

Working paper: A culture of improvement
Reviewing the research on teacher working conditions

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Please note: this is currently a working paper and we are inviting your feedback while we refine and improve it.

This is a Teacher Development Trust working paper. That is, it is currently a work in progress, offered on this site by the authors, in the interests of scholarship. Working Papers are not refereed.

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Executive Summary

Most existing reviews of professional development literature focus on the *content* and *process* of teacher development. They also tend to draw upon experimental studies based on large interventions. This potentially neglects important findings about how or whether teachers' working conditions affect teachers' improvement, measured in terms of impact upon students' academic attainment, over time.

We reviewed 30 papers on teacher working conditions and school leadership in order to explore the impact of teacher working conditions on student attainment. We find evidence that:

- The quality of teachers' working conditions has a clear, consistent relationship with student attainment that tentatively suggests a causal impact;
- The role of the school leader in fostering these conditions appears to be crucial;
- There are five aspects of teachers' working conditions that appear most closely associated with increased student attainment:
 - Creating opportunities for effective teacher collaboration to explore student data, plan and review lessons and curricula, and plan and moderate assessments,
 - Involving teachers in whole school planning, decision-making and improvement,
 - Creating a culture of mutual trust, respect, enthusiasm in which communication is open and honest,
 - Build a sense of shared mission, with shared goals, clear priorities and high expectations of professional behaviours and of students' learning, and
 - Facilitating classroom safety and behaviour, where disruption and bullying are very rare and teachers feel strongly supported by senior leaders in their efforts to maintain this classroom environment.
- Allocating teachers to the certain partners, mentors, subjects and classes and keeping this stable over time is associated with a positive impact on student attainment;
- The same working conditions appear to be associated with successful, sustainable school turnaround...
- ... and with successful retention of teachers in the profession...
- ... and with successfully navigating the complexities and uncertainties of COVID-19.

We also identified four guiding principles for training leaders around the required skills, the necessity to focus on use of time including meetings, the importance of mentoring and coaching and the importance of an open and communicative culture.

A Culture of Improvement

Introduction

The research behind improving teachers is often focused on processes and structures: what types of courses should be delivered, how are they presented, what follow-up is required and how do the experts or facilitators work with the teachers to embed the ideas?

However, as any professional will know, learning does not only happen in formal training or in structured processes. A lot of learning happens informally and through collaboration. The amount of learning that takes place depends significantly on the teacher's working conditions - the organisational team culture, the approach to leadership, the types of collaboration, the effectiveness of communication, the sharing (or not) of goals and values. In this paper, whilst there is much debate about terminology elsewhere, no distinctions are drawn between "teacher professional development" or "teacher learning" (or indeed any other common term), as we recognise the ways in which teachers improve are complex and not always attributed to specific events or processes.

In this paper we demonstrate that the *context* or *conditions* for professional development are at least as important to consider as the *content* and *process*. To put it another way, it is not enough to consider *what* teachers need to learn. We need to make schools places where teachers thrive and grow so that children can succeed.

Multiple teams of researchers have made significant efforts to summarise the research on the process and content of teacher professional development. In general, these papers review evidence from randomised controlled trials, exploring common characteristics from medium and large scale professional development interventions.

However, these reviews tend to put less emphasis on the many studies that now exist that explore how teachers' reports of their working conditions relate to their professional growth and ability to raise student outcomes.

In this paper we attempt to find, review and summarise findings from some of the major studies in this space. This is not intended to be exhaustive nor systematic, but rather a scoping review which could serve to lay the groundwork for a future more systematic review. We look in particular depth at fourteen studies of teacher working conditions - twelve from the USA, one from Australia and one from a range of International Schools across Cambodia, Indonesia, Singapore, Thailand & Vietnam - which use survey data to identify what is happening in teachers' professional environments and how this correlates with student achievement. Some papers look across multiple years and are able to get closer to causal conclusions, while others are briefer snapshots that can only find correlations.

We also review some additional experimental and observational evidence on teacher allocation as well as a number of reviews of literature on school leadership, school turnaround, collaboration, self-efficacy and response to COVID-19.

Approach

A systematic literature search was not viable with the time and capacity available. Instead, we used experts in the field to highlight relevant and high-quality studies and reviews and then sought additional relevant papers in the references of these studies.

For our initial working definition of *teacher working conditions* we began with the six elements identified by Kraft & Papay (2014) and looked for studies where some or all of these same elements appeared.

In particular, we sought studies and reviews that compared large-scale data of these *teacher working conditions* (primarily through survey data and in some cases with additional observations) to either *school growth* (variation in student test scores at school level or change in these levels over time) or *student attainment* (matching individual teacher survey data to their students' test data, either exploring variation among these or change over time). We found fourteen studies that matched this definition.

We then looked across all fourteen studies for commonly identified elements of teacher working conditions, seeking both full and partial matches.

We supplemented this by exploring recent reviews of how teacher working conditions impact teacher morale, how school leadership impacts student attainment and, following expert advice, how teacher allocation to classes, subjects and peers impacts student attainment.

Key findings

There are some important findings from the reviews and studies that we summarise here.

One: the quality of teachers' working conditions is strongly associated with student attainment and there are tentative signs of a causal link. We find a consistent, statistically significant link between teachers' working conditions and student attainment. Five core aspects of this are explored in more depth in Finding Three.

1

One study (Kraft & Papay, 2014) suggests that working conditions are associated with the difference between teachers plateauing in effectiveness or improving continually.

"On average, teachers working in schools at the 75th percentile of professional environment ratings improved 38% more than teachers in schools at the 25th percentile after ten years"

These studies mainly focus on English/reading and/or mathematics as these are the most commonly assessed at state or national level. However some studies do cross other subjects. For example, Eells' (2011) meta-analysis of the impact of teacher collective efficacy found similar associations across maths, reading, writing, science and social studies.

The studies consistently show a positive correlation between working conditions and students' academic outcomes and this is consistent across years and areas.

Three of the studies come closer to finding causality:

- Helal & Coeli (2016) find an *"important and large causal effect of individual principals on student achievement"* and *"that principals have a significant impact on a range of factors related to teaching and professional collaboration. Our estimates imply that principals who effectively raise student achievement are those who enhance their teaching staff's sense of goal congruence as well as their level of professional interaction and professional growth"*;
- Kraft & Papay (2014) find that *"teachers working in more supportive professional environments improve their effectiveness more over time than teachers working in less supportive contexts"*. They confirm that *"a prior measure of the work environment predicts large and statistically significant differential returns to experience in future years"* and find no evidence that the teacher growth causes the improvement in environment, although they stop short of claiming direct causality the other way;
- Sebastian, Allensworth & Huang (2016) find that *"Fostering a strong school climate through teacher leadership appears to be the key mediating mechanism through which leadership is related to student achievement, and a second mediating process through which elementary school principals influence student achievement is through the quality"*

and coherence of programs offered in the school—professional development, curriculum, and instruction” although “A final limitation is that these analyses do not allow for strong causal inference. This analysis has provided insight into the strongest paths through which principals are likely to influence instruction and student achievement; these could subsequently inform the structure of training programs for leadership development. However, it does not provide evidence that principals will be more effective if they receive such training”

The challenge in finding definitive causality in this field is that there is no reliable, controlled way of ‘switching on and off’ either aspects of the working conditions or the way that leaders lead.

The claim we make in this paper is therefore that there is a consistent and robust association between teachers’ working conditions and student attainment, as well as emerging evidence that leaders who successfully take action to improve these conditions have a causal impact upon student attainment.

To ignore this vital aspect of school leadership as a core mechanism through which schools and teachers improve until we have stronger experimental proof would seem to be illogical and counterproductive.

Two: the extent to which leaders actively foster these working conditions is associated with school improvement. Liebowitz and Porter’s major 2019 systematic review of 42 high quality studies of school leadership concluded that there is

“direct evidence of the relationship between principal behaviors and student achievement (0.09-0.17 standard deviations), teacher well-being (0.34 SD), teacher instructional practices (0.34 SD), and school organizational health (0.69 SD)”

2

Helal and Coelli’s decade-long study of 1500 schools in Victoria (2016), Australia found that four aspects of principals’ leadership of working conditions were associated with student attainment, including fostering and communicating shared goals, professional development, and (more tentatively) building morale and creating effective teacher collaboration.

Johnson, Kraft and Papay (2012) find that:

“providing a supportive context in which teachers can work appears to contribute to improved student achievement”

Sebastian, Allensworth and Huang (2016) find that:

“in elementary schools, principals’ influence on school climate comes almost entirely through teacher influence in decision making. The results [...] suggest that empowering teachers to wield greater influence over school policy matters concerning the school

learning climate may be the most effective strategy for school principals to improve student achievement”

While Grissom, Loeb and Master (2011) nuance this finding by suggesting that it is not necessarily the time that is spent, but upon what and how it is perceived that is important. For example, when it comes to walkthroughs, or learning walks:

“In schools where walkthroughs are not viewed as professional development, walkthroughs are particularly negative; while in schools where they are viewed as professional development, coaching is particularly positive. In other words, different use of walkthroughs seems to be associated with different results”

Three: **there are some core aspects of teachers’ working conditions that seem to be most clearly associated with improving student attainment.**

3

Across the studies these aspects vary and different aspects appear statistically significant in some studies, but not others. However, looking across the studies, the common emerging aspects of teachers’ working conditions that are associated with improved student attainment appear to be:

1. Creating opportunities for effective teacher collaboration to explore student data, plan and review lessons and curricula, and plan and moderate assessments,
2. Involving teachers in whole school planning, decision-making and improvement,
3. Creating a culture of mutual trust, respect, enthusiasm in which communication is open and honest,
4. Building a sense of shared mission, with shared goals, clear priorities and high expectations of professional behaviours and of students’ learning,
5. Facilitating classroom safety and behaviour, where disruption and bullying are very rare and teachers feel strongly supported by senior leaders in their efforts to maintain this classroom environment.

Study	Aspect of teacher working conditions				
	1	2	3	4	5
Burns et al (2017)			(✓)	(✓)	
Goddard et al (2015)	✓	(✓)		(✓)	(✓)
Grissom, Loeb & Master (2011) ¹					
Helal & Coelli (2016)	(✓)	✓	✓	✓	(✓)
Hoy et al (1998)		(✓)	(✓)		
Johnson, Kraft & Papay (2012)	(✓)	✓	(✓)		
Kraft & Papay (2014)	(✓)		(✓)	(✓)	✓
Kraft, Marinell & Yee (2016)	(✓)		✓		✓

Ladd (2011) ²	(○) ¹	(○)	(○)		(✓)
Lee & Louis (2019)	(✓)		✓		
Lee, Walker & Bryant (2019)	○			○	
Ronfeldt et al (2015)	✓				(✓)
Sebastian, Allensworth & Huang (2016)	(✓)	(✓)	(✓)	(✓)	
TNTP (2012)	(✓)			(✓)	

Key:

✓ - this aspect is specifically shown to have a positive correlation with student attainment or school growth

(✓) - this aspect emerges as part of a wider construct that is shown to have a positive correlation with student attainment or school growth

<blank> - this aspect is not mentioned

○ - this aspect is specifically shown to have no statistically significant correlation with student attainment or school growth

(○) - this aspect emerges as part of a wider construct that is shown to have no statistically significant correlation with student attainment or school growth

✗ - this aspect is specifically shown to have a statistically significant negative correlation with student attainment or school growth

(✗) - this aspect emerges as part of a wider construct that is shown to have a negative correlation with student attainment or school growth

Notes:

1. Grissom et al (2011) find the only standalone statistically significant aspects of working conditions to be the negative impact of 'classroom walkthroughs' (albeit positive, where seen as developmental) and positive impacts of principal time spent on 'teacher evaluation' and 'developing the educational program' - i.e. no real overlap with other studies.
2. Ladd (2011) includes general teacher collaboration under 'empowerment' which has no statistically significant relationship with student attainment. However time on planning, including collaborative planning, is statistically significantly related.

Despite identifying some statistically significant relationships, it remains generally true that pulling out individual characteristics of the working conditions is somewhat fraught in these types of studies:

- In some cases an element (such as provision of professional development opportunities) may be a statistically contributory factor to an overall measure of working condition, but may not, by itself, be statistically significantly related to attainment.
- In other cases, researchers 'bunch together' a larger number of survey responses to a much broader concept in which so many items contribute, it becomes hard to pick out individual elements.
- This is particularly challenging around the concept of 'professional development' (PD) where, for example, Ladd (2011) identifies external PD as part of components that she finds correlated negatively with student attainment, however this is combined with elements such as funding for PD and access to technology PD. In other studies, researchers are not always clear on their specific definition of PD; are teachers including learning from each other through collaboration or only thinking about external training when they answer the survey questions?
- Researchers take different approaches, combining ideas in different ways. For example, in two papers the concepts of behaviour and discipline are explicitly separated out (Kraft & Papay, 2014 and Kraft et al, 2016) but in other papers they are

combined with different ideas (e.g. Ronfeldt et al 2015 includes collaboration around improving student discipline as part of a wider *collaboration around students* concept)

The challenges can be seen in the table above, with most matches between the definitions of our five elements being only partial with different papers' definitions of concepts.

Nevertheless, the ubiquity of certain concepts, not only in the 14 working conditions studies but also appearing in other key leadership and teacher retention literature, suggests that these are highly plausibly important areas for leaders and policymakers to explore, even if they are hard to disentangle.

Four, the allocation of teachers to teams, classes and subjects and the provision of experienced and effective colleagues appears to be another crucial working condition associated with improved student attainment.

4

Four papers independently find evidence that students' learning improves while their teacher is paired with a more effective colleague with whom they have opportunities to work together and give/receive feedback. This appears to be consistent with the finding from Kraft, Blazar and Hogan's 2018

The four studies about teacher assignment & partnering:

- Papay et al (2016)
- Jackson & Bruegmann (2009)
- Sun et al (2017)
- Goldhaber et al (2020)

review into instructional (or sometimes known as 'pedagogical') coaching where pairing teachers to work together in a coaching relationship with chances for observation and feedback appears beneficial, as well as other activities such as co-planning.

The effect is substantial. Jackson and Bruegmann (2009) note that *"for both math and reading, the quality of a teacher's peers the year before, and even two years before, affect her current students' achievement. For both subjects, the importance of a teacher's*

previous peers is as great as, or greater than, that of her current peers."

Furthermore, Kini et al's 2016 review suggests that teachers also accumulate effectiveness if allowed to spend multiple years working on similar topics/subjects and year-groups.

The major implication of this finding is that consideration of teachers' working conditions needs to include thinking about the way in which teachers are allocated to teams, to classes and to subjects.

Five: teachers' working conditions appear to be associated with turnaround of less successful schools.

5

Two reviews of school turnaround identify that successful school improvement is associated with a culture that focuses on teacher development. For example, Meyers & Hitt (2017) note that:

"Not only do turnaround principals ensure that professional-development opportunities are available (Jacobson et al., 2007), they strategically ensure them through establishing

common planning periods, providing professional-development or additional release time, and disseminating research materials to staff, as necessary (Aladjem et al., 2010)."

And that

"In another turnaround initiative, the principal had worked tirelessly to build a culture of high-powered professional growth in which administrator and teacher leadership growth were assumed to such an extent that the loss of numerous staff members to leadership openings in other schools was assumed. The school's distributed leadership structure anticipated turnover and continued to build the strengths and improve the weaknesses of administrators and teachers to consistently generate new leaders within the school to take the place of those exiting. This had the additional benefit of creating new belief within the school that people cared about advancement and growth of adults, which increasingly became visible to students."

While Le Floch (2015) notes that:

"Research also suggests that principals influence teacher working conditions, which often contribute greatly to teacher retention or churn. By virtue of their position, principals' practice can directly influence school conditions, teacher quality and placement, and instructional quality (Clifford, Behrstock-Sherratt, & Fetters, 2012). Positive teacher working conditions include fostering a collegial and trusting, team-based, and supportive school culture; promoting ethical behavior; encouraging data use; and creating strong lines of communication."

Overall, the literature on school turnaround aligns very closely with the previous literature on more general teacher working conditions and leadership, identifying that elements such as culture, collegiality, shared goals and classroom behaviour are associated with improvement in such schools.

Six: teacher working conditions appear to play a major role in retaining teachers.

Working conditions are seen to be strongly associated with teachers' decisions to stay in, or leave a school, and even the profession. Podolsky et al (2019) find that working conditions impact on teachers' decisions to stay in a school:

"Research has long shown that teachers' working conditions affect their ability to teach well. At least four interdependent factors consistently rise to the top as among the most important teaching and learning conditions for teachers and most highly related to their decisions to remain teaching in a given school:

- *(1) school leadership and administrative support;*
- *(2) opportunities for professional collaboration and shared decision-making;*
- *(3) high-stakes accountability systems; and*
- *(4) resources for teaching and learning"*

6

In a large study of schools in England, Sims & Jerrim (2020) find that:

“Teachers who report higher Leadership/Management scores for their school also tend to have higher retention. For an experienced teacher with otherwise average characteristics, a one standard deviation increase in the Leadership/Management score is associated with a reduction in the probability of leaving the school by the next academic year from 4.1% to 2.3% and a reduction in the probability of leaving the profession altogether from 1% to 0.5%”

In a separate review, Nguyen et al (2019) find that working conditions can impact retention in the profession more widely:

“various measures of school characteristics as an organization, namely student disciplinary problems, administrative support, and professional development, strongly influence whether teachers stay or leave teaching.”

These same conditions that have been shown to be positively associated with student attainment are also, therefore, crucial in cultivating workplaces where teachers not only improve, but also stay.

Seven: **the quality of teacher working conditions of schools is associated with how successfully schools have been responding to COVID-19 closures, remote-schooling and moving to online teaching.**



The ability to collaborate with colleagues seems crucial to enable teachers and leaders to respond and adapt rapidly to the new, stressful and unpredictable challenges of the pandemic. A sufficient sense of shared mission and understanding, effective approaches to team-work and sufficient opportunities to learn with and from colleagues, have been important during these difficult times.

As Kraft et al (2020) note:

“Although teachers in every career phase, life stage, geographic region, and school-type were challenged by the transition to emergency remote teaching, hardships differed in type and in magnitude. Consistent with prior research, however, our findings highlight the critical importance of school organizational practices to teachers’ work. A schools’ working conditions during the pandemic mattered greatly for sustaining teachers’ sense of success. We find that teachers who could depend on strong communication, fair expectations, and a recognition of effort from the top, along with targeted professional development and facilitated, meaningful collaboration with colleagues, were least likely to experience a dip in their sense of success.”

Final Thoughts

It is worth reflecting on a few cautions and caveats. Twelve of the key papers are from the USA, one from Australia and one from a range of International Schools across Cambodia, Indonesia, Singapore, Thailand & Vietnam. There are very few papers on the working conditions of teachers which originate in England although Sims & Jerrim (2020) do find relationships between working conditions and both retention and morale in England.

While we did not attempt to conduct a full systematic search, we searched a number of related reviews and consulted some key academics for further recommendations of papers in this field. It is possible that there are significant and yet relatively unknown papers that show different findings to those shown here.

While we have pulled out the statistically significant positive findings from these papers, there are other papers in which the same aspect of teachers' working conditions are *not* found to have a statistically significant impact on student attainment. Only a full meta-analysis of the original data from all of the papers could effectively attempt to pull together these findings in a meaningful way and that is beyond the scope of this scoping review. In addition, there may be concerns about *common source bias* - a number of studies using similar datasets or similar survey instruments. There are disagreements about the significance of this issue, for example between Favero & Bullock (2014) and George & Pandey (2017).

Also, while there are headline similarities across studies, definitions of terms such as *interpersonal trust*, *collaboration*, *professional development* and *collective efficacy* may vary from study to study, with underlying survey items differing. Therefore, while we can identify trends and commonalities across papers, we cannot always be sure that the underlying concepts are defined in exactly the same way.

Guiding Principles & Conclusions

There is now a significant research base that we interpret to say that we need to **not only think about the content and process of teacher development** and put far greater effort into creating **supportive professional environments for teachers**.

This leads us to suggest a number of guiding principles for the way that we train school leaders for our schools and our system.

1. **Leadership matters:** fostering school leaders' knowledge and skill in developing others will be vital to future efforts for school and system improvement. As Liebowitz & Porter (2019) note, this is not about narrowing down school leaders' roles to one of only 'instructional leadership' but about ensuring that all efforts are aligned to produce the most effective collaboration, teamwork and learning for adults alongside well-communicated, shared and aligned goals. This also requires the creation of between- and cross-school networks through which schools share and discuss the art, craft and science of people development.
2. **Time matters:** ensuring that we think much more creatively about staff timetables and work demands so that there is significantly more safeguarded time available for the highest quality team dialogue, planning and reflection. This involves reflecting on how we can improve the quality of every in-service training day, every staff and team meeting, every one-to-one meeting, every coaching session, while removing competing pressures and managing workload. The Wellcome Trust's CPD Challenge project has demonstrated that every school in England is capable of ensuring at least 35 hours of the highest quality professional development time per teacher per year, and in many cases this can be significantly higher.
3. **Mentoring and coaching matter:** ensuring that every teacher has the opportunity to work with a skilled coach and a more effective practitioner, and later to progress to take on these roles. This involves a significant investment in the skills and knowledge of pedagogical (or instructional) coaching as well as ensuring that staff timetables and structures allow for paired discussion and peer observation.
4. **Culture and communication matter:** ensuring that every school leader has the skills, knowledge and disposition to foster a culture where the highest quality conversation happens, where colleagues trust and respect each other, where difficult issues are aired and resolved, where every voice is valued and heard and where staff feel safe, supported and engaged.

Appendix - The research in detail

Methodology

A systematic literature search was not viable with the time and capacity available. Instead, we used our own knowledge of the literature in the field along with that of key experts to highlight relevant and high-quality studies and reviews and then sought additional relevant papers in the references of these studies.

For our initial working definition of *teacher working conditions* we began with the six elements identified by Kraft & Papay (2014) and looked for studies where some or all of these same elements appeared, expanding the definition where several other studies identified a common element not shown in Kraft & Papay (2014).

In particular, we sought studies and reviews that compared large-scale data of these *teacher working conditions* (primarily through survey data and in some cases with additional observations) to either *school growth* (variation in student test scores at school level or change in these levels over time) or *student attainment* (matching individual teacher survey data to their students' test data, either exploring variation among these or change over time). We found fourteen studies that matched this definition. Aside from these conditions, we did not delve into the detailed methodology of each paper to evaluate its quality. Most core studies, apart from Helal & Coelli (2016), were found to be cited frequently in a number of other peer reviewed papers, albeit this could be because the great majority of the rest of the literature was from the USA while Helal & Coelli (2016) is from Australia and Lee, Walker and Bryan (2019) was from a group of International Schools in East Asia.

We then looked across all fourteen studies for commonly identified elements of teacher working conditions, seeking both full and partial matches.

We supplemented this by exploring recent reviews of how teacher working conditions impact teacher morale, of how school leadership impacts student attainment and, following expert advice, how teacher allocation to classes, subjects and peers impacts student attainment.

Key papers

We summarise key findings from the papers that form the basis of this review.

Working condition studies

[Helal, Mike & Coelli, Michael , 2016. "How Principals Affect Schools," Melbourne Institute Working Paper Series wp2016n18, Melbourne Institute of Applied Economic and Social Research, The University of Melbourne](#)

- *Approach:* Using data from staff surveys and principal employment data between 1997 and 2007 across 1500 schools in Victoria, Australia, and exploring the impact on mathematics and reading scores of school principals and what they were perceived to be doing by staff.
- *Results:* Two aspects of Principal leadership had a strongly statistically significant ($p < 0.01$) and causal impact on both mathematics and reading scores. These were:
 - a) Goal congruence - the extent to which teachers felt personally aligned & committed to the school's values and that the goals were easily understandable and clear.
 - b) Professional growth - the extent to which teachers felt encouraged to pursue development & new skills and had access to the training to achieve it, that their colleagues were actively interested in their growth, and that the school's PD offer took accounts of their needs and interests.
- Two additional aspects were found to have statistically significant impact on mathematics achievement:
 - c) School morale - the extent to which the school had good team spirit, enthusiasm, morale and pride.
 - d) Professional interaction - the extent to which staff feel involved, accepted, supported by colleagues and the amount & quality of collaboration, communication and pedagogical discussion.

[Johnson SM, Kraft MA, Papay JP. How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. Teachers College Record \[Internet\]. 2012;114 \(10\) :1-39.](#)

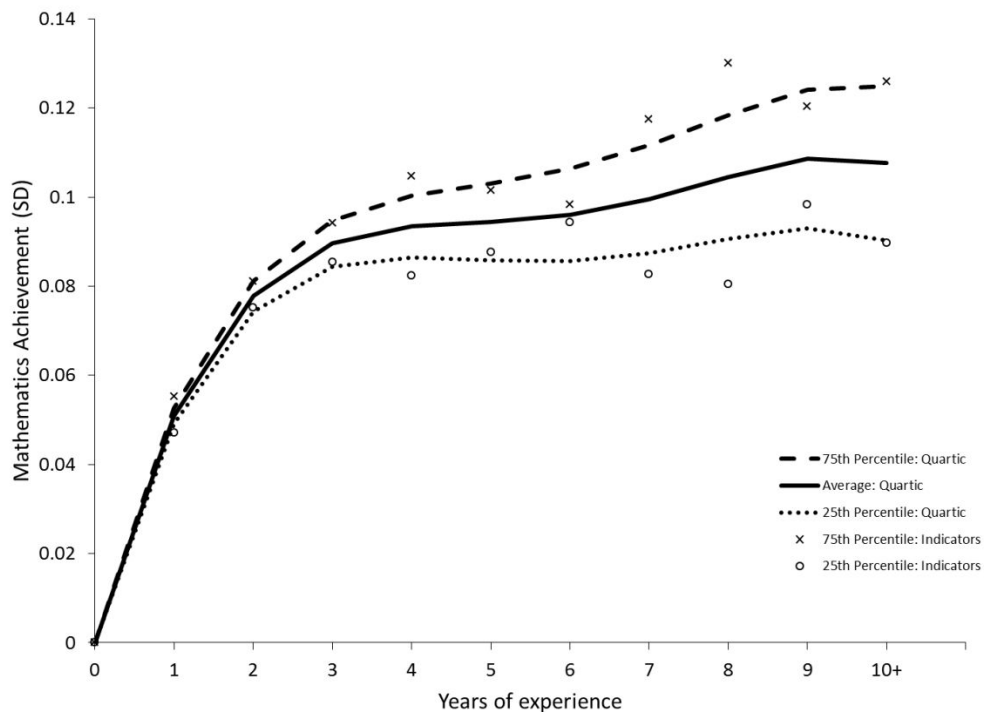
- *Approach:* using 2008 data from Massachusetts schools, the authors find correlation (not causal data) between teachers' views of their working conditions and student achievement growth.
- *Results:* "it is the social conditions—the school's culture, the principal's leadership, and relationships among colleagues—that predominate in predicting teachers' job satisfaction and career plans. More importantly, providing a supportive context in which teachers can work appears to contribute to improved student achievement. We find that favorable conditions of work predict higher rates of student academic growth, even when we compare schools serving demographically similar groups of students".

- “we find that a one standard deviation improvement in the context of teachers’ work is associated with improvements in student achievement growth of 0.15 standard deviations in mathematics ($p=0.053$) and 0.20 standard deviations in English language arts ($p=0.004$) in a single year”
- Four aspects of the professional environment are found to be statistically significantly correlated with student achievement in English language arts (although not mathematics):
 - a) Colleagues (the extent to which teachers have time to collaborate with colleagues to solve problems, learn from each other and hold each other to high expectations for practice)
 - b) Governance (teachers are meaningfully involved in decision-making about school issues, including use of the school day, budget priorities, behaviour policies, professional development and hiring decisions).
 - c) Principal (leaders shield teachers from disruptions and distractions, support the enforcement of behavioural policies, give teachers feedback that is seen as helpful and take time to address teachers’ concerns)
 - d) School Culture (teachers feel comfortable raising issues, there is mutual trust and respect, there is shared commitment to helping children succeed, there are clear shared expectations)

[Kraft MA, Papay JP. Can Professional Environments in Schools Promote Teacher Development? Explaining Heterogeneity in Returns to Teaching Experience. Educational Effectiveness and Policy Analysis \[Internet\]. 2014;36 \(4\) :476-500.](#)

- *Approach:* using teacher survey data and standardised test achievement data from across 174 schools in North Carolina, exploring how individual teachers’ perceptions of their working conditions impact on each teachers’ pupils’ attainment, between 2001 and 2009.

Figure 4: Fitted Returns to Teaching Experience for Prototypical Teachers, across School Professional Environments



- *Results:* “Our analyses show that teachers working in more supportive professional environments improve their effectiveness more over time than teachers working in less supportive contexts. On average, teachers working in schools at the 75th percentile of professional environment ratings improved 38% more than teachers in schools at the 25th percentile after ten years”
- Three components of working conditions are individually statistically significantly ($p < 0.05$) correlated to student achievement:
 - a) Order and Discipline (the extent to which the school is a safe environment where rules are consistently enforced and administrators assist teachers in their efforts to maintain an orderly classroom;)
 - b) Peer Collaboration (the extent to which teachers are able to collaborate to refine their teaching practices and work together to solve problems in the school;)
 - c) School Culture (the extent to which the school environment is characterized by mutual trust, respect, openness, and commitment to student achievement;)
- In addition, three additional components appear to identify better the working environment quality, while not individually statistically significantly correlated to achievement, and these are:
 - d) Principal Leadership (the extent to which school leaders support teachers and address their concerns about school issues;)
 - e) Professional Development (the extent to which the school provides sufficient time and resources for professional development and uses them in ways that enhance teachers’ instructional abilities;)
 - f) Teacher Evaluation (the extent to which teacher evaluation provides meaningful feedback that helps teachers improve their instruction, and is conducted in an objective and consistent manner)

[Kraft MA, Marinell WM, Yee D. School organizational contexts, teacher turnover, and student achievement: Evidence from panel data. American Educational Research Journal \[Internet\]. 2016;53 \(5\) :1411-1499.](#)

- *Approach:* Using teacher survey data of professional environment in 278 New York Middle Schools, between 2008 and 2012, and correlating each school's mean scores with student achievement over time.
- *Results:* "we replicate and extend previous research findings that schools with higher quality school contexts have students who experience larger achievement gains, 2) we show that improvements in the school context within a school over time are associated with corresponding increases in student achievement gains, meaningful, positive associations between Safety, Expectations, and Leadership with student achievement gains in both subjects. We find that Safety has the strongest relationship with student gains 24 across both subjects"
- Three components correlate positive and statistically significantly with attainment in one or both of maths and English language arts tests:
 - a) Academic Expectations (high expectations and standards for all pupils, clear measures of academic progress)
 - b) Safety and Order (maintenance of discipline, feeling of safety, behaviour support from school leaders, lack of crime & bullying, levels of adult respect to students).
 - c) Leadership and Professional Development (clarity of Principal's vision, perception of Principal as a supportive and effective leader, extent that Principal fosters teacher collaboration, perceived usefulness of feedback from Principal to teachers, relevance/usefulness of professional development)

[J Sebastian, E Allensworth, H Huang \(2016\) The role of teacher leadership in how principals influence classroom instruction and student learning American Journal of Education, DOI: 10.1086/688169](#) - The Role of Teacher Leadership in How Principals Influence Classroom Instruction and Student Learning

- *Approach:* using teacher survey data across over 450 elementary schools in Chicago, between 2007 and 2013, exploring how schools' mean teacher perceptions of the environment correlated with achievement over time.
- *Results:* "Our results suggest that effective principals use teacher leadership to improve the school learning climate while they work directly on professional development and school program coherence"
- "by fostering a school climate where students and teachers feel safe to do their work of teaching and learning, all classrooms benefit"
- "in elementary schools, principals' influence on school climate comes almost entirely through teacher influence in decision making. The results of the SEM models suggest that empowering teachers to wield greater influence over school policy matters concerning the school learning climate may be the most effective strategy for school principals to improve student achievement"
- "Fostering a strong school climate through teacher leadership appears to be the key mediating mechanism through which leadership is related to student

achievement, and a second mediating process through which elementary school principals influence student achievement is through the quality and coherence of programs offered in the school—professional development, curriculum, and instruction. It appears that principals' direct involvement in these areas, rather than indirect influence via teachers, translates to benefits for student learning"

[Goddard, R., Goddard, Y., Sook Kim, E., & Miller, R. \(2015\). A Theoretical and Empirical Analysis of the Roles of Instructional Leadership, Teacher Collaboration, and Collective Efficacy Beliefs in Support of Student Learning. American Journal of Education, 121\(4\), 501–530. doi:10.1086/681925](#)

- *Approach:* using teacher surveys administered across 93 elementary schools in 'a Midwestern state' drawn from the wider School Leadership Improvement Study, from 2009, comparing school-level averages to fourth-grade test results in 2009 and 2010.
- *Results:* Collective Efficacy of teachers is shown to be statistically significantly predictive of student achievement. They defined collective efficacy from survey items including whether teachers believe that they can get through to difficult students, motivate all students, that all students can learn, that all students can be motivated to learn, and so on.
- Two factors appeared to statistically significantly predict teacher collective efficacy:
 - a) Instructional Leadership (the Principal is knowledgeable about effective teaching and curriculum, provides effective guidance about practice and assessment, creates a shared vision of success, sets high standards and supports teachers by knowing and visiting classrooms and providing support and feedback, encourages teachers to express opinions even if contrary to their own)

Instructional Leadership Measurement Properties

Instructional Leadership ^a	Factor Loading
The principal at this school is very knowledgeable about effective instructional practices	.86
The principal at this school is very knowledgeable about classroom curricular issues	.86
The principal at this school provides conceptual guidance for the teachers regarding effective classroom practice	.89
The principal at this school is very knowledgeable about effective classroom assessment practices	.87
The principal at this school sets high standards for teaching	.85
The principal at this school sets high standards for student learning	.85
The principal at this school is directly involved in helping teachers address instructional issues in their classrooms	.82
The principal at this school helps me with my instructional practices	.82
The principal at this school pushes teachers to implement what they have learned in professional development	.80
The principal at this school actively monitors the quality of teaching in this school	.86
The principal at this school knows what is going on in my classroom	.83
The principal at this school makes systematic and frequent visits to classrooms	.76
The principal develops a shared vision of what the school could be like	.82
The principal at this school encourages people to express opinions that may be contrary to his/her own	.71

NOTE.—Rating scale is 1–6: strongly disagree to strongly agree.

^a Cronbach's alpha = .96 (14 items).

- b) Teacher collaboration (leaders and staff collaborate to solve problems, collaboration is frequent and well-structured and covers lesson planning, data analysis, moderation, pedagogical discussion, curriculum design and planning, professional development activity)

Collaboration Measurement Properties

Type of Collaboration	Factor Loading
Formal collaboration (Cronbach's alpha = .74):	
The principal, teachers, and staff collaborate to make this school run effectively	.66
Collaboration in this school occurs formally (e.g., common planning times, team meetings)	.80
When teachers in this school collaborate, our collaboration time is typically structured; we stick to an agenda and/or we systematically work on a particular goal	.83
The principal at this school participates in instructional planning with teams of teachers	.64
Frequency of collaboration on instruction (Cronbach's alpha = .85):	
This school year, how often have you worked with colleagues to develop materials or activities for particular classes/lessons?	.90
This school year, how often have you worked with colleagues to develop instructional strategies?	.88
This school year, how often have you worked with colleagues to make teaching decisions using student assessment data?	.80
This school year, how often have you worked with colleagues to discuss what helps students learn best?	.75
Teachers' collaboration on instructional policy (Cronbach's alpha = .89):	
Teachers in this school work collectively to plan school improvement	.77
Teachers in this school work collectively to select instructional methods and activities	.82
Teachers in this school work collectively to evaluate curriculum and programs	.89
Teachers in this school work collectively to determine professional development needs and goals	.90
Teachers in this school work collectively to plan professional development activities	.81

NOTE.—For categories “formal collaboration” and “teachers’ collaboration on instructional policy,” the rating scale is 1–6: strongly disagree to strongly agree. The category “frequency of collaboration on instruction” used a 6-point scale: 1 = not at all, 2 = once or twice a year, 3 = several times this year, 4 = monthly, 5 = weekly, 6 = almost daily.

- Collective efficacy was determined through the following items:

Collective Efficacy Measurement Properties

	Factor Loading
Group competence (Cronbach's alpha = .80):	
Teachers in this school are able to get through to the most difficult students	.71
Teachers here are confident they will be able to motivate their students	.71
If a child does not want to learn, teachers here give up	.76
Teachers here do not have the skills needed to produce meaningful student learning	.72
Teachers in this school believe that every child can learn	.72
Teachers in this school do not have the skills to deal with student disciplinary problems	.53
Task difficulty (positive; Cronbach's alpha = .75):	
These students come to school ready to learn	.71
Home life provides so many advantages that students here are bound to learn	.83
The opportunities in this community help ensure that these students will learn	.73
Task difficulty (negative; Cronbach's alpha = .61):	
Students here just are not motivated to learn	.47
Learning is more difficult at this school because students are worried about their safety	.76
Drug and alcohol abuse in the community make learning difficult for students here	.71

NOTE.—Rating scale is 1–6: strongly disagree to strongly agree.

- “Our findings also indicate that, consistent with prior research (Bandura 1993;

Goddard et al. 2000, 2004), perceived collective efficacy is a significant positive predictor of differences among schools in student achievement. The more robust the sense of collective efficacy characterizing the schools in our sample, the greater their levels of student achievement, even after controlling for school and student background characteristics and prior levels of student achievement.”

- “Finally, our results demonstrate that both principals’ instructional leadership and teacher collaboration for instructional improvement are important indirect predictors of differences among schools in student academic achievement. These findings are not only consistent with extant research (Goddard et al. 2007; Louis et al. 2009; Robinson et al. 2008; Waters et al. 2003) but also add the finding that leadership and collaboration make a difference in part because of their influence on teachers’ beliefs.”

[Ronfeldt, M., Farmer, S. O., McQueen, K., & Grissom, J. A. \(2015\). Teacher Collaboration in Instructional Teams and Student Achievement. American Educational Research Journal, 52\(3\), 475–514. doi:10.3102/0002831215585562](#)

- *Approach:* Survey and interview data from 336 schools in the Miami-Dade Public School System from 2011 and 2012 was individual teachers’ students’ test scores as well as their school’s overall results.
- *Results:* “Teachers and schools that have instructional teams engaged in better collaboration also have higher achievement gains in both math and reading. Moreover, teachers improve at greater rates when they work in schools with better collaboration quality.” although “This evidence is suggestive that instructional collaborations have positive effects on students’ achievement gains; the design of the study, however, does not lend itself to drawing causal conclusions”
- “Coefficients on all forms of collaboration trended positive across models and tables, suggesting positive effects of collaboration regardless of its instructional focus. Even so, collaboration about assessment was most often significantly predictive of achievement gains across math and reading. In reading, collaboration about instructional strategies and curriculum also predicted achievement gains.”
- Types of collaboration explored were:
 - “Collaboration About Instructional Strategies and Curriculum: Variables loading most strongly on this factor focus on collaboration about pedagogical and curricular approaches/strategies, including coordinating curriculum across classrooms, developing instructional strategies, and developing aligned materials
 - Collaboration About Students: Variables loading most strongly on this factor included collaboration about instructional topics/strategies focused on students, including discussing the needs of specific students, reviewing classroom work, and addressing student discipline/classroom management issues
 - Collaboration About Assessment: Items loading on this factor focused

on collaboration about assessments, including reviewing state test results and formative assessments “

TNTP (2012) - Greenhouse Schools: How Schools Can Build Cultures Where Teachers and Students Thrive

- *Approach:* Teachers at 249 schools across the USA were surveyed in 2011 to find out about organisational leadership and culture and this was compared to student achievement at each of the schools..
- *Results:* “We found that positive responses to three questions on our survey had the strongest connection with greater retention of successful teachers and higher student achievement in reading and math. All three ask teachers how much they agree with the following statements: “Teachers at my school share a common vision of what effective teaching looks like.” “The expectations for effective teaching are clearly defined at my school.” “My school is committed to improving my instructional practice.””
- “Schools with the strongest cultures give their teachers more valuable professional development opportunities. At greenhouse schools, 81 percent of teachers felt that professional development opportunities are “well planned and well facilitated,” compared to just 28 percent of teachers at bottom-quartile schools. When asked about any specific development opportunity, teachers at greenhouse schools were twice as likely to rate it “highly effective” than teachers at bottom-quartile schools. “I have the right amount of time to be observed by and get feedback from colleagues.” Greenhouse Schools Bottom-Quartile Schools 69% 39% Schools with strong cultures also offer more opportunities for teachers to collaborate with each other. For example, nearly seven in 10 teachers at greenhouse schools felt they had enough time to plan with their colleagues, and nearly the same number felt they had enough time to observe or be observed by their colleagues. At bottom-quartile schools, however, only 5 in 10 teachers felt they had enough common planning time, and only 4 in 10 felt they had enough time to be observed by and receive feedback from colleagues.”
- “Importantly, school leaders who create strong cultures also remove teachers who consistently struggle— and teachers appear to agree with those decisions. Compared to bottom-quartile schools, only half as many teachers at greenhouse schools felt that one of their colleagues had been either wrongly retained or unfairly dismissed—probably because teachers at greenhouse schools are much more likely to trust the accuracy of their evaluations (71 percent, compared to only 33 percent at bottom-quartile schools). This contradicts the conventional wisdom that dismissing teachers will hurt a school’s culture. In fact, it’s the failure to remove ineffective teachers that appears to weaken instructional culture.”

Burns, M. K., Naughton, M. R., Preast, J. L., Wang, Z., Gordon, R. L., Robb, V., & Smith, M. L. (2017). Factors of Professional Learning Community Implementation and Effect on Student Achievement. Journal of Educational and Psychological Consultation, 1–19. doi:10.1080/10474412.2017.1385396

- *Approach:* Teachers were surveyed across 181 schools of all phases/age across Missouri, all of which were in their third year of working in the Missouri PLC (Professional Learning Community) project. School level averages were then

compared to data from the Missouri Assessment Program to explore impact on student achievement.

- *Results:* The results found that the eight strands correlated with student achievement, especially for elementary schools in mathematics, but that the eight strands and 46 items within them were probably representations of two broader constructs. The two factors of PLC implementation were named Collaborative Leadership Processes and Data-Driven Systems for Learning.
 - Collaborative Leadership Processes included creating shared leadership of the PLC, effective team communication and collaboration, clear senior leadership to model and support the process, high levels of shared trust, effective induction, action research and celebration of success.
 - Data-Driven Systems for Learning included focus on assessment purposes, methods and exploring data findings together, focusing on student learning intentions and evidence, updating curriculum and teaching plans and timetables in response, planning interventions and enrichments, setting smart goals and embedding evaluation and the seeking of evidence.

[Grissom, J.A., Loeb, S & Master, B \(2011\) Effective Instructional Time Use for School Leaders: Longitudinal Evidence from Observations of Principals](#)

- *Approach:* Large scale, structured observations in 2008, '11 and '12 of over 100 school principals in Miami-Dade, Florida, across Elementary, Middle and High School level, explored what activities they carried out and how this correlated with student achievement in those schools over time.
- *Results:* "We find no relationship between overall time spent on instructional activities and schools' effectiveness or improvement trajectories. When we decompose instruction into its element tasks, however, a more nuanced story emerges that has potentially important implications for school leadership practice."
- "Like time on the school's educational program and teacher evaluation, time spent directly coaching teachers is positively associated with achievement gains and school improvement, especially in math. Yet coaching appears to be a rare practice among observed principals, which may reflect principals discounting the effectiveness of coaching or their own capacity to coach effectively. "
- "In contrast, informal classroom observations or "walkthroughs" are more common but negatively associated with achievement gains and school improvement, at least in high schools."
- "For a subset of schools we also had survey data indicating whether the walkthroughs were viewed by teachers as professional development. In schools where walkthroughs are not viewed as professional development, walkthroughs are particularly negative; while in schools where they are viewed as professional development, coaching is particularly positive. In other words, different use of walkthroughs seems to be associated with different results."
- "In short, our results suggest that time spent engaging in instruction is not itself sufficient but rather that the effects of instructional leadership activities

are conditional on the type and quality of those time investments.”

[Ladd, H. \(2011\). Teachers' perceptions of their working conditions: How predictive of planned and actual teacher movement? *Educational Evaluation and Policy Analysis*, 33\(2\), 235-261.](#)

- *Approach:* using 2006 teacher survey data from over 1000 elementary schools in North Carolina and correlating with Grade 4 and 5 reading and mathematics test data.
- *Results:* “teachers’ perceptions of their working conditions contribute modestly to school-specific differences in student achievement across primary schools, with the contribution somewhat larger for math achievement than for reading”
- “For math, two of the survey measures enter with statistically significant positive coefficients: leadership and the quantitative time variable indicating that teachers have more than three hours of time for planning. These two variables are also positive for reading but only the latter is statistically significant, and the coefficient of the leadership factor is less than half the size of the comparable coefficient for math”
- “For reading, teachers’ perceptions of facilities are also predictive of positive school effects but, contrary to expectations, a higher rating for professional development opportunities within the school is predictive of negative achievement effects. This latter finding most likely illustrates one of the statistical problems noted earlier, namely that policy makers do not distribute resources randomly across schools. In this case, it appears that more professional development opportunities are provided to schools that are performing less well in reading than other schools with the same types of students”

[Hoy, W. K., Hannum, J. and Tschannen-Moran, M. \(1998\) ‘Organizational Climate and Student Achievement: A Parsimonious and Longitudinal View’, *Journal of School Leadership*, 8\(4\), pp. 336–359. doi: 10.1177/105268469800800401](#)

- *Approach:* using survey data from 86 middle schools in New Jersey to construct school-level measures of climate and correlating with school-level results of an 8th-grade reading and mathematics test both in the year of the survey and looking at academic performance two years later.
- *Results:* the researchers find four components of organizational climate that contribute, statistically significantly, to student achievement. These include:
 - “*Collegial leadership* captures the essence of this factor; the principal’s behavior is supportive and egalitarian and neither directive nor restrictive.
 - *teacher professionalism*, which is teacher behavior characterized by commitment to students, respect for the competence of colleagues, warm and friendly interactions, and engagement in the teaching task
 - *academic press*: teachers setting high but reasonable goals, students responding positively to the challenge of these goals, and the principal supplying the resources and exerting influence to attain these learning goals
 - *environmental press*: strong pressure from parents and the community to change school policy and influence the functioning of the school.
- Taking each component individually, only *academic press* and *environmental press* are independently statistically significantly correlated with academic outcomes. However,
- “for each of the measures of achievement, about two-thirds of the variance is explained by the independent variables. All the climate variables make a significant

independent contribution to one or more of the achievement measures. Although socioeconomic status is the single best predictor of achievement, Environmental Press and Academic Press are not far behind. Collegial Leadership and teacher Professionalism work together to contribute to achievement; in fact, if either is omitted from the regression equation, the other makes a significant and independent contribution to the explanation of variance. Two years later, the relationship between climate and achievement was very similar. A comparison of the results shows that the zero-order and multiple correlations are either the same or vary by a few one hundredths."

[Lee, M. & Louis, K.S. \(2019\). Mapping a strong school culture and linking it to sustainable school improvement. Teaching and Teacher Education, 81, 84-96.](#)

- *Approach:* the authors use 2008 survey data from 9 US states and 133 schools, constructing school-level measures of climate and exploring correlations with student achievement in English Language Arts in academic years 2005/6, 2006/7 and (in a sub-sample of 34 schools) 2007/8.
- *Results:* "What are the key elements of a strong school culture in conjunction with school improvement, which are identified in existing studies? In this study, we identified academic press, student support, trust & respect, low negativity (or optimism as the opposite of negativity), professional learning community (consisting of shared responsibility, reflective dialogue, deprivatized practice, and organizational learning). More importantly, results suggest that schools strongly equipped with those cultural elements showed higher levels of school performance than that of their counterparts; there were significantly positive associations between school culture constructs and the levels of school performance."
- The authors define their key constructs as
 - *Professional Learning Community:* this included four key sub-components

Organizational Learning	How many teachers in this school show initiative to identify and solve problems?
	How many teachers in this school share current findings in education with colleagues?
	How many teachers in this school seek out and read current findings in education?
Shared Responsibility	How many teachers in this school meet with other teachers to collaboratively plan?
	How many teachers in this school help maintain discipline in the entire school, not just their classroom?
	How many teachers in this school take responsibility for improving the school outside their own class?
	How many teachers in this school feel responsible to help each other improve their instruction?
Reflective Dialogue	How often in this school year have you had conversations with colleagues about what helps students learn best?
	How often in this school year have you had conversations with colleagues about development of new curriculum?
	How often in this school year have you had conversations with colleagues about the goals of this school?
	How often in this school year have you exchanged suggestions for curriculum materials with colleagues?
Deprivatized Practice	How often in this school year have you visited other teachers' classrooms to observe instruction?
	How often in this school year have you received meaningful feedback on your performance from colleagues?
	How often in this school year have you had colleagues observe your classroom?
	How often in this school year have you invited someone in to help teacher you class(es)?

- *Academic Press:*

Academic Press	We have well defined learning expectations for all students.
	Our student assessment practices reflect our curriculum standards.
	Our school's curriculum is clearly aligned with learning goals.
	Our school has multiple ways of assessing student learning other than state tests.
	Academic achievement is recognized and acknowledged by the school.
	The school sets high standards for academic performance.

○ *Student support:*

Student Support	Students have equal opportunities to be assigned to the best teachers.
	Resources are allocated to support students who have greater needs.
	All students receive the same quality of instruction.
	Struggling students get the attention they need in this school.
	In our school, problems are viewed as issues to be solved, not as barriers to action.

○ *Trust/Respect:*

Trust and Respect	Even in a difficult situation, teachers in this school can depend upon each other.
	Most of my colleagues can be relied upon to do as they say they will do.
	I can trust the people I work with to lend me a hand if I need it.
	Teachers in this school respect the professional competence of their colleagues.
	Teachers in this school help and support each other.
	Most teachers in our school share a similar set of values, beliefs, and attitudes related to teaching and learning.

○ *Negativity:*

Negativity	Students at this school are absent habitually.
	Teachers at this school are absent habitually.
	There are race or cultural tensions at this school.

- “compared to teachers in lower performing schools, their counterparts in mid-performing schools turned out to perceive significantly stronger school cultures in terms of professional learning community (.197***), academic press (.318***), student support (.345***), and trust/respect (.286***)”

Table 4

Latent Mean Comparison of A Strong School Cultures: Low-Performing vs. Mid-Performing Schools

<i>School Cultures</i>	<i>Latent Mean^a</i>	<i>SE^a</i>	<i>Effect Size^c</i>
Professional Learning Community	0.197***	0.034	0.305
Academic Press	0.318***	0.041	0.376
Student Support	0.345***	0.043	0.375
Trust and Respect	0.286***	0.04	0.305
Negativity	-0.468***	0.054	-0.332

Notes. N = 3720 teachers (from the imputed data). *** $p < .001$

^aThe bias in mean estimates and standard errors was corrected through bootstrapping.

^cEffect sizes were calculated using bias corrected estimates and common variances of latent constructs.

- “The same pattern was identified in the comparison between low- and high-performing schools. Compared to teachers in low-performing schools (reference group), their counterparts in high-performing schools perceived significantly stronger school cultures”

Table 5
Latent Mean Comparison of A Strong School Cultures: Low-Performing vs. High-Performing Schools

<i>School Cultures</i>	<i>Latent Mean^a</i>	<i>SE^b</i>	<i>Effect Size^c</i>
Professional Learning Community	0.332***	0.034	0.515
Academic Press	0.528***	0.041	0.624
Student Support	0.560***	0.041	0.609
Trust and Respect	0.442***	0.039	0.471
Negativity	-0.734***	0.055	-0.521

Note. N = 3720 teachers (from the imputed data). *** $p < .001$

^aThe bias in mean estimates and standard errors was corrected through bootstrapping.

^cEffect sizes were calculated using bias corrected estimates and common variances of latent constructs.

- The authors also explore the sub-sample of 34 schools where there was continuous decline or continuous improvement in student performance. They find that “there were significantly positive associations between the cultural elements of school and the levels of school performance. More importantly, our analysis further suggests that there was a clear linkage between schools with a strong culture and their continuous improvement in school-level achievement. That is, the cultural elements are critical to sustainable school improvement, measured by academic achievement. Even low-performing schools appeared to be able to sustain the improvement of academic achievement, especially when they were strongly equipped with those cultural elements. This suggests that the effect of school culture on school performance is not short-lived. It can be an enduring effect that counters organizational inertia.”
- It is worth noting that this study draws on the same data set as an earlier report: [Karen Seashore Louis, Kenneth Leithwood, Kyla L. Wahlstrom, and Stephen E. Anderson, Investigating the Links to Improved Student Learning: Final Report of Research Findings, Learning from Leadership Project, 2010.](#)

[Lee, M., Walker, A., & Bryant, D. \(2019\). What Leadership Practices Are Associated with International Baccalaureate \(IB\) Student Achievement? An Exploratory Study of IB Schools in Southeast Asia. Peabody Journal of Education, 1–19. doi:10.1080/0161956x.2018.1515831](#)

- *Approach:* the authors surveyed teachers in 18 International Baccalaureate schools across Cambodia, Indonesia, Singapore, Thailand, and Vietnam in 2013-14 and correlated teacher responses with International Baccalaureate exam outcomes in 2013.
- The authors constructed 8 contextual factors from theory:

School-level variables	Survey item	Factor loadings
Strategic resourcing (alpha = .91)	Allocates resources strategically based on student needs	0.87
	Demonstrates an ability to secure additional resources for the school	0.89
	Utilizes support (auxiliary) staff for the benefit of student learning	0.80
	Provides or locates resources to help staff improve their teaching	0.85
Monitoring classroom teaching and curriculum (alpha = .92)	After observing classroom activities, works with teachers to improve their teaching	0.87
	Regularly observes classroom activities	0.90
	Regularly inspects student work	0.90
Encouraging teacher learning and development (alpha = .92)	Share ideas about effective teaching with other DP teachers in this school	0.91
	Share teaching materials or learning activities with other DP teachers in this school	0.92
	Discuss the DP program standards and assessment with other DP teachers in this school	0.89
	Share what I learned at workshops or conferences with other DP teachers in this school	0.75
Ensuring teachers' cross-program interaction (alpha = .83)	Discuss the educational philosophy and values embedded in the Learner Profile with other DP teachers in this school	0.75
	School leaders purposively schedule time for teachers to work together	0.87
	School leaders purposively schedule time for teachers across programs to work together	0.85
	School leaders provide enough resources to support teachers to work effectively across programs	0.68
	Our strategies are formulated around our school purpose	0.90
Focusing on mission and goal (alpha = .88)	Our annual plan aligns with our school vision	0.89
	We know the priorities that our school wants to achieve	0.75
	Teachers in this school help maintain discipline across this school, not just their own classroom	0.76
Shared responsibility (alpha = .86)	Teachers in this school take responsibility for improving the school beyond their own class	0.81
	Teachers in this school feel responsible for helping each other to teach better	0.89
	Teachers in this school talk to each other about what helps students learn best	0.84
Reflective dialogue (alpha = .90)	Teachers in this school work together to develop new curriculum	0.86
	Teachers in this school work together to develop or improve curriculum materials	0.89
	Teachers in this school visit each other's classes to observe teaching	0.90
	Teachers in this school give each other meaningful feedback on their performance	0.91
Deprivatized practice (alpha = .87)	Colleagues regularly observe my teaching	0.82
	I regularly invite colleagues to help me teach in my classroom	0.50

- **Results:** looking at the factors independently, only two factors are statistically significantly correlated with student outcomes, while two more are close to statistical significance but are not $p < 0.05$.

Table 4 HLM predicting DP examination scores.

Fixed effects	Model 1	Model 2 ^b	Model 3
	Effect ^a (SE)	Effect (SE)	Effect (S.E.)
For adjusted grand mean	33.24 (0.53)***	29.45 (1.27)***	29.39 (1.10)***
Deprivatized practice			1.05 (0.48)**
Strategic resourcing			1.61 (0.83)†
Monitoring classroom teaching and curriculum			-0.89 (0.39)*
Encouraging teacher learning and development			1.85 (1.05)†

- The other four components were not found to have statistically significant relationship with student outcomes nor to contribute positively to overall model fit. (ensuring teachers' cross-programme interaction, focusing on mission and goal, shared responsibility, reflective dialogue)

School Leadership Reviews

In this section we look at two more recent reviews of school leadership research that, themselves, build on previous well-known reviews such as Leithwood et al (2012) and Robinson et al. (2009).

[Liebowitz, D. D. and Porter, L. \(2019\) 'The Effect of Principal Behaviors on Student, Teacher, and School Outcomes: A Systematic Review and Meta-Analysis of the Empirical Literature', Review of Educational Research, 89\(5\), pp. 785–827. doi: 10.3102/0034654319866133.](#)

- Our analysis has three central findings: (1) we find direct evidence of the relationship between principal behaviors and student achievement (0.09-0.17 standard deviations), teacher well-being (0.34 SD), teacher instructional practices (0.34 SD), and school organizational health (0.69 SD); (2) we find that prior literature may overstate the unique importance of instructional management as a tool to improve student achievement outcomes;
- First, in a review of 42 empirical studies relating principal behaviors to student, teacher and school outcomes, we find consistently positive relationships between increased principal time or skill and student achievement, teacher well-being, instructional practices and school organizational health. The strength of these relationships implies that a one standard deviation difference in principal time or skill in [our 5 leadership domains:] instructional management, internal relations, organizational management, administration or external relations is associated with between one-tenth and one-third of a standard deviation difference in student achievement, teacher well-being and instructional practices. Based on Kraft's (2018) empirically-derived schema for educational effect sizes, these represent moderate- to large-effect sizes
- Second, we find that previous literature may overstate the unique student achievement effects of principals' time spent on and skill in instructional leadership behaviors. In fact, the effects of four other leadership behaviors are statistically indistinguishable from the effects of instructional management. We conclude from this that an exclusive focus on diverting time or skill development away from other non-instructional tasks towards instructional ones as some have suggested (e.g., Bambrick-Santoyo & Peiser, 2012) may be misguided. Note that our findings do not imply that instructional leadership is not important, nor that it does not merit more attention. In fact, as Grissom, Loeb and Master (2013) document, in Miami-Dade, principals spent only 12.7 percent of their time on average on instructional management related tasks. Thus, a more equal balance of time across the task categories may be of value. Alternatively, instructional management may in fact have a unique role in improving outcomes, but it must be paired with other strategies to leverage its unique status.
- The five domains are:
 - Instructional management: principal behaviors focused on, or linked to, schools' instructional practices and curricular program implementation, supporting teachers' instructional practices through teacher evaluation, observation, and feedback, as well as planning teachers' professional development, planning or developing education programs, developing and enacting a schoolwide vision, using data related to the school's education program and aspects of program evaluation.
 - Internal relations: building within-school interpersonal relationships including developing and sustaining student and family relationships and attending school activities, as well as handling staff conflicts and engaging informally and socially with staff, paying attention to staff relationships and well-being.
 - Organizational management: managing the operational functions of the school related to medium- and long-term strategic goals, including

budgetary tasks, facility planning and managing non-instructional staff, developing a safe school environment, responding to staff concerns, and engaging with other school leaders

- Administration: operationally focused actions (as distinct from organizational management) characterized by more routine administrative duties and tasks such as compliance activities, standardized assessment implementation and school schedule management, as well as student service management, student supervision, and managing school attendance.
- External relations: engagement with stakeholders beyond the school building, communication with the district office, community members, partners, or other outside stakeholders, as well as fundraising efforts.

[Hitt, D.H. and Tucker, P. D. \(2016\), Systematic Review of Key Leader Practices Found to Influence Student Achievement: A Unified Framework. Review of Educational Research June 2016, Vol. 86, No. 2, pp. 531–569 DOI: 10.3102/0034654315614911](#)

- *Approach:* “The specific purposes of this article are to identify and synthesize the empirical research on how leadership influences student achievement and to provide evidence on how school leaders should direct their efforts. During the literature review, we consulted experts for recommendations and searched peer-reviewed journals from 2000 to 2014. The literature review yielded 56 empirical research studies of relevance to the topic and 3 frameworks consisting of clustered practices. We then grouped the 28 practices according to systematic criteria and found 5 overarching domains.
- *Results:* There are five key domains of leadership that are associated with improvement in student achievement:
- 1. Creating, Articulating, and Stewarding Shared Mission and Vision:
 - setting (with involvement of others) and gaining buy-in to an appropriate vision for the school which is context-appropriate, creating shared meaning; setting and monitoring motivating goals and performance targets against this vision;
 - modelling, explaining and communicating the ethos of the school in practice;
 - using assessment, data, evaluation and KPIs to build collective monitoring of progress.
- 2. Building professional capacity:
 - recruiting teachers with strong fit to collective goals & ethos; providing individual and differentiated support & opportunity for teachers;
 - proactively building and maintaining high levels of relational trust between leaders, staff, pupils, parents and community; [the authors note studies that suggest that 10% of teachers’ instructional/pedagogical effectiveness is explained by levels of peer trust, while 57% of teachers’ levels of professionalism are explained by peer trust]
 - providing individual, team and whole-organisation opportunities to learn; intervening to protect their teachers’ time and energies from

- distractions that detract from mission and then recognising and rewarding efforts that produce results that are mission-aligned;
- creating effective collaboration including structuring teachers' schedules such that job-embedded learning occurs on a regular basis including professional dialogue and examination of student work;
- engendering teachers' responsibility for student learning, assume a positive mindset for growth, invite teachers to use innovation in meeting the goals, encourage teachers to have high self-expectations, and promote an environment in which teachers assume responsibility for meeting expectations
- 3. Creating a Supportive Organization for Learning:
 - acquiring and allocating resources strategically for mission and vision, including allocating people, budget, materials, physical space;
 - considering context to maximize organizational functioning, adapting approach to the context and strengths of the school;
 - building collaborative processes for decision-making, understanding that the resulting decision will ultimately be enhanced in terms of quality and benefit to students when multiple perspectives work together, not only by intentional sharing but also by capacity building of those who may have previously remained in a follower or stakeholder role;
 - sharing and distributing leadership and decision making rather than centralize these functions, develop a sense of community rather than individuals, encourage collaborative work efforts rather than isolate practitioners, and base authority on expertise rather than role or position;
 - building team diversity, demonstrating their commitment to divergent and varying through careful communication with diverse groups of stakeholders (with diverse backgrounds and diverse perspectives, cultures, views, and people, working from an inclusive mindset;
 - strengthening and optimising school culture, fostering authentic professional learning communities, openness, transparency, efficacy, trust, conflict resolution, and other such structures and characteristics, meeting the affective needs of teachers and help to maintain their commitment to the school organization;
 - Maintaining ambitious and high-performance expectations and standards, positively insisting on and expecting high performance, making those performance expectations public and transparent, designing formative and summative assessments aligned with the desired outcomes that hold stakeholders accountable and measure progress in ways that advance the desired outcome - not only calling attention to what needs improvement, but also positively reinforcing what is being done correctly.
- 4. Facilitating a high-quality learning experience for students:
 - maintaining safety and orderliness, address this concern by insisting agreed on codes of conduct and enforcing a fair and consistent set of expectations, setting the tone for how members of the community will

- interact with each other focusing on maintaining an attractive campus that is fully functioning;
 - personalizing the environment to reflect students' backgrounds, assisting teachers in identifying the diverse types of social and intellectual capital students bring with them to school and leveraging these assets in their interaction with students;
 - developing and monitoring the curricular program, requiring rigor and high expectations of all students, insisting that every individual student has the opportunity to learn., monitoring and evaluating continuously the alignment of curriculum, instruction and assessment, coordinating vertical (within subject) and horizontal (across subject) alignment through the allocation of time and the development of the master schedule to support such endeavors, a prime example being the protection of common planning time for teachers;
 - Developing and monitoring the curriculum programme, equipping themselves with a deep knowledge of pedagogy and devoting a large portion of the time to the advancing teaching, prohibiting the scheduling of non-instructional school events during the instructional day, encouraging student and teacher attendance, and limiting the time individuals are pulled from their classrooms;
 - Developing and monitoring the assessment programme, (to include teacher designed, school designed, and standardized) and both formative and summative in nature, facilitating this data collection and subsequent analysis in ways that permit disaggregation on indicators important to the school's improvement effort and goals and to inform efforts toward individual student progress, teacher and departmental effectiveness, and overall school performance, informing the iterative process of vision and mission building and future improvement efforts, faculty professional development, and individual teacher learning.
- 5. Connecting With External Partners:
 - Building productive relationships with families and community, including parents in the educational process of their children, designing welcoming and inclusive environments, developing multiple ways (traditional and nontraditional) for parents to be involved, and fostering teacher understanding and commitment of the importance of parent and community participation;
 - Engaging families and community in collaborative processes, involving parents/family members in the decision making processes regarding school policy, budgetary issues, and the school improvement plan, finding ways for parents and the community to perceive a sense of influence in their school;
 - Anchoring schools in the community, serving as connectors for families of their students, seeking to connect them to helpful community agencies, participating in networks with other school leaders in the broader community to share and discuss ways to meld home, community, and school efforts

Teacher assignment and partnering research

The emergence, more recently, of a number of studies that explore teacher assignment to mentors and partners is a significant contribution to the evidence base about how the organisation of the school and working conditions contribute to teacher growth and student achievement.

[Papay, J.P., Taylor, E.S., Tyler, J.H. and Laski, M., 2016. Learning job skills from colleagues at work: Evidence from a field experiment using teacher performance data \(No. w21986\). National Bureau of Economic Research.](#)

- *Approach:* The experiment was conducted at 14 elementary and middle schools (7 treatment, 7 control) in a medium-sized district in Tennessee.
- We report on a field experiment designed to study on-the-job, peer learning between teachers who work at the same school. At schools randomly assigned to the treatment condition—known in the schools as the “Evaluation Partnership Program”—low-performing “target” teachers were paired with a high-performing “partner” teacher, and each pair was encouraged to work together on improving each other’s teaching skills over the course of the school year. Importantly, teachers were matched using micro-data from state-mandated performance evaluations...these prior evaluations include separate performance ratings for many specific instructional skills (e.g., “questioning,” “lesson structure and pacing,” “managing student behavior”)..... Pairs were approached by their school principal and asked to work together for the year focusing on the strength-matched-to weakness skill areas, with the goal of improving instructional skills. Thus the topics and skills teachers worked on were specific to each pair and varied between pairs.
- While individual teacher pairings were the focus of the intervention, treatment was assigned at the school level. Thus the success of individual pairs may have been influenced by the principal’s role or support, or influenced by other teacher pairs in the school working in the same kinds of ways.
- *Results:* The relatively low-performing teachers targeted by our intervention—and ultimately their students—benefited substantially from partnering with a higher-performing colleague at their school. Target teachers’ performance improved 0.12 student standard deviations in the year of treatment, and perhaps double that much in the following year. These performance improvements were larger when teacher partnerships were better matched on strong and weak skills, but otherwise we find little evidence of heterogeneity
- Particularly notable, the treatment effects for target teachers appear to hold for both experienced and inexperienced teachers
- One important contextual feature of the experiment is the formal teacher evaluation system. All teachers in our study—treatment and control, target and partner and no role—are subject to Tennessee’s new formal performance evaluation system. Teacher pairs were identified based on prior evaluation results, and teacher pairs were encouraged, in part, to work on improving evaluation results. These connections to formal evaluation likely influenced principals’ and teachers’ willingness to participate, and the nature of their

participation. For these reasons we think this study has contributions for the small, still-developing literature on how evaluation affects teacher performance (Taylor and Tyler 2012, Steinberg and Sartain 2015, Bergman and Hill 2015). One additional result on this subject comes from a survey of teachers at the end of the experiment. Teachers were asked a series of questions to measure their attitude toward formal evaluation, for example, “I have a favorable impression of the teacher evaluation system” rated on a six point agree/disagree scale.³⁰ Judging from survey responses, teachers in treatment schools left with more favorable opinions of evaluation: attitudes about evaluation were 0.23 standard deviations more positive, as measured by a composite of the four survey questions.

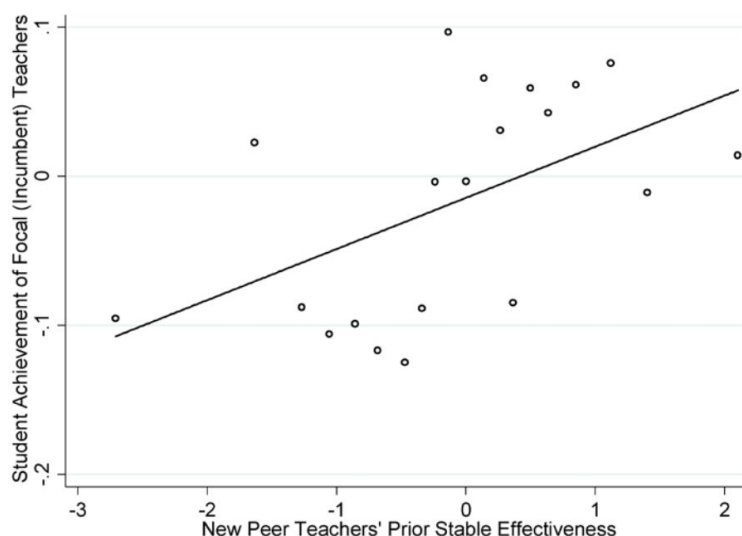
- [Jackson, C.K. and Bruegmann, E., 2009. Teaching students and teaching each other: The importance of peer learning for teachers. American Economic Journal: Applied Economics, 1\(4\), pp.85-108](#)
 - *Approach:* We use data on all third-grade through fifth-grade students in North Carolina between 1995 to 2006 from the North Carolina Education Research Data Center
 - [We provide] evidence of peer learning among teachers, using a unique longitudinal dataset of student test scores linked to teacher characteristics in North Carolina. Specifically, we test whether changes in a teacher’s peers affect the test score growth of her own students, and we investigate possible mechanisms.
 - *Results:* Using longitudinal elementary school teacher and student data, we document that students have larger test score gains when their teachers experience improvements in the observable characteristics of their colleagues. Using within-school and within-teacher variation, we further show that a teacher’s students have larger achievement gains in math and reading when she has more effective colleagues (based on estimated value-added from an out-of-sample pre-period). Spillovers are strongest for less-experienced teachers and persist over time, and historical peer quality explains away about twenty percent of the own-teacher effect, results that suggest peer learning
 - We find that (1) less experienced teachers who are still acquiring “on-the-job” skills are most sensitive to changes in peer quality, (2) teachers with greater labor-market attachment are more sensitive to peer quality, (3) both current and historical peer quality changes affect current student achievement, and (4) historical peer quality explains away between 18 and 25 percent of the own-teacher effect.
 - We outline three potentially important sources of spillovers between teachers and outline a framework for thinking about learning between teachers...1. Joint production and shared resources....2. Motivation and Effort....3. Peer Learning.
 - Students have higher test scores in both subjects [Maths and reading] when their own teacher has a regular teaching license, has higher scores on her license exam, is fully National Board certified, and has more years of experience. Having a teacher with no previous experience is particularly detrimental, and having a teacher with an advanced degree appears to be negatively correlated with test scores, conditional on the other covariates.

- We document that a teacher's own performance is affected by the quality of her peers. In particular, changes in the quality of a teacher's colleagues (all other teachers in the same school who teach students in the same grade) are associated with changes in her students' test score gains. Using two separate measures of peer quality, one based on observable teacher qualifications and the other on estimated peer effectiveness, we find that teachers perform better when the quality of their peers improves within the same school over time.... In our preferred model, a one-standard-deviation improvement in observable teacher peer quality is associated with a 0.008 and 0.006 standard deviation increase in math and reading scores respectively. Using estimated value-added (estimated out-of-sample to avoid simultaneity bias), which is a much better predictor of subsequent student achievement, we find that a one-standard-deviation improvement in estimated teacher peer quality is associated with a 0.0398 standard deviation increase in math scores and a 0.026 standard deviation increase in reading scores....We show that for both math and reading, the quality of a teacher's peers the year before, and even two years before, affect her current students' achievement. For both subjects, the importance of a teacher's previous peers is as great as, or greater than, that of her current peers. The cumulative effect over three years of having peers with one standard deviation higher effectiveness is 0.078 standard deviations in math and 0.072 standard deviations in reading.
- [Sun, M., Loeb, S. and Grissom, J.A., 2017. Building teacher teams: Evidence of positive spillovers from more effective colleagues. Educational Evaluation and Policy Analysis, 39\(1\), pp.104-125.](#)
 - *Approach:* Utilizing a decade of data on teacher transfers between schools that result in changes of peers when transfer teachers enter grade-level team in the new school, we find evidence of strong positive spillover effects associated with the introduction of peers who are more effective than the incumbent teacher himself or herself. However, the incumbent teacher's students are not meaningfully disadvantaged by the entry of relatively ineffective peers. This finding provides initial evidence that mixing teachers with diverse performance levels can be a strategy for increasing student achievement in the aggregate. These results are robust to several student sorting and teacher selection issues
 - Our data come from M-DCPS, the fourth-largest school district in the United States, and cover the school years from 2003-04 through 2012-13. We focus on math teachers in grades 3-8 who can be linked to students for whom we have state standardized test scores in math. The data cover about 1.15 million student-year observations over the 10 years.
 - Our analysis focuses on estimation of spillover effects in math for several reasons. First, prior studies show that teachers generally have a stronger effect on math achievement than on reading (e.g., Nye, Konstantopoulos, & Hedges, 2004). Analysis of the data used in this study similarly suggest that the estimated effect of a student's classroom teacher on test scores is only about one-third to one-half as large in reading as in math. Second, mathematics teaching may provide a context more conducive to spillover effects than

teaching in other subjects. Research has documented the distributed nature of math teaching in many schools, with teachers working together to set goals, choose instructional activities, design assessment instruments, and interpret evidence of learning (Cobb, de Silva Lamberg, & Dean, 2003). More so than many other subjects, there is widespread agreement on appropriate content, sequence, and pedagogy, which means both greater opportunities to coordinate across classrooms and greater likelihood that teachers are following similar curricula and routines

- *Results:* The average effects of a one standard deviation change in the prior stable effectiveness of the new transfer teacher on the achievement gains of students taught by incumbent teachers in the same grade, are between one percent and two percent of a standard deviation of students' math test scores. They are positive and mostly statistically significant at either the 0.10 or 0.05 level.
- If a student in the class of an incumbent teacher has a new transfer teacher at the same grade level who is one standard deviation higher in prior stable effectiveness than that of their own teacher, this student would have a 1.9 or 2.8 percent of a standard deviation increase in math test scores. This spillover effect is about 23 or 29 percent of the student's own teacher effect (0.019/0.081 or 0.028/0.095). Surprisingly, if the transfer peer teacher is about one standard deviation lower than that of their own teacher, this student would not be meaningfully affected by the new teacher. The "relatively ineffective" estimate is very close to zero and not statistically different from zero.
- Moreover, low-performing teachers seem more responsive to the composition of peers than high performing teachers. With one standard deviation decrease in students' own teachers' prior effectiveness, the spillover effect from new transfers would increase about 0.6 percent or 0.8 percent of one standard deviation of student test scores. These findings imply that strategic grouping of teachers to potentially maximize all students' learning in aggregate is to pair ineffective teachers with more effective colleagues.

Figure 1. “Linear-in-means”, the association of new peer teachers’ prior stable effectiveness with the student achievement of focal (incumbent) teachers



Note. This figure plots the linear relationship between new peer teachers’ prior stable effectiveness and the average student achievement of focal (incumbent) teachers, after controlling for focal teachers’ own prior stable effectiveness, based on Equation 1.

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- [Goldhaber, D., Krieg, J., & Theobald, R. \(2020\). Effective like me? Does having a more productive mentor improve the productivity of mentees?. *Labour Economics*, 63, 101792.](#)
 - *Approach:* We use a novel database of the preservice apprenticeships (“student teaching placements”) of teachers in Washington State to investigate the relationship between mentor effectiveness (as measured by value added) and the future effectiveness of their mentees.
 - *Results:* We find a strong, positive relationship between the effectiveness of a teacher’s mentor and their own effectiveness in math and a more modest relationship in English Language Arts. The relationship in math is strongest early in a teacher’s career, and would be positive and statistically significant even in the presence of non-random sorting on unobservables of the same magnitude as the sorting on observables. This suggests that at least some of this relationship reflects a causal relationship between mentor effectiveness and the future effectiveness of their mentees in math.
 - The increase in math value added associated with a one standard deviation increase in mentor quality is roughly equivalent to the difference in average value added between a novice and second-year teacher; in other words, the expected gain in teacher effectiveness from assignment to a more effective mentor is equivalent to the well-documented returns to the first year of teaching experience (e.g., Ladd and Sorensen, 2017; Rivkin et al., 2005; Rockoff, 2004).
 - Importantly for this study, there is both quantitative (Krieg et al., 2016, 2019) and qualitative (Meyer, 2016; St. John et al., 2018) evidence about the factors that influence that matching of mentees to mentors in student teaching placements, much of it from Washington State (the setting of this study).

- Central to our study is the need to obtain unbiased measures of the productivity of both mentor teachers and their mentees. A significant literature investigating teachers is devoted to assessing the impacts of individual teachers on students (e.g., Aaronson et al., 2007; Chetty et al., 2014a; Rivkin et al., 2005) as well as the extent to which value-added models (VAMs) can be used to obtain unbiased estimates of the contribution of individual teachers to student test score gains (Bacher-Hicks et al., 2014; Chetty et al., 2014b; Goldhaber & Chaplin, 2015; Kane and Staiger, 2008; Kane et al., 2013; Rothstein, 2009, 2014). While this issue is not settled,¹⁷ we argue that appropriately specified VAMs show minimal bias (Koedel et al., 2015), especially in estimating teacher effectiveness in math.
- In math we see strong evidence that value-added measures of mentor effectiveness are related to mentees' value-added effectiveness; a one standard deviation increase in mentor effectiveness is associated with a 18% of a standard deviation increase of the effectiveness of their mentees; this is roughly the half of the difference between a novice teacher and one with one to two years of experience (see Appendix Table A3) and about three times as large as the comparable estimate in Ronfeldt et al. (2018a)
- Fig. 1 illustrates that first-year teachers who student-taught with a highly-effective mentor teacher in math (i.e., 2 standard deviations above the mean) are predicted to be just as effective as third year teachers who worked with an average mentor. While it is certainly possible that some of these differences reflect the non-random sorting of mentees to mentors (and thus reflect cross-mentee differences in effectiveness), the decay in these relationships over time and the robustness of these relationships under extreme sorting on unobservables (in which the relationship is still significant and positive) both suggest that assignment to higher quality mentors induces a causal and within-mentee improvement in quality. Thus, the assignment of student teachers to more effective mentor teachers appears to be a sensible low-cost approach to inducing marginal improvements in beginning teacher quality

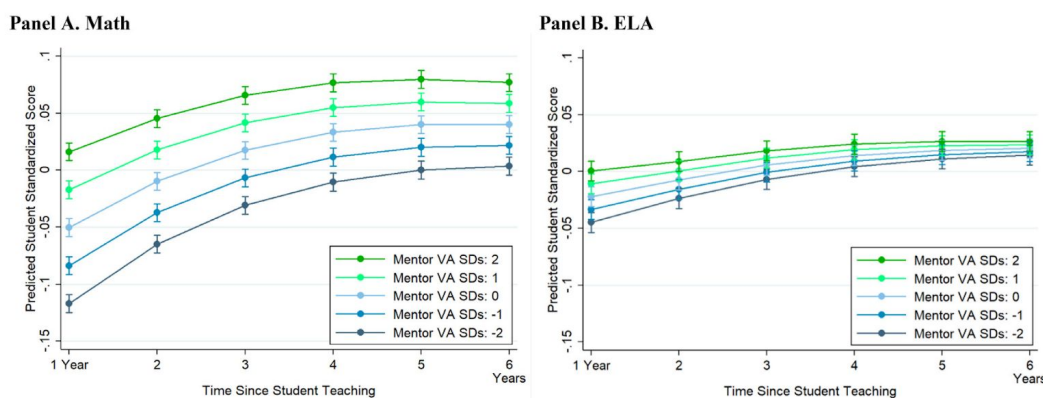


Fig. 1. Predicted Student Achievement by Time Since Student Teaching and Mentor Value Added.

School Turnaround Literature

Meyers Coby V. & Dallas Hambrick Hitt (2017) School Turnaround Principals: What Does Initial Research Literature Suggest They Are Doing to Be Successful?, Journal of Education for Students Placed at Risk (JESPAR), 22:1, 38-56, DOI: 10.1080/10824669.2016.1242070

- *Approach:* a systematic review resulting in 18 papers with empirical evidence of the factors that make the difference between Principals who successfully turn around failing schools versus those who don't.
- *Results:* 12 domains were identified, split into three categories.
- Utilizing vision and strategic leadership
 - Establish, shape, and drive a vision focused on high academic expectations
 - Identify, analyze, and respond to causes of school decline and failure
 - Navigate policies that, on the surface, limit their ability to lead effectively or their teachers' ability to provide high-quality, differentiated instruction
 - Make unilateral decisions as necessary
- Building capacity with support and accountability
 - Secure significant, purposeful opportunities for teachers to develop and grow
 - Cultivate leadership in administration and faculty
 - Focus on improving culture and instruction specifically in literacy and mathematics
 - Leverage data effectively to make strategic administrative and instructional decisions
 - Focus intensively on driving instructional improvement
- Shaping of culture
 - Create or improve a climate that is safe and focused on teaching and learning
 - Generate quick wins to publicly demonstrate changing priorities and that improvement is possible
 - Develop authentic relationships with parents and the community broadly

[Le Floch, K. C., Ph.D. \(2015\). Supporting School Turnaround: Lessons for Texas Policymakers.](https://www.raiseyourhandtexas.org/wp-content/uploads/2015/09/Turnaround_ResearchReport.pdf)

https://www.raiseyourhandtexas.org/wp-content/uploads/2015/09/Turnaround_ResearchReport.pdf

- *Approach:* a literature review of evidence about the most effective approaches to school turnaround
- *Results:* ". This review highlights six practices that appear to support successful turnaround: strong leadership, strategic staffing, professional learning opportunities, use of data for instructional decisions, a collaborative and trusting school culture, and program coherence"
- Strong leadership:including a clear instructional focus, quick wins, and distributed leadership;
- Strategic Staffing:attracting, hiring, and keeping the best teachers—and, when necessary, removing teachers who are detrimental to the success of the school
- Professional Learning Opportunities:
 - Core features: The core features of high-quality professional development include: (1) a focus on curricular content; (2) opportunities for active learning (e.g., observing classroom instruction, being observed while teaching a lesson,

- or reviewing student work); and (3) consistency with other reform efforts in the school.
- Structural features: The structural features of high quality professional development include: (1) the long duration of the activity, in terms of both the number of hours and the span of time over which the activities were spread; (2) activities more commonly described as “job-embedded”; and (3) collective participation of teachers from the same school, grade, or subject.
- Use of Data for Instructional Decisions: Establish a clear vision for data use; Develop and maintain a district-wide data system; Make data part of an ongoing cycle of instructional improvement; Provide supports that foster a data-driven culture within the school; Teach students to examine their own data and set learning goals.
- Develop a Collaborative and Trusting School Culture: promote teacher collaboration by providing scheduled time, space, and material resources for such efforts, in an overall environment that prioritizes time for teacher collaboration and cultivates a sense of shared responsibility for student achievement
- A Collaborative and Trusting School Culture: ensuring a set of interrelated programs for students and staff that are guided by a common framework for curriculum, instruction, assessment and learning climate and that are pursued over a sustained period;
- Additional commentary: Want to Improve Low-Performing Schools? [FOCUS ON THE ADULTS](#).

Working conditions and teacher retention

[Podolsky, A., Kini, T., Darling-Hammond, L., & Bishop, J. \(2019\). Strategies for attracting and retaining educators: What does the evidence say? Education Policy Analysis Archives, 27\(38\). <http://dx.doi.org/10.14507/epaa.27.3722>](#)

- *Approach:* “we examined studies that analyzed the effect of different educational practices and policies on teachers’ decisions to enter, remain in, leave, and return to the profession. In addition, we reviewed policy literature to identify district, state, and federal policy strategies that have been effective at addressing the factors influencing teachers’ professional decisions. We also analyzed, using descriptive statistical techniques, a nationally representative survey of current and former elementary, middle, and high school teachers, the Schools and Staffing Survey (SASS) and the Teacher Follow-up Survey (TFS), conducted by the National Center for Education Statistics (U.S. Department of Education, National Center for Education Statistics, 2012 & 2013). The TFS includes responses from approximately 4,400 current and former public school teachers.”
- *Results:* “The success of recruiting and retaining teachers by raising salaries, along with providing effective preparation, hiring, and induction can be enhanced when teachers work in collaborative and supportive environments. Along with salaries, teachers’ working conditions are a strong predictor of teacher retention in educators’ decisions about where to teach and whether to stay. For example, efforts to institute one-time bonuses to attract teachers to hard-to-staff schools, often called “combat pay,” have proven largely unsuccessful when they do not also address underlying poor working conditions (Berry, 2009).”

- “Research has long shown that teachers’ working conditions affect their ability to teach well. At least four interdependent factors consistently rise to the top as among the most important teaching and learning conditions for teachers and most highly related to their decisions to remain teaching in a given school:
 - (1) school leadership and administrative support;
 - (2) opportunities for professional collaboration and shared decision-making; (3) high-stakes accountability systems; and
 - (4) resources for teaching and learning”

[Kini, T., & Podolsky, A. Does Teaching Experience Increase Teacher Effectiveness? A Review of the Research \(Palo Alto: Learning Policy Institute, 2016\).](https://learningpolicyinstitute.org/our-work/publications-resources/does-teaching-experience-increase-teacher-effectiveness-review-research)

<https://learningpolicyinstitute.org/our-work/publications-resources/does-teaching-experience-increase-teacher-effectiveness-review-research>

- *Approach:* “In this review, we examined 30 studies that analyzed the effect of teaching experience on student outcomes in K-12 public schools, as measured by student standardized test scores and non-test metrics when available. We reviewed studies that examined teaching experience published in peer-reviewed journals and by organizations with established peer-review processes since 2003, when the use of teacher fixed effects methods—which allows researchers to compare a teacher with multiple years of experience to that same teacher when he or she had fewer years of experience—became more prevalent.”
- *Results:* “Teaching experience is positively associated with student achievement gains throughout much of a teacher’s career; as teachers gain experience, their students are more likely to do better on measures of success beyond test scores; teachers make greater gains in their effectiveness when they teach in a supportive, collegial environment, or accumulate experience in the same grade, subject or district; and more experienced teachers confer benefits to their colleagues”

Nguyen, Tuan D., Lam Pham, Matthew Springer, and Michael Crouch. (2019). The Factors of Teacher Attrition and Retention: An Updated and Expanded Meta-Analysis of the Literature. (EdWorkingPaper: 19-149). Retrieved from Annenberg Institute at Brown University:

<https://www.edworkingpapers.com/sites/default/files/ai19-149.pdf>

- *Approach:* “Building on a previous meta-analysis of the literature on teacher attrition and retention by leveraging studies with longitudinal data and a modern systematic search process, this updated comprehensive meta-analysis synthesizes findings from 120 studies on the factors of teacher attrition and retention”
- *Results:* “We also find stronger evidence that teacher satisfaction plays an important role in teacher decisions to leave or stay in teaching.”
- “We find that various measures of school characteristics as an organization, namely student disciplinary problems, administrative support, and professional development, strongly influence whether teachers stay or leave teaching. In terms of school resources, we find that providing teaching materials reduces odds of attrition.”
- “Being evaluated, even for accountability purposes, does not necessarily increase teacher attrition; in fact, the odds of attrition for teachers who are assessed are somewhat smaller than those who are not. In terms of teacher effectiveness, higher

quality teachers are less likely to exit than lower quality teachers, and there is evidence that teachers in the lowest quartile or quintile of value-added scores are more likely to leave teaching. Relatedly, teachers in merit pay programs are less likely to leave teaching than those who are not."

- "We find teachers are less likely to turnover when they are satisfied with the school environment or when they report adequate support from administrators. The same is true when there are fewer disciplinary problems in the school, when a more effective principal leads their school or when salaries are higher. In addition to the importance of salary, these findings suggest other effective strategies for retaining teachers are factors that school leaders have the power to control, such as creating a consistent approach to discipline and providing teachers with opportunities for professional development."

[Sims, S., & Jerrim, J. \(2020\). TALIS 2018: teacher working conditions, turnover and attrition. London: Department for Education.](#)

- *Approach:* sampling data from England from TALIS 2018 and also from England's School Workforce Census, teacher survey data from their schools is linked to turnover data.
- *Results:* "Teachers who report higher Leadership/Management scores for their school also tend to have higher retention. For an experienced teacher with otherwise average characteristics, a one standard deviation increase in the Leadership/Management score is associated with a reduction in the probability of leaving the school by the next academic year from 4.1% to 2.3% and a reduction in the probability of leaving the profession altogether from 1% to 0.5%"
- "The Leadership/Management score is composed of a number of questions capturing: whether there is a supportive culture within the school; whether managers recognise teachers for doing a good job; whether teachers have a chance to participate in decision-making and whether teachers are given the autonomy necessary to do their job."

Some other relevant papers

[Vangrieken, Katrien & Dochy, Filip & Raes, Elisabeth & Kyndt, Eva. \(2015\). Teacher collaboration: A systematic review. Educational Research Review. 15. 10.1016/j.edurev.2015.04.002.](#)

- "In total, 82 studies were selected based on predefined selection criteria and reviewed by means of a narrative review method to thematically gather information across the studies. The first aim of this review was to provide an overview of the terminological framework to describe teacher collaboration used in previous research. Collaboration was perceived here as a continuum ranging from mere aggregates of individuals to strong team collaboration. This continuum was conceptualised as the degree of team entitativity. Second, the review investigated the focus and depth of collaboration. These appeared to be important issues and provide different opportunities for (collaborative) learning. Third, although realising teacher collaboration proves to be challenging, this review listed benefits for students, teachers, and the school. Fourth

and fifth, various facilitating and hindering factors were explored that may serve as valuable points of action to realise effective collaboration."

[Eells, Rachel Jean, "Meta-Analysis of the Relationship Between Collective Teacher Efficacy and Student Achievement" \(2011\). Dissertations. 133.](#)

- "The meta-analyses conducted for this sample demonstrate a strong positive effect size for the relationship between CTE and achievement. As collective teacher efficacy increases in a school, so does achievement. This holds true for all subject areas measured, and regardless of timing of measurement"

[Kraft, Matthew A., Nicole S. Simon, and Melissa Arnold Lyon. \(2020\). Sustaining a Sense of Success: The Importance of Teacher Working Conditions During the COVID-19 Pandemic. \(EdWorkingPaper: 20-279\). <https://doi.org/10.26300/35nj-v890>](#)

- *Approach:* "We examine teachers' experiences during emergency remote teaching in the spring of 2020 using responses to a working conditions survey from a sample of 7,841 teachers across 206 schools and 9 states."
- *Results:* "supportive working conditions in schools played a critical role in helping teachers to sustain their sense of success. Teachers who could depend on their district and school-based leadership for strong communication, targeted training, meaningful collaboration, fair expectations, and recognition of their efforts were least likely to experience declines in their sense of success"

[Kraft MA, Blazar D, Hogan D. The Effect of Teacher Coaching on Instruction and Achievement: A Meta-Analysis of the Causal Evidence. Review of Educational Research \[Internet\]. 2018;88\(4\) :547-588](#)

- *Approach:* "We review the empirical literature on teacher coaching and conduct meta-analyses to estimate the mean effect of coaching programs on teachers' instructional practice and students' academic achievement"
- *Results:* "Combining results across 60 studies that employ causal research designs, we find pooled effect sizes of 0.49 standard deviations (SD) on instruction and 0.18 SD on achievement"
- "Our estimates of the effect of coaching on teachers' instructional practice (0.49 SD) are larger than differences in measures of instructional quality between novice and veteran teachers' (0.2 to 0.4 SD; Blazar & Kraft, 2015)."
- "Effects on students' academic performance (0.18 SD) are of similar or larger magnitude than estimates of the degree to which teachers improve their ability to raise student achievement during the first five to ten years of their careers, with estimates ranging from 0.05 to 0.15 SD (Atteberry, Loeb, & Wykoff 2015; Papay & Kraft, 2015). "
- "Effects on achievement are also larger than pooled estimates from causal studies of almost all other school-based interventions reviewed by Fryer (2017) including student incentives, teacher pre-service training, merit-based pay, general PD, data-driven instruction, and extended learning time. Interventions of comparable effect sizes on achievement include comprehensive school reform (0.1 to 0.2 SD, depending on the school reform model; Borman, Hewes, Overman, & Brown, 2003), oversubscribed charter schools (0.04 SD to 0.08 SD per year of attendance; Chabrier, Cohodes, & Oreopoulos, 2016), large reductions in class size (roughly 0.2 SD; Krueger,

- 1999), high dosage tutoring (0.15 to 0.25 SD; Blazar et al., 2015a; Blachman et al., 2004), and changes in curriculum (0.05 to 0.3 SD depending on the grade level and curriculum under investigation; Agodini et al., 2009; Koedel, Li, Springer, & Tan, 2017)."
- "we find that pairing coaching with group trainings is associated with 0.31 SD larger effect size on instruction and 0.12 SD larger effect size on achievement. Consistent with the theory of action outlined in Figure 1, this suggests that teachers may benefit from building baseline skills (e.g., content knowledge) prior to engaging directly with a coach. For instructional outcomes, pairing coaching with instructional resources and materials (e.g., curriculum) also is associated with greater gains (0.21 SD larger), while providing teachers with a video library is associated with more limited benefits (-0.27 SD smaller). We do not find any significant difference in effect sizes for coaching programs that were delivered in person or virtually, though our standard errors are too large to rule out even moderately sized differences. Finally, for both measures of dosage – total hours of coaching, and total hours of PD when coaching is paired with other program features – we fail to find any evidence in support of the hypothesis that coaching must be high-dosage to be effective. We find very precisely estimate null effects for both instruction and achievement outcomes"

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