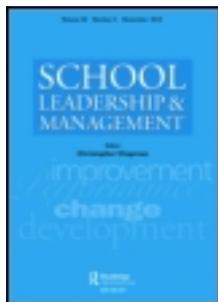


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Collaborative leadership and school improvement: understanding the impact on school capacity and student learning

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Fifty years of theory and research offer increasing levels of support for the assertion that principal leadership makes a difference in the quality of schooling, school development, and student learning. In the current context of global education reform, however, recent inquiries have focused on identifying how teams of school leaders contribute to school improvement and student learning. This paper reports findings drawn from a series of empirical analyses that assessed the effects of collaborative leadership on school improvement capacity and student learning in a large sample of US primary schools over a four-year period. Our findings support the prevailing view that collaborative school leadership can positively impact student learning in reading and math through building the school's capacity for academic improvement. The research extends this finding, however, by offering empirical support for a more refined conception that casts leadership for student learning as a process of mutual influence in which school capacity both shapes and is shaped by the school's collective leadership.

Keywords: leadership; change; school improvement; leadership effects; leadership for learning

Over the past 50 years, scholars in Europe (Bell, Bolam, and Cubillo 2003; Krüger, Witziers, and Slegers 2007; Southworth 2002; van de Grift 1990; Witziers, Bosker, and Krüger 2003), North America (Bossert et al. 1982; Gross and Herriott 1965; Hallinger and Heck 1996; Heck and Hallinger 2009; Leithwood et al. in press; Marks and Printy 2003; Pounder, Ogawa, and Adams 1995; Wiley 2001), and the Asia Pacific (Caldwell 1998; Cheng 1994; Mulford and Silins 2009; Robinson, Lloyd, and Rowe 2008) have sought to understand if and how leadership contributes to school improvement and more specifically to student learning (Heck and Hallinger 2005). This research generally supports the conclusion that leadership contributes to learning through the development of a set of structural and sociocultural processes that define the school's capacity for academic improvement (Hallinger, Bickman, and Davis 1996; Hallinger and Heck 1996; Heck, Larson, and Marcoulides 1990; Leithwood et al. in press; Robinson et al. 2008; Southworth 2002).

While this finding offers encouragement to policy-makers and practitioners, this research has relied largely upon cross-sectional surveys of principal effectiveness and case studies of school improvement (Heck and Hallinger 2005; Reynolds et al. 2000). Neither research design offers a satisfactory approach for understanding *how*

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leadership contributes to school improvement. Thus, we assert that gaining deeper insight into this issue requires longitudinal data that describe changes in school processes and outcomes in a substantial number of schools over time (Hallinger 2003; Hallinger and Heck 1996; Reynolds et al. 2000; Southworth 2002).

This paper describes findings from a series of related quantitative studies in which we sought to understand how leadership contributes to school capacity for improvement and student learning. Scholars have framed the ‘elusive search’ (Witziers, Bosker, and Kruger 2003) for a link between leadership and learning through a variety of contrasting perspectives. In this paper, we compare four conceptual perspectives or models:

- *A direct effects model* in which leadership is conceptualised as the primary driver for changes in student learning.
- *A mediated effects model* in which leadership drives growth in student learning by shaping and strengthening the school’s capacity for improvement.
- *A reversed mediated effects model* in which the school’s results – i.e., changes in student learning outcomes – drive changes in school improvement capacity and leadership.
- *A reciprocal effects model* in which leadership and school improvement capacity are conceptualised as a mutual influence process that contributes to growth in student learning.

This report presents the results of analyses of a longitudinal dataset collected from 198 primary schools over a four-year period in the US. These data described student and teacher perceptions of collaborative leadership and school improvement capacity, as well as student achievement in reading and math.¹ The analyses that we report here compared the efficacy of these four models in accounting for patterns of change in leadership, school improvement capacity and learning outcomes in the 198 schools. This effort represents, to our knowledge, the first comprehensive empirical tests to explicitly compare these four conceptual models of school leadership effects on learning since they were proposed by Nancy Pitner (1988) more than 20 years ago.

Overview of the research

Our approach to understanding the means by which leadership contributes to school improvement is framed by two assumptions. First, we assume that studies of *school improvement* must assess change (i.e., improvement or decline) in the school’s academic processes and learning outcomes over a period of time. While this observation may seem self-evident, we note that scholars have frequently opined on issues of school improvement based on the analysis of data that describe school performance at one point in time (Heck and Hallinger 2005; Reynolds et al. 2000).

Second, we assume that *school improvement leadership* is directed towards growth in student learning. Scholars have rightfully suggested that a key role of leadership is to define the ends towards which the school will strive to improve, sometimes referred to as ‘leadership for what’. Yet, even though schools must work towards a variety of goals, we take the position that school leadership must first and foremost be directed towards improvement of learning. These assumptions framed the conceptual models, selection of variables, and design for this research.

School improvement leadership

Empirical research finds that successful school leadership creates conditions that support effective teaching and learning and builds capacity for professional learning and change (Fullan 2001; Hallinger, Bickman, and Davis 1996; Hallinger and Heck 1996; Heck, Larson, and Marcoulides 1990; Leithwood et al. in press; Marks and Printy 2003; Mulford and Silins 2009; Robinson, Lloyd, and Rowe 2008; Wiley 2001). Over the past decade there has been increased interest in exploring the sources, means and implications of viewing school leadership more broadly than that which is exercised by the principal (Gronn 2002; Leithwood et al. 2009; Ogawa and Bossert 1995). Although scholars have proposed meaningful distinctions between terms such as distributed (Gronn 2002; Spillane 2006), shared (Marks and Printy 2003; Pounder, Ogawa, and Adams 1995), and collaborative (Hallinger and Heck in press) leadership, all three terms reflect a similar concern for broadening the sources of school leadership. The current study employed a conceptualisation that we called collaborative leadership.

We suggest that collaborative leadership focuses on strategic school-wide actions that are directed towards school improvement and shared among the principal, teachers, administrators and others. In the context of this study, collaborative leadership entailed the use of governance structures and organisational processes that empowered staff and students, encouraged broad participation in decision-making, and fostered shared accountability for student learning. We note that the state in which this study took place had been actively promoting the use of school leadership teams as a means of fostering school improvement.

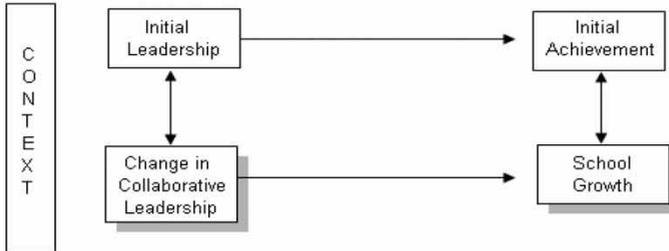
Increasing the school's capacity for improvement represents a key target of leadership efforts designed to impact teacher practice and student learning (Fullan 2001; Leithwood et al. in press; Heck and Hallinger 2009; Robinson et al. 2008). In our research, we defined school improvement capacity as school conditions that support teaching and learning, enable the professional learning of the staff, and provide a means for implementing strategic actions aimed at continuous school improvement (Fullan 2001; Heck and Hallinger 2009, in press; Hill and Rowe 1996; Leithwood et al. in press; Mulford and Silins 2009; Stoll and Fink 1996). We sought to develop a dynamic picture of school improvement in this study by measuring teachers' perceptions of their school's collective leadership and related school improvement processes at several points in time. This information was used to define an 'improvement trajectory' that portrayed change in these processes for each school over a four-year period of time.

Defining conceptual models of leadership and learning

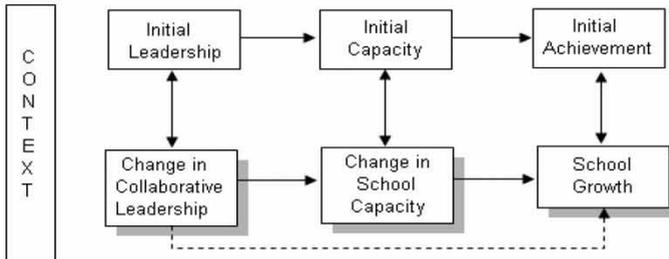
It is only since the 1960s that scholars began to conceptualise and study school leadership as directed *explicitly* towards improvement in the quality of teaching (Gross and Herriott 1965). Subsequently, this focus was expanded to include the effects of principal leadership on student learning (Bossert et al. 1982; Hallinger and Heck 1996). In 1988, Pitner proposed several conceptual models that sought to explain the means by which leadership could impact student learning. A decade later, we elaborated on these models in a review of empirical research on principal leadership and student learning (Hallinger and Heck 1996). In this study, we test

these models as a means of furthering our understanding of how collaborative leadership contributes to school improvement and student learning (see Figure 1). We note that in contrast to prior research in this domain, our proposed models are conceptualised as ‘growth models’ rather than ‘static models’. Thus, Figure 1

Model 1: Direct Effects Where Leadership Drives Change in Learning

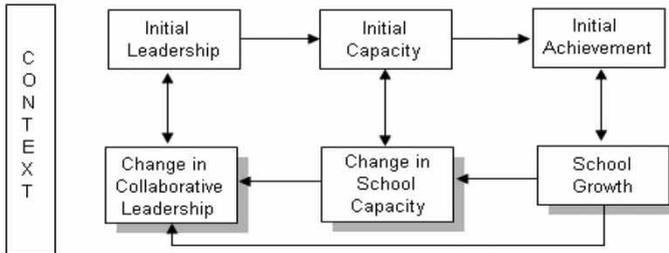


Model 2: Mediated Effects Where Leadership Drives Change in Improvement Capacity

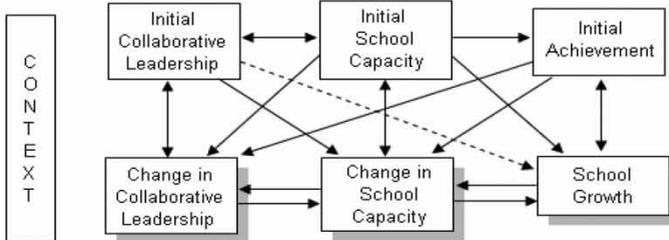


note: ----> Path tested but not expected to be significant

Model 3: Mediated Effects Where School Growth is the Driver for Change



Model 4: Reciprocal Effects Where Leadership is a Mutual Influence Process



note: ----> Path tested but not expected to be significant

Figure 1. Conceptual models of leadership effects.

includes both the initial states of constructs as well as the changes in the constructs over time (shown as shaded rectangles).²

Direct effects model (leadership as the driver for change in learning)

Early research in this field implicitly framed the relationship of principal leadership to learning as a direct effects model. Some have termed this a ‘heroic leadership’ model in that it seeks to explain student learning outcomes solely in terms of the principal’s leadership. Typically researchers employing this approach collected perceptions of principal leadership and student achievement across a set of schools and sought to determine if there were significant patterns in the relationship (Braughton and Riley 1991; O’Day 1983). In general, studies employing this type of model did not yield significant results and scholars were subsequently discouraged from pursuing this path (Hallinger and Heck 1996). In our analysis of this model, we proposed that change in collaborative leadership might be *directly* related to change in student achievement, controlling for context factors such as student composition.

Mediated effects model (leadership as the driver for change in capacity)

Given the disappointing results of the direct effects studies, scholars increasingly adopted models that conceptualised the relationship between leadership and learning as mediated by school-level organisational structures and processes that we have referred to as ‘school improvement capacity’ (Cheng 1994; Hallinger, Bickman, and Davis 1996; Heck, Larson, and Marcoulides 1990; Leithwood and Jantzi 1999; Marks and Printy 2003; Wiley 2001). While these studies continued to frame leadership as a driver for school effectiveness and improvement, they proposed *indirect rather than direct effects of leadership on learning* (see Model 2 in Figure 1). As noted earlier, these indirect effects of principal leadership on student learning are achieved through shaping the school’s capacity for academic improvement (Bell, Bolam, and Cubillo 2003; Hallinger and Heck 1996, Leithwood et al. in press; Robinson et al. 2008; Southworth 2002). This model assumes that changes in leadership and capacity for improvement which take place at the school level produce ‘trickle down’ effects on teacher classroom behaviour and student learning (Hallinger and Heck in press; Leithwood et al. in press; Mulford and Silins 2009). The reader will, however, note that we did not directly test this assumption in this research.

Reversed mediated effects model (change in learning outcomes drives changes in capacity and leadership)

While virtually all mediated effects studies have explicitly framed leadership as the driver for school improvement, one could also conceptualise change in school results (improvement or decline) as providing the impetus for changes in school capacity and leadership as shown in Model 3 (Heck and Hallinger, in press-a). It is noteworthy that explicit discussions of this mediated effects model are rare in the leadership literature. However, we observe that scholars have *tacitly* acknowledged the possibility of this model when they have questioned the direction of the causal relationship between leadership and learning in cross-sectional studies of principal

effects (Heck and Hallinger 2005; Luyten, Visscher, and Witziers 2005; Witziers, Bosker, and Kruger 2003). Given our interest in exploring all possible avenues of effects, we included this conceptual model in our own empirical analyses.

Reciprocal effects model (mutual influence creates paths to improvement in learning)

In our 1996 review of the principal effects literature, we noted: ‘To the extent that leadership is viewed as an adaptive process rather than as a unitary independent force, the reciprocal effects perspective takes on increased salience’ (Hallinger and Heck 1996, 19). A reciprocal effects model implies that the variables (e.g., leadership, school improvement capacity, student learning) *mutually influence each other over time* (Marsh and Craven 2006).

This type of reciprocal influence is shown in two ways in Model 4 (see Figure 1). First, the concept of a mutually-reinforcing system suggests that the initial status of each variable will explain subsequent change in the other two variables (see the arrows from the top static portion of the model to the lower growth portion). Second, we highlight an indirect feedback loop between the growth factors. This suggests first, as in Model 2, that changes in leadership are likely to influence capacity and growth in learning (indirectly) over time. However, it further proposes that the *total or combined effects* of collaborative leadership within the school actually increase (or decrease) as a function of changes occurring in improvement capacity and student achievement (see Heck and Hallinger, in press-a). Expressed differently, we propose that the *interaction over time* between leadership and capacity building will produce effects on learning beyond the separate effects of either construct observed at any arbitrary point in time. This formulation of Model 4 is consistent with Ogawa and Bossert’s (1995) proposition that leadership is an ‘organisational property’ that can increase (or decrease) in both strength and impact over time.

For example, the work of school leaders at any given point in time is shaped by the culture of the school. As leaders initiate changes in work structures, management processes, curriculum, community relations, and instructional practices, they do so with the constraints, resources, and opportunities afforded by the school’s current capacity for improvement in mind. As these conditions that describe the school’s academic capacity change over time, theories would suggest that effective leadership behaviour will adapt in response (Fiedler 1967; Glover et al. 2002; Hallinger and Heck 1996; Kimberly and Miles 1980; Ogawa and Bossert 1995; Pitner 1988). Moreover, our model suggests that the strength of leadership and its impact on learning will be further moderated by the changing conditions of the school, for better or worse.

Reciprocal influence and related concepts of responsive adaptation, mutual influence, and leader–follower interaction are implied in various leadership theories (Bass and Avolio 1994; Bridges 1977; Fiedler 1967). However, progress in testing conceptual models that imply reciprocal causation has been hindered by methodological challenges. Reciprocal effects models explicitly propose that behavioural adaptation unfolds over time (Bass and Avolio 1994; Glover et al. 2002; Hallinger and Heck 1996; Kimberly and Miles 1980; Marsh and Craven 2006; Ogawa and Bossert 1995). Suitable longitudinal data are, however, difficult to obtain, especially on a scale sufficient to assess the effects of leadership across comparable

organisational units (Tate 2008). Moreover, until recently, we lacked analytical tools capable of modelling reciprocal effects over time (Griffin 1997; Heck and Hallinger 2005; Marsh and Craven 2006; Tate 2008).

Research focus and method

The purpose of this program of research was to seek insights into how collaborative school leadership contributes to school improvement. For the purposes of this particular report, we seek both to synthesise and extend previous analyses that assessed the efficacy of these four models. Therefore, in this section we describe the main features of the research and the specific analyses conducted for our model testing. We refer the reader to other more detailed treatments for additional information on the research methodology (see Hallinger and Heck in press; Heck and Hallinger 2009; Heck and Hallinger in press-a, b).

A sample of 198 elementary schools was randomly selected from the population of elementary schools in a western state in the US.³ Within those schools, a longitudinal cohort consisting of all third-grade students within the schools (N = 13,000+) participated in the study. The study utilised longitudinal survey data on leadership and school improvement capacity collected from teachers on three occasions over a four-year period (Year 1, Year 3, and Year 4) to compare the efficacy of four models in explaining relationships to growth in student achievement in reading and math. Data on individual students' achievement were collected in Year 2, Year 3, and Year 4. At each measurement occasion, the data from school surveys preceded the student achievement data.

Student background controls in the within-schools portion of the models included gender, ethnicity, socioeconomic status, special education status, English language status, and student mobility. School context indicators (student composition, teacher experience, principal stability, teacher professional certification) described initial school contexts during the first year of the study (2002–2003) and were used to control for differences among schools.

Collaborative leadership was measured by nine items describing teacher perceptions of leadership processes within the school. The items captured three dimensions of the school's leadership: make collaborative decisions focusing on educational improvement, emphasise school governance that empowers staff and students; encourage commitment, broad participation, and shared accountability for student learning; emphasise broad participation in efforts to evaluate the school's academic development.

We operationalised school improvement capacity from among a set of eight subscales. While different combinations of subscales were used in the different studies, the overall trend was similar (Hallinger and Heck in press; Heck and Hallinger 2009, in press-a, b). These subscales described the extent to which the school: has educational programs that are aligned to state curriculum standards; seeks ways to implement programs that promote student achievement over time; develops over systems of communication; involves staff in educational decision-making; has a well-developed range of academic and social support services for students; and has a professional teaching staff well qualified for assignments and responsibilities and committed to the school's purpose.

We defined growth in student learning as changes in the math and reading scores of a cohort of students over a three-year period (Grades 3–5). Longitudinal assessment of individual students' growth is considered to be superior to comparing successive student cohorts (e.g., percentages of third graders who attain proficiency) for the purpose of monitoring school improvement. Monitoring the progress of individual students over time captures the actual growth of these students as they move through their educational careers. This focuses attention more squarely on the experiences of specific students attending a particular school over several years and provides a way of recognising that schools serve students who start at different places and progress at different rates (Seltzer, Choi, and Thum 2003).

In this set of analyses we used latent change analysis (LCA), a type of structural equation modelling used for investigating longitudinal data, to test our proposed models. Our approach entailed analysing and comparing the efficacy of the four conceptual models. Statistical analyses were used to determine both the significance of relationships and various indicators of model fit (see Heck and Hallinger in press-a).

Results

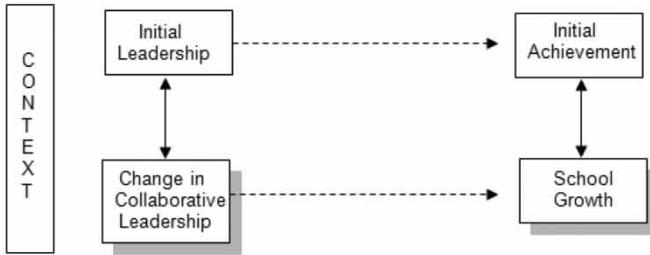
Figure 2 summarises the results of our model testing. All proposed models fit the data adequately, as determined by model-fitting criteria.⁴ In the figure, we focus on the key paths summarising the major propositions associated with each model (these were tested at the 0.05 level of significance). Model 1 posited that change in collaborative leadership exerts direct effects on growth in student learning. Our analyses that assessed this relationship for both reading and math, however, failed to support this hypothesis. Thus, consistent with earlier reviews of school leadership effects studies (see Hallinger and Heck 1996), we conclude that this approach is a 'dry hole' for exploring leadership effects on learning in schools (see also Hallinger and Heck in press; Heck and Hallinger 2009, in press-b).

Our test of Model 2 assessed the efficacy of a mediated effects framework that posited change in collaborative leadership as the driver for change in school capacity and student learning. The three main findings of our analysis of the longitudinal data were consistent with earlier cross-sectional studies of principal leadership effects (see Hallinger et al. 1996; Heck et al. 1990; Wiley 2001). First, change in collaborative leadership was positively related to change in school capacity. Second, change in school improvement capacity positively affected growth in math. Finally, we found a small, positive *indirect* relationship between changes in collaborative leadership and growth in student learning in reading and math.

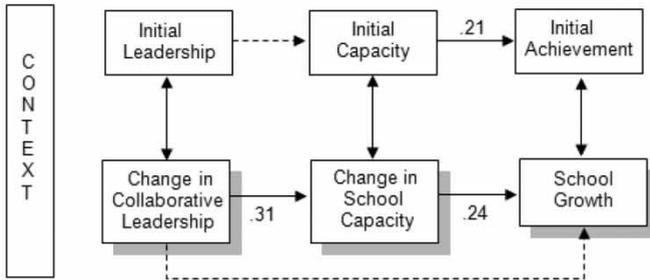
We wish to highlight the fact that these results not only reinforce but also extend findings from prior cross-sectional studies of principal effects. The use of longitudinal data made it possible to establish both the significance and stability of relationships among these constructs at several points in time. When compared with previous research, this increases our confidence that a causal – though indirect – relationship may indeed exist between school leadership and learning.

Analysis of the data did not support the efficacy of Model 3. School growth in learning outcomes did not appear to serve as a driver for change in school improvement capacity and collaborative leadership. Change in capacity, however, was predictive of change in collaborative leadership. Model 3 offered little leverage in understanding the dynamics in these relationships as they evolved over time.

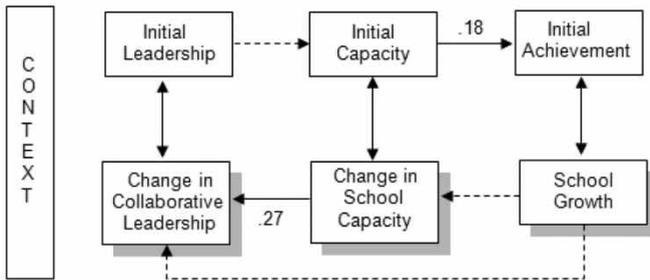
Model 1: Direct Effects Where Leadership Drives Change in Learning



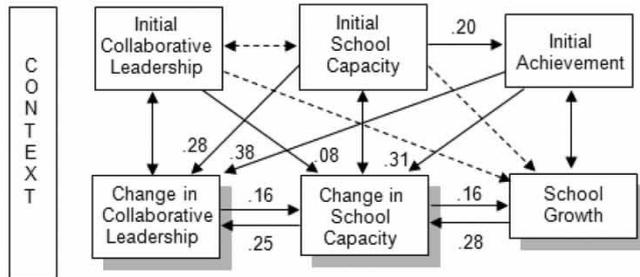
Model 2: Mediated Effects Where Leadership Drives Change in Improvement Capacity



Model 3: Mediated Effects Where School Growth Drives Change in Capacity and Leadership



Model 4: Reciprocal Effects Where Leadership is a Mutual Influence Process



Note: --> Path was tested but not found to be significant, $p > .05$.

Figure 2. Results of empirical testing.

Model 4 provided even stronger evidence in support of a reciprocal effects perspective on leadership and school improvement (Heck and Hallinger in press-a). Initial achievement was positively related to subsequent changes in both collaborative leadership and school improvement capacity. However, the converse was not true; neither initial levels of leadership nor initial levels of school improvement capacity were directly related to subsequent growth in achievement. These findings provide empirical support for the premise that schools can improve learning outcomes regardless of their initial achievement levels by changing key organisational processes such as leadership and school improvement capacity. In addition, initial school improvement capacity positively affected subsequent changes in leadership, and initial collaborative leadership positively affected subsequent changes in school improvement capacity. This suggests that leadership and school improvement capacity were part of a mutually-reinforcing relationship in which growth in one led to positive change in the other.

Finally, our analysis confirmed the existence of an indirect feedback loop between leadership and learning in the context of this reciprocal effects model (Heck and Hallinger in press-a). More specifically, change in collaborative leadership was related positively to change in school improvement capacity, and change in school improvement capacity was positively related to student growth in reading and math. This is consistent with the change portion of Model 2. Conversely, however, we noted that changes in school learning growth were also positively related to changes in school improvement capacity, and changes in school improvement capacity were positively related to changes in collaborative leadership. This more complex pattern of mutual causation would be missed in studies that employed mediated effects models such as Model 2 or Model 3.

Our test of Model 4, therefore, supported the proposition that changes in collaborative leadership and school improvement capacity are mutually reinforcing processes. Changes in the schools appeared to ‘gain momentum’ over time through changes in leadership and school improvement capacity that were organic and mutually responsive. The presence of the indirect feedback loop implies that the total effects of variables such as leadership can increase as the sum of repeated cycles of influence between the component variables over time (Hayduk 2009). Moreover, we found that the effect of school improvement capacity on collaborative leadership was *stronger* over time than the corresponding effect of collaborative leadership on improvement capacity.

We wish to note that our most recent (unpublished) analyses have found that the same trend of Model 4 results held when a fourth wave of survey data was added into the dataset. This further increases our confidence in the findings since each additional year of data allows us to further establish the predictive validity of the model. While this approach to model testing still lacks the power of experimental research designs, we suggest that the longitudinal research design employed in this research enabled us to achieve an incremental advance in research on leadership effects on school improvement.

Discussion

Research has made important advances in the past several decades in clarifying and elaborating how leadership contributes to learning in schools. A recent meta-analysis

conducted by Robinson and her colleagues (2008) reinforced a developing consensus among researchers, policymakers and practitioners that 'leadership makes a difference' in the quality of learning in schools. Nonetheless, despite the scientific aura of meta-analysis, it is still essential to acknowledge critical limitations in the studies that formed the underlying knowledge base. Two key limitations were a reliance on cross-sectional surveys and an almost exclusive focus on leadership by the principal. Our research sought to address these limitations in order to illuminate more clearly the contribution that collaborative leadership makes to school improvement *over time*.

The analysis of a longitudinal dataset collected over a period of four years in a large number of primary schools enabled us to explore how the relationship between collaborative leadership and learning in schools changed over time. The nature of this longitudinal dataset allowed us to employ statistical methods that were capable of shedding light on *patterns of change* in these complex organisational processes over time. The focus on collaborative leadership offered an opportunity to determine the extent to which prior findings about principal leadership also applied to collaborative leadership.

Conclusions

The study yielded the following conclusions:

- Analyses of Model 2 found small but statistically significant indirect effects of leadership on learning. In this model collaborative leadership was a driver for change in school improvement capacity and indirectly impacted growth in student learning (Hallinger and Heck in press; Heck and Hallinger 2009, in press-b).
- Although this mediated effects model produced significant findings, a variety of statistical analyses clearly suggested that the reciprocal effects model (Model 4) provided a more robust and comprehensive explanation of the pattern of change in the relationships over time (Heck and Hallinger in press-a).
- The pattern of findings related to the reciprocal effects model further suggested that changes in collaborative leadership compounded over time through an indirect feedback loop consisting of changes in school improvement capacity and growth in student math achievement (Heck and Hallinger in press-a).
- We also noted that leadership effects on school improvement capacity were smaller over time than corresponding effects of changes in school improvement capacity on changes in collaborative leadership (Heck and Hallinger in press-a).

Thus, the overall pattern of results favoured a perspective on school improvement leadership as a mutual influence or reciprocal process. This is a potentially important finding in that we believe the reciprocal effects model is also the most theoretically compelling of the four models. It does not make untenable assumptions about the heroic role of leadership, and presents leadership for learning in dynamic relationship with other organisational processes. More specifically, these findings offer insight into how both external events (e.g., resource allocations, policy sanctions) and internally-driven planned reforms (e.g., developing curriculum and classroom

instruction) may influence stakeholders' evolving perceptions of leadership in systematic ways. The model also draws attention to how changes in collaborative leadership mediated the effects of initial organisational conditions (i.e., achievement levels, improvement capacity) on subsequent changes observed in improvement capacity and growth in student learning. Thus, this model captures the dynamic and responsive nature of leadership for learning.

Implications

This report has sought both to retrace and extend the intellectual lineage in school leadership effects research. We believe that this research offers relevant commentary on several important issues concerning research, practice, and policy in school improvement. Here we briefly highlight potential contributions of this research to these domains.

First, the research demonstrates the importance of longitudinal data and the viability of using structural equation modelling in efforts to monitor and analyse change processes in schools over time. As seen in another recent study that employed longitudinal data (Mulford and Silins 2009), this approach offers considerable advantages over cross-sectional research designs when researchers are seeking to explore causal relationships. Thus, we strongly advise researchers and relevant funding agencies to invest in developing and employing such databases in future research on school improvement.

Second, from the perspective of leadership practice, the research supports the view that school improvement leadership is highly contextualised. The type of leadership exercised by the principal and the school's leadership team must be linked both to the school's profile of learning results and improvement capacity at any point in time. Elsewhere we have discussed the notion that every school is on its own unique 'improvement trajectory' (Hallinger and Heck in press-b). Accordingly, leaders must be ready to adapt their strategies to changing conditions at different stages in the journey of school improvement (Hallinger 2003; Jackson 2000). We believe that the finding that leadership and capacity building operate as a mutual influence process lends further weight to this perspective on leadership as a highly responsive and contextualised relational process.

Building on this point, we further suggest that this research offers a more comprehensive perspective on how leadership contributes to learning in schools. The research implies that while leadership acts as a catalyst for school improvement, both the nature of leadership as well as its impact are shaped by both historical and current conditions in the school. Academic structures (e.g., curriculum standards, team-based collaboration), school norms (e.g., tangible support for students and teachers, professional learning, open communication), and ongoing organisational processes (e.g., opportunities for participation in decision-making, resource allocation, external policies) create both opportunities and constraints for leadership (Bridges 1977). Effective leadership for school improvement must be responsive to these contextual characteristics. Our findings indicated that at each point in time, the impact of the school's culture on leadership was greater than vice versa. We suggest that this offers a more refined picture of how leadership actually operates in schools (Bridges 1977).

This last point is the proper point of departure for understanding the implications of our research for policy-makers. During the 1980s research on effective schools served up the conclusion that ‘leadership makes a difference’ in schools. Subsequently, this finding became a hammer in the hands of policy-makers for whom all educational problems began to look like nails. While our research reaffirms the importance of leadership as a catalyst for school improvement, it also qualifies this assertion in three important ways.

First, it suggests that no single approach to leadership will work to improve all schools. Effective leadership styles and strategies are highly contextualised. They must be responsive both to the ‘initial state’ of the school’s academic capacity and learning outcomes, and to changes in these conditions as they develop (or decline) over time.

Second, this research suggests that leadership, while a potentially important driver for change, is by itself insufficient to bring about improvement in learning outcomes. With this in mind, the school’s culture, or capacity for educational improvement, becomes one key target for change interventions *in concert with efforts to strengthen leadership*. Indeed, the findings suggest that leadership and school improvement capacity operate as part of a set of systemic relationships. Focusing on one without attending to the others is unlikely to bring about sustained improvement.

Third, this research represents one of the most substantial efforts to examine the impact of collaborative school leadership on learning. The findings support the belief that collaborative leadership, as opposed to leadership from the principal alone, may offer a path towards more sustainable school improvement. We note that inclusion of a broader range of leaders in the school improvement process also provides expanded avenues for reshaping school improvement capacity, or conditions in the school that directly impact teaching and learning (Caldwell 1998; Heck and Hallinger in press-a, b; Leithwood et al. in press; Saphier and King 1985).

In our view, these findings are both sobering and heartening. They may disappoint those who have hoped that upgrading the quality of leadership will provide an efficient and ready means of solving ‘the school improvement problem’. However, we suggest that the results are also quite encouraging. They suggest that strengthening leadership capacity can pay off when it is part of a more comprehensive strategy that simultaneously targets the academic improvement capacity of the school.

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Notes

1. Note that the general tests of the model reported in this paper have been compared for both reading and math, and show a similar trend of results in both subjects. Some of the analyses reported in other related papers examined learning outcomes in mathematics or reading.
2. In growth formulations, it is common for the initial state of each variable to be correlated with its growth, or change, over time (shown with two-headed arrows in the figure). Correlations have no causal interpretation. The models presented in Figure 1 are also multilevel, in that each includes a within-school model explaining the effects of student background variables on their achievement growth trajectories.

3. The total sample in the prior reports ranged from 194 to 202 schools.
4. For example, the comparative fit index (CFI), which compares the adequacy of each proposed model against a 'poor-fitting' model, should be above 0.95 for an adequate model fit to the data (with 1.0 indicating a perfect fit). In all models tested, the CFI coefficients were 0.99.

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