The Role of Social Capital for Teacher Professional Learning and Student Achievement: A Systematic Literature Review

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Abstract

This systematic review synthesises research on social capital in relation to teachers and teacher professional learning between the years 2004-2019. The study was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement and the Weight of Evidence framework for quality and relevance appraisal. After applying eligibility criteria, 66 empirical items were included in the final review. The review finds that social capital among teachers has been associated with five categories of outcomes: 1) teacher professional development, 2) the implementation of change, 3) the introduction of new and beginning teachers, 4) teacher retention and job satisfaction, and 5) improved student achievement. These have, in turn, been associated with the implicit outcome of promoting educational equity. A synthesis of enablers and barriers to building social capital among teachers identifies the pervasive role of organisational structures for moderating the relationship between social capital and these outcomes. Findings indicate that different organisational structures may foster different social capital dimensions, such as bonding, bridging, and linking. More research is needed on the relationship between these dimensions and schools' organisational structure to promote the desired outcomes of teacher social capital identified in this review.

Keywords: Social capital; teacher professional learning; student achievement; organisational structures; educational equity.

Introduction

Social capital has been referred to as the resources embedded in the relationships that exist among adults and children, which contribute to a diverse set of instrumental and expressive outcomes, from student achievement to teacher satisfaction (Coleman, 1988; Smylie, 1997). Recent research has pointed to the benefit of social capital for teacher professional development (Baker-Doyle et al., 2011; Coburn & Russell, 2008; Fox & Wilson, 2015; Johnson, 2012; Johnson et al., 2011; Minckler, 2014).

The work of a teacher is often lonely. However, teachers do engage in meaningful interactions around teaching in corridors and staffrooms and during formal and informal meetings. In educational research, there has been growing interest in these interactions and how they contribute to social capital formation and their relationship with different aspects of school improvement (Johnson et al., 2011). Social capital has become an important lens through which to study the effectiveness of teams, the strength of ties within teacher networks, and the levels of trust between teachers and teachers and administrators and principals (Leat et al., 2006). Lately, there has been increased interest in mapping different aspects of teacher interaction through social network analysis, SNA (Baker-Doyle, 2010). Studies using both quantitative and qualitative methods have used SNA to analyse how the shape of a network or a teacher's position in the network predict their performance and influence their access to resources (Daly et al., 2014; Penuel et al., 2009; Woodland & Mazur, 2019a).

Two decades ago, Dika and Singh (Dika & Singh, 2002) reviewed the applications of social capital in educational research, focussing entirely on the role of social capital *for students* (and their families) and its relation to academic performance (Dika & Singh, 2002). Since then, there have been a small number of conceptual articles on social capital *for teachers*. However, these have either been narrow in focus, showing how a social capital model for professional development can improve music education (West, 2019) or technology use and integration (Whipp et al., 2005), while others have pointed to social capital as an antecedent of teacher values and attitudes (Collinson, 2012) and teacher confidence (Nolan & Molla, 2017). Baker-Doyle showed how a social network perspective (founded in social capital theory) can be useful for research on teacher recruitment and retention (Baker-Doyle, 2010). These are all important contributions to the field that help highlight the importance of social capital. But considering the increased interest in social capital *for teachers* and the extensive amount of empirical research that has accumulated in the last 15 years, there is a need for a systematic review of empirical research on social capital in relation to teachers and teacher professional learning.

This systematic literature review has two interrelated aims. The first is to review recent empirical research on the role of social capital for teacher professional learning. Secondly, it aims to make a synthesis of enablers and barriers to social capital among teachers. The underlying motivation for the review is to understand the factors that influence teachers' chances to build and access social capital that contributes to professional learning with the ultimate aim of promoting student learning. The study is guided by the following review questions:

RQ1. With what outcomes have teacher social capital been associated?
RQ2. What are the enablers and barriers to teacher social capital?

Before turning to address the review questions, the following section will attempt to elucidate the theoretical underpinnings of social capital and explain how it can be understood in relation to teachers.

Theoretical Underpinnings

In the field of education, social capital has often been referred to as part of teacher professional capital, which is a multidimensional concept comprising of human, social, and decisional capital (Galosy & Gillespie, 2013; Hargreaves & Fullan, 2012; Naicker et al., 2016; Osmond-Johnson, 2017; Qvortrup, 2016). While human capital is associated with a teacher's education, qualifications, and experience, and decisional capital involves teachers' ability to make insightful judgements and to improvise; social capital is built through meaningful interactions with peers about instruction based on feelings of closeness and trust (Hargreaves & Fullan, 2012; Nolan & Molla, 2017; Rehm & Notten, 2016). Even though professional capital acknowledges the prominent role of social capital for the formation of both human capital (Burt, 2000; Coleman, 1988) and decisional capital (Nolan & Molla, 2017; Osmond-Johnson, 2017) as they are built through practice and reflection with colleagues over time, it provides little understanding as to what social capital is to teachers and how it is built and accessed by teachers.

There are several theoretical conceptions of social capital, with the main proponents being Bourdieu (1986), Coleman (1990) and Putnam (2000). Bourdieu (1986) defined social capital as 'the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition' (Bourdieu, 1986, p. 9). According to Bourdieu (1986), social capital comprises both the structure of relations and the assets that can be accessed through them. From Bourdieu's perspective, teacher social capital can thus be understood as the accumulated and potential wealth of relationships that teachers build and access through professional interactions with others.

While Bourdieu was concerned with issues of power and how inequal distribution of social capital leads to the reproduction of privilege, Coleman (1990) provided a more positive conception of social capital that emphasised its role for the greater good of the group. According to Coleman, social capital allows individuals to achieve otherwise unattainable goals. In other words, social capital helps teachers accomplish things they cannot do alone. Coleman (1990) placed physical, human, and social capital along a continuum of tangibility, with social capital being the least tangible and formed in interactions with others. In his view, social capital cannot be possessed by individuals, and when shared, it cannot be diluted or diminish but instead grows and multiplies. This means that we cannot talk of *the* social capital of *a* teacher, but rather the social capital of teachers, or teacher social capital, as an underlying construct that is unearthed through the mycelia of interactions that are fruitful for learning and accomplishments.

Putnam (2000) expanded the concept of social capital, arguing that it also fulfils individuals' belonging needs. In other words, building social capital among teachers also

means creating a sense of identification and belonging to a team or a group. Combined, these views suggest that there are both instrumental and expressive outcomes of social capital, rendering it a complexity worthy of further exploration in relation to teaching.

Nahapiet & Ghoshal (1998) distinguished between the structural, cognitive, and relational dimensions of social capital. The structural dimension refers to the overall pattern of interactions through the presence or absence of ties between actors, in other words, who is interacting with whom. The relational dimension is about the personal relationships developed through these interactions over time that build friendship and respect and is thus concerned with how deep or meaningful social relations are. The cognitive dimension refers to access to resources that provide shared representations, e.g., a common language or terminology of shared understandings and meanings across members. Among teachers, this may involve developing a shared epistemology, vision, or goal.

To better understand how teachers build and access social capital, many educational researchers have adopted bonding, bridging and linking as key elements of social capital (Adler & Kwon, 2002; Putnam, 2000), sometimes referred to as internal, external, or vertical social capital (Pil & Leana 2009). These dimensions help elucidate the concept of social capital and explain how different types of interactions contribute to social capital and what purposes they fulfil. The ideas originate in Granovetter's theory of the 'strength of weak ties' (1977), which posited that it was people's distant acquaintances (weak ties) rather than close friends (strong ties) that were vital for job opportunities and career advancement. Granovetter's study showed that strong connections within networks tended to give access to redundant information as network members were deeply embedded within the same social context. Weak ties, however, with people outside the tight-knit network, provided access to novel information and knowledge that was necessary for finding a new job or climbing the career ladder.

Putnam (2000) developed the concept by identifying within-group connections as 'bonding social capital' and across-group connections as 'bridging social capital'. *Bonding* occurs when individuals who share similar characteristics, values or terminology form ties that build a sense of belonging, trust, solidarity. Trusting relationships lead to a willingness to share knowledge and experiences and build confidence that colleagues will be reliable and competent. In the teacher setting, bonding social capital is built through within-group interactions between teachers who, e.g., teach the same grade-level, the same subject, or share similar characteristics or values. Teachers who work closely together in teams or groups *bond* or form ties that build trust and solidarity, crucial for the members' willingness to share knowledge and information, ask for support and learn from each other. Less bonding means less altruism and more turf-watching among members. On the other hand, too much bonding can make groups inward-looking and less receptive to new ideas. It can also lead to too much reciprocity where ideas and materials are being shared as balanced transactions; for every favour, there is a favour in return, for every advice sought, there is advice given, which can make the network more closed.

Bridging social capital occurs when individuals reach beyond their immediate groups or networks (Putnam, 2000). Bridging is vital for the influx of new ideas, novel information, and knowledge generation. Among teachers, this means interacting with teachers outside the immediate group. This can be with teachers from other groups within the school, for

example, teachers of different subjects, grade-levels, or age groups. It can also involve across-school interactions with teachers from other schools or school districts. Bridging social ties can thus help teachers access novel information from outside of the immediate group.

Borgatti & Halgin (2011) argue that optimal performance is attained when ties within the group are strong and external ties are weak. In other words, teachers' strong internal ties need to be paired with weak external ties with teachers outside the group to remain dynamic and receptive to change. For example, teachers who build strong social capital with their closest peers, whether they belong to the same team or group, subject, or grade-level, or teach in adjacent classrooms, should also nurture and maintain relationships with teachers of different teams, groups or even schools to remain creative, open to new ideas, and responsive to change. Too much bridging, on the other hand, can lead to distrust from members of the immediate group.

Adler & Kwon (2002) added *linking* to these dimensions of social capital. Linking occurs when people with different amounts of power, such as an employer and employee, connect and are important for career mobility and advancement. Like bridging, linking means reaching beyond the primary group of belonging. The difference is that linking involves bridging hierarchies. Linking can occur when teachers interact with principals or school administrators and vice versa, or when teacher leaders or experienced teachers interact with new or beginning teachers. Linking with school leaders or teachers that are hierarchically superior provides pathways for career advancement and promotions and insights into the conditions and priorities of mentors and managers. At the same time, interacting with people higher up in the hierarchy also means exposing oneself to the risk of sanctions.

Notwithstanding the rich developments of social capital, some theorists have raised concerns about the explanatory power of some components of social capital. For example, Burt (2000) argued that the primary source of benefit is not the tie's weakness or strength, but the 'structural hole' it spans. A structural hole refers to an empty space between contacts in a network. Actors on either side of the structural hole have access to different flows of information. Exploring structural holes thus means to broker and control the information flows between groups of people within a network. In the school setting, structural holes are easily found between departments and grade-level teams or between teachers and school leaders (Leat et al., 2006). Teacher leaders can play a vital role in brokering these information flows as they often constitute a link between teachers and school management or teachers in different departments or teams.

Some theorists have also cautioned against the potentially negative effects of social capital. For example, Portes (1998) identified that most conceptions of social capital disregard outsiders and make excess claims on group members, put excessive weight on pressures for conformity and downward levelling norms. In other words, social capital may fail to take into consideration the mechanisms of group pressure or isolation of specific individuals. Others point to the risk that the concept of social capital may give primacy to the networks' structural elements at the cost of the content of network ties and members' agency (Adler & Kwon 2002). In other words, social capital may focus more on the mycelia of interactions and less on what goes on within those interactions.

However, social capital remains a powerful conceptual tool to explain and understand the role and structure of relationships among teachers that are associated with instrumental and expressive outcomes that promote learning. The dimensions bonding, bridging, and linking are especially constructive for understanding how different interactions contribute to and are balanced in forming social capital among teachers.

Informed by these conceptions, I define teacher social capital as the wealth of relationships that are embedded in teachers' meaningful interactions with peers inside and outside of groups, that contribute to trusting relationships which promote learning and a sense of belonging, shape shared languages and understandings, and give access to new knowledge and information that encourage creativity and career advancement. In the sections that follow, I will turn to the method used for systematically synthesising research on the role of social capital for teacher professional learning.

Method

This review was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement (Moher et al., 2009). The PRISMA Statement consists of a 27-item checklist and a four-phase flow diagram (Figure 1) for identifying, selecting, and critically appraising relevant research and a format for collecting, analysing, and presenting data from the studies included in the review. The PRISMA approach was chosen to ensure rigour and minimise bias in the review process. The Weight of Evidence (WoE) framework developed by Gough (2007) was used to evaluate the quality and relevance of included itemsto identify key pieces and guide the author to research outputs that spoke more directly to the RQs. This process will be explained in further detail below.

Identifying Search Terms

Social capital in educational research often focusses on its role for student learning. For the purposes of this review, the search terms had to capture the role of social capital for teacher learning. The following synonyms were identified using an online thesaurus: teacher learning, teacher professional learning, teacher development, teacher professional development. Social capital is a well-established theoretical concept, and as such, no synonyms were added to that search term. Studies on closely related concepts like trust, advice, and social networks are often founded in social capital theory, which means they are likely to include reference to social capital, making them eligible for this review.

Search strategy

Step 1: An initial search was carried out in April 2019, using a Boolean search phrase to combine the search terms and identify relevant research outputs. The following databases were chosen according to their relevance to the topic: Web of Science (Multidisciplinary Sciences, Education, Educational Research, Education Scientific Disciplines, Educational Psychology), EBSCO Host (British Education Index, British Education Abstracts, ERIC, PsycINFO, and Teacher Reference Center) and Science Direct (International Journal of Educational Development, Teaching and Teacher Education, and International Journal of Educational Research). This search generated 228 items. After removing duplicates, applying eligibility criteria, 48 articles were selected for in-depth review.

Step 2: The final search was carried out in the same databases in September 2020 in order to identify recently published items, and generate research outputs with a more explicit focus on *both* teacher learning *and* social capital. This time, all search terms were limited to subject terms, meaning they had to appear in the title, abstract, or keywords of identified items. Synonyms to teacher learning were made interchangeable, so that each of them could appear on its own or in combination with others *and* social capital. To avoid limitations of using pre-determined search terms and controlled vocabulary (Brunton et al., 2012), the option to include related search terms was applied within the database searches. Additional hand-searches were carried out by snowballing the reference lists of included items. Items referred to more than three times in any of the screened items were added to the list. While all 48

items from the first search were regenerated, the second search generated 66 items in total. The process used to complete this second search and the results of that search now follow.

Eligibility Criteria

The publication type was limited to peer-reviewed, empirical studies. Conceptual articles and reviews that met the search criteria were used for snowballing. Short conference papers without a clear description of the research design were excluded. Only pieces that were related to social capital among teachers working in K12 schools were included. K12 refers to compulsory schooling for children aged 5-16 (the equivalent of reception to year 11 in the UK, kindergarten to grade 12 in the US). In-service teachers include student teachers in in-school placements as part of their postgraduate or teacher training programmes. Student teachers undertaking studies at teaching colleges and universities were excluded. Studies that lacked an explicit focus on the search terms were excluded on the criteria 'not on topic'. A comprehensive list of excluded items with reasons is found in Appendix 1. The time frame was set to the last 15 years (2004-2019). The inclusion and exclusion criteria are displayed in Table 1.

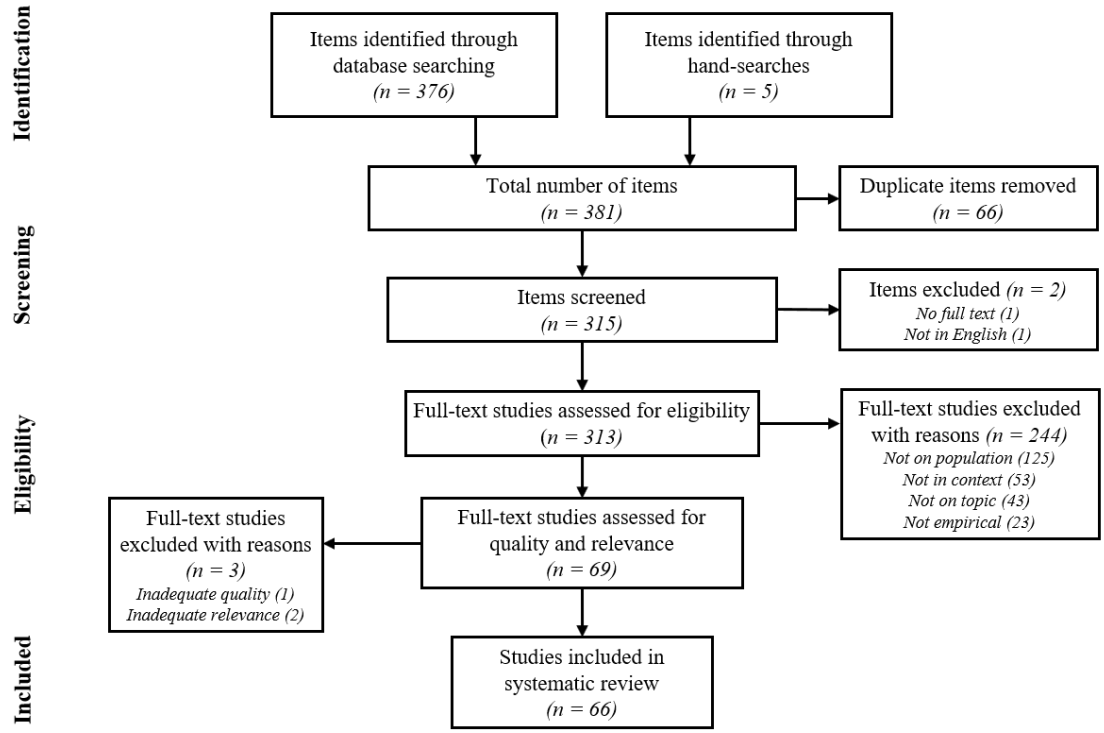
Table 1. Inclusion and Exclusion Criteria.

Inclusion criteria	Exclusion criteria
Population	*Population*
K-12 teachers	Student teachers
In-service teachers	Teacher educators
Pre-service teachers in in-school training	Pre-service teachers in university/college education
Context	*Context*
K-12 education	Post-secondary education
Primary school	Higher education
Elementary school	Vocational education
Middle school	College education
Secondary school	After-school contexts
Item type	*Item type*
Empirical	Reviews
Peer reviewed	Conceptual articles
Language	Conference papers
English	No full text available
Time frame	*Language*
2004-2019	Not in English

Study Selection

The number of items identified per database was: Web of Science (248), EBSCO Host (90) and Science Direct (38). Five items were added via hand-searches, which led to a total of 381 items. After removing duplicates (66) and applying inclusion/exclusion criteria (244 removed), 69 items remained. Three articles were removed on the basis of quality (1) and relevance (2) appraisal, leaving a total of 66 included items. The selection process is outlined in the flow-chart in Figure 1.

Figure 1. Flow-Chart of Study Selection.



Note: adapted from The PRISMA Statement (Moher et al. 2009, p.3).

Quality and Relevance Appraisal

All items that met the inclusion/exclusion criteria were assessed according to the Weight of Evidence (WoE) framework for the appraisal of the quality and relevance of evidence developed by Gough (2007). This process guided the identification of key pieces in this review.

For each item, three dimensions of quality and relevance are assessed: Evidence A is a non-review-specific assessment of the coherence and integrity of the evidence in its own terms; Evidence B evaluates the appropriateness of that form of evidence for answering the review question; Evidence C is a review-specific judgement about the relevance of the focus of the evidence for answering the review questions. Each is scored on a scale of 0-3 considering the extent to which the criteria are met: 0 = not at all met, 1 = met to some extent, 2 = mostly met, 3 = fully met. A score of 0 for any of the criteria led to exclusion.

An overall rating of high, mid, or low is then established for each item based on its average score, WoE D. Only two studies in this review were excluded due to inadequate quality and relevance; one because of lack of topic relevance as it did not involve any social interaction between teachers in the school setting, and one based on insufficient methodological quality because the sample size was considered too small.

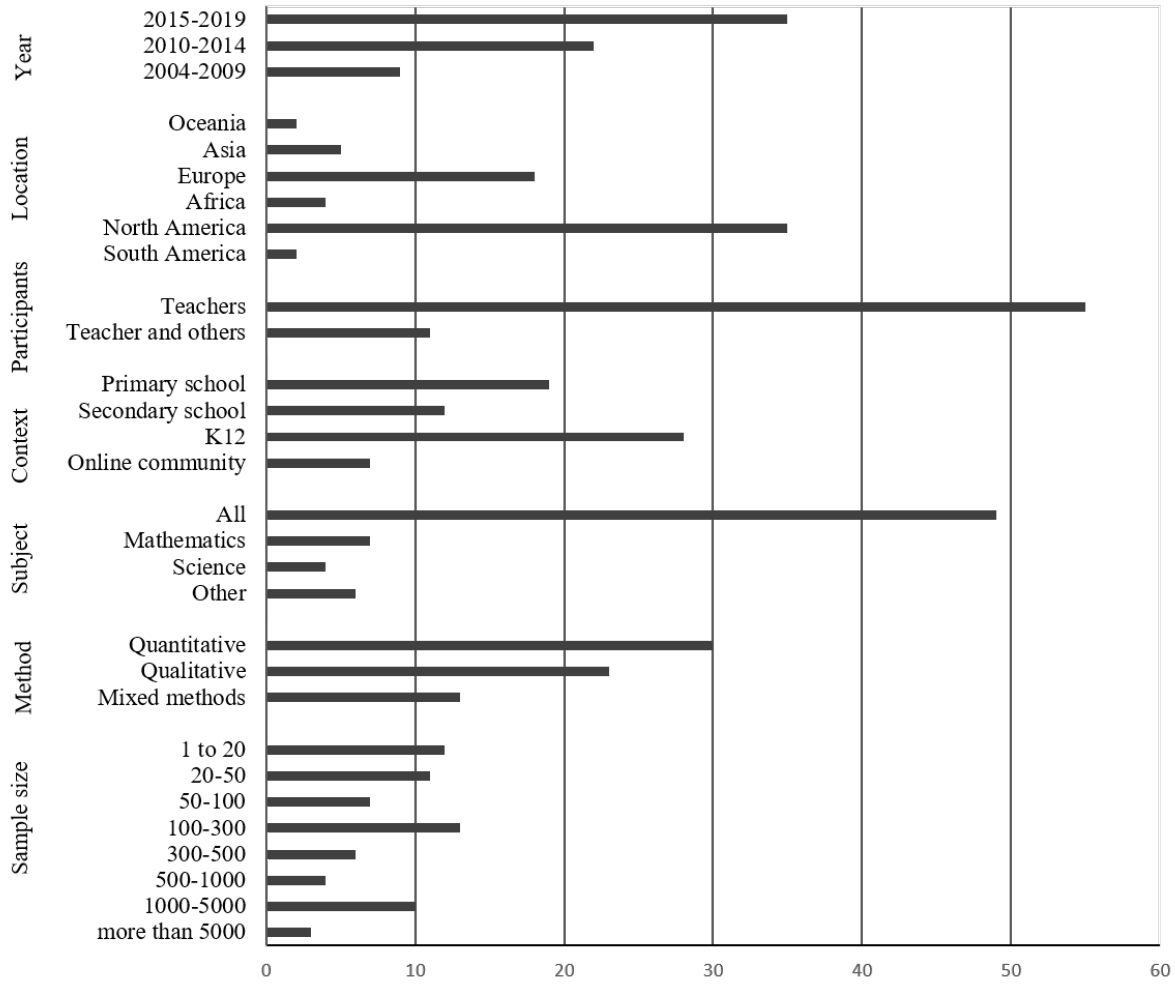
As shown in Table 2, which gives the rankings of articles for each theme, a large majority of included items scored high (27) or mid (38) while only two (2) scored low, indicating that the overall quality, methodological rigour, and relevance of included items was high. A comprehensive list of Weight of Evidence scores A, B, C and D for each item is found in Appendix 2.

Results

Surface Characteristics of Included Items

Per PRISMA guidance, the following surface characteristics were gathered for each included item: location, population, grade-level, subject area, method, and sample size. Publication year was synthesised into groups of five years, indicating a growing research interest in the topic. Over half of the studies were published in the last five years (2015-2019), while only 9 of the 66 studies were published before 2010.

Figure 2. Surface Characteristics of Included Items.



As shown in Figure 2, the studies have been carried out on all continents of the world, in a variety of settings, even though a large majority of the studies were carried out in North America and Europe. The participants were primarily teachers only, while a few studies included students, principals, or parents. Grade-levels ranged from primary to secondary school, with most studies carried out in K12 settings, which covers all compulsory school years (primary and secondary). Notably, 10 per cent of the items studied online contexts.

Far from all studies targeted teachers of particular subjects, but for those who did, a majority focused on maths and science. The quantitative studies outweigh the number of qualitative studies, while about half as many employed mixed methods. Sample sizes were varied, ranging from a handful to about fifty teachers in the qualitative studies and from around sixty to more than five thousand teachers in the quantitative studies. Even though there is no clear correlation, some outcomes seem to lend themselves to a quantitative method, which will be explained further in the thematic analysis. Appendix 3 provides a comprehensive list of sample sizes and surface characteristics of all included items.

Risks of Bias

All but two studies scored on average 'high' or 'mid' for the Weight of Evidence framework, meaning they were both of high quality and to a large extent relevant for answering the review questions. However, some risks of bias have been identified. First, the North American dominance is striking. Exactly half of the studies were carried out in the USA, comprising 94 per cent of the North American studies. This may result from the limitation to research outputs written in English, which might have led to an overrepresentation of studies from English-speaking countries. It can also be due to the overall dominance of English-speaking countries in terms of research outputs rather than the linguistic limitation per se. Second, there is a relative focus on maths and science teaching in proportion to other subjects in the reviewed items. This may be due to government initiatives in many countries over the last decade to improve student achievement and teacher attrition and retention in those subjects1, which may have led to increased interest and incentive for researchers to focus on maths and science specifically.

Identifying Themes

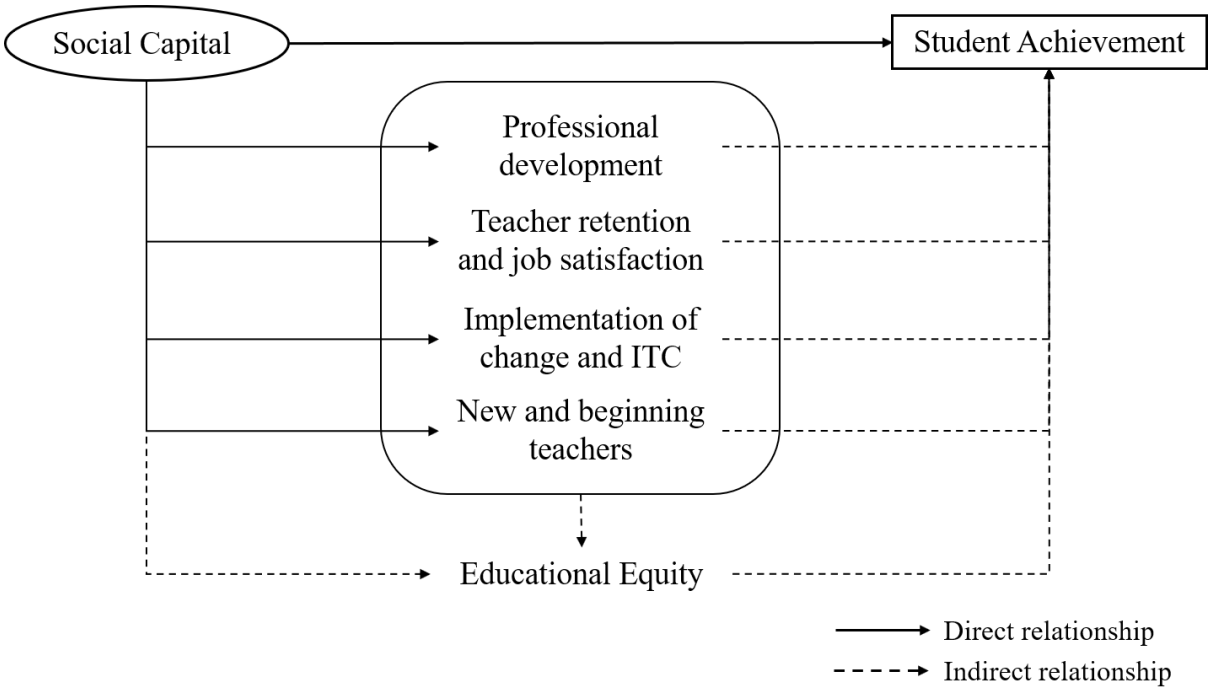
Through the close reading of all included items, five categories of outcomes related to the social capital of teachers emerged: one identifying social capital as beneficial to professional development initiatives, a second its positive influence when implementing large scale change, a third its role for teacher job satisfaction and teacher retention, and a fourth the benefit of social capital when initiating new teachers. The fifth category point to the positive impact of teacher social capital on student achievement. These themes provide answer to RQ1- what outcomes social capital of teachers been associated with. The thematic analysis also revealed patterns of relationships between the categories. These relationships are illustrated in figure 3. First of all, the categories are interrelated. Professional development often goes hand in hand with the implementation of change. When change is introduced, it sets off a series of professional development initiatives that aim to enable desired changes in behaviour to occur. Conversely, professional development initiatives often entail the implementation of some change. Similarly, teacher retention and job satisfaction are often

[1] STEM Learning and Nrich (England), the Maths- and Science Lift (Sweden), African Maths Initiative, among others.

related to the successful induction of new teachers and promoting their sustenance in the profession.

In most studies, social capital is conceived or measured as an independent variable, even though there are cases when social capital serves the function of a mediating variable. In the first four categories, studies point to benefits of social capital on factors that in turn are related to improved student achievement. In contrast, the fifth category points to a direct relationship between teacher social capital and enhanced student achievement measured as the dependent variable. In addition, some studies point to the implicit outcome of social capital among teachers for promoting educational equity. The association of variables is illustrated in figure 3.

Figure 3. Illustration of Variable Association.



In the following section, a thematic analysis of the studies representing the five categories will be presented, placing emphasis on studies with higher WoE scores. The first category, professional development, is the most recurring theme, comprising more than 40 per cent of the items in this review. The following three themes; implementation of change, job satisfaction and retention, and new and beginning teachers, are about equal in size representing about 15 per cent each of the total amount of studies. These will be presented in order of their interrelation. The last theme, also compiling about 15 per cent of the studies, is the only category that establishes a direct link between teacher social capital and improved student achievement. In this category, the implicit outcome of educational equity is most prominent, even though it appears in other themes as well.

Thematic Analysis of Outcomes of Teacher Social Capital

In the following section, the categories of identified outcomes of social capital will be outlined and exemplified in more detail. The analysis has been guided by the WoE framework for identifying and placing emphasis on key pieces. Table 1 lists articles in each category ranked according to average WoE high, mid, or low.

Table 2. Categories of Outcomes of Teacher Social Capital in Reviewed Items.

Professional development [28]*	*WoE D*	Implementation of change [10]	*WoE D*	Teacher retention and job satisfaction [11]	*WoE D*	New teachers [8]	*WoE D*	Student achievement [9]	*WoE D*
Bridwell-Mitchell & Cooc (2016)	*High*	Brown et al. (2016)	*High*	Edinger & Edinger (2018)	*High*	Civís et al. (2019)	*High*	Daly et al. (2014)	*High*
Chapman et al. (2016)	*High*	Frank et al. (2004)	*High*	Neugeberger (2019)	*High*	Cabezas et al. (2017)	*Mid*	Leana & Pil (2006)	*High*
Minckler (2014)	*High*	Li & Choi (2014)	*High*	Schiff et al. (2015)	*High*	Christensen et al. (2013)	*Mid*	Pil & Leana (2009)	*High*
Spillane et al. (2012)	*High*	Yoon et al. (2017)	*High*	Struyve et al. (2016)	*High*	Fee (2011)	*Mid*	Salloum et al. (2017)	*High*
Spillane et al. (2015)	*High*	Penuel et al. (2009)	*Mid*	Allen & Sims (2018)	*Mid*	Fox & Wilson (2015)	*Mid*	Van Maele and Van Houtte (2011)	*High*
Spillane et al. (2018)	*High*	Scanlan et al. (2019)	*Mid*	Fagerlind et al. (2013)	*Mid*	Lane & Sweeny (2018)	*Mid*	Anderson (2008)	*High*
Van Emmerik et al. (2011)	*High*	Leat et al. (2006)	*Mid*	Galosy & Gillespie (2013)	*Mid*	Tang et al. (2016)	*Mid*	Kodzi et al. (2014)	*High*
Woodland & Mazur (2019a)	*High*	Li (2010)	*Mid*	Qvortrup (2016)	*Mid*	Wong (2018)	*Mid*	Beard et al. (2010)	*Mid*
Woodland & Mazur (2019b)	*High*	Naicker et al. (2016)	*Mid*	Roffey (2012)	*Mid*			Kempen & Steyn (2017)	*Mid*
Baker-Doyle & Yoon (2011)	*High*	Van den Beemt & Diepstraten (2016)	*Mid*	Glazer (2018)	*Mid*				
Pedder et al. (2005)	*High*			Hofman & Dijkstra (2010)	*Mid*				

Coburn & Russell (2008)	*Mid*
Dudley (2013)	*Mid*
Farooq et al. (2007)	*Mid*
Fetter et al. (2012)	*Mid*
Nisar & Mar oulis (2017)	*Mid*
Rehm & Not ten (2016)	*Mid*
Tseng & Kuo (201 4)	*Mid*
Visone (2019)	*Mid*
Wilhelm et al. (2016)	*Mid*
Druken (201 5)	*Mid*
Johnson et al. (2011)	*Mid*
Modipane & Themane (2014)	*Mid*
Osmond-Johnson (2017)	*Mid*
Osmond-Johnson (2019)	*Mid*
Ranieri et al. (2012)	*Mid*
Booth & Kellogg (2015)	*Low*
Hu et al. (2018)	*Low*

** The number in brackets represents the number of items in each category.*

Social capital and professional development.

Findings from 28 studies point to the benefit of social capital for teacher professional development. Several studies conclude that even though teachers may gather information at one-off professional development workshops, it is through their informal social networks that the information is interpreted, shared, compiled, contextualised and sustained (Baker-Doyle

& Yoon, 2011; high WoE; Hofman et al., 2010; mid WoE; Modipane & Themane, 2014; mid WoE).

Findings also show that teachers value and benefit from participation in social networks in and out of class, with teachers from within and outside their schools (Pedder et al. 2005; high WoE). In a study of teacher networks in Philadelphia, USA, Schiff et al. (2015; high WoE) found a positive correlation between networking time as a proxy for social capital and high performing schools. The study also showed that even though teachers value and participate in numerous formal and informal networks, both in and out of school, more than half of the network opportunities are formalised. Two-thirds of them appear within the teacher's own school. Findings from several high WoE studies also point to a spill-over effect of teachers' formalised networking on informal interactions. Teachers who value and have the opportunity to participate in strong formal networks in school are also more likely to take part in informal ones outside of school (Schiff et al., 2015; high WoE; Woodland & Mazur, 2019a; high WoE).

Using qualitative SNA, Baker-Doyle and Yoon (2011; high WoE) investigated how teachers' informal advice networks influenced social capital access. Establishing a Teacher Characteristic Index for teacher quality based on experience, education level, content knowledge, degree of specialisation, formal leadership role etc. their findings show that teachers with higher scores were less likely to be sought out for advice by other teachers, especially those of lower quality, who preferred reaching out to teachers who they believed had more mentoring skills. Thus, the findings highlight the risk that 'expert teachers' could become isolated in the networks, inhibiting access and diffusion of social capital. According to the authors, one of the most important tasks for managers is, therefore, to unlock this expertise and make it available to the network.

Coburn & Russel's study (2008; mid WoE) provide evidence that such a task is possible to achieve, as their findings indicate that district policy (mediated by school leaders) can affect the building of social capital among teachers by influencing the structure, access to expertise and depth of interaction within teachers' social networks.

In a longitudinal study of teacher teams, Woodland & Mazur (2019b; high WoE) showed how SNA could help administrators to identify isolates in the network and help establish professional learning communities that increase access to social capital resources within and across schools and (in this case rural) districts.

Looking at the effects of school leadership on social capital, Minckler (2014; high WoE) found a positive correlation between 'transformational leadership' and teacher social capital. Leadership was seen as transformational in the sense that it provided the structures, both physical (e.g., shared scheduling time) and cultural (e.g., norms of collegiality), that allowed groups of teachers to work together to create and use social capital.

Instead of looking at how teachers' social interactions impact their effectiveness, Spillane et al. (2018; high WoE) reversed the directionality and looked at how teacher performance predicted interactions. Interestingly, high performing teachers were not more likely to be sought out for advice, but they sought more advice themselves. In other words, the ones who asked a lot seemed to learn a lot, which improved their performance.

Wilhelm et al.'s longitudinal study of teachers across 27 schools (2016; mid WoE) found that teachers were more likely to seek new advice from colleagues who were better at improving student achievement than any other type of expertise. Nisar & Maroulis (2017; mid WoE) found that teachers strategically identify and seek out peers who possess the most sought-after knowledge at the time, which means that improvement initiatives can sometimes alter teachers' social networks.

Some studies in this category point to the benefit of social capital to specific professional development models, and conversely, how these models contribute to the building of social capital. Chapman et al. (2016; high WoE) studied a collaborative inquiry model for professional development aimed to close the gap in educational outcomes between children from poorer and wealthier settings in Scotland. Drawing on data from over 50 schools, the authors showed that collaborative inquiry both enhanced teacher social capital and led to achievement gains for disadvantaged pupils.

Dudley (2013; mid WoE) point to the benefit of social capital for 'lesson study', which has become an increasingly popular model for teacher professional development and a vehicle for developing and sustaining professional learning communities. Dudley's case study analysis found that the building of social capital in collaborative lesson studies enabled teachers to access tacit knowledge about how their students learn and how their learning could be improved. Social capital has also been found beneficial to lesson study sustainability (Druken, 2015: mid WoE).

Another vehicle for professional development that has increased in popularity over the last years is collegial visits. Visone (2019; mid WoE) found that collegial visits increased social capital characterised as collective ownership (having a common goal) and helping teachers view colleagues as resources, which positively impacted instruction. Osmond-Johnson (2017; mid WoE) showed how a peer leadership model for professional learning can promote teacher capital and how social capital was beneficial to teachers' transition into leadership roles (2019; mid WoE).

Finally, a group of studies with WoE ranging from mid to low looked at online communities as an arena for professional development and teacher social capital. Findings indicate that networking in online communities help teachers build and access social capital in terms of resources and support, both in generic communities like Facebook, Twitter and Pinterest (Ranieri et al., 2018; mid WoE; Rehm & Notten, 2016; mid WoE; Hu et al., 2018; low WoE) and in communities purposefully aimed at teacher knowledge sharing (WoE; Fetter et al. 2012; mid WoE; Tseng & Kuo, 2014; mid WoE; Booth & Kellogg, 2015; low WoE). Social capital was also the key to sustaining users in online networks (Farooq et al., 2007; mid WoE).

Social capital and implementation of change.

Closely related to professional development is this next category of ten articles that study the relationship between social capital and change implementation. Comparing the impact of teachers' human and social capital on instructional change, Yoon et al. (2017; high WoE) found that social capital was a stronger predictor than human capital, positing that a teacher's access to social capital influences how reforms play out in practice. Similarly, Penuel et al.

(2009; mid WoE) found that social capital, characterised as the distribution of resources and access to expertise, was significantly related to the level of instructional change observed in schools.

Some studies in this category looked specifically at implementing ITC policies, following increasing government initiatives of technology infusion in schools. Using longitudinal network data from six US schools, Frank et al. (2004; high WoE) found that social capital, characterised as peer pressure and access to expertise, was significantly correlated with IT use. Their findings challenge the traditional view that change starts by changing teacher perceptions at the individual level, subsequently dispersed to others through communication. This is echoed by Li & Choi's study (2014; high WoE) of technology infusion in 130 schools in Hong Kong, which found that social capital was more influential than conventional technology infusion models. Their findings show that social relations not only developed teachers' knowledge and skills but also brought about behavioural changes in the classroom. Social capital both facilitated change in the pedagogical use of technology and enhanced teachers' receptivity towards using technology in teaching and learning. This is further confirmed by Li (2010; mid WoE) and van den Beemt & Diepstraten (2016; mid WoE), who found that teachers' conceptions of ITC did not necessarily effect change in teacher practices and student learning, but that the most crucial impetus for change came from trust, informal access to expertise and peer pressure.

Social capital also emerged as key to the infusion of research/evidence use in schools. In an SNA analysis of teacher interactions in more than 40 schools in England, Brown et al. (2016; high WoE) found that higher levels of social capital in a school, measured as more frequent and useful interactions around teaching and higher levels of trust, was associated with higher levels of research/evidence use.

Building on Burt's theory of structural holes (2000), Leat et al. (2006; mid WoE) showed that by exploring the 'holes' in the organisation, social capital could limit the element of trial and error and frustration when implementing change. According to the authors, these structural holes are easily found between departments and between teachers and managers, and that trust is the glue that binds them together. However, their findings also show that too strong lateral trust (tight-knit bonding between peers) combined with weak vertical trust (linking with management) can lead to resistance to leaders.

Social capital has also been found essential to change and transformation in disadvantaged and emerging economic contexts (Naicker et al., 2016; mid WoE) and when transitioning into bilingual education due to changing student populations (Scanlan et al. 2019; mid WoE).

Social capital and teacher retention and job satisfaction.

Research suggests that teachers worldwide are exceedingly dissatisfied with their jobs and have significantly higher turnover rates than other professions (Edinger & Edinger 2018). In this third theme we find studies pointing to social capital's positive effect on both job satisfaction and teacher retention.

Some studies in this category study teacher efficacy, which is commonly defined as teachers' confidence in their ability to affect students positively. Edinger & Edinger (2018;

high WoE) studied the relationship between social capital, measured as trust and density of advice networks, teacher efficacy, and support in two rural school districts. They found that a teacher's position in the network predicted their job satisfaction and that perceived organisational support strengthened the relationship between teacher efficacy and job satisfaction. In a longitudinal analysis of survey data, Neugebauer et al. (2019; high WoE) similarly found that social capital, measured as teacher interactions and access to resources through their relations, contributed to teacher self-efficacy over time. Similarly, Qvortrup (2016; mid WoE) found that research-informed school development increased teacher professional capital, which was positively associated with both teacher self-efficacy, teacher wellbeing, and student achievement. The correlations were strong, indicating that teachers who interact strongly around teaching and students feel more competent and comfortable as teachers. In a study of two teacher development networks, Hofman et al. (2010; mid WoE) found that teacher networks that are not top-down but emerge from teachers themselves are more effective for promoting professionalism, job motivation and retention.

Another dimension of job satisfaction is the concept of 'flow'. Flow is a feeling of enjoyment, motivation and absorption that can occur when dealing with situations that involve both high challenges and require high utilisation of skills[2]. In a study of 3700 Swedish professionals, of which 350 were teachers, Fagerlind et al. (2013; mid WoE) found that social capital significantly increased the likelihood of experiencing work-related flow.

Roffey (2012; mid WoE) explored how social capital affects both teachers' and students' wellbeing within an ecological framework. Building on a qualitative study of six Australian schools, the study demonstrates that by promoting teacher wellbeing through increased social capital (feelings of belonging, respect, value, and trust), schools can enhance their capacity to meet the needs of diverse populations and reduce the numbers of students needing intensive and expensive support.

Looking at teacher retention, Struyve et al. (2016; high WoE) found that social connectedness as a proxy for social capital positively influenced early career teachers' job attitude, which in turn worked counter to intentions to leave the profession. This further establishes Galosy & Gillespie's findings (2013; mid WoE) that teacher retention among beginning maths and science teachers could be improved by developing professional capital, comprised of human, social and decisional capital.

Glazer (2018; mid WoE) looked at teacher retention through so--called 'invested leavers', i.e. teachers who have decided to leave the profession after years of teaching. Social capital, or in this case lack thereof, emerged as key, together with perceived lack of autonomy and insufficient management support as reasons for giving up teaching.

This category's last study links teacher retention, turnover rates, and educational equity. Using data from the School Workforce Census (SWC) of all teachers working in English state schools, Allen & Sims (2018; mid WoE) found clear and consistent evidence of inequitable allocation of teacher quality between schools. High turnover rates in deprived

[2] The concept of flow is further developed in e.g., *Flow: The psychology of happiness*, Csikszentmihalyi (2013) and *Flow theory and research* in Handbook of positive psychology, Nakamura & Csikszentmihalyi (2009).

schools meant less opportunities for teachers to build social capital over time, which in turn made it harder to attract and sustain teachers. Thus, disadvantaged pupils were more likely to have unqualified, inexperienced, or out-of-subject teachers.

Social capital and new and beginning teachers.

Closely related to teacher retention is the induction and attrition of new and beginning teachers as we know that attrition rates are especially low among new teachers. Worldwide, more than half of new teachers leave the profession within five years (Steen 2011).

Looking at social network and performance data from more than 300 pre-service teachers in school-based training programmes in Spain, Civis et al. (2019; high WoE) found that social capital among teachers affects both the performance of new teachers and their perceived professional competence.

Another quantitative study in this category studied the impact of social capital on teachers' first job. Drawing on data from Chile, Cabezas et al. (2017; mid WoE) found evidence that teachers with higher social capital are less likely to start working in public schools, which has implications for educational equity. At the same time, the authors found evidence that initial in-school training in public schools increased the likelihood of teachers with higher social capital starting their first employment in a public school This means that giving new teachers a chance to train in public schools could help distribute social capital to disadvantaged settings.

Mapping beginning teachers' networks through qualitative SNA, Fox and Wilson (2015; mid WoE) found that social capital was vital to successful integration of new teachers. Even though formal support was offered through different introduction programmes, it was the social capital developed through their networking that helped new teachers cope with the challenges of starting teaching. Engaging in relationship-building was also determining for developing a teacher identity and for sustaining in the profession. Two similar studies confirm this, showing that new teachers' competence to work in schools requires deep contextualised learning characterised by the building of social capital (Tang et al., 2016; mid WoE), which requires a mix of resources and a variety of colleagues to help them with the diverse challenges of teaching (Lane & Sweeny, 2018; mid WoE). Looking at the other side of the coin, Wong (2018; mid WoE) found that mentoring not only represents an opportunity for new teachers but also for experienced teachers to build social capital, commitment, and self-efficacy, and to renew their knowledge by reflecting on their professionalism.

Contrasting the experiences of two new teachers' positioning in the staffroom, Christensen et al. (2018; mid WoE) studied the effect of formal and informal spaces, e.g. staffrooms, corridors, etc., on the building of social capital of new teachers. The authors conclude that even though there might be induction policies entirely laid out in policy documents, implementation is often diverse and that weak teacher induction is linked to weak teacher retention.

Finally, social capital has been found essential when integrating foreign teachers into new cultural settings. Fee (2011; mid WoE) showed how social capital contributed to the successful integration of teachers from Spain into bilingual education in the USA.

Social capital and improved student achievement.

Even though all categories of outcomes in this review point to the benefit of social capital for different aspects of school improvement, only one category point to a direct relationship between teacher social capital and improved student outcome. In this category, most studies employed a quantitative research method, using student grades or marks on tests as the outcome variable in correlational analyses. The WoE in this category was strong, with seven of nine studies scoring 'high'. Several studies in this category also point to the implicit outcome of social capital on educational equity.

Drawing on data from teachers, principals, parents and students in 88 US schools, Leana and Pil (2006; high WoE) found a positive correlation between teacher social capital and student achievement as measured by standardised tests. Both internal social capital (relations between teachers) and external social capital (relations between the principal and external stakeholders) predicted student achievement in mathematics and reading. The effects were sustained over time for reading achievement, providing support for a causal relationship between social capital and performance.

In a later study, Pil and Leana (2009; high WoE) analysed the impact of teacher human and social capital respectively on student achievement. Applying the model to a sample of more than a thousand teachers in over 200 grade-teams, the study 'found that the structure and content of relationships among teachers (social capital) significantly predicted school-level student achievement' (Pil & Leana, 2009, p. 1102). But, for teachers' human capital to impact student achievement, it had to be specific to the setting and task (grade-level experience and ability to teach maths). The implication is that 'employment practices that promote stability in teacher assignments in particular schools, along with professional development that is specific to the subject matter, may be better investments by school districts than is the current focus on general educational attainment' (Pil & Leana, 2009, p. 1117). Another interesting finding was that less able teachers benefitted most from strong ties with peers. Fostering social capital among teachers can thereby reduce the disadvantage of students of low socio-economic status (SES). As teachers who work in schools with lower SES students tend to be less experienced and the grade-level teams less educated, 'upgrading the grade-level experience of teachers working in low-SES schools to be comparable to levels found in high-SES schools would help offset the negative effects of low SES' (Pil & Leana, 2009, p. 1118).

Daly et al. (2014; high WoE) used SNA to analyse teacher interactions in five schools using benchmark assessments instead of standardised tests as the outcome variable. They also found that the level of social capital among teachers was an indicator of improved student achievement. Increased sharing of task-specific knowledge (in this case, reading comprehension) was associated with higher student achievement. In comparison, an increased number of mutual relationships (ego-reciprocity) reflected a more closed system with fewer chances to encounter new ideas and practices, which may lead to lower student achievement. Daly et al. (2014) also found that more teaching experience in the current school was associated with better student performance. Schools in disadvantaged areas generally have higher staff turnover rates which means that investing in building long-term, meaningful relationships between teachers can diminish the effects of segregation and disadvantage.

Salloum et al.'s study (2017; high WoE) tested and confirmed social capital as a construct, but also found that social capital was a positive predictor of student achievement. Differences in social capital levels were significantly related to school membership, and only half of the social capital was related to social class. This empirically supports Pil & Leana's (2009; high WoE) assertion that strengthening access to school-based resources in poor and low-achieving schools can help offset the negative effects of low SES and promote educational equity.

Van Maele and Van Houtte (2011; high WoE) showed how shared understandings, collective beliefs, and common goals as proxies of social capital affect student achievement. Developing similar and positive conceptions among teachers about students' teachability builds social capital, which in turn benefits student learning. They found that the teacher workplace's structural, compositional, and cultural characteristics affect trust in colleagues and argue that less homogenous cultures of teacher teams can explain the lower levels of collegial trust in socioeconomically disadvantaged schools. Van Maele & Van Houtte's results are confirmed by Beard et al. (2010; mid WoE), who found that 'collective academic optimism' among teachers, i.e. teachers' joint optimism towards the teachability of their students as grounded in social capital theory, was associated with enhanced academic performance.

Another benefit of social capital to educational equity that emerged in this category was its role in developing contexts. In examples from Kenya (Kodzi et al., 2014; high WoE), Latin America (Anderson, 2008; high WoE) and South Africa (Kempen & Steyn 2017; mid WoE) studies found that relationships among teachers, students, parents, and principals led to gains in teachers' professional capacity, learner outcomes, and whole school improvement.

Synthesis of Enablers and Barriers to Social Capital

In the following section, RQ2 will be addressed by synthesising the enablers and barriers to social capital found in the reviewed items. More than 90 per cent of the articles in this review identify one or more factors that contribute to the development of social capital among teachers, while around 70 per cent suggest factors that may hinder it. The enablers and barriers were thematically coded into 12 categories. Eight of these categories appeared both as enablers and in reversed form as barriers, e.g., 'teacher agency' as an enabler also appeared as a 'lack of teacher agency' among the barriers. The remaining categories appeared only as enablers (2) or barriers (2). The categories were grouped according to the level on which they occur, conceptualised as individual level, group level, and organisational level factors as illustrated in Table 3 and Table 4 below. Consideration was made to the WoE framework by fore-fronting and emphasising key pieces. Some consideration was also made to the number of items referring to a particular enabler or barrier. Frequency is arguably a blunt measure of the importance of enablers/barriers since different research designs may yield different factors. However, given the large number of studies included in this review (66), the number of occurrences can still give us an indication of their relevance.

Enablers of Social Capital

This review has identified ten categories of enablers of social capital among teachers, occurring at the individual, group, and organisational level, as illustrated in Table 3. These will be explained and exemplified in the sections that follow.

Table 3. Enablers of Social Capital among Teachers.

Enablers	Studies
Individual level factors	
Teacher characteristics (2)	*WoE high:* Bridwell-Mitchell & Cooc 2016; Spillane et al. 2012;
Teacher agency (11)	*WoE high:* Spillane et al. 2012; Spillane et al. 2015; Spillane et al. 2018; *WoE mid:* Fox & Wilson 2015; Glazer 2018; Naicker et al. 2016.; Pedder & James 2005; Rehm & Notten 2016; Tseng & Kuo 2014; Wilhelm et al. 2016; Wong 2018.
Principal agency (8)	*WoE high:* Minckler 2014; Woodland & Mazur 2019a; Woodland & Mazur 2019b; *WoE mid:* Druken 2015; Dudley 2013; Osmond-Johnson 2017; Tang et al. 2016; Visone 2019.
Group level factors	
Team/group/network characteristics (4)	*WoE high:* Bridwell-Mitchell & Cooc 2016; Li & Choi 2014; van Emmerik et al. 2011; van Maele & Van Houtte 2011.
Peer pressure (3)	*WoE high:* Li & Choi 2014; *WoE mid:* Li 2010; Tseng & Kuo 2014.
Organisation level factors	
Team/group/network structures (30)	*WoE high:* Anderson 2008; Baker-Doyle & Yoon 2011; Chapman et al. 2016; Edinger & Edinger 2018; Frank et al. 2004; Leana & Pil 2006; Minckler 2014; Pil & Leana 2009; Schiff et al. 2015; Spillane et al. 2012; Spillane et al. 2015; Spillane et al. 2018; Struyve et al. 2016; Woodland & Mazur 2019a; Woodland & Mazur 2019b; *WoE mid:* Christensen et al. 2018; Coburn & Russell 2008; Dudley 2013; Fetter et al. 2012; Galosy & Gillespie 2013; Hofman & Dijkstra. 2010; Johnson et al. 2011; Kempen & Steyn 2017; Nisar & Maroulis 2017; Osmond-Johnson 2017; Penuel et al. 2009; Qvortrup 2016; Scanlan et al. 2019; van den Beemt & Diepstraten 2016; Visone 2019.
Access to expertise (28)	*WoE high:* Anderson 2008; Baker-Doyle & Yoon 2011; Brown et al. 2016; Frank et al. 2004; Leana & Pil 2006; Li & Choi 2014; Neugebauer et al. 2019; Pil & Leana 2009; Schiff et al. 2015; Spillane et al. 2012; Spillane et al. 2015; Spillane et al. 2018; Struyve et al. 2016; Yoon et al. 2017; *WoE mid:* Coburn & Russell 2008; Dudley 2013; Fox & Wilson 2015; Galosy & Gillespie 2013; Hofman & Dijkstra. 2010; Johnson et al. 2011; Lane & Sweeny 2018; Leat et al. 2006; Osmond-Johnson 2017; Osmond-Johnson 2019; Penuel et al. 2009; Ranieri et al. 2012; Scanlan et al. 2019; van den Beemt & Diepstraten 2016.

School climate (21)	*WoE high:* Anderson 2008; Bridwell-Mitchell & Cooc 2016; Brown et al. 2016; Civís et al. 2019; Edinger & Edinger 2018; Frank et al. 2004; Kodzi et al. 2014; Li & Choi 2014; Minckler 2014; Schiff et al. 2015; van Maele & Van Houtte 2011; Yoon et al. 2017; *WoE mid:* Allen & Sims 2018; Beard et al. 2010; Coburn & Russell 2008; Druken 2015; Fagerlind et al. 2013; Kempen & Steyn 2017; Leat et al. 2006; Qvortrup 2016; Roffey 2012; Visone 2019;
Organisational support (23)	*WoE high:* Edinger & Edinger 2018; Leana & Pil 2006; Minckler 2014; Pil & Leana 2009; Spillane et al. 2012; Spillane et al. 2015; Spillane et al. 2018; *WoE mid:* Cabezas et al. 2017; Christensen et al. 2018; Druken 2015; Dudley 2013; Fox & Wilson 2015; Glazer 2018; Johnson et al. 2011; Kempen & Steyn 2017; Leat et al. 2006; Osmond-Johnson 2017; Osmond-Johnson 2019; Tang et al. 2016; van den Beemt & Diepstraten 2016; Visone 2019; Wong 2018. *WoE low:* Hu et al. 2018
Stability in employment practices (5)	*WoE high:* Daly et al. 2014; Leana & Pil 2006; Pil & Leana 2009; Struyve et al. 2016; *WoE mid:* Allen & Sims 2018.

Individual-level enablers

Teacher characteristics (2): Only two studies in this review identify individual-level characteristics as enabling teacher social capital, and this category only appears as an enabler. Spillane et al. (2012; high WoE) showed how a teacher's gender, age, and status is associated with the formation of ties between teachers, while Bridwell-Mitchell & Cooc (2016; high WoE) showed their significance for maintaining ties over time. However, both studies indicate that these individual-level factors are trumped by factors at the group and organisational level (see below).

Teacher agency (11): Studies in this category identify individual teacher agency as an important enabler of social capital. The main argument here is that while structural conditions are important, teachers are not only subjected to the structures in which they operate but are also driven by their own thoughts and convictions that will influence social capital. Highlighting the agency of teachers, some studies show that teachers are strategic in their networking choices (e.g. Nisar & Maroulis, 2017; Spillane et al. 2018; Wilhelm et al., 2016; all high WoE), while others underline the importance of teachers becoming aware of their networking possibilities (e.g. Fox & Wilson, 2015; Wong, 2018; both mid WoE). When teachers serve as actors rather than remaining primary agents, they are also crucial to transformation in developing contexts (Naicker et al., 2016; mid WoE).

Principal agency (9). Findings in this category posit that just like teachers, principals make strategic choices about who to interact with and how to use their time (Leana & Pil 2006; high WoE). This, together with principals' transformational leadership, is crucial to change (Minckler 2014; Woodland & Mazur 2019a; Woodland & Mazur 2019b; all high WoE). Principal agency can also enable social capital building among teachers by encouraging different types of collaborative practices like lesson study (Dudley 2013; mid WoE) and

collegial visits (Visone 2019; mid WoE) and by supporting mentors and mentees for the successful integration of new teachers (Tang et al., 2016; mid WoE).

Group level enablers

Team/group/network characteristics (4): Bridwell-Mitchell & Cooc (2016; high WoE) found that teacher communities were more important than individual teacher traits and formal organisation for the formation of ties between teachers that foster social capital. Specifically, teachers in larger communities and communities with stronger cohesion (more overlapping ties or bonding) were more likely to continue to interact over time, while teachers who often span community boundaries (bridging) were less likely to persist in their interactions. The authors suggest opportunities for teachers to mix it up in terms of their usual interaction patterns to encourage community cohesion that foster social capital. Quite contrary to mixing it up, van Emmerik et al. (2011; high WoE) found that developing 'deep-level similarity' as a form of social capital increased learning behaviours among team members. The implication is that school leaders should develop similar and positive conceptions among their teachers about students' teachability to promote social capital and student learning (van Maele & van Houtte 2011; high WoE).

Peer pressure (2): Two studies have shown that performance expectations from peers can have a positive impact on the building of social capital, as it serves as an important igniter and driver for diffusion of innovation and ITC (Li, 2010; mid WoE; Li & Choi, 2014; high WoE). This category appeared only as an enabler.

Organisation level enablers

Team/group/network structures (30): Almost half of this review's items identify providing the structural conditions for teachers to interact in groups and networks as a vital enabler of social capital. Looking at the antecedents of social capital, Spillane et al. (2015; high WoE) found that organisational structures, i.e. formal group or team assignment, had a larger effect in shaping the conditions for the promotion of social capital than individual characteristics. In another study, Spillane et al. (2012; high WoE) looked at tie formation antecedents as the initial step towards building social capital. Findings showed that even though individual factors such as race and gender contributed to tie formation (as mentioned above), formal organisational structures such as grade-level assignment, holding a formal leadership position, and single-grade teaching (rather than teaching multiple grades) had significantly larger effects on tie formation.

Moreover, since there is contingency between formal and informal networks (Woodland & Mazur, 2019; high WoE) and formal networking has a spill-over effect on informal networking (Schiff et al., 2015; high WoE), school leaders and policy makers can influence informal teacher networks through shaping the structure of their formal ones (Woodland & Mazur, 2019a). Through policy and leadership, school leaders can influence the structure, access to expertise, and depth of interaction (Coburn & Russell; mid WoE, 2008; Minckler, 2014; high WoE).

This reasoning is echoed by Wilhelm et al. (2016; mid WoE), who argue that even though teacher networks are emergent phenomena, they can still be influenced. Their findings

suggest that with all else equal, two math teachers of the same grade-level are more likely to interact around mathematics instruction than teachers of different grade-levels. This is related to both the content of interaction being shared and the physical proximity to peers. In primary schools, teachers of the same grade are typically located adjacent to one another. Physical proximity to peers may increase the probability of forming a tie, as will participation in the same organisational routines, such as grade-level meetings (Spillane 2012; high WoE). Translated to the secondary school setting, an increased probability of forming ties would occur among teachers of the same subject, who typically participate in the same departmental meetings and teach in clusters of classrooms close to each other.

Minckler (2014; high WoE) put forward the role of organisational structures for providing teachers with the time, place, and resources to form relationships. Through, e.g., shared scheduling time and collegiality norms, school leadership can provide opportunities for groups of teachers to work together to create and use bonding social capital. Likewise, Scanlan et al. (2019; mid WoE) argue that providing the organisational structures that support relational networks and communities of practice will increase all forms of professional capital, of which social capital is one.

Dudley's (2013; mid WoE) findings highlight the need to provide school routines that can accommodate lesson studies and other collaborative forms of teacher learning that contribute to the building of social capital, such as timetabling efforts and staff cover systems and budget. Similarly, investment in social capital through collaborative learning sessions where knowledge and experience are shared is suggested for promoting successful technology infusion in schools (Li, 2010; mid WoE; Li & Choi, 2014; high WoE).

When it comes to forming external ties, serving similar student populations is associated with increased sharing of instructional advice and information between schools. High-performing schools tend to 'keep to themselves' and were less likely to seek external advice or information than lower-performing schools (Spillane et al., 2015; high WoE). This has implications for educational equity as it reproduces disadvantage and unequal distribution of social capital across schools.

Access to expertise (28): Several studies point to the benefit of access to expertise that is *task-specific* or *close to classroom practice*. Teacher interactions that involved sharing of task-specific knowledge were associated with higher student achievement (Daly et al. 2014; Leana & Pil 2006; Pil & Leana 2009; all high WoE), and interaction around specific teaching episodes was more beneficial for promoting teacher self-efficacy over time than more general ones (Neugebauer et al. 2019; high WoE).

Studies also point to the benefit of 'unlocking expertise' (Baker-Doyle & Yoon, 2011; high WoE) through content-rich interaction (Galosy & Gillespie, 2013; mid WoE Schiff et al., 2015; high WoE), exploiting subgroups and network meetings with a strong content focus (Hofman et al., 2010; mid WoE), and distribution of resources and expertise (Penuel et al., 2009; mid WoE). Since teachers are less likely to seek advice from 'expert teachers', school leadership should make sure that teachers become aware of these 'silent' experts and that their knowledge is explicitly shared (Baker-Doyle & Yoon, 2011; high WoE).

The same patterns are evident when looking at enabling factors for the building of social capital online. In a comparative study of two different types of online networks it was

found that dedicated private forums had a lower threshold for engagement which led to more people asking questions, whereas in traditional open forums, fewer people asked questions, but more people answered (Fetter et al. 2012; mid WoE). In other words, the private forum's safety generated bonding and trust, which made teachers more prone to ask questions, whereas in the open forum, new knowledge was accessed through bridging. This was further established by the finding that thematic, or task-specific, interaction in online communities built more bonding social capital, while interactions around more general teaching issues developed bridging social capital (Ranieri et al. 2012; mid WoE).

School climate (21). About a third of the studies in this review put forward school climate as an essential enabling factor for social capital. School leaders are encouraged to build an atmosphere of trust and respect between teachers (Anderson, 2008; high WoE; Dudley, 2013; mid WoE) and promote teacher wellbeing (Qvortrup, 2016; mid WoE) to improve teacher retention (Fagerlind et al., 2013; Qvortrup, 2016; Roffey, 2012; all mid WoE) and student wellbeing (Roffey, 2012; mid WoE). The argument is that teacher and student wellbeing are two sides of the same coin, which means that schools should support teachers' wellbeing to promote wellbeing for students (Roffey, 2012; mid WoE). A supportive learning climate is also vital for enabling new teachers to access and build social capital, which will affect both performance and professional competence (Civis et al., 2019; high WoE)

A trusting school climate that allows teachers to try out novel ideas is also beneficial for the implementation, and pedagogical use, of new technology (Li and Choi 2014; high WoE), and ‘social capital cannot be infused nor can it be enacted from external authorities; rather, it can only be nurtured over time from within the school organization.’ (Li and Choi 2014, p. 14). A school climate of learning and trust is also needed to promote the relations needed to provide teachers with access to the research/evidence-based social capital that resides within a school (Brown et al., 2016; high WoE).

Organisational support (23). More than a third of the articles identify the role of organisational support for enabling social capital. This can be either through fostering the socio-emotional side of support through linking or vertical social capital between teachers and school leaders (Pil & Leana, 2009; high WoE; Druken 2015; mid WoE) or by providing organisational support structures through providing guidance and support for mentoring programmes (Christensen, 2013; mid WoE; Tang et al., 2016; mid WoE) collaborative practices for professional development (Chapman et al. 2016; high WoE; Dudley 2013; mid WoE; Visone et al. 2019; mid WoE) and peer leadership (Dudley 2013; Coburn & Russel 2008; Osmond-Johnson 2017; all mid WoE). Holding a formal leadership position, particularly a subject-specific leadership position makes a teacher more likely to be sought out for instructional advice (Spillane et al., 2015; high WoE). In addition, the overall interaction between teachers working in schools with formally assigned leaders is both more frequent and more profound (Coburn & Russel; 2008; mid WoE). Organisational support is also essential for exploring the structural holes in the organisation that promote bridging social capital (Baker-Doyle & Yoon, 2011; high WoE) and teacher wellbeing and teacher retention (Edinger & Edinger, 2018; high WoE; Glazer, 2018; mid WoE).

Stability in employment practices (5). Findings in this category show that since social capital is built through interaction over time, one way to enable social capital is to promote stability in employment practices, allowing for teachers to build social progressively (Daly et al., 2014; Leana & Pil, 2006; Pil & Leana, 2009; all high WoE). There is also evidence that this is especially important in schools in deprived areas where turnover rates are higher and teachers' collective experience is lower (Allen & Sims, 2018; mid WoE; Pil & Leana, 2009; high WoE).

Teachers' use of decisional capital, i.e. the ability to make sound judgements even when there are no rules or guidance, becomes especially problematic in the light of high turnover rates, as it can only be developed through years of experience (Galosy & Gillespie, 2013; mid WoE). Rather than changing membership frequently, managers should attempt to facilitate deep-level similarity by allowing teams to develop a shared history by increasing contact among members (van Emmerik et al., 2011; high WoE).

Barriers to social capital.

This review has identified nine categories of barriers to teacher social capital, again occurring at the individual, group, or organisational level, as illustrated in Table 4. While most of the barriers are reversions of the enablers or a lack of a specific enabler, two barriers stand out, namely network closure and government policy. These will be explained and exemplified in the sections below.

Table 4. Barriers to Social Capital among Teachers.

Barriers	Studies
Individual level factors	
Lack of teacher agency (10)	*WoE high:* Pedder et al. 2005; *WoE mid:* Dudley 2013; Fox & Wilson 2015; Glazer 2018; Naicker et al. 2016; Rehm & Notten 2016; Tang et al. 2016; Tseng & Kuo 2014; Wong 2018.
Lack of principal agency (5)	*WoE high:* Minckler 2014; Woodland & Mazur 2019a; *WoE mid:* Dudley 2013; Naicker et al. 2016; Tang et al. 2016.
Group level factors	
Network closure (4)	*WoE high:* Daly et al. 2014; Schiff et al. 2015; *WoE mid:* Leat et al. 2006; Nisar & Maroulis 2017.
Organisation level factors	
Poor team/group/network structures (26)	*WoE high:* Anderson 2008; Baker-Doyle & Yoon 2011; Edinger & Edinger 2018; Leana & Pil 2006; Minckler 2014; Pedder et al. 2005; Pil & Leana 2009; Schiff et al. 2015; van Emmerik et al. 2011; van Maele & Van Houtte 2011; Woodland & Mazur 2019a; Yoon et al. 2017; *WoE mid:* Christensen et al. 2018; Dudley 2013; Fetter et al. 2012; Fox & Wilson 2015; Galosy & Gillespie 2013; Hofman & Dijkstra. 2010; Johnson et al. 2011; Kempen & Steyn 2017; Li 2010; Modipane & Themane 2014; Osmond-Johnson 2017; Qvortrup 2016; Ranieri et al. 2012; van den Beemt & Diepstraten 2016.

Lack of access to expertise (17)	*WoE high:* Anderson 2008; Baker-Doyle & Yoon 2011; Leana & Pil 2006; Li & Choi 2014; Neugebauer et al. 2019; Pil & Leana 2009; Schiff et al. 2015; Yoon et al. 2017; *WoE mid:* Druken 2015; Dudley 2013; Galosy & Gillespie 2013; Hofman & Dijkstra. 2010; Johnson et al. 2011; Leat et al. 2006; Osmond-Johnson 2017; Ranieri et al. 2012; van den Beemt & Diepstraten 2016.
Poor school climate (14)	*WoE high:* Anderson 2008; Edinger & Edinger 2018; Kodzi et al. 2014; Minckler 2014; Schiff et al. 2015; van Maele & Van Houtte 2011; *WoE mid:* Allen & Sims 2018; Beard et al. 2010; Dudley 2013; Fagerlind et al. 2013; Leat et al. 2006; Modipane & Themane 2014; Qvortrup 2016; Roffey 2012;
Lack of organisational support (9)	*WoE high:* Minckler 2014; *WoE mid:* Christensen et al. 2018; Dudley 2013; Fox & Wilson 2015; Glazer 2018; Leat et al. 2006; Modipane & Themane 2014; Tang et al. 2016; van den Beemt & Diepstraten 2016.
High turn-over rates (6)	*WoE high:* Daly et al. 2014; Leana & Pil 2006; Pil & Leana 2009; Schiff et al. 2015; *WoE mid:* Allen & Sims 2018; Modipane & Themane 2014.
Government policy (2)	*WoE high:* Frank et al. 2004; Penuel et al. 2009.

Group level barriers

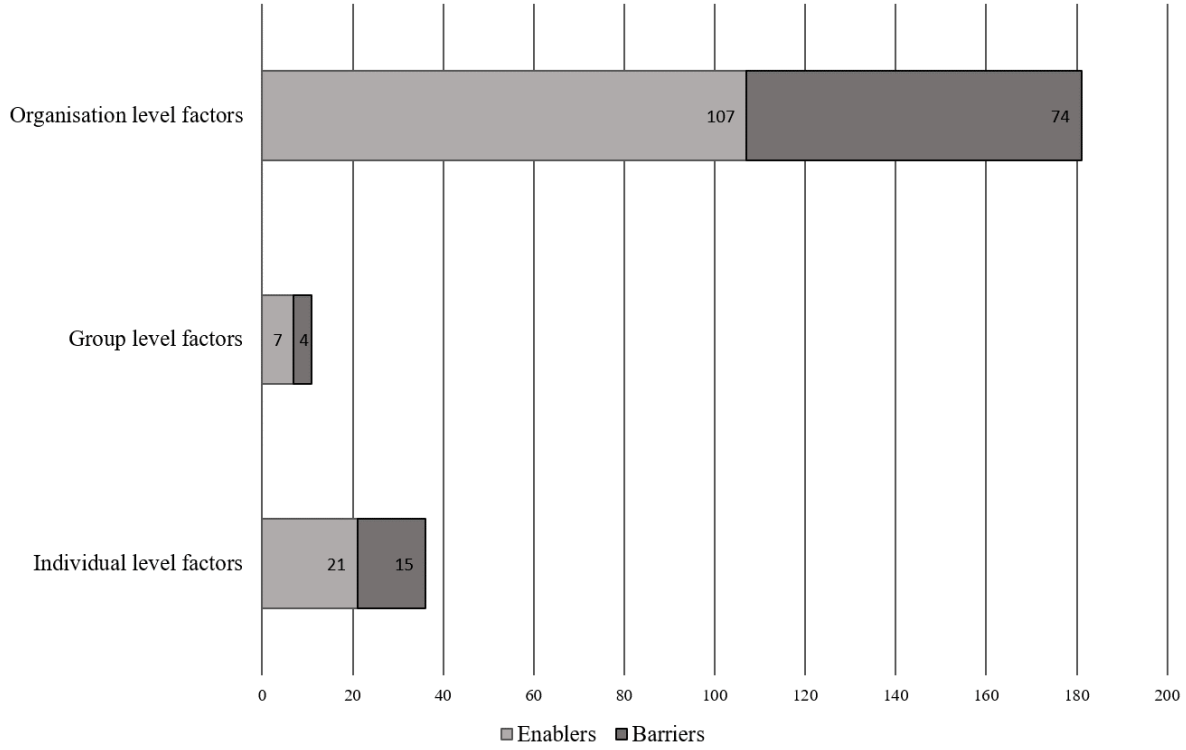
Network closure (4). In line with the theory of the strength of weak ties (Borgatti & Halgin, 2011; Granovetter, 1977), structural holes (Burt, 2000), and isolation of experts (Portes, 1998), one barrier to the effective building of social capital that is put forward in this review is the risk of network closure. If there are too many mutual relationships in a network, this may indicate that the system is closed and less open to new ideas. In other words, too much bonding may indicate a lack of bridging, i.e. failing to reach out beyond the immediate network borders for inspiration and influx of innovation, which may signal lower student achievement (Daly et al. 2014; high WoE). A similar argument put forward by Schiff et al. (2015; high WoE) who refer to this as the risk of isolation of experts, while Leat et al. (2006; mid WoE) argue that too strong lateral trust (bonding) between teachers, combined with weak vertical trust (linking) between teachers and school management can result in resistance to leaders.

Organisation level barriers

Government policy (2). Another barrier identified by two studies in this review is that government policies sometimes may hinder social capital cultivation. For example, an increased dependency on high stakes testing may inhibit teachers from exposing themselves to the risks of innovation (Frank et al. 2004; high WoE; Penuel et al. 2009; mid WoE), and multiple innovation and reform initiatives implemented at the same time may ‘drain the stores of social capital’ (Frank et al. 2004, p. 163; high WoE).

The synthesis of enablers and barriers has shown that organisation level factors are more commonly identified as enabling or hindering social capital in the items in this review than individual or group level factors. This is illustrated in Figure 4 below, which shows the number of times enablers on the different levels are referred to in the included items.

Figure 4. Synthesis of Enablers and Barriers.



Discussion

This literature review set out to systematically synthesise empirical studies carried out between 2004 and 2019 on social capital for professional learning. Through the search process detailed above, 66 studies were identified for providing answer to the review questions. In this section, the results of the review will be summarised and discussed, and avenues for further research will be suggested. But first, a note on limitations. All endeavours to review research literature are inevitably partial and limited by search terms and sources. Moreover, interpretations of research are always influenced by the perspectives of the authors and readers. When synthesising literature, it is impossible to do full justice to each item or body of work. However, this review has employed a systematic approach that aims to reduce the risks of bias and ensure rigour and relevance of included items.

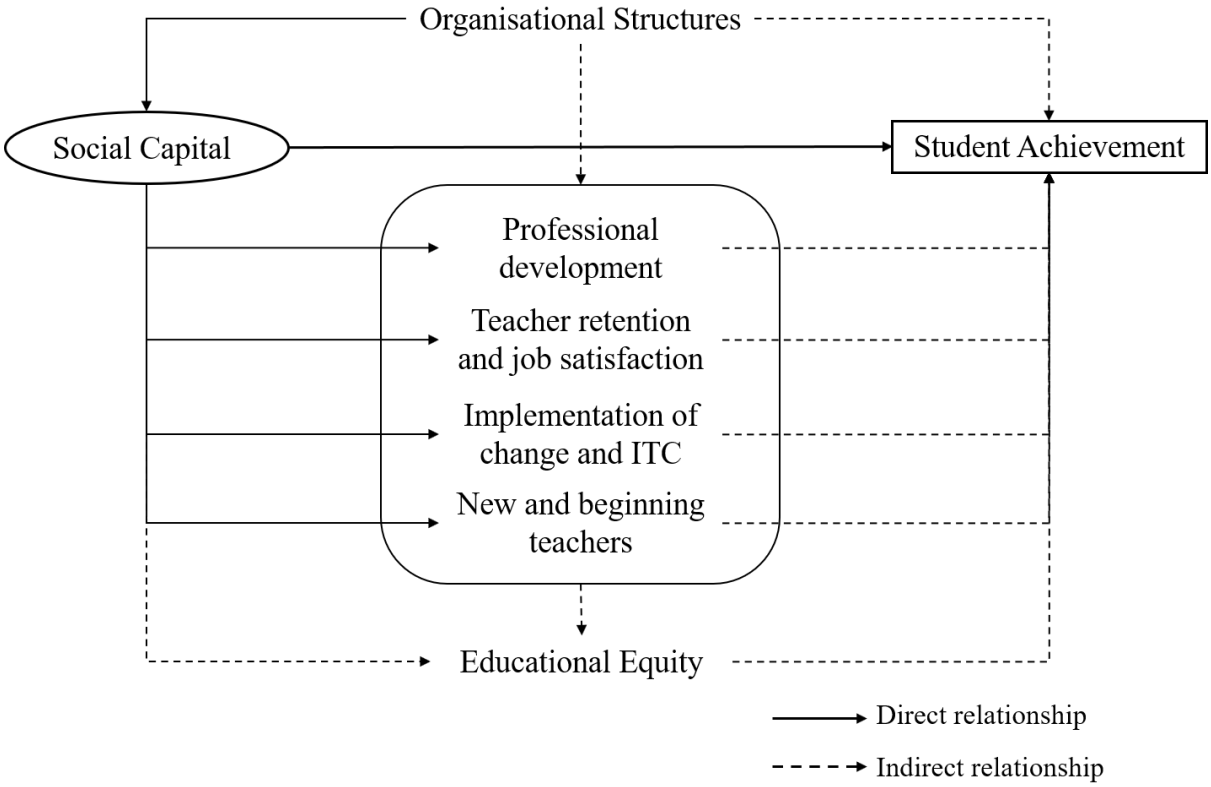
This review's findings establish the important role of teacher social capital for promoting five categories of outcomes: teacher professional development, implementation of change, teacher retention and job satisfaction, the successful introduction of new and beginning teachers, and improved student achievement. Findings also point to the implicit outcome of teacher social capital for reducing the disadvantage of students of low SES and promoting educational equity. A synthesis of enablers and barriers has identified factors operating on the individual, group, and organisation level that influence teachers' ability to build and access social capital. Not only are the organisational level factors more commonly identified as enabling or hindering teacher social capital, but more importantly, they are pervasive. The individual and group level factors are heavily influenced or even trumped, by organisation level factors, both in terms of shaping the conditions for social capital (e.g. Spillane et al. 2015; high WoE) and in terms of networking behaviours (e.g. Schiff et al., 2015; high WoE; Woodland & Mazur, 2019; high WoE). In addition, many of the organisation level factors, like access to expertise and organisational support, are contingent on the school's formal organisational structure. How the school is organised will affect teachers' ability to build and access social capital, both in terms of who they are likely to form and maintain ties with (Spillane 2012; high WoE; Bridwell-Mitchell & Cooc 2016; high WoE), what kind of expertise they can access and share and to what extent they are exposed to colleagues with different types of expertise (Baker-Doyle et al., 2011; Penuel et al., 2009; mid WoE; (Galosy & Gillespie, 2013; Schiff et al., 2015). Organisational structures will also influence teachers' chances to build social capital over time in terms of employment practices (Allen & Sims 2018; mid WoE; Daly et al. 2014; high WoE; Pil & Leana 2009; high WoE), and the availability of formal support structures through, e.g., mentoring programmes and formalised peer leadership roles (Tang et al. 2016; mid WoE; Coburn & Russell 2008; mid WoE)

Further, studies in this review have highlighted the benefit of task-specific interaction (Daly et al., 2014; Galosy & Gillespie, 2013; Leana & Pil, 2006; Neugebauer et al., 2019; Pil & Leana, 2009) and similarity of team members (van Emmerik et al., 2011; Van Maele & Van Houtte, 2011) for the effective building of social capital. A smaller number of articles have put forward a potential risk with promoting sameness and task-specific interaction (bonding social capital) as an increased number of reciprocal relationships may indicate lower student achievement (Daly et al., 2014; Schiff et al., 2015).

The review reveals that generic interactions build more bridging social capital and thematic interactions more bonding social capital (Neugebauer et al., 2019; Ranieri et al., 2012). This suggests that different organisational structures like grade-level teams, cross-grade-level teams, subject departments and mixed-subject teams will be more or less effective for promoting different social capital dimensions such as bonding and bridging.

In other words, organisational structures will moderate the relationship between teacher social capital and the outcomes that it has been associated with. This leads to a new illustration of variable association, as shown in Figure 5.

Figure 5. New Illustration of Variable Association.



As suggested in Figure 5, organisational structures moderate the relationship between social capital and student achievement in that it affects the effective building of and access to social capital among teachers, which in turn promotes the outcomes related to social capital, which directly or indirectly will promote student achievement and educational equity.

Given the critical role of organisational structures for promoting social capital and its associated outcomes, it is worth noting that few items in this review pay attention to the organisational structures of the schools studied. Even less is said about the potential impact of these structures on the building of social capital amongst teachers within them. It seems taken for granted that schools are organised in a certain, almost universal, way. There are mentions of departments and grade-level teams in the studies, but few engage in any further discussion of what these departments or grade-level teams look like in terms of, e.g., composition and size. Even less is said about how the organisation of these teams/groups/departments influence the building of social capital among their members.

Intrigued by the little reference made to the organisational structure of the schools studied in this review, a brief synthesis was carried out. Out of the 66 items in this review, less than a fifth (13 of 66) make reference to the organisational structure of the schools studied. And among the studies that do, a majority do so by highlight an organisational structure that somehow deviates from the norm or is seen as an alternative structure, e.g. where teachers of different subjects worked together instead of in same-subject departments in secondary schools (Nisar & Maroulis, 2017; van Emmerik et al., 2011). As shown earlier in Figure 2 (Surface Characteristics of Included Items), few studies in this review targeted teachers of particular subjects, which means that the content of interaction between the teachers is seldom specified, more than as interactions around teaching or teaching advice. Given the identified benefit of fostering task-specific, close-to-classroom, content-rich interactions among teachers, this lack of insight into these interactions' specific content represents a gap in existing research on teacher social capital and its potential effect on student achievement.

Implications for Future Research

First, this review calls for empirical research that can contribute to our understanding of teacher social capital in relation to the organisational structure of the schools in which they operate. Future research could investigate the effects of different organisational structures such as grade-level teams, cross-grade-level teams, subject departments, and mixed-subject teams on social capital building among teachers. This would also answer Spillane et al.'s (2012) call for research investigating teachers' tie-formation in schools that have primarily grade-level specific routines with teachers in schools where organisational routines cut across grades. In secondary school settings, such research could involve teachers in traditional subject departments and teachers working in student-centred, mixed-subject teams. It would also be valuable to extend existing research to include teachers of specific subjects other than maths and science.

Studying the impact of different organisational structures could also add to the theory of the strength of weak ties (Borgatti & Halgin, 2011; Granovetter, 1977) by exploring the effects of teacher interactions within and outside these settings. Even though close-knit, more homogenous communities foster greater degrees of emotional support, some suggest that weakly-linked, heterogeneous networks tend to be more innovative (Baker-Doyle, 2010).

Addressing the issue of organisational structures might also shed light on the definition of networks. Many scholars in this review suggest participation in networks as beneficial to teacher social capital. However, many of the 'networks' referred to seem to be inhabited by members of departments or grade-level teams. While such constellations are seldom voluntary, networks do not have 'natural boundaries' (Borgatti & Halgin, 2011, p. 1170). Looking at the impact of formally assigned groups and teams allows for an analysis of barriers and hierarchies that social network theory often lacks consideration for.

More studies are also needed to establish the indirect links between different social capital outcomes on student achievement. Here triangulation of data could be useful, triangulating for example, social capital, teacher retention, and student achievement, or including the experiences or voices of students when studying the relationship between social

capital and, e.g., professional development. How are the learning gains for teachers translated into learning gains for students?

Second, several studies in this review have pointed to the implicit outcome of teacher social capital on educational equity. For example, a recent review revealed the importance of contextual resources for leadership for professional learning in order to promote more equitable learning outcomes (Poekert et al., 2020). Future research could explore how social capital can help build, utilise, and share such contextual resources in pursuit of educational equity.

Third, this review has methodological implications. Research methods across the studies in this review were diverse. However, given the many dimensions of social capital: the structural, cognitive, relational and expressive dimensions, and the elements of bonding, bridging, and linking, there is no standard for analysing or measuring social capital among teachers. This review has shown that the applications of social capital and the proxies by which it has been measured are diverse. Some studies use SNA to map the social networks of teachers (Coburn & Russel, 2008), the density of advice networks (Daly et al., 2014) or teachers' position within the networks (Baker-Doyle & Yoon, 2010; Edinger & Edinger, 2018). Others measure the number, frequency, and depth of interactions between teachers (Pil & Leana, 2009) or use levels of trust or peer pressure among teachers as proxies for social capital. Some study advice-seeking patterns (Nisar & Maroulis, 2017; Wilhelm et al., 2016), access to resources and expertise (Ranieri, 2012; Rehm & Notten, 2016; Hu et al., 2018; Fetter et al., 2012) or networking time (Schiff et al., 2015). Yet others look at the shared understandings, common goals, or collective beliefs (van Maele & van Houtte, 2011) or collegiality norms (Minckler, 2014) as indicators of social capital. Another important avenue for further research is thus to develop context-sensitive theoretical frameworks for understanding teacher social capital and more elaborate measures.

Finally, even though the findings from this review show that in-school, formalised interaction is still the bread and butter of teacher networks (Schiff et al., 2015; Woodland & Mazur, 2019a), the current pandemic has pushed the boundaries of teaching. Possibly it has even pushed the boundaries of what we perceive as in-school teaching. Online communities will play an increasingly important role in teachers' professional development. As teaching moves more and more online, research studies could investigate or try to understand what this means for teachers' ability to build and access social capital in the future. For example, future research could look at how bonding, bridging, and linking social capital are being promoted in the online environment of teacher interactions.

Implications for Practice

First, this review's findings establish the role of social capital among teachers for several desired outcomes, not least its direct and indirect effect on improved student achievement and its role in reducing disadvantage and promoting educational equity. In addition, the review sheds light on important organisational issues at the school level, such as the deliberate use of formally assigned teams and groups for promoting informal teacher interactions that build social capital. This becomes especially interesting in light of reform initiatives in the 1990s and early 2000s that strived to increase teachers' overall interactions by reorganising from

subject departments to mixed-subject teams (Elmore et al., 1997; Long, 1996). Reformers hoped that these changes would create professional learning communities that would support ongoing teacher learning. Unfortunately, this has not always been the case (Johnson et al., 2011). Instead, teachers in reorganised schools often continue to interact predominantly with teachers of their own subjects (Scharmann, 2007; Siskin, 1995). The persistence of subject department interactions reveals a more complex picture of how teachers interact. Instead of analysing the total amount of interactions in a school, researchers and practitioners should take a closer look at who is interacting with whom (Johnson et al., 2011).

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Declaration of competing interest

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Appendix 1. Excluded Items with Reasons.

Total number of excluded items (249)				
Not on population (125)	**Not on population (continued)**	**Not in context (53)**	**Not on topic (43)**	**Not empirical (23)**
Alfrey et al., 2020	Lamb et al., 2016	Abbot et al., 2018	Blignaut, Els, & Howie, 2010	Adolfsson & Håkansson, 2019
Allan & Catts, 2014	Layte, 2017	Ajakaiye & Kimenyi, 2011	Bojczyk et al., 2019	Azorin & Muijs, 2017
Allan, 2011	Lin & Tsai, 2020	Ankiah-Gangadeen & Samuel, 2014	Brogan, 2013	Baker-Doyle, 2010
Ameri & Ghahari, 2018	Liou et al., 2017	Babich et al., 2008	Burgess, 2016	Blackmore, 2010
Andrzejewski et al., 2016	Liu & Tannacito, 2013	Barnes & Nolan, 2019	Claussen & Osborne, 2013	Collinson, 2012
Beddoe, 2019	Loh & Tam, 2016	Benbow & Lee, 2019	Collinson, 2012	Conway et al., 2013
Belfi et al., 2015	López Solé et al., 2018	Bhattacharyya & Shariff, 2014	El Kadri & Roth, 2015	Coupal, 2004
Black et al., 2010	Lunneblad & Johansson, 2012	Boit et al., 2020	Faneca et al., 2016	Hall, 2019
Black et al., 2018	Lynch et al., 2018	Brooks & Everett, 2008	Fuchs et al., 2017	Hargreaves & Fullan, 2020
Bonal & Tarabini, 2016	McManus & Suizzo, 2020	Cawley & Speiss, 2008	Garrett & MacGill, 2019	Johnson, 2012
Bonde et al., 2018	Morel & Coburn, 2019	Coelho Junior et al., 2020	Ghajarieh & Cheng, 2011	Kaser & Halbert, 2014
Brader et al., 2014	Moskal, 2016	Edgington, 2016	Goggins et al., 2011	Lambert & Biddulph, 2015
Broadbent & Cacciattolo, 2013	Murray et al. 2020	Edwards, 2019	Hamoudi & Birdsall, 2004	Liou & Canrinus, 2020
Brouwer et al., 2020	Nordstrom, 2019	Ellis et al., 2014	Harber & Mncube, 2011	Lloyd & Davis, 2018
Brown et al., 2011	Olitsky et al., 2010	Ferrinho et al., 2011	Imran et al., 2018	Marin, 2013
Brown, 2005	Park et al., 2016	Geagea et al., 2019	Jackson & Povey, 2015	Nolan & Molla, 2017
Campbell et al., 2018	Passarelli, 2008	Glickman & Scally, 2008	Jager, 2011	Rincon-Gallardo & Fullan, 2016
Cardoso et al., 2011	Pearrow et al., 2016	Hillyard & Bagley, 2013	Janthaluck & Ounjit, 2012	Rotherham et al., 2008
Carter-Thuillier et al., 2018	Pedder & McIntyre, 2006	Ince, 2019	Karlberg-Granlund, 2019	Schreurs & Laat, 2014

Caughy et al., 2012
Chambers & Sandford, 2019
Compton-Lilly & Delbridge, 2019
Cun, 2020
Czop Assaf & O'Donnel Lussier, 2020
Dahl, 2014
Daly, 2018
Daniels, 2017
Durand, 2011
Emam & Alkharusi, 2018
Erjavec, 2013
Everington, 2015
Fairbanks & Ariail, 2006
Fakoyede & Otulaja, 2020
Ferguson, 2018
Francescato et al., 2007
Francis et al., 2017
Gamoran et al., 2012
Gao, 2012
Garcia-Aracil et al., 2016
Goldenberg, 2014
Graham et al., 2019
Hadidi & Al Khateeb, 2013
Pels & de Ruyter, 2012
Peterson & Heywood, 2007
Pillay, 2015
Pulkkinen et al., 2011
Quarmby et al., 2019
Rafalow, 2018
Rawatlal & Petersen, 2012
Rizk & Hillier, 2020
Roberts-Mahoney et al., 2016
Rose et al., 2013
Saaranen et al., 2006
Schuchart, 2013
Seiler & Elmesky, 2007
Serpell & Jere-Folotiya, 2008
Shen et al., 2014
Širca et al., 2018
Skilton et al., 2016
Snow et al., 2015
Subotnik et al., 2011
Symeou, 2008
Tannehill, 2016
Teo et al., 2018
Thomas & Watters, 2015
Jahanian, 2013
Kangas et al.,2015
Kouritzin et al., 2009
Kubota, 2011
Lanford & Maruco, 2018
Liu, 2018
Lypka, 2018
MacKenzie et al., 2010
Maggi et al., 2011
Mebane et al., 2008
Naidoo, 2009
Nolan & Molla, 2017
Nolan & Molla, 2018a
Nolan & Molla, 2018b
Palsdottir, 2017
Pedro et al., 2020
Qiang et al., 2017
Rheinlander et al., 2015
Rhodes & Schechter, 2014
Rienties & Hosein, 2015
Rienties & Kinchin, 2014
Rienties et al., 2015
Saqr et al., 2018a
Kempf, 2014
Kozleski & Proffitt, 2020
Lee & Cheung, 2017
Llantos & Estuar, 2018
Maistry, 2010
Maistry, 2014
Marklund, 2020
Mazur & Woodland, 2017
Mellin et al., 2017
Modiba & Stewart, 2014
Montecinos et al., 2014
Nayatuka, 2017
Novelli & Sayed, 2016
Parhar & Sensoy, 2011
Pokludova, 2008
Spellman, 2015
Twyford et al., 2017
Uhlmann, 2011
Wang et al., 2018
Wenner et al., 2019
Williams & Pill, 2020
Williams et al., 2020
Wisdom et al., 2019
Shirley, 2016
Staudt et al., 2013
West, 2019
Whipp et al., 2005
White, 2015
Zajda, 2014

No full text available (1)
Lee et al., 2014

Not in English (1)
Gállego-Diéguez et al., 2016

Inadequate relevance (2)
Reichenberg & Andreassen, 2018
Stranger-Johannessen, 2017

Inadequate quality (1)
Karagiorgi & Lymbouridou, 2009

Hall, 2010
Hardie, 2018
Hardy, 2016
Hawkins, 2005
Hayes, 2010
Heilig, 2011
Henry, 2016
Hunter, 2015
Ines Meo, 2011
Ishimaru, 2013
Ishimaru, 2014
Jober, 2017
Jonasson, 2011
Jones & Enriquez, 2009
Jorgensen et al., 2014
Jurow et al., 2019
Keller, 2019
Kelley & Lee, 2018
Koranteng et al., 2019
Krauss et al., 2020
Kutnick & Kington, 2005
Tobin, 2005
Tolbert & Eichelberger, 2016
Trainor, 2008
Uddin, 2017
van der Merwe, 2011
Varelas et al., 2011
Wang & Mansouri, 2017
Whitaker & Hoover-Dempsey, 2013
Wilkinson et al., 2013
Wilkinson et al., 2020
Wilson & Stemp, 2008
Wrench et al., 2013
Yaacob et al., 2015
Yakavets, 2014
Yan et al., 2020
Ye et al., 2020
Yin & Mu, 2020
Yin et al., 2019
Zeichner & Hollar, 2016
Zheng et al., 2017
Saqr et al., 2018b
Shoji et al., 2014
Somporn et al., 2018
Tamakloe, 2018
Tran & Soejatminah, 2016
van Waes et al., 2016
Wall et al., 2017
Wiggins, 2018
Zapata & Hargreaves, 2018
Zhang & Fang, 2019
Zhu et al., 2010
Woolworth, 2008

Appendix 2. Weight of Evidence Scores of Included Items.

Author/s	Title	Journal	WoE A	WoE B	WoE C	WoE D
Bridwell-Mitchell & Cooc (2016).	The Ties That Bind: How Social Capital Is Forged and Forfeited in Teacher Communities.	*Educational Researcher, 45(1), 7–17.*	3	3	3	3 (high)
Brown et al. (2016).	Improving trust, improving schools Findings from a social network analysis of 43 primary schools in England.	*Journal of Professional Capital and Community, 1(1), 69–91.*	3	3	3	3 (high)
Chapman et al. (2016).	Professional capital and collaborative inquiry networks for educational equity and improvement?	*Journal of Professional Capital and Community, 1(3), 178–197.*	3	3	3	3 (high)
Civís et al. (2019).	Collaborative and innovative climates in pre-service teacher programs: The role of social capital.	*International Journal of Educational Research, 98, 224–236.*	3	3	3	3 (high)
Daly et al. (2014).	Accessing Capital Resources: Investigating the Effects of Teacher Human and Social Capital on Student Achievement.	*Teachers College Record*, *116*(7).	3	3	3	3 (high)
Edinger & Edinger (2018).	Improving Teacher Job Satisfaction: The Roles of Social Capital, Teacher Efficacy, and Support.	*The Journal of Psychology*, *152*(8), 573–593.	3	3	3	3 (high)
Frank et al. (2004).	Social Capital and the Diffusion of Innovations Within Organizations: The Case of Computer Technology in Schools.	*Sociology of Education, 77(2), 148–171.*	3	3	3	3 (high)
Leana & Pil (2006).	Social Capital and Organizational Performance: Evidence from Urban Public Schools.	*Organization Science*, *17*(3), 353–366.	3	3	3	3 (high)
Li & Choi (2014).	Does social capital matter? A quantitative approach to examining technology infusion in schools.	*Journal of Computer Assisted Learning*, *30*(1), 1–16.	3	3	3	3 (high)
Minckler (2014).	School leadership that builds teacher social capital.	*Educational Management Administration &*	3	3	3	3 (high)

		Leadership, *42*(5), 657–679.				
Neugebauer et al. (2019).	Social Sources of Teacher Self-Efficacy: The Potency of Teacher Interactions and Proximity to Instruction.	*Teachers College Record, 121*(4).	3	3	3	3 (high)
Pil & Leana (2009).	Applying Organizational Research to Public School Reform: The Effects of Teacher Human and Social Capital on Student Performance.	*Academy of Management Journal*, *52*(6), 1101–1124.	3	3	3	3 (high)
Salloum et al. (2017).	Social Capital in Schools: A Conceptual and Empirical Analysis of the Equity of Its Distribution and Relation to Academic Achievement.	*Teachers College Record, 119(7).*	3	3	3	3 (high)
Schiff et al. (2015).	Teacher Networks in Philadelphia: Landscape, Engagement, and Value.	*Penn GSE Perspectives on Urban Education*, *12*(1).	3	3	3	3 (high)
Spillane et al. (2015).	Intra- and Interschool Interactions about Instruction: Exploring the Conditions for Social Capital Development.	*American Journal of Education, 122(1), 71–110.*	3	3	3	3 (high)
Spillane et al. (2012).	Instructional Advice and Information Providing and Receiving Behavior in Elementary Schools: Exploring Tie Formation as a Building Block in Social Capital Development.	*American Educational Research Journal, 49(6), 1112–1145.*	3	3	3	3 (high)
Spillane et al. (2018).	Constructing "Experts" Among Peers: Educational Infrastructure, Test Data, and Teachers' Interactions About Teaching.	*Educational Evaluation and Policy Analysis, 40(4), 586–612.*	3	3	3	3 (high)
Struyve et al. (2016).	More than a mentor: The role of social connectedness in early career and experienced teachers' intention to leave.	*Journal of Professional Capital and Community, 1(3), 198–218.*	3	3	3	3 (high)
van Emmerik et al. (2011).	Social capital, team efficacy and team potency: The mediating role of team learning behaviors.	*Career Development International*, *16*(1), 82–99.	3	3	3	3 (high)

Van Maele & Van Houtte (2011).	Collegial Trust and the Organizational Context of the Teacher Workplace: The Role of a Homogeneous Teachability Culture.	*American Journal of Education*, *117*(4), 437–464.	3	3	3	3 (high)
Woodland & Mazur (2019a).	Of Teams and Ties: Examining the Relationship Between Formal and Informal Instructional Support Networks.	*Educational Administration Quarterly*, *55*(1), 42–72.	3	3	3	3 (high)
Woodland & Mazur (2019b).	Examining capacity for "cross-pollination" in a rural school district: A social network analysis case study.	*Educational Management Administration & Leadership, 47(5), 815–836.*	3	3	3	3 (high)
Yoon et al. (2017).	The Effects of Teachers' Social and Human Capital on Urban Science Reform Initiatives: Considerations for Professional Development.	*Teachers College Record*, *119*(4).	3	3	3	3 (high)
Anderson (2008).	Social capital and student learning: Empirical results from Latin American primary schools.	*Economics of Education Review*, *27*(4), 439–449.	2	3	3	2.67 (high)
Baker-Doyle & Yoon (2011).	In search of practitioner-based social capital: a social network analysis tool for understanding and facilitating teacher collaboration in a US-based STEM professional development program.	*Professional Development in Education*, *37*(1), 75–93.	3	2	3	2.67 (high)
Kodzi et al. (2014).	Social relations as predictors of achievement in math in Kenyan primary schools.	*International Journal of Educational Development*, *39*, 275–282.	3	3	2	2.67 (high)
Pedder & James (2005).	How teachers value and practise professional learning.	*Research Papers in Education*, *20*(3), 209–243.	3	2	3	2.67 (high)
Allen & Sims (2018).	Do pupils from low-income families get low-quality teachers? Indirect evidence from English schools.	*Oxford Review of Education*, *44*(4), 441–458.	3	2	2	2.33 (mid)
Beard et al. (2010).	Academic optimism of individual teachers: Confirming a new construct.	*Teaching and Teacher Education*, *26*(5), 1136–1144.	3	2	2	2.33 (mid)

Cabezas et al. (2017).	First job and the unequal distribution of primary school teachers: Evidence for the case of Chile.	*Teaching and Teacher Education, 64, 66–78.*	3	2	2	2.33 (mid)
Coburn & Russell (2008).	District Policy and Teachers' Social Networks.	*Educational Evaluation and Policy Analysis*, *30*(3), 203–235.	3	2	2	2.33 (mid)
Dudley (2013).	Teacher learning in Lesson Study: What interaction-level discourse analysis revealed about how teachers utilised imagination, tacit knowledge of teaching and fresh evidence of pupils learning, to develop practice knowledge and so enhance their pupils' learning.	*Teaching & Teacher Education*, *34*, 107–121.	3	2	2	2.33 (mid)
Fagerlind et al. (2013).	Experience of work-related flow: Does high decision latitude enhance benefits gained from job resources?	*Journal of Vocational Behavior*, *83*(2), 161–170.	3	2	2	2.33 (mid)
Farooq et al. (2007).	Sustaining a community computing infrastructure for online teacher professional development: A case study of designing tapped in.	*Computer Supported Cooperative Work (CSCW)*, *16*(4–5), 397–429.	3	2	2	2.33 (mid)
Fetter et al. (2012).	Using peer–support to connect learning network participants to each other: an interdisciplinary approach.	*International Journal of Learning Technology*, *7*(4), 378–399.	3	2	2	2.33 (mid)
Galosy & Gillespie (2013).	Community, Inquiry, Leadership: Exploring Early Career Opportunities That Support STEM Teacher Growth and Sustainability.	*Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *86*(6), 207–215.	3	2	2	2.33 (mid)
Nisar & Maroulis (2017).	Foundations of Relating: Theory and Evidence on the Formation of Street-Level Bureaucrats' Workplace Networks.	*Public Administration Review, 77*(6), 829–839.	3	2	2	2.33 (mid)
Penuel et al. (2009).	Analyzing Teachers' Professional Interactions in a School as Social Capital: A Social Network Approach.	*Teachers College Record, 111(1), 124–263.*	2	3	2	2.33 (mid)

Qvortrup (2016).	Capacity building: data- and research-informed development of schools and teaching practices in Denmark and Norway.	*European Journal of Teacher Education*, *39*(5), 564–576.	3	2	2	2.33 (mid)
Rehm & Notten (2016).	Twitter as an informal learning space for teachers!? The role of social capital in Twitter conversations among teachers.	*Teaching and Teacher Education*, *60*, 215–223.	3	2	2	2.33 (mid)
Roffey (2012).	Pupil wellbeing—Teacher wellbeing: Two sides of the same coin?	*Educational and Child Psychology*, *29*(4), 8–17.	3	2	2	2.33 (mid)
Scanlan et al. (2019).	Affordances and constraints of communities of practice to promote bilingual schooling.	*Journal of Professional Capital and Community, 4(2), 82–106.*	2	3	2	2.33 (mid)
Tseng & Kuo (2014).	A study of social participation and knowledge sharing in the teachers' online professional community of practice.	*Computers & Education*, *72*, 37–47.	3	2	2	2.33 (mid)
Visone (2019).	What teachers never have time to do: Peer observation as professional learning.	*Professional Development in Education, 1–15.*	3	2	2	2.33 (mid)
Wilhelm et al. (2016).	Selecting Expertise in Context: Middle School Mathematics Teachers' Selection of New Sources of Instructional Advice.	*American Educational Research Journal*, *53*(3), 456–491.	3	2	2	2.33 (mid)
Christensen et al. (2018).	Entering the field: beginning teachers' positioning experiences of the staffroom.	*Sport, Education and Society*, *23*(1), 40–52.	2	2	2	2 (mid)
Druken (2015).	Social Capitol, Social Networks, and Lesson Study: Sustaining Mathematics Lesson Study Practices	*North American Chapter of the International Group for the Psychology of Mathematics (p. 37).*	2	2	2	2 (mid)
Fee (2011).	Latino Immigrant and Guest Bilingual Teachers: Overcoming Personal, Professional, and Academic Culture Shock.	*Urban Education*, *46*(3), 390–407.	2	2	2	2 (mid)

Fox & Wilson (2015).	Networking and the development of professionals: Beginning teachers building social capital.	*Teaching & Teacher Education*, *47*, 93–107.	2	2	2	2 (mid)
Glazer (2018).	Learning from those who no longer teach: Viewing teacher attrition through a resistance lens.	*Teaching and Teacher Education*, *74*, 62–71.	2	2	2	2 (mid)
Hofman et al. (2010).	Effective teacher professionalization in networks?	*Teaching & Teacher Education*, *26*(4), 1031–1040.	2	2	2	2 (mid)
Johnson et al. (2011).	Teacher Professional Learning as the Growth of Social Capital.	*Current Issues in Education*, *14*(3).	2	2	2	2 (mid)
Kempen & Steyn (2017).	An Investigation of Teachers' Collaborative Learning in a Continuous Professional Development Programme in South African Special Schools.	*Journal of Asian and African Studies*, *52*(2), 157–171.	2	2	2	2 (mid)
Lane & Sweeny (2018).	Colleagues, Challenges, and Help Provision: How Early Career Teachers Construct Their Social Networks to Help Them with the Endemic Challenges of Teaching.	*The Elementary School Journal, 119(1), 73–98.*	2	2	2	2 (mid)
Leat et al. (2006).	The road taken: professional pathways in innovative curriculum development.	*Teachers & Teaching*, *12*(6), 657–674.	2	2	2	2 (mid)
Li (2010).	Social capital, empowerment and educational change: A scenario of permeation of one-to-one technology in school.	*Journal of Computer Assisted Learning*, *26*(4), 284–295.	2	2	2	2 (mid)
Modipane & Themane (2014).	Teachers' social capital as a resource for curriculum development: lessons learnt in the implementation of a Child-Friendly Schools programme.	*South African Journal of Education*, *34*(4), 1034.	2	2	2	2 (mid)
Naicker et al. (2016).	Schools performing against the odds: Enablements and constraints to school leadership practice.	*South African Journal of Education*, *36*(4).	2	2	2	2 (mid)

Osmond-Johnson (2017).	Leading Professional Learning to Develop Professional Capital: The Saskatchewan Professional Development Unit's Facilitator Community.	*International Journal of Teacher Leadership*, *8*(1), 26–42.	2	2	2	2 (mid)
Osmond-Johnson (2019).	Becoming a teacher leader: Building social capital through gradual release.	*Journal of Professional Capital and Community, 4(1), 66–80.*	2	2	2	2 (mid)
Ranieri et al. (2012).	Why (and how) do teachers engage in social networks? An exploratory study of professional use of Facebook and its implications for lifelong learning.	*British Journal of Educational Technology*, *43*(5), 754–769.	2	2	2	2 (mid)
Tang et al. (2016).	The Preparation of Pre-Service Student Teachers' Competence to Work in Schools.	*Journal of Education for Teaching: International Research and Pedagogy*, *42*(2), 149–162.	2	2	2	2 (mid)
van den Beemt & Diepstraten (2016).	Teacher perspectives on ICT: A learning ecology approach.	*Computers & Education*, *92–93*, 161–170.	2	2	2	2 (mid)
Wong (2018).	Why social capital is important for mentoring capacity building of mentors: a case study in Hong Kong.	*Teachers & Teaching*, *24*(6), 706–718.	2	2	2	2 (mid)
Booth & Kellogg (2015).	Value creation in online communities for educators.	*British Journal of Educational Technology*, *46*(4), 684–698.	2	1	1	1.33 (low)
Hu et al. (2018).	What do teachers share within Socialized Knowledge Communities: A case of Pinterest.	*Journal of Professional Capital and Community, 3(2), 97–122.*	2	1	1	1.33 (low)

Appendix 3. Sample Sizes and Surface Characteristics of Included Items.

Location	Population	Context	Subject area	Method	Sample Size
Australia	Teachers	K-12	All	Qualitative	20-30
Australia	Teachers	Secondary school	P.E.	Qualitative	2
Belgium	Teachers	Secondary school	All	Quantitative	2104
Belgium	Teachers	Secondary school	All	Quantitative	736
Canada	Teachers	K-12	All	Mixed methods	22
Canada	Teachers and others	K-12	All	Qualitative	13
Chile	Teachers	Primary school	All	Mixed methods	340
Denmark and Norway	Teachers, students and principals	K-12	All	Quantitative	ca 10000
England	Teachers	Secondary school	Various	Qualitative	8
England	Teachers and principals	Primary school	English	Qualitative	5
England	Teachers	Secondary school	Science	Qualitative (SNA)	3
England	Teachers	K-12	All	Quantitative	1397
England	Teachers	K-12	All	Quantitative	ca 500000
England	Teachers	Primary school	All	Quantitative	828
Europe	Teachers	Online community	All	Quantitative (SNA)	691
Germany	Teachers	Online community	All	Quantitative (SNA)	4196
Hong Kong	Teachers	K-12	All	Qualitative	12
Hong Kong	Teachers	K-12	All	Qualitative	31
Hong Kong	Teachers	Primary school	All	Qualitative	8
Hong Kong	Teachers	K-12	All	Quantitative	1076
Italy	Teachers	Online community	All	Quantitative	1107
Kenya	Teachers, students	Primary school	Mathematics	Quantitative	70

	and principals				
Latin America	Teachers, students and parents	Primary school	All	Quantitative	100
Netherlands	Teachers	K-12	All	Qualitative	36
Netherlands	Teachers	Secondary school	All	Qualitative	55
Netherlands	Teachers	Secondary school	All	Quantitative	221
Scotland	Teachers	K-12	All	Mixed methods (Longitudinal, SNA)	254
South Africa	Teachers	K-12	All	Qualitative	20
South Africa	Teachers and principals	K-12	Fire safety	Qualitative	All staff in 6 special needs schools.
South Africa	Teachers, students and principals	K-12	All	Qualitative	2
Spain	Teachers	K-12	All	Quantitative	321
Sweden	Teachers and others	Secondary school	All	Quantitative	352
Taiwan	Teachers	Online community	All	Mixed methods	321
USA	Teachers	K-12	All	Mixed methods	183
USA	Teachers	K-12	Mathematics	Mixed methods	80
USA	Teachers	Primary school	All	Mixed methods	ca 700
USA	Teachers	Secondary school	Science	Mixed methods	207
USA	Teachers	Secondary school	Science	Mixed methods	21
USA	Teachers, principals and others	K-12	All	Mixed methods	63
USA	Teachers	Online community	All	Mixed methods (longitudinal)	ca 8000
USA	Teachers	Primary school	All	Mixed methods (Longitudinal)	ca 200

USA	Teachers	Primary school	All	Mixed methods (SNA)	67
USA	Teachers	K-12	All	Qualitative	25
USA	Teachers	K-12	Spanish	Qualitative	31
USA	Teachers	K-12	All	Qualitative	8
USA	Teachers	Online community	All	Qualitative	25
USA	Teachers	Online community	Mathematics	Qualitative	29
USA	Teachers, principals and others	Primary school	All	Qualitative	13
USA	Teachers	Primary school	All	Qualitative (SNA)	18
USA	Teachers	Secondary school	Science	Qualitative (SNA)	16
USA	Teachers, principals and others	Primary school	Mathematics	Qualitative (SNA)	56
USA	Teachers	K-12	All	Quantitative	465
USA	Teachers	K-12	All	Quantitative	ca 1200
USA	Teachers	Primary school	Mathematics	Quantitative	1013
USA	Teachers	Primary school	All	Quantitative	122
USA	Teachers	Primary school	Mathematics and reading	Quantitative	2167
USA	Teachers	Primary school	All	Quantitative	260
USA	Teachers	Primary school	All	Quantitative	63
USA	Teachers and students	K-12	All	Quantitative	ca 1500
USA	Teachers	K-12	All	Quantitative (Longitudinal SNA)	240
USA	Teachers	K-12	All	Quantitative (Longitudinal SNA)	130
USA	Teachers	Primary school	Mathematics	Quantitative (Longitudinal)	345
USA	Teachers	Secondary school	Mathematics	Quantitative (Longitudinal)	109
USA	Teachers	K-12	All	Quantitative (SNA)	1100

USA	Teachers	K-12	All	Quantitative (SNA)	101
USA	Teachers	Primary school	All	Quantitative (SNA)	215