The leadership of the improvement of teaching and learning: Lessons from initiatives with positive outcomes for students

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The purpose of this study was to examine how leaders foster school renewal by facilitating and participating in the types of teacher professional learning and development that improve student academic and non-academic outcomes. The methodology involved a backward mapping strategy that takes as its starting point, not theories of leadership, but professional development initiatives that have made a demonstrable impact on the students of the teachers involved. Eighteen studies with evidence of such impact were analysed for descriptions of the leadership practices involved in each initiative. Through an iterative process of review and critique, these descriptions were categorised into the leadership dimensions associated with teacher professional learning that resulted in improved student outcomes. The analysis revealed five leadership dimensions that were critical in fostering teacher and student learning: providing educational direction; ensuring strategic alignment; creating a community that learns how to improve student success; engaging in constructive problem talk; selecting and developing smart tools. The analysis showed that leadership of the improvement of learning and teaching is highly distributed in terms of both who leads and how it is enacted. Such leadership is embedded in school routines that are aligned to improvement goals, and involves the use of smart tools that are designed to assist teachers' learning of more effective pedagogical practices.

Fundamental to answering questions about of the role of leaders in school renewal is how both these concepts are interpreted. We have taken a particular stance towards both school renewal and leadership that we need to state at the out-set because it has shaped our approach to this paper. By school renewal we are referring to a variety of processes through which the professionals within schools learn to promote the achievement of agreed and valued outcomes for their students. Its effectiveness is judged against these consequences.

This student outcome focus has implications for how we have framed leader-ship, because it is well established that it is teachers, rather than leaders, who have

greater direct influence on students. Australian researchers (Cuttance, 1998; Hill & Rowe, 1996; Rowe & Hill, 1998) have led the use of multi-level models to estimate the magnitude of teacher influence, with these and other international estimates consistently identifying that classroom teachers have the greatest system influence (Darling-Hammond, 2000; Muijs & Reynolds, 2001; Nye, Konstantanopoulos, & Hedges, 2004).

Relative to teacher effects, the impacts of leaders are typically much smaller (Marzano, Waters, & McNulty, 2005; Witziers, Bosker, & Krüger, 2003). A closer examination of the data on the impact of leadership on student out-comes reveals, however, that leaders can have a substantial impact on student outcomes particularly through such activities as promoting and participating in teacher learning and development (Andrews & Soder, 1987; Bamburg & Andrews, 1991; Heck, Larsen, & Marcoulides, 1990; Heck, Marcoulides, & Lang, 1991). Understanding this chain of influence has led to a burgeoning literature on professional learning and development for teachers. Most of this literature, however, incorporates the assumption that if teachers learn, then so do their students. This assumption is rarely tested. A recent meta-analysis of the impact of professional development in mathe-matics and science in the United States (Scher & O'Reilly, 2007), for example, located 146 studies on professional development, but only 14 of these studies docu-mented outcomes for students. Not all outcomes were positive. Similarly, a recent synthesis of the international literature on professional learning and development that included personal, social and academic outcomes, identified that much of the effort to promote teacher learning was either neutral or counter-productive for the students involved (Timperley, Wilson, Barrar, & Fung, 2007).

In this paper, therefore, we have focused on how school leaders can promote the learning of teachers to achieve a range of valued outcomes for the students for whom they have responsibility. We wish to acknowledge that effective leaders do many other things, such as organising and managing resources, and working with people other than teachers including parents, communities and government officials. Given the relative influence of teachers, however, we have directed our attention to how leaders work with their staff to improve outcomes for students.

This focus is very different from the usual focus of educational leadership research which typically examines the quality of leader-follower relations (Robinson, 2006). It cannot be assumed, however, that leadership that works for the adults in the system also works for the students. For example, transformational leadership research consistently shows relatively large effects on staff attitudes but negligible or weak indirect effect on students (Leithwood & Jantzi, 2005). Similarly, distributed leadership analyses focus on how leadership is spread throughout a particular institutional environment and pays little attention to the impact of leadership on valued student outcomes (Leithwood et al., 2007; Spillane, Camburn, & Pareja, 2007). The central concern of this paper, therefore, is to identify the role of leadership in promoting teacher learning that is demonstrably effective in improving student outcomes.

Methodology

Our focus on the leadership of teacher learning that improves student outcomes shaped our methodology. We determined how educational leaders promote student success through a process of backward mapping that took as its starting point, not theories of educational leadership, but empirical research on effective professional development for teachers. We inductively derived conclusions about the role of leadership in school renewal from systematic analysis of these studies.

The studies we used were selected from a recent best evidence synthesis of the international literature on teacher and professional learning (Timperley et al., 2007). The synthesis located 72 studies from which effect sizes for the impact of professional development on student outcomes could be calculated. Studies accepted for inclusion needed to show some independent verification of student outcomes other than teacher report. Of the 72 studies, 17 were conducted in Australasian schools and those formed the core studies from which leadership dimensions were derived[1]. While the effect sizes for the 17 studies ranged from small to large, the great majority were moderate to large in impact[2]. Sixteen of the 17 studies measured academic outcomes and one measured social outcomes. While most studies were conducted in primary schools, a few included middle and high schools in their samples.

We read each study and took detailed notes on every aspect of leadership mentioned (see Figure 1). We analysed these notes for key themes and identified 23 initial categories of leadership. The results of this analysis were entered into an excel spreadsheet, along with each core study and the outcomes for students. An iterative checking process was then undertaken to ensure that the leadership categories identified adequately represented the specific characteristics of leadership mentioned in each study. During this analysis, we re-read the studies and entered brief descriptions of the leadership practices occurring under the relevant categories, together with the individuals or groups providing the leadership. We then critiqued the entries under each category and merged the categories with similar meanings. Through this process, the 23 initial categories were collapsed into five broad dimensions of leadership.
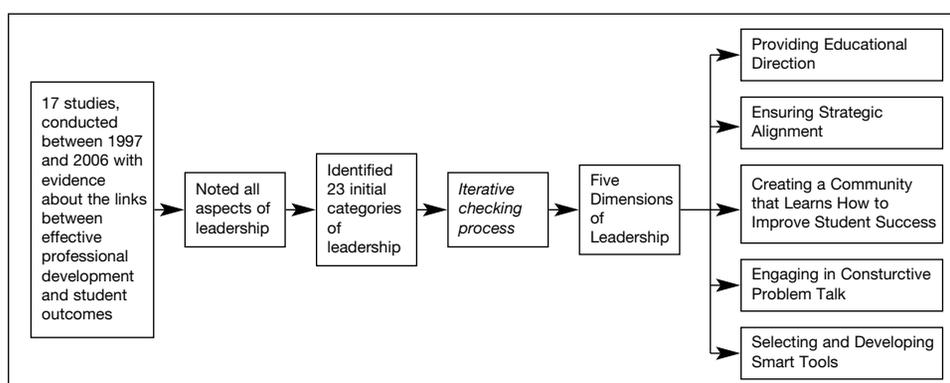

Figure 1 Research process to identify leadership dimensions.

While the five leadership dimensions themselves were derived from the 17 core studies, the discussion of these dimensions was enriched by the use of supplementary studies which provided theoretical insights into the dimensions or evidence of their application to wider international—usually North American—educational contexts.

The role of leadership in developing effective teaching

As shown in Figure 1, five key leadership dimensions were identified from this backward mapping strategy. We elaborate each of these dimensions by providing a theoretical explanation of their power and empirical illustrations of the particular qualities that make these leadership dimensions effective in helping teachers to learn how to improve the achievement of their students. The empirical illustrations provide both positive and negative illustrations of these qualities.

Providing educational direction/goal setting

One of the most obvious ways in which leadership was exercised in the studies is through the discussion, setting and communicating of goals for teacher and student learning. Goal setting works by creating a discrepancy between what is currently happening and some desired future state. When people are committed to a goal, this discrepancy is experienced as constructive discontent that motivates persistent goal–relevant behavior. It is this increased attention and effort that leads to better enjoyment of and performance in the relevant task or activity (Latham & Locke, 2006).

Commitment to goals is critical to their effectiveness as they only motivate if they are understood by and important to those whom they are meant to influence (Latham & Locke, 2006). Goals gain importance by being linked to wider philosophical and moral purposes. Articulating and winning commitment to such purposes is frequently discussed as part of visionary leadership (Hallinger & Heck, 2002). There was little evidence in the studies we reviewed, however, that talking about vision was important in developing commitment to particular goals. Rather, the moral and philosophical commitments that made goals important were deeply embedded in specific contextualised leadership practices and thus not recognisable as explicit 'visionary' leadership (Robinson, 2001).

The evaluation of a national literacy leadership project in New Zealand (Timperley & Parr, 2005) showed that participating school leaders and teachers had little understanding of and commitment to the project goal of strengthening school-based leadership of literacy teaching. Although the focus on improving school leadership was made explicit in the documents produced for participating schools and was clear to the national facilitators, the evaluation showed that not one principal or literacy teacher understood that their own leadership was the focus of change. Not surprisingly, the project showed no change in the literacy achievement of students.

It is commonly assumed that commitment to goals requires that they are set by those who are to achieve them. The empirical evidence suggests that this is not

necessarily the case. People can become committed to goals that they others have set, as long as they believe they are important and have the capacity to achieve them (Latham & Locke, 2006). In the evidence we reviewed, the co-construction of goals by both teachers and external researchers or professional developers, was associated with the highest gains for students. This is probably because a co-constructed process gives leaders the opportunity to check the understanding and confidence of staff and to adjust external expectations in the light of internal realities (Bishop, Berryman, Cavanagh, Teddy, & Clapham, 2006; McNaughton, Lai, MacDonald, & Farry, 2004).

In summary, the leadership of effective professional development frequently involved setting explicit goals, which were clearly understood and judged to be important.

Ensuring strategic alignment

In the prior discussion of goal setting we indicated that goals were effective when embedded in the tasks of teaching and learning rather than just articulated in relevant meetings. In this section we examine some of the many ways in which the leadership of improvement initiatives embedded goal achievement into the fabric of the school by ensuring that decisions about material and human resources and about the organisation of the teaching programme were aligned to key pedagogical goals and principles.

When it comes to resources, a key leadership challenge is to align resources to goals rather than to treat resource acquisition as an end in itself. Bryk, Sebring, Kerbow, Rollow, and Easton (1998) use the metaphor of plucking presents from a Christmas tree to describe leadership that gathers additional resources with little regard for the coherence and strategic alignment of the resulting activities.

Strategic alignment is particularly critical in initiatives that rely on externally provided resources and expertise. In the 17 core studies, some leaders planned for sustainable resourcing by shifting operational funds to supplement external resources (Anand & Bennie, 2005). Others planned for continuity of expertise by ensuring that school personnel were trained to take over the leadership functions of externally based researchers and professional developers (Timperley & Phillips, 2003), and that there were rigorous procedures for inducting new staff into effective pedagogical practices (Timperley & Wiseman, 2003).

Another aspect of strategic alignment is the coherence of the teaching programme. A coherent programme is one that is guided by a common set of principles and key ideas, including specific strategies for teaching and assessment; school organisation that supports the common framework on such issues as staff recruitment, evaluation and professional development; and human and financial resource allocation to support the learning and implementation of the common framework.

While none of the core studies included measures of programme coherence, there were many leadership activities that were directed to this end. In some studies, teachers in a given year level learned a common approach to teaching and assessing junior school reading (Phillips, McNaughton, & MacDonald, 2002) or

writing (Parr, Timperley, Reddish, Jesson, & Adams, 2006). Another study showed that those leaders who allowed staff to opt out of the common pedagogical approach risked student achievement for the sake of greater staff autonomy (Timperley, 2005).

A critical dimension of program coherence which is not emphasised in the United States literature is coherence with what students already know and how they learn. It makes little sense to have a programme that is coherent in the eyes of adults but does not work for students. Research on the experience of Māori students in English medium secondary schools in New Zealand has shown that they experience major discontinuities between the cultural practices found in their classrooms and their culturally located student identities (Bishop et al., 2006). An intervention project, known as Te Kotahitanga, aims to improve the educational achievement of Māori students in mainstream schools by developing learning-teaching relationships where 'connectedness' between students and teachers, and between home and school is a fundamental pedagogical principle. Early findings suggest that Māori students in maths classes with teachers who have been trained in the approach do better than those whose teachers have not been so trained (Bishop et al., 2006).

Creating a community for improved student success

Much has been written about the virtues, or otherwise, of professional learning communities (Little, 2003; Timperley & Robinson, 1998). There is very little evidence available, however, about how this form of professional learning benefits students. What evidence there is suggests that the impact of professional learning communities on student outcomes is weak (Bolam, McMahon, Stoll, Thomas, & Wallace, 2005). We suspect, however, that these findings reflect a failure to identify the qualities of professional learning communities that are needed to promote the type of teacher learning that makes a difference to their students, rather than an inevitable outcome of this form of professional learning. Our analysis of the core studies, many of which involved teachers and leaders meeting together to improve student achievement, identified two qualities that may have been responsible for their success.

The first quality involved an intensive focus on the relationship between how teachers had taught and what students had learned. Leaders promoted this focus by collating and distributing records of student learning, by modeling and expecting specific discussion of teaching-achievement relationships and by focusing the group on how to move beyond analysis of the data to identifying specific teaching strategies to help a particular student or group of students (Bishop et al., 2006; Timperley, 2005; McNaughton et al., 2004).

The second quality of effective professional communities was strong norms of collective responsibility and accountability for student achievement and well-being. Newmann (1994) defines collective responsibility as 'a sense of responsibility not only for one's own actions and students, but also for the actions of colleagues and other students in the school' (p. 2). He suggests that there is an interaction effect between teachers' individual and collective responsibility, because the degree of

responsibility felt by individual teachers is attenuated or enhanced by the collective beliefs of their colleagues.

One of the challenges for leaders in developing collective responsibility is that it is in tension with traditional norms of professional autonomy. Collective responsibility inevitably means more collegial accountability as it develops mutually felt obligations to shared standards of instruction and learning (Kruse, Louis, & Bryk, 1994). In schools where norms of teacher autonomy and the privacy of classroom practice are strong, teachers are more likely to focus on the possible negative impact of greater accountability rather than on the benefits of opening up their practice to colleagues.

Several of the core studies described how leaders had helped to deprivatise teachers' practice so it could be more readily discussed and observed. They communicated an expectation of collective responsibility through the way they organised activities and asked teachers to help one another with specifically identified teaching problems. One study, for example, showed that leaders were able to assist their teachers to make the shift to greater collective responsibility by focusing on an analysis of literacy achievement data across the first three years of schooling (Timperley, 2005). The leader structured the discussion so that every slow progress child was individually discussed and decisions made about what teaching strategies might be more effective. The routine of meeting to monitor student progress every five weeks established a sense of collective accountability and mutual support that contributed to sustained gains in student achievement.

Engaging in constructive problem talk

In order to build communities that learn, leaders may need to challenge and change well established aspects of teacher culture. We have already discussed how norms of privatised practice and comfortable collegiality need to be replaced by norms that support collective analysis of and accountability for students' achievement. In teacher professional development that benefited students as well as teachers, leaders were proactive in addressing and supporting teachers in making these changes. We have called this dimension of leadership 'Engaging in Constructive Problem Talk' because it had two problem solving qualities: the first is the ability to name and describe problems in a way that invites ownership and commitment rather than defensiveness, and the second is the ability to respectfully examine the extent to which the beliefs and practices of teachers and leaders are, however, unwittingly, contributing to the problem.

We identified several different ways in which leaders named and gained commitment to addressing problems. One strategy involved making the challenge of change explicit at the outset of a project by discussing the likely difficulties and the support that would be needed (Phillips, et al., 2002). Another strategy involved naming and gaining commitment to specific problems by showing how current practice feel short of standards to which teachers were already committed (Phillips, 2003). On other occasions, leaders could not assume that the standards they used to detect problems were shared by their staff. In such cases leaders in successful projects combined problem naming with capacity building so that

teachers became more confident that leaders' standards were realistic (Timperley, 2005).

The second aspect of this leadership dimension is the ability to respectfully examine the contribution of teachers' current beliefs and practices to the problem in question. Research on teacher learning and professional development shows that teachers interpret feedback and suggestions for change through the lens of their existing beliefs about how their students learn, what they should be taught and how best to teach them (Kennedy, 2004; Robinson & Lai, 2006). These beliefs and values, sometimes called a 'theory of action' are powerful determinants of current practice and teachers are unlikely, unless coerced, to make changes that conflict with their theories of action (Argyris & Schon, 1974). In successful professional development initiatives, leaders recognised this tension and engaged with, rather than bypassed or ignored, teachers' theories. As portrayed in Figure 2, this involves respectful inquiry into and evaluation of both the contribution of the current theory to the problem and the merits of the leader's proposed alternative theory. The result of the dialogue, which may require numerous iterations, is agreement about the relative merits of the current and alternative theories of practice and a decision about whether or not change is required.
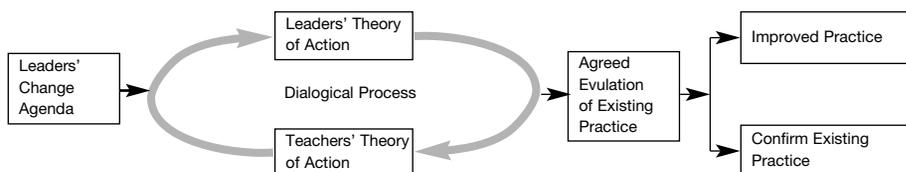

Figure 2 Leadership strategy for responding to teachers' theories

The following example of theory engagement involves a literacy facilitator, supported by university-based researchers, engaging with teachers in a rural primary school involved in the New Zealand national literacy professional development project (Parr et al., 2006). The three junior school teachers had asked the facilitator to focus on writing, and she began by involving them in a critical examination of their own theories of action for writing lessons. First, the three teachers were observed teaching a 45 minute lesson of their choice. The results of these observations, as presented in the 'Teaching Practices' box in Figure 3, were posted in the staff room and the teachers were asked to describe the beliefs that led them to teach as described. They indicated, in essence, that the teaching of writing was a predominantly motivational exercise. This information helped explain why they had spent considerably more time in their lessons on motivating the children to write rather than on teaching how to write or in actual writing.

The consequences of these beliefs and teaching strategies were that the students were well behind national norms in their writing achievement. In addition, interviews with a representative sample of students in each class showed that they
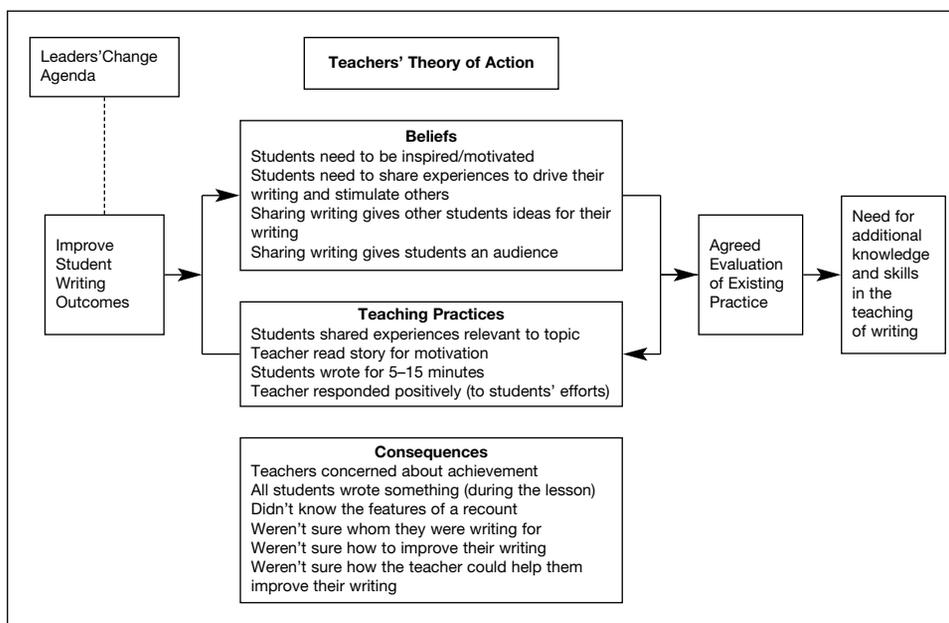
Leaders'Change Agenda

Teachers' Theory of Action

Improve Student Writing Outcomes

Beliefs
Students need to be inspired/motivated
Students need to share experiences to drive their writing and stimulate others
Sharing writing gives other students ideas for their writing
Sharing writing gives students an audience

Teaching Practices
Students shared experiences relevant to topic
Teacher read story for motivation
Students wrote for 5–15 minutes
Teacher responded positively (to students' efforts)

Consequences
Teachers concerned about achievement
All students wrote something (during the lesson)
Didn't know the features of a recount
Weren't sure whom they were writing for
Weren't sure how to improve their writing
Weren't sure how the teacher could help them improve their writing

Agreed Evaluation of Existing Practice

Need for additional knowledge and skills in the teaching of writing

Figure 3 The theories of action of three teachers for the teaching of writing

had limited understandings of the lesson aims and success criteria, and thus lacked the tools that would enable them to regulate and improve their own writing. By working with the three teachers to describe and evaluate their current theories of action, the facilitator had built shared understanding of the limitations of their current practice and insight into what needed to change. Although Figure 3 does not include the leader's alternative theory of writing, it had been influential during this diagnostic process in informing the type of evidence that was collected about both the teaching of writing and the understandings of students. The leader's alternative theory became even more salient as teachers learned how to formulate and communicate more precise learning intentions and success criteria, align their illustrations and explanations to the success criteria and give more focused feedback to students. In just four months a repeat of the writing assessment showed that students at all levels had made significant gains. In addition, both teachers and students now reported much greater enjoyment of writing.

In summary, the leadership dimension 'Engaging in Constructive Problem Talk' involves the ability to name problematic practices and gain commitment to addressing them. This was a feature of the leadership in many of the core studies, as was leaders' ability to involve teachers in an examination of how their own theories of action contributed to the problematic situation, and of how an alternative theory could contribute to its resolution.

Leadership through selecting and developing smart tools

When people think of leadership, they typically think of it operating through face to face interaction. Leadership, however, is not just an interpersonal activity.

Leadership is also exercised in impersonal ways by shaping the situation in which people learn how to do their jobs (Spillane, Reiser, & Reimer, 2002). One of the most powerful ways in which this happened in the successful initiatives we reviewed was through the development of tools and of the routines to support their wise use. The purpose of examining the tools used in these initiatives is to identify the qualities that seemed to be particularly important in the success of the initiatives. Such knowledge will help leaders at all levels of the education system to make better informed judgments about how to select or develop tools which will help their staff learn how to improve the outcomes of students.

By 'tools' we mean all the physical resources with which people interact in doing their jobs. This term is so broad that it covers everything from white boards to classroom furniture to software for tracking assessment data and attendance, to policy documents and report forms. Tools and their associated routines institutionalise particular ways of doing things so that desired practices continue independently of face to face leadership.

The role of leadership in respect of tools is not just to develop or select tools but to ensure that the tools and associated routines have the qualities needed to help users achieve the goals of the activity in which the tools are used. We call tools that meet this criterion 'smart tools'. At a general level, smart tools share the following two characteristics: (a) they incorporate a valid theory of the task for which they were designed and (b) the tools themselves are well designed. The distinction between tools and smart tools is critical because there are instances where teachers are aligning their activities to tools, in the form of templates, policy documents, or curriculum guidelines, which lack the qualities needed to help them achieve the goals of the activity for which the tools were designed.

The theories incorporated in the tools used in the successful teacher learning projects were valid in the sense that they reflected evidence about how teachers learn to improve student achievement. Two aspects were particularly noticeable: (a) the tools incorporated standards of good practice and (b) those standards structured how data about teacher skill, knowledge and performance were collected and evaluated.

Tools which incorporate standards promote teacher learning by translating the abstract vision and goals of an initiative into concrete explanations and illustrations of what is required. For example, the national numeracy project provided a tool which described a progression of development in students' numeracy reasoning. The importance of this tool in communicating progressions in student mathematical reasoning was emphasised by facilitators in their interviews with a project evaluator (Higgins, 2004):

> Facilitator: When we present them with the Framework it is without doubt the most powerful [time]. They get this enormous sense of knowing that they are going to know where the students are, they are going to know where they have been and where to take them next . . . they have never had that—knowing where from and where to. (p. 49)

The power of tools which enable staff to evaluate students' performance against explicit standards is well illustrated by the 'wedge graph' which is used to

help teachers reflect on the progress of their students in Year One literacy. The tool was developed by an independent professional developer as part of her work with an early literacy initiative (AUSAD) in Mangere and Otara schools (Timperley & Wiseman, 2003). An example of the tool is reproduced in Figure 4 below. The individual points on the graph represent the reading level of each child in three Year One classes, plotted against the number of weeks they have been at school. The angled lines represent the upper and lower boundaries of expected achievement given the number of weeks each child has been enrolled at school. Those students lying above the wedge are performing above age-expected levels, those falling below the wedge are achieving below expected levels, and those that lie within it are reading at the expected level.
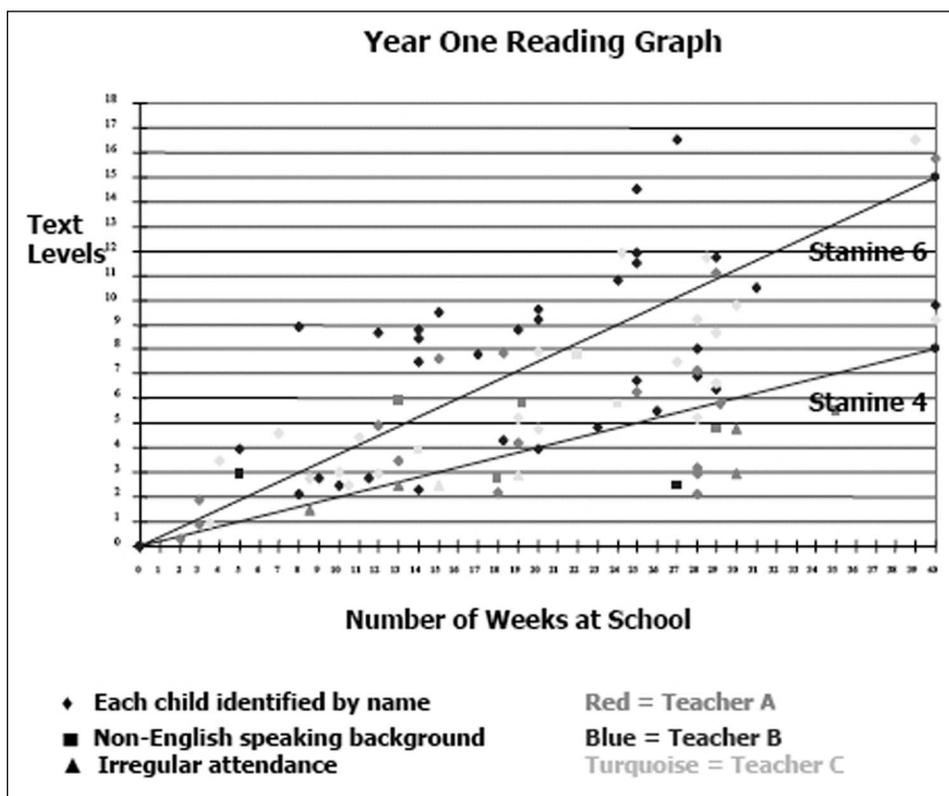

Figure 4 Year one reading graph

The wedge graph is a smart tool because it incorporates a sound theory about the conditions which help teachers to learn. By identifying which students were taught by each of the three teachers the graph enabled teachers to focus on the teaching-achievement relationship and to identify expertise; by incorporating standards for student achievement it enabled evaluation of the adequacy of progress. We reiterate, however, that it was not the tool itself that created the teacher learning and student improvement, but how it was integrated into school and classroom routines for professional learning about how to improve specific student achievement.

Given the power of tools to shape teacher and administrator practice, it is important that those designing and promulgating them know what constitutes a valid theory of the relevant task and are guided by research which speaks to good quality tool design, including that which is concerned with sense making (Spillane, 2004; (Spillane, Reiser & Reimer, 2002) and cognitive load (Mayer, 1993; Mayer & Merino, 2003).

Discussion

The five leadership dimensions that were derived from our analysis of 18 core studies should not be treated as discrete sets of leadership practices. Leaders' learning about how to improve student outcomes through teacher learning is dependent on the integration of the dimensions into coherent and iterative cycles of inquiry into both teachers' and students' learning needs.

Our framing of these inquiry cycles is based on the principles of self-regulated learning which requires evaluating performance against identified goals, monitoring progress towards them and adjusting further action based on the feedback provided by the monitoring systems (Butler & Winne, 1995). It is a deliberate, evaluative and adaptive process. Although Butler and Winne developed their model of self-regulated learning from research on individual learning, we argue that it can be applied equally to organisations.

The student-focused goals of dimension one are central to organisational self-regulation because they form the basis of the monitoring and feedback system. The effectiveness of the deployment of human and material resources of dimension two becomes part of the monitoring and inquiry systems. Similarly, in an integrated inquiry model, the quality of the learning of the community in dimension three would be monitored against progress towards the goals, with the constructive problem talk of dimension four directed to investigating and overcoming the barriers identified in the monitoring processes. The smart tools of dimension five would underpin alignment and support the learning and implementation of new practices. Rich qualitative research is needed on exactly how these cycles of inquiry are established in improvement initiatives and sustained beyond the life of any single initiative.

Since the core studies used in this paper were not designed as studies of leadership, it is important to reflect on any differences between the findings reported here and those that are derived from more typical empirical studies of school leadership. One major difference is the prominence of the distributed, rather than heroic, nature of leadership. The distributed nature of the leadership was evident with respect to who exercised leadership and how it was practiced. Rather than portrayals of the qualities and activities of a pre-selected group of formal school leaders, these studies provided more subtle and embedded descriptions of a range of leadership practices that were carried out by staff who may or may not have held formal leadership positions. There were virtually no references to the role of the principal, with teacher leaders (e.g., literacy leaders) being far more prominent. In addition, a great deal of the leadership of these initiatives was carried out by outsiders, such a university- based researchers, national facilitators and private

professional developers. In many cases, the leadership of the initiatives developed as a partnership between the internal and external leaders.

The leadership of these successful initiatives was also distributed in the sense that leadership influence was exercised in the context of particular school routines and in interaction with task–relevant tools. Organisational routines such as the design and collection of common assessments, regular meetings for reviewing teaching in the light of student progress, and the induction of new teachers into effective pedagogical practices provided the contexts in which face to face leadership could be more effective, more sustained and less personalised. In addition, smart tools served as leadership substitutes in that they provided the focus, the information and the cues that enabled teachers to learn more effective pedagogical practices.

Organisational routines and smart tools do not, however, replace the need for skillful face-to-face leadership. Our evidence on the qualities of effective professional learning communities and of constructive problem talk, show the importance of respectful inquiry into the theories that inform teachers' practice. Effective leadership of teacher learning that makes a difference to students involves a combination of face to face interaction and the use of smart tools embedded in school routines that are clearly focused on the continuous improvement of learning and teaching.

Keywords

improvement	leadership	leadership qualities
principals	student outcomes	teaching methods

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Notes

1 A list of these core studies along with the effect sizes is available from the first author.

2 An effect size between 0 and 0.20 was considered to be having weak to no impact; between 0.20 and 0.40 having a small but educationally significant impact; between 0.40 and 0.60 having a medium educationally significant impact; and greater than 0.60 having a large educationally significant impact. Where effect sizes were not provided by the authors of the individual studies, the BES authors computed effect sizes themselves from the statistical data provided.

3 Developed from Parr, J., Timperley, H., Reddish, P., Jesson, R., & Adams, R. (2006). *Literacy professional development project: Identifying effective teaching and professional development practices for enhanced student learning.* Wellington: Learning Media Ltd.

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