the school environment that affected teachers' implementation of learning from TPLD related to interpersonal staff dynamics. Teachers' accounts of these dynamics contrasted widely. Some described a sense of competition among staff:

"I'm a better teacher than you"—there's just so much of that and it doesn't help anybody. It can be that particular person has a very much "my department is better than every other department" … kind of thing. There is a lot of competition. [FG2]

Power dynamics were also discussed, with reference to "*hierarchy*" [FG3] and leaders who "*expect you to implement it their way*" [FG3]. Beginning teachers faced particular difficulties in this regard:

You're caught in a vulnerable position because you can't really challenge that authority. Your mentor says, "Implement this, do it this way" but you're actually allowed to bring those fresh ideas as well, which you might have been hired for initially—[but]

you don't get the opportunity to do that because there's some senior staff that says, "No, we've always done it like this, this is how you go." [FG3]

Others, however, described trusting communities of colleagues within which they could safely and honestly admit their weaknesses, ask questions, and seek support [FG2]. Having this sort of environment was seen as critical to enable teachers to implement new learning from TPLD in their classroom practice:

I am such a relationship person. If I am expected to go to PLD with somebody that I don't have a good working relationship with, or I am expected to implement it with somebody that you don't have that good relationship with … you've got to be able to work well with those people before you can actually apply all of those things. [FG3]

All being on the same page

The final aspect of the school environment that affected teachers' implementation of TPLD learning related to a sense that the school community was on the same page. Classroom implementation was more likely to occur when teachers felt they were on a shared journey with their colleagues [FG1, FG3, FG7]. Shared TPLD focuses provided positive accountability [FG7], opportunities for collaborative learning [FG3], and support to ensure that classroom implementation remained "*at the forefront of what you were doing*" [FG3]. In contrast, implementation was hindered if only one teacher was pursuing a particular direction [FG1, FG4, FG6] or when colleagues supposedly on the same TPLD journey had different understandings of what implementation might look like [FG4, FG7]. One teacher also observed that "*If PLD is perceived negatively by other teachers, this may impact on a teacher's decision to implement it in their classroom or not*" [FG6]. These considerations were particularly acute when multiple teachers had to negotiate shared practice in a single teaching space such as an innovative learning environment [FG1, FG3].

Staff turnover could disrupt the sense of everyone being on the same page, inhibiting TPLD implementation [FG3, FG5, FG8]:

Staff turnover can have a huge impact. Especially if staff are leaving part way through the year, whether it be changing jobs or maternity leave or anything like that. If you're doing staff-wide PD then you've got everyone on the same page, [but] then someone leaves and you get someone new in and trying to bring them up to speed and things can be quite tricky. [FG8]

The impact of staff turnover was heightened for TPLD that involved more major changes to teaching and learning and was therefore likely to take a long time to be effectively embedded in a school:

You might not see too many changes in the first six months. Within a year, things are starting to tick but it might be two, three, four years later—[but] by the time there's that real ingrained culture, part of your staff might have left. [FG3]

Bringing new staff up to speed with established TPLD implementation was not always easy. Other teachers or team leaders sometimes had to absorb this extra work when funding was not available for the new staff to attend external TPLD or have TPLD facilitators come into the school to work with them individually [FG8]. This was described as "*a massive burden*" for both the new staff and those supporting them [FG3].

At a broader level, teachers also commented that TPLD implementation required wider buy-in from students and their families [FG3, FG4, FG5, FG6, FG7]: "*Another aspect, too, is how much do the community buy into it? If the students and the whānau [families] are keen, there's a drive where you can see it actually impacting the classroom and everybody's excited about it"* [FG5]. If students resisted or reacted negatively to a teacher's implementation of new practices following TPLD, the teacher was less likely to maintain the new practices [FG1, FG2, FG3, FG4]. Teachers reported that sometimes students were "*not open to change*" and did not like feeling "*like they are part of an experiment because it [the newly implemented practice] is not what they are used to*" [FG6; also FG7].

Discussion

In the research reported in this paper, we considered the role of school climate and culture as the environment in which teachers learn. Drawing on McChesney and Aldridge's (2021) conceptualisation of the TPLD-to-impact trajectory, the study highlighted five aspects of the school environment that constrained or enabled teachers' classroom implementation of new learning they had gained through TPLD opportunities.

Most implementation research in education has focused on evaluating the fidelity of innovation implementation (Century & Cassata, 2016). Such work has tended toward quantitative methods and experimental or quasi-experimental designs. However, given the complexity and diversity of real school settings, there is an urgent need to understand the contextual factors that lead to variation in the outcomes of educational change efforts (Bryk, 2015). Valuable insights into "the 'why' and the 'how'" (Century & Cassata, 2016, p. 184) of educational improvement can be obtained through the richness of qualitative data, as in the case of the study reported in this paper.

The study took an inductive approach, seeking teachers' accounts of school-level factors that affected their implementation of TPLD learning. Having identified these factors, it is now possible to consider whether they reflect school *climate* or school *culture*, which are defined differently in the literature (Gruenert, 2008; Gruenert & Whitaker, 2015). Three of the five factors identified in this study—leadership engagement and actions; the change environment; and all being on the same page—seem best characterised as features of school *climate*. These factors reflect values and beliefs in action, with specific practical decisions being made (and having the potential to be made differently) around things such as who participates in TPLD; who determines TPLD focuses and the pace or extent of change; and the practical ways in which leaders support TPLD and change efforts. On the other hand, the attitudes towards change and the staff dynamics present in a school seem better characterised as features of the school *culture*, reflecting underlying values and beliefs that cannot be so rapidly changed but that shape people's behaviours in important ways. Thus, the findings of this research indicate that both school culture and school climate influence the extent to which teachers implement new learning from TPLD in their classrooms.

Two of the present study's themes—leadership engagement and actions, and staff dynamics—have clear correspondences within Wang and Degol's (2016) categorisation of the constructs that have been examined in existing school climate research. However, the change environment, attitudes towards change, and the sense of all being on the same page do not directly align with any of the elements noted by Wang and Degol[4]. This suggests that these three areas could offer new lines of inquiry within learning environments research. For example, instruments could be developed and validated to explore concepts of change fatigue or change overload in educational contexts, teachers' attitudes towards change and perceptions of the change expectations, and the extent to which teachers feel that the whole community is on the same page around improvement goals.

At a broader level, the study's findings can be considered in relation to existing theories and models of educational improvement. Much existing research highlights the crucial role of school leaders in leading educational change (Daniëls et al., 2019; Robinson et al., 2009). However, whereas some past studies have emphasised school leaders' pedagogical or instructional leadership roles, the findings of this study more closely align with Murphy et al.'s (2007) Leadership for Learning model, which encompasses pedagogical and instructional aspects of leadership but also highlights leaders' work setting the vision for collective improvement, facilitating the development of communities of learners, managing resource acquisition and use, and shaping the organisational culture and climate.

The importance of all being on the same page—highlighted in the present study—resonates with recent literature that has focused on the role of coherence in educational change efforts (Fullan & Quinn, 2016; Robinson et al., 2017) and more established literature identifying coherence as a feature of effective TPLD (Desimone, 2009; Garet et al., 2001). Related to this is the importance of managing the overall pace and scope of change being asked of teachers, so that improvements are able to be meaningfully and sustainably embedded (Robinson, 2018).

The insights generated through this research are important as they provide new specificity around the ways in which school climate and culture affect the outcomes of TPLD. Although there has previously been ample acknowledgement that school climate and culture matter for educational improvement, identifying the specific elements that are influential can inform practice-based efforts to enhance the classroom implementation of TPLD. Leaders can consider their practice in relation to the points raised by teachers in this study, as well as reflecting on and seeking to enhance the change environment, the prevailing attitudes towards change amongst staff, the wider staff dynamics, and the extent to which staff, students, and the wider school community are all "on the same page" in relation to change efforts. Professional development providers and policymakers can also be mindful of the role that these school-level factors play in teachers' TPLD implementation. For example, they might talk with teachers or school leaders about these aspects of their school climate and culture and invite reflection and action around how to enhance the teachers' learning environment in order to promote successful TPLD implementation in classrooms.

In identifying the school-level factors that affect the outcomes of TPLD, it is important to remain attentive to the huge variation that we know will be present among schools, teachers, and students in any context. While the teachers in this study described the importance of (for

[4] Interestingly, Wang and Degol's framework does include a category called "professional development", but this is restricted to describing "the opportunities and programs provided to teachers and staff to cultivate and improve their teaching strategies and curriculum design" (p. 323).

example) school leaders supporting TPLD with appropriate resourcing, this should not be interpreted as meaning that all schools or all leaders do this either poorly or well – and similarly for the other factors identified in the study. It is therefore important to empower both teachers and school leaders as actively engaged "improvers" who shape, implement, reflect on, and refine TPLD and change efforts in their specific context (Bryk, 2015, p. 475). Hearing teacher voice, as in the case of this study, should inform ongoing improvement efforts: In line with Bryk's (2015, p. 475) vision, "respecting and valuing the varied expertise that is needed to solve educational problems, networked improvement communities embrace all involved as full members."

Directions for further research

This study has explored one specific aspect of the TPLD-to-impact trajectory (teachers' classroom implementation of new learning) and, within that, has looked specifically at school-level (rather than teacher-level, TPLD-related, or wider environmental) factors. Similar research could identify factors influencing other aspects of the TPLD-to-impact trajectory.

Researchers in the field of learning environments have previously developed instruments for measuring teachers' perceptions of school climate and culture (for an overview, see Aldridge & Fraser 2017). However, some of the factors highlighted in this study have not previously been examined within learning environments research. These factors, therefore, suggest directions for further instrument development and application in order to help schools assess the extent to which their current environment and/or improvements made to the environment over time support teachers' implementation of new learning from TPLD.

As a qualitative study arising from one geographic context, this study naturally has limitations. The sample of teachers was self-selected, and the experiences of teachers in New Zealand may differ from those of teachers in other contexts. Therefore, further research could usefully explore the extent to which the factors highlighted in this study are endorsed as important by teachers in other contexts.

It is interesting to note that, despite sharing a broad definition of TPLD (as any activities that cause, or are intended to cause, teacher learning; McChesney, 2017) with the participating teachers, their contributions in the focus groups and brainstorms seem to imply a persistent focus on more structured forms of professional development. Teachers spoke of TPLD and change as being essentially "top down", stemming from school-wide strategic planning and decision making. This perhaps contributes to our understanding of the teachers' calls for clear leadership engagement and for a school community to be all on the same page, but it obscures to some extent how school environments can facilitate teachers' independent and/or informal engagement in diverse forms of professional learning and development. Findings from the present study related to staff dynamics, attitudes towards change, and the need for time and "headspace" to allow for learning and reflection are likely to remain relevant for more personalised and informal professional learning as well as for teacher inquiry, but these types of TPLD need further targeted research.

A further limitation of the present study is the conceptualisation of teachers' classroom implementation of practice following sequentially from their learning. Much literature indeed conceptualises the TPLD-to-impact trajectory in sequential ways, meaning there is

a significant basis for this kind of modelling, but there are nonetheless weaknesses in such conceptualisations that should be acknowledged. It is likely that the trajectory is not purely linear, as (for example) the process of implementing new pedagogies in their classrooms following TPLD could lead teachers to develop better understandings (i.e. new learning) of those pedagogies.

Finally, further research might continue to bring together the fields of learning environments research, teacher development research, and/or implementation science. Ongoing work located at the intersections of these fields could generate further helpful insights that will support educational improvement.

Conclusion

Teachers, just like their students, need access to quality learning experiences situated within supportive learning environments. However, it has long been recognised that "To bring about improvement at the heart of education—classroom instruction … [is] the most difficult kind of reform" (Tyack & Cuban, 1995, p. 135). Recent trends within both the implementation science literature and the TPLD literature move towards acknowledging and better understanding the contextual complexity that makes classroom change so challenging to achieve. For example, writing about TPLD, Strom & Viesca (2021, p. 221) argue that "rather than attempting to link teacher learning outcomes directly to student learning outcomes, we need to design and conduct studies that account for all the mediating elements in between these, in all their complexity"—while, writing about implementation science, Century & Cassata (2016, pp. 171–172) teach us that "contexts and conditions can affect innovation enactment in legitimate ways … [and] improving education requires processes for changing individuals, organizations, and systems."

The research reported in this article has contributed to our understanding of how contextual conditions—in the form of the school culture and climate, understood as the environment in which teachers learn and practice—affect teachers' implementation of new learning gained through engagement in TPLD. It is hoped that the findings of this study might support school leaders, teachers, and TPLD facilitators to be more mindful of, and deliberate in seeking to enhance, the school climate and culture in order to promote positive changes to teachers' classroom practice.

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Declarations

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