

## School Districts' Contributions to Students' Math and Language Achievement

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**Abstract** Conducted in British Columbia, this mixed-methods study tested the effects of nine district characteristics on student achievement, explored conditions that mediate the effects of such characteristics, and contributed to understandings about the role school-level leaders play in district efforts to improve achievement. Semi-structured interview data from 37 school administrators provided qualitative data. Quantitative data were provided by the responses of 998 school and district leaders' in 21 districts to two surveys. Student achievement data were district-level results of elementary and secondary student provincial math and language test scores. All nine district characteristics contributed significantly to student achievement. Three conditions served as especially powerful mediators of such district effects. The same conditions, as well as others, acted as significant mediators of school-level leader effects on achievement. This is among the few large-scale mixed-methods studies identifying characteristics of districts explaining variation in student achievement.

**Keywords** School districts effects; School Leadership: District Improvement Processes

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## Introduction

This mixed-method study is part of a larger long-term project aimed at better understanding how school districts contribute to the success of their students. After Andrea Rorrer, Linda Skryla, and James Scheurich (2008), a school district is defined as “an organized collective constituted by the [superintendent]; the [elected board of trustees]; the central office-level administration; and principals, who collectively serve as critical links between the district and the school for developing and implementing solutions to identified problems” (p. 311).

Supported by the British Columbia School Superintendents' Association, this study builds on the methods and results of research recently completed in Alberta (Bedard & Mombourquette, 2015; Brandon, Hanna, Morrow, Rhyason, & Schmold, 2013) and Ontario (Leithwood & Azah, 2016; Leithwood & McCullough, 2016). Testing the efficacy of nine district Characteristics identified in some of this previous work, as well as deepening understandings about the profile of each district Characteristic in its most effective state, were among the primary objectives for the study. Results of this mixed-methods study help answer four broad questions. The qualitative portion of the study asked:

1. How do school leaders understand the contribution made by their district's characteristics to the success of their work in schools?

The quantitative portion of the study addressed three questions:

2. What characteristics of districts, under the control of districts themselves, explain significant amounts of variation in student learning?
3. How do such characteristics interact with conditions found in schools, classrooms, and families to achieve their effects on student learning?
4. What role do school-level leaders play in district efforts to improve student learning?

## Framework

Leithwood developed the framework of this study, which is a replication of work completed in Ontario. The framework consists of nine characteristics of high-performing districts with both direct and indirect effects on students' math and language achievement. School leadership and four categories of conditions (13 specific Conditions in total) with significant direct effects on student achievement mediate the indirect effects of the nine district characteristics on student achievement.

## District characteristics

Nine district characteristics serving as independent variables for this study are briefly summarized in this section (see Figure 1). Further information about each variable can be found in an extensive review of original empirical evidence about what districts do to close achievement gaps among their students (Leithwood, 2010), as well as more recent related publications, including Tina Trujillo (2014), Karen Louis

**Figure 1. District characteristics**

| District characteristics  | Specific features   |
|---|---|
| <p>1. Broadly shared mission, vision and goals founded on ambitious images of the educated person</p> | <p>Ensure that a transparent visioning/direction-setting process is carried out</p> <p>Consult extensively about district directions as part of the process</p> <p>Spend sufficient time to ensure that the mission, vision and goals (directions) of the system are widely known, understood and shared by all members of their organizations</p> <p>Articulate, demonstrate and model the system's goals, priorities, and values to staffs when visiting schools</p> <p>Embed district directions in improvement plans, principal meetings and other leader-initiated interactions</p>  |
| <p>2. Coherent instructional guidance</p>   | <p>Adopt a service orientation toward schools</p> <p>Align curricular goals, assessment instruments, instructional practices and teaching resources</p> <p>Insist on ambitious goals for teaching and learning</p> <p>Advocate for attention to the best available evidence to inform instructional improvement decisions</p> <p>Expect schools to focus on needs of individual as well as groups of students</p> <p>Encourage staff to be innovative within the boundaries created by the district's instructional guidance system</p>   |
| <p>3. Deliberate and consistent use of multiple sources of evidence to inform decisions</p>           | <p>Use data from all available sources to assist decision making in the central office</p> <p>Insist on the use of the best available research and other systematically collected evidence to inform decisions wherever possible</p> <p>Encourage collaboration in the interpretation and uses of data</p> <p>Build system's capacity and disposition for using systematically collected data to inform decision-making</p> <p>Provide training for principals and staff on the use of data and research literature to sustain decision-making</p> <p>Model evidence-informed decision-making to school staffs</p> <p>Ground interactions with, and advice to, trustees in sound evidence</p>   |
| <p>4. Learning-oriented organizational improvement processes</p>                                      | <p>Require improvement processes to be evidence-informed</p> <p>Set a manageable number of precise targets for district school improvement</p> <p>Include school-level leaders in decisions about district-wide improvement decisions</p> <p>Create structures and norms within the district to encourage regular, reciprocal and extended deliberations about improvement progress within and across schools, as well as across the system as a whole.</p> <p>Develop and implement district and school improvement plans interactively and collaboratively with school leaders;</p> <p>Create structures to facilitate regular monitoring and refining of improvement processes</p> <p>Acknowledge Provincial goals and priorities in district and school improvement initiatives</p> <p>Allow for school-level variation in school improvement efforts</p> |

Figure 1. (continued)

| District characteristics   | Specific features  |
|--|--|
| 5. Professional development for all members  | <p>Provide extensive PD opportunities for both teachers and school-level leaders, most of it through some form of learning community or on-the-job context</p> <p>Use internal system networks as central mechanism for the professional development of school-level leaders</p> <p>Align the content of professional development with the capacities needed for district and school improvement</p> <p>Require individual staff growth plans to be aligned with district and school improvement priorities</p> <p>Hold staff accountable for applying new capacities by monitoring the implementation of school improvement plans</p> |
| 6. Alignment of budgets, personnel policies/ procedures and uses of time with district mission, vision and goals | <p>Align the allocation of resources with district and school improvement goals</p> <p>Align personnel policies and procedures with the district's improvement goals</p> <p>Align organizational structures with the district's improvement goals</p> <p>Provide principals with considerable autonomy in the hiring of teaching staff</p> <p>Expect and assist schools to allocate instructional resources equitably</p>  |
| 7. A comprehensive approach to professional leadership development   | <p>Use the best available evidence about successful leadership as a key source of criteria used for recruiting, selecting, developing and appraising school and district leaders</p> <p>Match the capacities of leaders with the needs of schools</p> <p>Provide prospective and existing leaders with extended opportunities to further develop their leadership capacities</p> <p>Develop realistic plans for leadership succession</p> <p>Promote co-ordinated forms of leadership distribution in schools</p>  |
| 8. A policy-oriented district of trustees  | <p>Encourage trustees to focus on district policy and the achievement of the district's goals and priorities (policy governance model of trustee practice)</p> <p>Encourage participation of the elected district in setting broad goals for its use in fulfilling its policy-setting and policy-monitoring responsibilities</p> <p>Regularly report to the district progress in achieving these broad goals</p>   |
| 9. Productive working relationships with staff and stakeholders  |  |
| <i>Internal district and school staffs</i>   | <p>Develop communication systems and processes throughout the district to keep all members informed</p> <p>Develop open, accessible and collaborative relationships with principals</p> <p>Encourage reciprocal forms of communication with and among schools</p> <p>Promote high levels of interaction among all school leaders, driven by a shared sense of responsibility for system improvement</p>  |

Figure 1. (continued)

|   |   |
|---|---|
| <p><i>Internal district and school staffs (continued)</i></p> | <p>Create structures to facilitate reciprocal forms of communication, resulting in deeply interconnected networks of school and system leaders working together on achieving the system's directions</p> <p>Buffer schools from external distractions to the district's and schools' priorities and goals</p>   |
| <p><i>Local community groups</i></p>                          | <p>Routinely consult with community groups on decisions affecting the community</p> <p>Encourage staff to participate directly in community groups</p> <p>Demonstrate the importance the district attaches to its community connections</p>   |
| <p><i>Parents</i></p>   | <p>Hold schools accountable for developing productive working relationships with parents</p> <p>Influence the work of schools toward fostering improved educational cultures in the home environments of their students</p>   |
| <p><i>Ministry of Education</i></p>                           | <p>Develop/maintain high levels of engagement with provincial department/ministry of education</p> <p>Engagement with department/ministry is frequently proactive rather than only responsive</p> <p>Make flexible, adaptive use of provincial initiatives and frameworks, ensuring that they contribute to, rather than detract from, accomplishing system goals and priorities.</p> |

Handford & Leithwood  
School Districts' Contributions to Student Achievement

Creating a *broadly-shared mission, vision and goals for students* entails a district engaging all key stakeholders in building a shared sense of direction for the district, a process that includes many elements of strategic planning (e.g., Berson, Da'as, & Walman, 2015) and aimed at identifying ambitious outcomes for students. When a district focuses its curriculum standards and frameworks, instructional practices (Joyce & Weil, 2008), and professional development emphases and assessment tools on that vision, it is providing *Coherent instructional guidance*. *Deliberate and consistent use of multiple sources of evidence to inform decisions* include districts' uses of systematic evidence from multiple sources to monitor progress, revise strategies, and encourage data-based decision throughout the organization (Datnow, Park, & Wohlstetter, 2007; Honig & Venkeswaran, 2012).

Two of the district characteristics are explicitly about the individual and collective learning of staff. *Learning-oriented organizational improvement processes* create structures and norms within districts to encourage regular, reciprocal, evidence-based deliberations about improvement progress within and across schools, as well as across the system as a whole. *Professional development for all members* is extensive, aligned with district visions, guided by individual learning plans, and are often job-embedded. Such learning often takes place in collaborative peer structures such as networks (Leithwood, 2018), while more formal approaches are sustained over time, anchored to practice, use active learning strategies, and are coherent with other learning activities (Sun, Penuel, & Frank, 2013; Garet, Porter, Desimone, Birman, & Suk Yoon, 2001). This vision-oriented learning is extended and reinforced by the *Alignment of budgets, personnel policies/procedures, and uses of time with district mission, vision, and goals*.

*Professional leadership development* across high-performing districts (those at least moderate to large in size) is guided by comprehensive policies and programs for re-

cruiting, pre-appointment professional development (PD), selection, appointment, post-appointment learning opportunities, evaluation (Davis, Darling-Hammond, LaPoint, & Meyerson, 2005), and succession planning. The best available evidence about successful leadership shapes these policies and programs. In particular, recruitment, selection, and appointment policies include strong provisions protecting against gender and racial biases. District governance is provided by a *Policy-oriented board of trustees* (Land, 2002), which forges strong internal bonds as a first priority, without neglecting the development of relationships with relevant external agencies and individuals (Saatcioglu, Moore, Sargut, & Bajaj, 2011). *Productive working relationships* are developed within the senior district leadership team, between school and district staffs, as well as with external stakeholders, including the local community and the government.

## Mediating variables

A mediating variable is a variable that helps to explain the relationship(s) between a dependent variable and an independent variable. The mediating variables in this study were School Leadership and four categories of conditions (encompassing 13 conditions in total) labelled Rational, Emotional, Organizational, and Family conditions.

### School leadership

A conception of effective school leadership developed by the *British Columbia Principals' and Vice-Principals' Association* was adopted for the study. This conception includes four leadership “domains”—Stewardship, Instructional Leadership, Relational Leadership, and Organizational Leadership—along with nine related standards of practice, each of which also specifies leadership practices associated with each standard. For example, the Stewardship domain includes two standards including *Values, Vision, and Mission* and *Ethical Decision-Making*. Practices associated with the *Values, Vision, and Mission* standard include contributing to staff's sense of overall purpose; helping clarify the reasons for implementing school improvement initiatives; providing useful assistance to staff in setting short-term goals for teaching and learning; and demonstrating high expectations for teachers' work with students. A complete description of BCPVPA's account of school leadership can be found at the BCPVPA website. The primary mediator is School Leadership.

### Four categories of mediating conditions

As well as School Leadership, four categories of conditions served as mediators in this study. Substantial evidence suggests that these conditions have significant direct effects on student learning and can be influenced by leadership.

Detailed descriptions of these conditions, including their effects on student achievement, can be found in Kenneth Leithwood, Sarah Patten, and Doris Jantzi (2010); (see also Leithwood, Sun, & Schumacker [2018]; Leithwood, Sun, & Pollock [2017]). A very brief account of these mediating conditions is provided in this section of the article, including examples of evidence supporting their significant effects on students.

The Rational category of conditions reflects the knowledge and skills of school staff members about curriculum, teaching, and learning—the technical core of schooling—

along with features of the school culture which directly support the technical core. Four individual conditions are in this category, including Classroom Instruction (Hattie, 2009; Marzano, Pickering, & Pollock, 2001), Teachers' Use of Instructional Time (Tornroos, 2005; Wang, 1998), Academic Press (Cooper, 2018; Hoy, Hannum, & Tschannen-Moran, 1998), and Disciplinary Climate (Ma & Crocker, 2007; Willms & Ma, 2004).

A second category, Emotional conditions, includes those feelings, dispositions, or affective states of staff members (both individual and collective) shaping the nature of their work, including Collective Teacher Efficacy (Bandura, 1993; Tschannen-Moran & Barr, 2004), Teacher Trust in Others (Forsyth, Barnes, & Adams, 2006; Goddard, Tschannen-Moran, & Hoy, 2001), and Teacher Commitment (Hulpia, Devos, & Keer, 2009).

A third set of Organizational conditions includes features of schools that structure the relationships and interactions among organizational members. Among the most relevant of these conditions are Safe and Orderly Environments (Bucher & Manning, 2010), Collaborative Cultures and Structures (Camburn & Won Han, 2017; Lomos, Hofman, & Bosker, 2011), as well as the Organization of Planning and Instructional Time (DuFour & Fullan, 2013; Sun, Przybylski, & Johnson, 2016).

The fourth and final category, Family conditions, encompasses three variables which, taken together, represent the educational cultures in the home that contribute most to students' success at school. Fostering development of the knowledge and dispositions families need to productively work with schools in the interests of their children's success include these conditions: Parent Expectations for Children's Success at School (Jeynes, 2005), Forms of Communication among Parents and Children in the Home (Epstein, Sanders, Simon, Salinas, Jansorn, & Van Voorhis, 2002; Jeynes, 2005), and Parents Social and Intellectual Capital about Schooling (Davies & Rizk, 2018; Ferlazzo, 2011). Only the aggregate result of these three Family conditions was examined in this study.

## Methods

This was a mixed-methods study, including the collection and analysis of survey and student outcome data. Mixed-methods research combines features of both quantitative and qualitative methods, helping to overcome the limitations of each method and adding a depth and breadth of understanding (Johnson, Onwueghuzie, & Tuner, 2007) to what is possible with the use of only quantitative or qualitative methods.

## Measures

### *Qualitative interviews*

The interview protocol used in this study consisted of a brief overview of the study and the purpose for the interview followed by 10 sets of questions. The first question was a broad and largely open-ended question about what respondents' districts had done in the past year that was most and least helpful for respondents and their staffs. Each of the remaining nine sets of questions was about the status, in the respondent's district, of one of the nine District Characteristics included in the study framework, along with perceptions of how each of these Characteristics influenced (positively or negatively) the improvement efforts in respondents' schools.

## Quantitative surveys

Two surveys were used to collect data from school and district leaders. The 95-item *Leading and Teaching in Schools Survey*, completed only by school-level leaders, provided data about School Leadership and the other 12 mediating conditions. While largely based on an instrument used in studies recently carried out in both Ontario<sup>1</sup> and Texas,<sup>2</sup> the scale measuring School Leadership was replaced by a new scale reflecting the BC Principals' and Vice-Principals' Association's leadership framework. The 94-item *BC District Survey* collected data from both school and district leaders about the status of the nine district characteristics. This survey was adapted from an instrument used in an earlier study (Leithwood, 2010; Leithwood & Azah, 2016).

Provincial test data were used as measures of student achievement in both math and language. Results of the Foundation Skills Assessment represented student achievement in Mathematics and Language for Grades four and seven.<sup>3</sup> Secondary student achievement was estimated using results from Grades 10 and 12 English tests and Grade 10 Math tests (both Foundations and Pre-calculus, as well as Apprenticeship and Workplace). Two estimates of achievement were used for all cases: the latest available one-year provincial assessment, as well as a change-over-five-year score.

## Sample

### Quantitative

The unit of analysis for the qualitative portion of the study was the district. British Columbia's publicly funded school system includes 60 districts, of which 21 provided sufficient numbers of responses to be included in the study, a 35 percent response rate. Across the 21 participating districts, 610 school administrators responded to the *Leading and Teaching in Schools Survey* (an average of 29 respondents for each district), while 388 district and school administrators responded to the *BC District Survey* (an average of 18 respondents for each district).

To qualify for inclusion in the quantitative portion of the study, the number of responses to each of the two surveys from a district had to closely approach the number required to be statistically representative at the .05 level of probability. This number varied from one district to another, reflecting differences in the population of potential respondents in each district. Close approximations to the ideal size were accepted to retain as much data as possible, but responses from nine districts agreeing to be part of the study failed to meet our criterion.

The first survey was administered in the fall of 2016, the second in the winter of 2017. Data collection often occurred during a regularly scheduled meeting of district and school administrators. Attendees were divided into two groups. One group, including only principals and vice principals, responded online to the *Leading and Teaching in Schools Survey*. The second group, including both district and school-level administrators, responded online to the *BC District Survey*. Each survey required about 15 minutes to complete.

## Data analysis

### Qualitative interviews

Digital voice recordings were made of the 37 hour-long individual interviews. These



recordings were transcribed and then summarized in tabular form, including a precis of response to each of the interview questions. Axial or thematic coding was then conducted with interview responses about each district characteristic to identify key ideas about the status of district practices and their value for the work of school leaders. These data were then summarized in the results section of this article as responses to question 10, “How do school leaders understand the work of their districts and its helpfulness to them?”

### **Quantitative surveys**

Because the district was the unit of analysis, the sample size for the study (21) was too small to permit the use of some of the more powerful statistical tests of relationships, such as Structural Equations Modeling. Scale reliabilities, means, and standard deviations of scales and individual survey items were calculated. Correlations (Pearson  $r$ ) were used to assess the strength of direct linear relationships among variables (e.g., the relationship between district Characteristics and student achievement). In this article, Pearson correlations are treated as Effect Sizes, and their importance is judged using common rules of thumb proposed by Jacob Cohen (1988) and John Hattie (2009): less than 0.1 = no effect, 0.1 to 0.3 = small effect, 0.3 to 0.5 = intermediate effect, and larger than 0.5 = large effect. Both variability and (indirectly) sample size can influence the size of correlations, and these factors influence the interpretation of results in this study.

The strength of causal claims based on correlational evidence depends, in large part, on the quality of underlying theory and/or previous evidence. The nine district characteristics were derived from extensive literature reviews and each characteristic reflects one or more social science theories (not described in this article). A 2010 Ontario study (Leithwood and Azah, 2017), replicated and extended by the current study, provided evidence of the total effects of these characteristics on student achievement. Each of the 13 mediating conditions has been the subject of varied and quite extensive research demonstrating its effects on several different types of student outcomes. While correlations are relatively weak methods for testing causal claims, the theory and evidence on which the framework guiding this study was based is relatively robust. Causal language is used to report correlational results in subsequent sections of this article.

A relatively new method, the calculation of “Power Indices” (Sun & Leithwood, 2016) was used to estimate indirect relationships, such as the relationship between district characteristics and student outcomes, mediated by conditions. This method entails the combination of correlations among three sets of variables, illustrated in the report of results below. For this study, Power Indices were used instead of regression mediation analysis (MacKinnon, Fairchild, & Fritz, 2007), in part because they require little statistical background to interpret, and in part because the limited evidence available to this point suggests that they produce essentially the same results (data from the parallel Ontario study was analyzed using both power indices and mediation regression analysis with few differences in results). The significance of Power Indices was interpreted using the same standards applied to Effect Size statistics, as outlined above.

The calculation of Power Indices responds to a wicked practical problem (Sun & Leithwood, 2016) faced by leaders attempting to determine the most productive focus for their own improvement efforts. While there is a considerable body of evidence about the effects on students of a wide range of mediating variables—see, for example, John Hattie's (2009) synthesis of this evidence—there is very little evidence about how likely it is that leaders' efforts will actually improve the status of these variables. For example, a compelling body of evidence indicates that Teachers' Trust in Others has important effects on student achievement, but what evidence there is suggests that at least the typical practices of school leaders have little influence on it (e.g., Sun & Leithwood, 2017).

## Qualitative results

### *The district characteristics*

Interviews were limited to questions about the status of each of the nine district Characteristics in respondents' districts. This report of results is further limited to descriptions of the status of those Characteristics when principals and vice-principals perceived them to be helpful to their school improvement work. Because most interviewees claimed little knowledge about the work of trustees in their districts, the subject of one of the Characteristics, only eight Characteristics are actually described in this section. While this restriction of the sample to principals and vice principals only is clearly a limitation on what can be deduced about the nine district characteristics in their most productive form, school leaders' perspectives are undeniably critical.

Conventional forms of reporting interview data require significant direct quotations to illustrate main ideas. These conventions, however, pose a significant challenge to the acceptable length of a journal article about the results of a mixed-methods study. This is addressed here by limiting commentary to a synthesis of interview results, absent quoted material.

### *Broadly shared mission, vision, and goals for students*

Evidence from the interviews indicated that highly participative approaches to building a district vision, alongside the alignment of school goals and processes to district goals and a substantial amount of staff buy-in to the vision, had a significant influence on the nature and direction of improvement efforts in schools.

### *Coherent instructional guidance*

Central office efforts to provide coherent instructional guidance were generally viewed as useful by school leaders when there was some choice available about which of those efforts in which to participate. In most districts, interviewees indicated positive effects on instruction when there was access to professional development linked to the improvement of instruction. Also useful to school leaders were district-established processes for improving instruction that encouraged innovative teaching practices based on research. Productive forms of instructional guidance also included the provision of financial support for schools from their district.

### ***Deliberate and consistent uses of multiple sources of evidence to inform decisions***

Districts were helpful to schools, interviewees indicated, when they had data warehouses and when they provided assistance to schools in accessing and interpreting data about their own schools. Districts were also helpful when they included one or more staff members with evidence-related expertise who could provide guidance to schools about the interpretation and use of data. District-developed assessment teams able to work with schools were viewed as important resources. But district size figured prominently in the extent of access to such expertise. Most of that expertise resided in large districts and, according to interviewees, small districts were forced to leave schools on their own to figure out how to use available evidence.

### ***Learning-oriented organizational improvement processes***

The most sophisticated approach to organizational improvement was described by interviewees from one district that required school improvement plans to take the form of a “theory of action.” At least conceptually, a theory of action consists of a series of “if-then” propositions (e.g., if our Grade 4 teachers have opportunities to view model lessons of especially effective math instruction, then they will begin to improve their own instruction in math; if our Grade 4 teachers improve their instruction in math, then our math results on the Foundation Skills Assessment will increase. A school improvement plan designed as a theory of action would include a large number of such propositions so that each component of the improvement strategy is linked to the end goal (some positive impact on students), however indirectly. Each proposition needs to be justified with evidence or, if evidence is lacking, at least logic or theory. Such an approach demands a high level of discipline in the creation of a plan and bringing such discipline to a plan requires considerable learning in order to justify the plan’s propositions.

Also relatively sophisticated, were approaches to improvement by districts that began with the development of a district strategic plan followed by an expectation that schools would align their own improvement goals with district goals included in that plan.

### ***Professional development for all members***

In comparison with much of the research evidence about effective PD, some districts were “doing it right.” Where this was true, PD was relatively plentiful, sufficiently comprehensive to allow for differences in PD needs among teachers and administrators, and carefully aligned to the capacities that staffs would need to move the district and school improvement agenda forward.

A substantial proportion of this PD was “job embedded,” allowing opportunities for participants to develop the knowledge and skills needed to successfully implement new practices in their own school and classroom contexts. At the school level, professional development was aimed more at general capacity building. When PD was primarily directed by the district, it was usually aligned with district and school improvement priorities. Professional education consultants were used in one district to support both administrators and teachers in their professional learning.

Interviewees said that because the same educators had been used in this district over a three-year period this ensured continuity. Such district support systems brought some alignment and common direction to professional development efforts, which was very helpful when administrators and staff were all working together.

***Budgets, structures, personnel policies and procedures, and uses of time are aligned with the district's mission, vision, and goals***

Most interviewees believed their school and district budgets were significantly aligned; several pointed, for example, to the long history of declining district budgets that resulted in serious shortfalls in facilities and maintenance in order to continue providing the resources needed in classrooms for students. Most interviewees also spoke about the alignment of personnel resources with district (if not school) priorities for contributing to student success. Districts that hired teachers were considered to be doing a very good job at selecting effective teachers. Staff required to support key priorities for district improvement were hired. Alignment of the budget to the school improvement plan and the alignment of school activities to the district plan showed the importance of district-wide and school-wide continuity. The majority of the interviewees noted that if alignment was clear, then everybody was “on the same page,” and it sent a clear message about the importance of an initiative or an activity.

Overall, respondents believed that Alignment made a big difference to work in schools and that the elements of the organization that are misaligned really stand in the way of effective education—improvement efforts “grind” to a halt.

***Comprehensive approaches to leadership development***

This characteristic is about how districts engage in leadership recruitment, selection, initial preparation, and both the professional development and performance appraisal of incumbent leaders. Effective ways of encouraging people to consider assuming formal school leadership positions were both indirect and direct. Interviewees pointed to the importance of being encouraged (often multiple times) by others (e.g., principals and superintendents) to consider the move from teacher to administrator, and the informal observations or conversations that helped them to better understand the nature of the job. Direct encouragement to consider formal leadership roles included being asked to be part of a school or district committee for the experience and being “tapped on the shoulder,” a process with considerable influence, according to the available research.

While selection and hiring processes were reported as very uneven, interviewees valued processes that included significant data collection about applicants and processes that were well known to applicants, including the qualities needed to be successful. Also valued were opportunities for both internal and external candidates to apply and some process, such as an interview, to assess the abilities and dispositions of candidates. These processes worked best when implemented by a selection committee that included representatives from multiple professional and support roles in the district.

Once placed in a principal or vice-principal position, especially valuable support was attributed to mentoring experiences, close working relationships with a district supervisor, a variety of formal professional development programs mostly available through provincial associations, and participation in a network of colleagues willing to provide advice and support on an “as needed” basis.

### **Relationships**

According to most of the interviewees, the current status of relationships among their district office leaders was quite good. Good, productive, or ideal relationships among senior district leaders were characterized as collaborative, with a collective focus on the districts’ vision and goals or “moral purpose.” Such relationships were a consequence of high levels of trust, transparency in decision-making, considerable respect for one another, and a sense of being part of a team. When district leaders had good relationships, school-level leaders heard the same messages from all members of the district team.

Most interviewees were quite positive about the quality of the relationships they had with their district colleagues. High-quality relationships with district colleagues, according to the interviewees, meant a collaborative (rather than top-down) approach to decision-making, the ease of access to district leaders for consultation, and a respectful disposition on the part of senior leaders toward the concerns, perspectives, and preferences of school-level leaders. Relationships were also judged to be of high quality when district leaders provided ample support for the work of school-level leaders and when school-level leaders were clear about who to communicate with in the district office about challenges they encountered.

Interviewees were asked about the advice and support they received from their district colleagues about school/parent relationships. Some interviewees described such advice and support as weak to non-existent. Others described receiving specific advice, with most focusing on building positive relationships with parents and the community and involving them in decision-making.

## **Quantitative results**

### **Descriptive statistics**

#### **Results of the BC District Survey**

All scales in the survey measuring the current status of the nine district Characteristics, except the Relationships scale, exceeded the commonly agreed on acceptable standard for reliability of .70 (Nunnery & Bernstein, 1994) by a significant margin. The Relationships scale was an aggregate of sub-scales measuring, separately, relationships among district leaders, between district and school staffs, relationships with parents, and relationships with community groups. The low reliability of this aggregate scale likely means that these different sets of relationships are not well aligned (some can be weak while others are strong).

Each of the nine district characteristics received mean ratings above the midpoint on the four-point response scale. Highest ratings were awarded to *Mission, vision, and goals* ( $m = 3.12$ ) and the *Extent of district alignment* ( $m = 3.00$ ). The lowest rated was *Uses of evidence* ( $m = 2.48$ ). Standard deviations for all characteristics were relatively

small, indicating considerable uniformity in ratings among respondents. An exploratory factor analysis (details not reported) conducted on this instrument found that all items loaded on nine factors, and almost all items conceptually associated with each district characteristic loaded as expected.

### Results of the Leading and Teaching in Schools Survey

This survey measured School Leadership and 12 other mediating conditions. All scales in this survey exceeded accepted standards of reliability. School Leadership and the other mediating conditions received mean ratings well above the midpoint on the five-point response scale. The results of an exploratory factor analysis (details not tabled) conducted on items in this survey closely reflected the conception of variables on which the instrument was developed for half of these variables. The distribution of items measuring the remaining variables was not readily interpretable. Given the relatively high reliabilities of all 13 scales, subsequent analyses retained the original conception of item assignment.

### ***Effects of mediating conditions on student achievement***

At the elementary school level, three of the mediating conditions had intermediate to large effects on achievement, including Uses of Instructional Time ( $r = .37$  with Grade 7 Math), Organization of Planning and Instructional Time ( $r = .47$  and  $r = .60$  with Language and Math, respectively), and Collaborative Cultures and Structures ( $r = .45$  with math achievement).

At the secondary level, six of the mediating conditions had intermediate to large effects on achievement. Of the six, only Disciplinary Climate had significant effects ( $r = .62$ ) on Grades 10 and 12 English, and only Organization of Planning and Instructional Time had significant effects on Foundations and Pre-Calculus Math ( $r = .43$ ). Grade 10 Math (Workplace and Apprenticeship), however, was influenced by four mediating conditions, including Classroom Instruction ( $r = .51$ ), Teacher Commitment ( $r = .58$ ), Safe and Orderly Environments ( $r = .38$ ), and Family Path Conditions in aggregate ( $r = .42$ ).

### ***Effects of district characteristics***

This section of results reports the effects of the nine district characteristics on mediating conditions (including School Leadership), as well as their total effects on student achievement, using the Pearson  $r$  Effect Size statistic. This section also describes, using Power Indices, the indirect effects of the nine district characteristics on student achievement.

### ***Effects on mediating conditions including School Leadership***

Eight of the nine district characteristics had at least intermediate effects on the aggregate measure of mediating Conditions (not *Professional development*): *Mission, vision, and goals* ( $r = .44$ ); *Coherent instructional programs* ( $r = .52$ ); *Uses of evidence* ( $r = .51$ ); *Professional leadership development* ( $r = .43$ ); *Alignment* ( $r = .44$ ); *Elected leadership* ( $r = .24$ ); *Learning-oriented improvement processes* ( $r = .40$ ); and *Relationships* ( $r = .34$ ). Influencing the largest number of individual mediating conditions were *Mission, vision,*

and goals (five Conditions), *Coherent instructional guidance* and *Uses of evidence* (four each), followed closely by *Professional leadership development* and *Alignment* (two each).

Six district characteristics had meaningful though small effects on School Leadership (aggregate), including *Coherent instructional guidance* ( $r = .25$ ), *Uses of evidence* ( $r = .32$ ), *Professional development* ( $r = .24$ ), *Professional leadership development* ( $r = .29$ ), *Alignment* ( $r = .23$ ), and *Relationships* ( $r = .29$ ).

### Total effects on student achievement

All nine district characteristics had meaningful effects on one or more measures of elementary student achievement used in the study. A few of these effects were weak, according to the standard used, but most were intermediate in strength. Because secondary school achievement scores were much less influenced by the District Characteristics only the elementary school results are summarized. In sum:

5. *Mission, vision, and goals* had weak effects on the one-year measure of Grade 4 language ( $r = .26$ ), as well as the five-year change measure of Grades 4 and 7 math ( $r = .28$  and  $.23$ ).
6. *Coherent instructional guidance* had intermediate effects on the one-year measure of Grade 4 language ( $r = .31$ ), as well as the five-year change scores in Grade 4 math ( $r = .29$ ) and the one-year score in Grade 7 math ( $r = .41$ ).
7. *Uses of evidence* had intermediate effects on one-year Grade 4 language achievement ( $r = .32$ ), Grade 4 five-year change measures in math ( $r = .45$ ), and one-year measures of Grade 7 math ( $r = .33$ ).
8. *Professional development* had intermediate effects on Grade 4 one-year language scores ( $r = .31$ ), as well as Grade 7 one-year math scores ( $r = .47$ ).
9. *Professional leadership development* had intermediate effects on Grade 4 one-year language scores ( $r = .30$ ) and Grade 7 one-year math scores ( $r = .40$ ).
10. *Alignment* had intermediate effects on Grade 4 one-year language scores ( $r = .30$ ) and one-year Grade 7 math scores ( $r = .37$ ). This characteristic also had weak but meaningful effects on the five-year change score in Grade 4 math ( $r = .20$ ).
11. *Elected leadership* had an intermediate effect on the one-year measure of Grade 7 math ( $r = .40$ ).
12. *Learning-Oriented improvement processes* also had an intermediate effect on the one-year measure of Grade 7 math ( $r = .29$ ).
13. *Relationships* had intermediate effects on Grade 4 one-year language scores ( $r = .23$ ) and Grade 7 one-year math scores ( $r = .48$ ).

### Indirect effects on achievement

Power Indices were calculated to estimate indirect effects on the achievement of the nine district characteristics through each of the 13 Conditions. None of the Power Indices achieved the .20 minimum standard used to designate meaningful effect sizes. These results are different from those reported in the parallel Ontario district

study. Evidence from that study identified seven conditions through which districts influenced math achievement, including three teacher emotions (Teacher Trust, Collective Teacher Efficacy, and Teacher Commitment), as well as Safe and Orderly Environments, Collaborative Cultures, Academic Emphasis, and Classroom Instruction. However, with just one exception, the most recent Ontario results were based on Power Indices with effect sizes ranging narrowly from the minimum meaningful effect size of .20 to just .33; only the path from district characteristics to math achievement through Collective Teacher Efficacy exceeded Power Indices in the .30 range. Differences in the sample sizes of the two studies may be part of the explanation for contrasting results.

### School leadership effects

This section reports the effects of School Leadership on the other mediating conditions, as well as the total and indirect effects of such leadership on student achievement. The same analytic techniques as those reported in the previous section were used to determine these effects.

### Effects on other mediating conditions

This analysis of School Leadership effects examined separately, School Leadership treated in aggregate, as well as each of the four dimensions of School Leadership separately. The aggregate measure of School Leadership had intermediate to large effects on seven mediating conditions: Academic Emphasis ( $r = .63$ ), Safe and Orderly Environments ( $r = .58$ ), Collaborative Cultures and Structures ( $r = .49$ ), Classroom Instruction ( $r = .70$ ), Uses of Instructional Time ( $r = .56$ ), Teacher Commitment ( $r = .43$ ), and Conditions on the Family Path ( $r = .58$ ). Among the four dimensions of School Leadership, Instructional Leadership had intermediate to large effects on seven Conditions, Relational on six Conditions, and Organizational Leadership on seven Conditions. Moral Leadership had intermediate-sized effects on Safe and Orderly Environments ( $r = .34$ ), Academic Emphasis ( $r = .29$ ), Classroom Instruction ( $r = .33$ ), Uses of Instructional Time ( $r = .25$ ), and Family Conditions ( $r = .44$ ). School Leadership, in sum, had small to intermediate effects on the majority of the 13 mediating Conditions. These effects were a function of all four leadership dimensions.

### Total effects on student achievement

Results evident from the one-year measures of achievement indicated that School Leadership (aggregate) had moderate-sized effects on Grade 4 Math ( $r = .37$ ), Grade 4 Language ( $r = .37$ ), Grade 7 Math ( $r = .32$ ) as well as Grade 10 Math: Workplace and Apprenticeship ( $r = .40$ ); these are generally smaller than the effect sizes reported in the parallel Ontario study, most of which were intermediate in size.

Of the four elementary-level one-year scores, Relational Leadership had meaningful effects on all, while both Moral and Instructional Leadership had intermediate effects on two of the four. Instructional Leadership also had a modest effect on the Grade 4 change-over-five-year math score. Organizational Leadership had weak but meaningful effects on one-year Grade 4 language ( $r = .21$ ) and Grade 7 math ( $r = .26$ ) scores, as well as a modest effect on the five-year change score in Grade 4 language ( $r = .26$ ).



## Indirect effects on student achievement

Power Indices were used to estimate the indirect effects of School Leadership on student outcomes. Using the aggregate measure of School Leadership, Power Indices identified six mediating conditions that met or exceeded the minimum meaningful effect size of .20.

14. Through Academic Emphasis, School Leadership indirectly influenced Grade 4 Language achievement (Power Indices range from .20 to .32).
15. Through the Organization of Time for Planning and Instruction, School Leadership had an influence on Grade 4 Math achievement (.20).
16. Through Safe and Orderly Environments, School Leadership had an influence on achievement in Grade 4 Math and Grade 10 Math (Workplace and Apprenticeship) (.20 to .29).
17. Through Collaborative Cultures and Structures, as well as Conditions on the Family Path (aggregate), School Leadership had a weak to moderate influence on Math achievement at both Grades 4 and 10 Workplace and Apprenticeship) (.21 to .36).
18. Through both Classroom Instruction and Teacher Commitment, School Leadership had an influence on Grade 10 Math – Workplace and Apprenticeship.

Results of the parallel Ontario study, using three achievement scores, identified most of the same paths, except for Uses of Instructional Time.

## Discussion and conclusion

This study aimed to address four questions about districts and their contributions to student achievement. The first question, “How do school leaders understand the contribution made by their districts’ characteristics to the success of their work in schools?” was explored through interviews with school leaders. Interview results generally reflect evidence from previous research about the status of each Characteristic in its most helpful or productive form. Nonetheless, future research aimed at deepening understanding of the nine Characteristics in their most powerful form would overcome the limitation of this interview sample of school-level leaders only. Such research would include the voices of district administrators, as well as teachers and possibly community members.

Underlying the interview evidence from school leaders about the nine district characteristics is an implicit conception of the basic building blocks of effective district organizations as, for example, participative decision-making, collaboration, teamwork, staff empowerment, shared vision, transparency, communication, and the importance of leaders at all levels engaging in “systems thinking” (Shaked & Schechter, 2016). These building blocks reflect Lee Bolman and Terrence Deal’s (2017) conception of organizations as “families,” as well as Gareth Morgan’s (1986) metaphors of organizations as “brains” and “culture.” The practical implication of this evidence for district leaders, especially if it is confirmed by additional research,

is to exploit (in the best sense) and further develop the professional expertise of staff, designing into one's district the fundamental properties of a learning organization (Watkins & Marsick, 1993).

A second question addressed by the study was about the effects on students of the nine district characteristics, associated, in previous research, with high-performing districts. All nine characteristics had meaningful total effects on at least some measures of student achievement. These results confirm the findings of the two previous studies partly replicated by this one. One practical implication of this set of results is the potential value to district leaders of using the nine district characteristics as a framework for their improvement efforts. This recommendation reflects the requirements for research use by central office staff identified by Meredith Honig, Nitya Venkateswaran, and Patricia McNeil (2018). For many districts, this would count as the sort of central office transformation—also identified by Honig and her colleagues (2010)—requiring considerable capacity development among central office leaders.

Future multi-case study research about the challenges encountered, and the outcomes realized, by districts choosing to follow this recommendation would significantly deepen understandings of the real work required of leaders using evidence-informed strategies for district-wide improvement. One case study carried out in the same provincial context as this study (Turner & Gordon, 2018), offers an especially robust example of what can be learned from such research.

A third question was about School Leadership effects. There were meaningful total effects of School Leadership on several measures of elementary, but not secondary, student achievement, as well as small to intermediate effects on the majority of the mediating conditions. All four dimensions of School Leadership (curriculum, instructional, moral, and relational) contributed to these effects. The indirect effects of School Leadership on student achievement were mediated by five conditions, largely paralleling the most recent Ontario study but with weaker effects.

One reason for weaker effects might be the differences in the frameworks on which the British Columbia and Ontario measures of School Leadership were based, along with the measures themselves. However, previous evidence about effective School Leadership practices has been dominated by evidence from elementary schools. This focus on elementary school leadership is more or less, and unavoidably, reflected in the approach to leadership measured by this study. The lack of effect of such leadership on secondary students' achievement demonstrated in this study recommends that future research award much greater priority to the comparison of effective leadership practices in elementary and secondary schools (e.g., Sammons, Day, Gu, & Ko, 2011).

Finally, this article addresses the generalizability of the results about nine district Characteristics. Results of this British Columbia study largely mirror the results of the two previous studies carried out in Ontario. In addition, research in Alberta has resulted in a "Framework for School System Success" (Bedard & Mambourquette, 2015; Brandon et al, 2013) reflecting many of the nine Characteristics although they are not fully organized and labelled in the same way. As a whole, then, the case for generalizability to districts in other Canadian provincial contexts is fairly strong. The

generalizability of these results to American districts also seems promising, since the nine district Characteristics characteristics were initially identified through a review of research (Leithwood, 2010), most of which was carried out in American districts.

## Notes

1. This work was part of the Leading Student Achievement: Networks for Learning project annual evaluations.
2. See Leithwood, Sun, and Schumacker, 2018.
3. Foundation Skills Assessment results were used for the study in the face of controversies in the province, at the time, about the validity and reliability of these results. The authors do not adopt a position in the controversies. But possible challenges to the reliability and validity of Foundation Skills Assessment data could be viewed as one limitation of the study.

## Website

British Columbia Principals' and Vice Principals' Association, <https://bcvpva.bc.ca/>

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